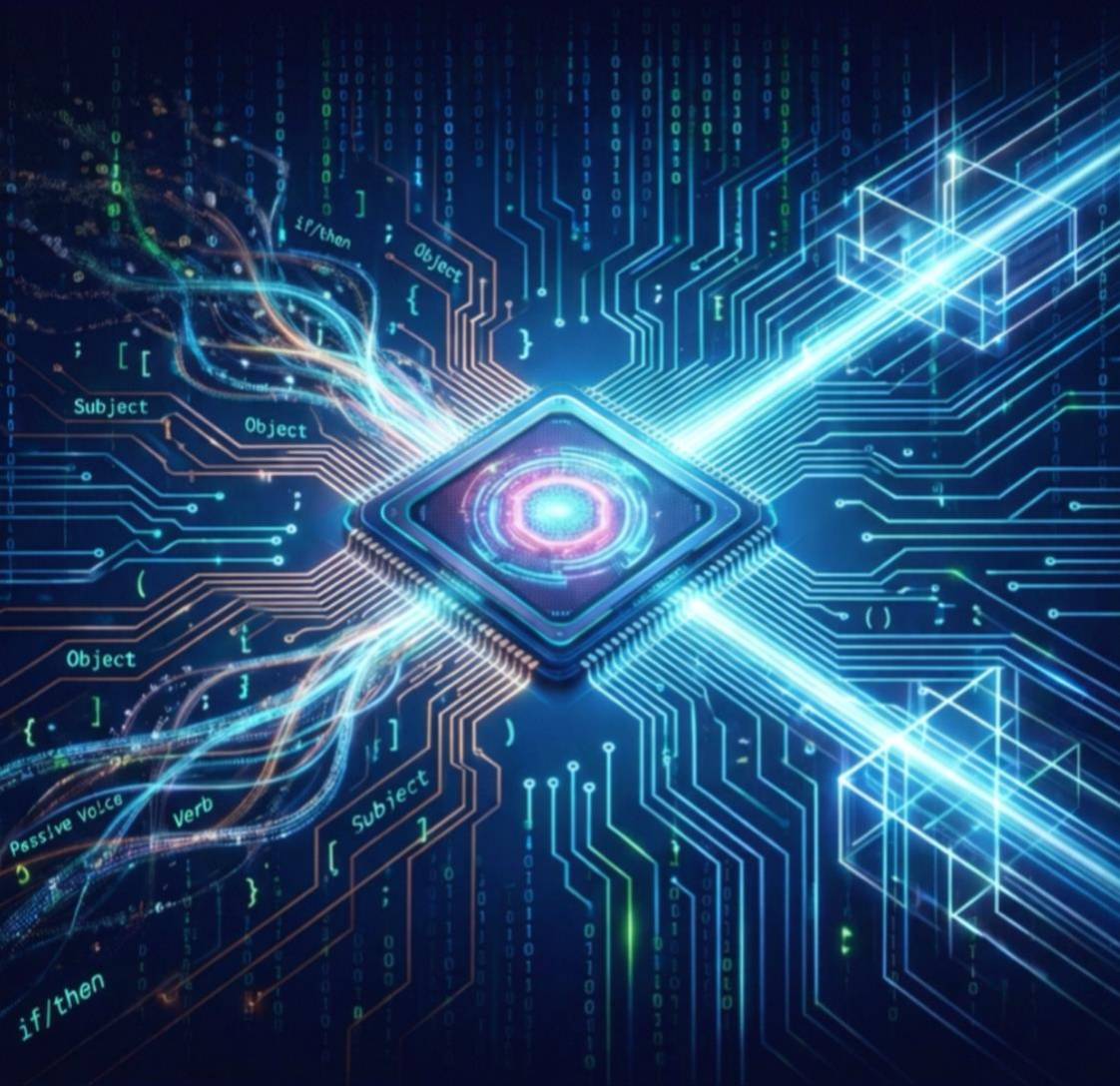


ENGLISH FOR TECHNICAL COMMUNICATION

Grammar Guide for CS Students



Debug Your Writing. Compile Clear Ideas.

Міністерство освіти і науки України
Чернівецький національний університет
імені Юрія Федьковича

English for Technical Communication: Grammar Guide for CS Students

***Навчальний посібник з граматики англійської мови
для студентів спеціальності F3 «Комп'ютерні науки»***

***Чернівці
2026***

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К971

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Рекомендовано до друку: методичною комісією кафедри іноземних мов для природничих факультетів Чернівецького національного університету імені Юрія Федьковича (протокол №7 від 24 лютого 2026 року)

Вченою радою факультету іноземних мов Чернівецького національного університету імені Юрія Федьковича (протокол №6 від 10 березня 2026 року)

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Навчальний посібник з граматики англійської мови для студентів спеціальності ФЗ «Комп'ютерні науки» / Укл. В. Кшевецький, О. Дідич. Чернівці, 2026. 293 с.

Основною метою посібника є формування та розвиток граматичної компетентності англійською мовою у сфері інформаційних технологій, а також удосконалення навичок читання та аналізу фахових текстів. Посібник призначений для студентів 1–2 курсів спеціальності “Комп'ютерні науки”, а також для всіх, хто вивчає технічну англійську мову.

Навчальний матеріал спрямований на опанування ключових граматичних структур, що використовуються в технічній документації, наукових статтях та професійному спілкуванні в ІТ-середовищі. Тексти та приклади насичені фаховою лексикою, що сприяє розширенню активного словникового запасу студентів. Посібник може використовуватися як для аудиторної роботи, так і для самостійного навчання.

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TABLE OF CONTENTS

INTRODUCTION	4
UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS.....	13
UNIT 2: SUBJECT-VERB AGREEMENT (SVA)	22
UNIT 3: VERB TENSES IN TECHNICAL WRITING.....	35
UNIT 4: ACTIVE VS. PASSIVE VOICE.....	53
UNIT 5: MODAL VERBS IN ACADEMIC WRITING	76
UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS	99
UNIT 7: SENTENCE STRUCTURE AND WORD ORDER	123
UNIT 8: PARALLEL STRUCTURE	152
UNIT 9: REPORTING VERBS AND CITATIONS	180
UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES.....	209
UNIT 11: COMPREHENSIVE REVIEW EXERCISES	245
CONCLUSION	283
REFERENCES AND RECOMMENDED RESOURCES.....	285

INTRODUCTION

Welcome to *English for Technical Communication*, a comprehensive grammar course designed specifically for ESL students pursuing careers in technology, software development, data science, and related technical fields. This course recognizes that technical professionals need more than just coding skills – clear, accurate written communication is essential for documentation, research papers, proposals, reports, and collaboration with international teams.

Whether you're writing code documentation, preparing a research paper, drafting a technical proposal, or communicating with colleagues and clients, the grammar skills you develop here will serve as a foundation for professional success.

WHY THIS COURSE?

Technical writing demands precision. A misplaced article, incorrect verb tense, or ambiguous pronoun reference can confuse readers, undermine your credibility, or even change the meaning of critical technical information. While grammar checkers and AI tools can help, they cannot replace a solid understanding of English grammar fundamentals.

This course is different from general ESL grammar courses because it:

- **Focuses on technical contexts:** All examples, exercises, and practice materials use authentic technical vocabulary and scenarios from computer science, software engineering, and IT
- **Addresses common ESL challenges:** Targets the specific errors that non-native speakers commonly make in technical writing
- **Builds systematically:** Progresses from foundational concepts to complex applications
- **Emphasizes practical application:** Every unit includes real-world writing tasks
- **Develops self-correction skills:** Teaches you strategies to identify and fix your own errors

COURSE STRUCTURE

This course consists of **11 comprehensive units**, each focusing on a critical aspect of English grammar for technical writing:

UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS

Master the use of *a*, *an*, *the*, and zero article in technical contexts. Learn when to use articles with technology names, programming languages, and abstract concepts.

UNIT 2: SUBJECT-VERB AGREEMENT (SVA)

Ensure verbs always agree with their subjects, even in complex sentences with intervening phrases, compound subjects, and collective nouns.

UNIT 3: VERB TENSES IN TECHNICAL WRITING

Use appropriate tenses for different sections of technical documents, research papers, and documentation. Understand when to use present simple, past simple, present perfect, and other tenses.

UNIT 4: ACTIVE VS. PASSIVE VOICE

Choose between active and passive voice appropriately based on context, audience, and emphasis. Learn when each voice is more effective in technical communication.

UNIT 5: MODAL VERBS IN ACADEMIC WRITING

Use modal verbs (*can*, *should*, *must*, *may*, etc.) to express ability, necessity, possibility, and recommendations with appropriate levels of certainty.

UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS

Master challenging prepositions used with time, place, technology platforms, and technical phrases. Learn dependent prepositions with common verbs, adjectives, and nouns.

UNIT 7: SENTENCE STRUCTURE AND WORD ORDER

Construct clear, well-organized sentences following English word order rules. Avoid fragments, run-ons, and word order errors common among ESL writers.

UNIT 8: PARALLEL STRUCTURE

Create balanced, professional sentences by maintaining consistent grammatical forms in lists, comparisons, and series.

UNIT 9: REPORTING VERBS AND CITATIONS

Cite sources effectively using appropriate reporting verbs. Learn to integrate research findings, quote other authors, and synthesize multiple sources.

UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES

Identify and correct frequent errors including irregular verbs, confusing word pairs (*affect/effect*, *its/it's*, *that/which*), and pronoun reference issues. Develop systematic proofreading strategies.

UNIT 11: COMPREHENSIVE REVIEW EXERCISES

Apply all concepts in integrated, real-world writing tasks. Edit complete documents, write in various technical formats, and demonstrate mastery across all grammar categories.

PEDAGOGICAL APPROACH

This course uses a **scaffolded learning methodology** where exercises systematically build your skills through five progressive stages:

1. ISOLATED ERROR CORRECTION

Begin with focused exercises targeting one specific grammar point. For example:

- Fill-in-the-blank exercises for articles

- Multiple choice questions for verb tenses
- Simple sentence correction for subject-verb agreement

2. MIXED ERROR TYPES

Progress to exercises combining multiple grammar concepts within single sentences or short paragraphs. This develops your ability to identify various error types simultaneously—a crucial real-world skill.

3. PARAGRAPH EDITING

Edit complete paragraphs (100-200 words) containing 8-15 errors of various types. This mirrors the complexity of actual technical writing and requires sustained attention to multiple grammar rules.

4. FULL DOCUMENT EDITING

Work with complete technical documents (400-800 words) such as:

- Research abstracts
- Technical proposals
- System documentation
- User guides
- Academic papers

These exercises simulate professional editing tasks and build stamina for reviewing longer texts.

5. REFLECTIVE PRACTICE

Analyze your own error patterns, create personal error logs, set improvement goals, and develop individualized correction strategies. This metacognitive approach ensures continued growth beyond the course.

Why this progression? Research shows that learners master grammar most effectively when they:

- Practice concepts in isolation first (to understand the rule)

- Apply concepts in combination (to develop flexibility)
- Work with authentic, extended texts (to build real-world competence)
- Reflect on their learning (to develop autonomy)

HOW TO USE THIS COURSE

FOR SELF-STUDY STUDENTS:

1. **Work sequentially through units** – Each unit builds on previous knowledge
2. **Complete ALL exercises** – Don't skip the basic exercises; they build your foundation
3. **Check your answers** – Review answer keys carefully to understand not just what's correct, but *why*
4. **Keep an error log** – Track your most common mistakes (template provided in Unit 10)
5. **Review regularly** – Revisit challenging units; grammar mastery requires repetition
6. **Write frequently** – Apply concepts immediately in your own technical writing
7. **Set a schedule** – Consistent practice (e.g., 3-4 hours per week) is more effective than cramming

Estimated completion time: 60-80 hours over 12-16 weeks

WHAT YOU'LL ACHIEVE

By completing this course, you will:

- **Write with confidence** in professional technical contexts
- **Identify and correct** your most common grammar errors
- **Understand grammar rules** rather than just memorizing examples
- **Edit your own writing** systematically and effectively
- **Adapt your writing style** for different technical audiences and document types

- **Recognize error patterns** in others' writing (useful for code reviews, team collaboration)
- **Develop lifelong learning strategies** for continued grammar improvement
- **Communicate technical concepts clearly** in writing
- **Produce professional documents** suitable for academic, business, and technical contexts

PREREQUISITES

This course assumes:

- **Intermediate English proficiency** (CEFR B1-B2 or equivalent)
- **Basic technical knowledge** (you should be comfortable with computer science concepts and terminology)
- **Motivation to improve** your written English for professional purposes

You do NOT need:

- Perfect English – this course will help you improve
- Advanced grammar terminology knowledge – concepts are explained clearly
- Prior technical writing experience – we'll develop this together

COURSE MATERIALS

Each unit includes:

- **Grammar Explanations:** Clear, concise rules with technical examples
- **Extensive Exercises:** 25-40 exercises per unit, progressing in difficulty
- **Common Error Alerts:** Warnings about frequent mistakes
- **Practical Applications:** Real-world writing tasks
- **Self-Assessment Tools:** Track your progress throughout the course

TIPS FOR SUCCESS

1. **Be patient with yourself** – Grammar mastery takes time; progress is incremental
2. **Learn from errors** – Mistakes are valuable learning opportunities
3. **Practice consistently** – Regular short sessions beat occasional long ones
4. **Apply immediately** – Use new concepts in your actual writing projects
5. **Seek feedback** – Share your writing with peers, tutors, or online communities
6. **Read technical writing** – Observe how professionals use grammar in your field
7. **Use tools wisely** – AI and grammar checkers supplement but don't replace learning
8. **Stay motivated** – Remember that strong writing skills enhance your technical expertise

SPECIAL FEATURES

TECHNICAL CONTEXTS THROUGHOUT

Every example and exercise uses authentic technical scenarios:

- Software development and debugging
- Database management and queries
- Algorithm analysis and complexity
- System architecture and design
- Cybersecurity and encryption
- Machine learning and AI
- Cloud computing and DevOps
- Research methodology and findings

MULTIPLE DOCUMENT TYPES

Practice writing across formats you'll encounter professionally:

- Research papers and abstracts
- Technical documentation
- API documentation
- User guides and tutorials
- Bug reports and issue tracking
- Technical proposals
- Code comments and README files
- Email and team communication
- Blog posts and technical articles

ERROR ANALYSIS AND PREVENTION

Beyond correction, learn to:

- Recognize your personal error patterns
- Understand *why* errors occur
- Develop prevention strategies
- Build systematic proofreading habits
- Create personal reference materials

ASSESSMENT AND PROGRESS TRACKING

Throughout the course, you'll have opportunities to assess your progress:

- **Unit exercises:** Immediate practice and feedback
- **End-of-unit self-checks:** Verify mastery before moving forward
- **Comprehensive reviews:** Units 10 and 11 integrate all concepts
- **Portfolio pieces:** Create polished writing samples
- **Error logs:** Track improvement over time
- **Reflection exercises:** Develop metacognitive awareness

BEYOND THIS COURSE

Grammar mastery is a journey, not a destination. After completing this course, continue developing your skills by:

- **Writing regularly** in professional contexts
- **Reading technical publications** in your field
- **Seeking feedback** from native speakers and editors
- **Teaching others** – explaining grammar solidifies your understanding
- **Staying updated** on evolving language conventions
- **Building your personal style** while maintaining grammatical accuracy

A NOTE ON GRAMMAR AND CODING

As a technical student, you might wonder: *"Why spend so much time on grammar when I should be coding?"*

Consider this: **Grammar is to writing what syntax is to programming.**

Just as incorrect syntax prevents code from compiling, grammar errors prevent clear communication. Just as clean code is maintainable and professional, clean writing is credible and effective. The debugging skills you use in programming – identifying errors, understanding why they occur, and systematically fixing them – apply directly to grammar improvement.

Your technical skills deserve clear expression. This course ensures your writing matches your expertise.

Let's begin your journey to grammar mastery in technical English!

UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS

1.1 GRAMMAR EXPLANATION

DEFINITE ARTICLE: THE

Use **the** when:

- The noun is specific or previously mentioned
- There is only one of something
- You're referring to a specific system, algorithm, or concept

Examples:

- *The algorithm we developed runs in $O(n \log n)$ time.*
- *The Internet has transformed communication.*
- *Close the application before updating.*

INDEFINITE ARTICLES: A/AN

Use **a/an** when:

- The noun is non-specific or mentioned for the first time
- You're introducing a concept
- **A** before consonant sounds; **AN** before vowel sounds

Examples:

- *A database stores structured information.*
- *An API allows programs to communicate.*
- *We need a more efficient solution.*

ZERO ARTICLE (NO ARTICLE)

Use no article with:

- Uncountable/abstract nouns in general statements
- Plural nouns in general statements
- Programming languages, most technologies

Examples:

- *Software development requires careful planning.* (general)
- *Python is widely used in data science.* (language name)
- *Computers have changed society.* (general plural)

BUT: Use article when specifying:

- *The software we developed* (specific)
- *The Python version installed on your system* (specific)

1.2 COMMON ERRORS

✗ The Java is object-oriented language.

✓ Java is an object-oriented language.

✗ Algorithm finds shortest path.

✓ The algorithm finds the shortest path.

✗ We need develop a software.

✓ We need to develop software. (uncountable)

✓ We need to develop a software application. (countable with qualifier)

1.3 EXERCISES

Exercise 1.1: Fill in the blanks with a, an, the, or Ø (zero article)

1. ____ computer science is ____ rapidly evolving field.
2. We implemented ____ algorithm that reduces ____ processing time by 40%.
3. ____ Python is ____ popular language for ____ machine learning.
4. ____ database management system stores ____ data efficiently.
5. ____ Internet of Things connects ____ devices through ____ networks.
6. She wrote ____ excellent code for ____ project.
7. ____ software engineer needs ____ strong foundation in ____ mathematics.
8. ____ API we created allows ____ seamless integration.
9. ____ artificial intelligence will transform ____ industry.
10. We encountered ____ error in ____ third iteration.

Exercise 1.2: Correct the article errors

1. The HTML is markup language for creating the web pages.
2. We need develop the new algorithm for a problem.
3. A cybersecurity is critical concern in the modern world.
4. Algorithm runs in a linear time.
5. The students must learn the programming fundamentals.
6. JavaScript is language for the web development.
7. We stored data in cloud.
8. The compiler converts source code into the machine code.

Exercise 1.3: Choose the correct option

1. (The/Ø) Cloud computing has revolutionized (the/Ø) data storage.
2. We developed (a/an/the) application using (a/an/the) React framework.
3. (A/An/The) encryption protects (Ø/the) sensitive information.
4. (The/Ø) SQL is (a/an/the) standard language for database queries.
5. (A/An/The) software we tested showed (Ø/a/the) significant improvement.

EXERCISE 1.4: PARAGRAPH COMPLETION

Fill in ALL the blanks with **a, an, the**, or **Ø** (zero article). Pay attention to context and whether items are specific or general.

Paragraph 1: ___ blockchain technology is ___ distributed ledger system that enables ___ secure transactions without ___ central authority. ___ concept was first introduced in 2008 when ___ anonymous developer published ___ whitepaper describing ___ cryptocurrency called Bitcoin. Today, ___ blockchain has applications beyond ___ cryptocurrency, including ___ supply chain management and ___ smart contracts. ___ companies worldwide are exploring how ___ technology can improve ___ transparency and ___ efficiency in their operations.

Paragraph 2: When developing ___ web application, ___ developer must consider ___ scalability from ___ beginning. ___ application that works well with ___ hundred users may fail when ___ user base grows to ___ thousands. ___ load balancing is ___ technique that distributes ___ traffic across ___ multiple servers. ___ system we implemented uses ___ Redis cache to reduce ___ database queries and improve ___ response times.

EXERCISE 1.5: ERROR IDENTIFICATION AND CORRECTION

Each sentence contains 0-3 article errors. Identify the errors and provide corrections.

1. The machine learning has become the essential tool for data scientists working with the large datasets.
2. When writing the code, developers should follow a coding standards to ensure the consistency across project.
3. A quantum computing promises to solve the problems that are impossible for classical computers.
4. The GitHub is platform where developers can collaborate on the open-source projects.
5. We deployed application to cloud using the Docker containers and Kubernetes for the orchestration.
6. A neural network learns patterns by adjusting weights during training process.
7. The JavaScript frameworks like React and Vue have simplified a frontend development significantly.
8. Researcher published paper describing novel approach to the natural language processing.

EXERCISE 1.6: SPECIFIC VS. GENERAL REFERENCE

Choose the correct article based on whether the reference is **specific** or **general**.

1. (The/Ø) Artificial intelligence can recognize patterns in data. BUT: (The/Ø) Artificial intelligence we developed can diagnose diseases.
2. (A/The) Software development requires collaboration. BUT: (A/The) Software development process we use follows Agile methodology.
3. (Ø/The) APIs enable communication between applications. BUT: (Ø/The) API documented in this manual uses REST architecture.
4. (A/An/The) Programmer must understand data structures. BUT: (A/An/The) Programmer who wrote this code left detailed comments.
5. (Ø/The) Cybersecurity threats are constantly evolving. BUT: (Ø/The) Cybersecurity threats identified in the report require immediate action.

EXERCISE 1.7: CONTEXT-DEPENDENT CHOICE

Select the appropriate article(s) based on the full context of the sentence.

1. After analyzing (Ø/the) code, we discovered (a/an/the) memory leak in (a/the) authentication module.
2. (The/Ø) Python's simplicity makes it (a/an/the) ideal language for (Ø/the) beginners, but (the/Ø) same simplicity can lead to (Ø/the) performance issues in (Ø/the) large-scale applications.
3. (A/An/The) microservices architecture divides (a/an/the) application into (Ø/the) smaller, independent services that communicate through (Ø/the/an) well-defined APIs.
4. We conducted (a/an/the) series of (Ø/the) tests to evaluate (a/the/Ø) performance of (a/an/the) new algorithm under (Ø/the) different conditions.
5. (The/Ø) Agile methodology emphasizes (a/an/the) iterative development, where (Ø/the) teams deliver (Ø/the) working software in (Ø/the) short cycles called (Ø/the) sprints.

EXERCISE 1.8: TECHNICAL DOCUMENTATION STYLE

Complete these sentences as they might appear in technical documentation. Consider formal/informal context.

1. To install ___ application, download ___ installer from ___ official website and run ___ setup wizard.
2. ___ function takes ___ array as ___ input and returns ___ sorted version using ___ quicksort algorithm.
3. ___ SQL injection is ___ type of ___ security vulnerability where ___ attacker can execute ___ malicious SQL code through ___ application's input fields.
4. For ___ optimal performance, configure ___ server with at least ___ 8GB of ___ RAM and ___ multi-core processor.

5. ____ unit testing is ____ practice of testing ____ individual components of ____ software to ensure they work correctly before ____ integration.

EXERCISE 1.9: TRANSLATION-STYLE EXERCISE

These sentences describe technical concepts. Add articles where necessary and explain why.

1. **Given:** "Version control system tracks changes in source code." **Rewrite with correct articles:** _____
2. **Given:** "DNS translates domain names into IP addresses that computers use to identify each other on network." **Rewrite with correct articles:** _____
3. **Given:** "Compiler optimization can significantly improve execution speed of program without changing its functionality." **Rewrite with correct articles:** _____
4. **Given:** "Responsive design ensures that website displays correctly on devices of different screen sizes." **Rewrite with correct articles:** _____

EXERCISE 1.10: ADVANCED PRODUCTION EXERCISE

Write 5 sentences about a technical topic of your choice (e.g., cloud computing, mobile development, AI). Each sentence must demonstrate correct article usage in at least TWO of these scenarios:

- **Scenario A:** General reference to a technology/concept
- **Scenario B:** Specific reference to something previously mentioned or unique
- **Scenario C:** First mention of a countable noun
- **Scenario D:** Plural or uncountable noun used generally

Example: "Ø Cloud computing (A) provides Ø scalability (D) for businesses, but the security concerns (B-specific concerns in this context) remain significant."

Your sentences:

- 1.
- 2.
- 3.
- 4.
- 5.

EXERCISE 1.11: CHALLENGING MIXED REVIEW

These sentences contain complex article situations. Choose ALL correct options (there may be more than one correct answer for some blanks).

1. (Ø/The/A) Research in (Ø/the) quantum computing has made (Ø/the) significant progress in recent years.
 - Which options are acceptable? Why might one be preferred over another?
2. She is (a/an/the/Ø) expert in (Ø/the) cybersecurity with (a/an/the/Ø) decade of (Ø/the) experience.
3. (The/Ø) Data shows that (the/Ø) users prefer (the/a/Ø) simple interface to (a/the/Ø) complex one.
4. We're developing (a/an/the) system that uses (Ø/the) machine learning to predict (Ø/the) server failures before they occur.
5. (A/An/The/Ø) Successful deployment requires (a/an/the/Ø) careful planning, (a/an/the/Ø) thorough testing, and (a/an/the/Ø) effective communication with (the/Ø) stakeholders.

EXERCISE 1.12: CRITICAL ANALYSIS

For each pair, explain why the article usage differs:

1. a) "Java is widely used in enterprise applications." b) "The Java Virtual Machine executes bytecode." **Explanation:** _____
2. a) "We need to implement encryption." b) "We need to implement an encryption algorithm." **Explanation:** _____
3. a) "The system crashed during testing." b) "Systems crash when memory is insufficient." **Explanation:** _____
4. a) "She's studying computer science at university." b) "She's studying at the university in Boston." **Explanation:** _____

UNIT 2: SUBJECT-VERB AGREEMENT (SVA)

2.1 GRAMMAR EXPLANATION

The verb must agree with the subject in number (singular/plural) and person.

BASIC RULES:

Singular subjects → Singular verbs

- The program **runs** successfully.
- The server **crashes** frequently.

Plural subjects → Plural verbs

- The programs **run** simultaneously.
- Multiple servers **crash** under heavy load.

TRICKY SITUATIONS:

1. Phrases between subject and verb:

- The algorithm for sorting arrays **is** efficient. (algorithm is)
- The results of the experiment **show** improvement. (results show)

2. Compound subjects with AND:

- Python and Java **are** popular languages.

3. Subjects with OR/NOR: Match the verb to the nearest subject:

- Neither the developer nor the testers **were** available.
- Neither the testers nor the developer **was** available.

4. Uncountable nouns (always singular):

- *The data **is** stored in the cloud.* (Note: "data" is technically plural, but often treated as singular in modern usage)
- *Information **travels** quickly online.*

5. Collective nouns:

- *The team **develops** the software.* (one unit)
- *The committee **meets** weekly.*

2.2 COMMON ERRORS

 The system for processing requests are slow.

 The system for processing requests is slow.

 Each of the algorithms have different complexity.

 Each of the algorithms has different complexity.

 The list of errors are displayed on screen.

 The list of errors is displayed on screen.

2.3 EXERCISES

Exercise 2.1: Choose the correct verb form

1. The application (run/runs) on multiple platforms.
2. Several methods for encryption (exist/exists).
3. Each of the functions (return/returns) a Boolean value.
4. The data from the sensors (is/are) transmitted wirelessly.
5. Neither the input nor the output values (match/matches) expectations.
6. The complexity of these algorithms (vary/varies) significantly.
7. Every programmer (need/needs) to understand data structures.

8. The collection of user preferences (is/are) stored locally.
9. Both Python and JavaScript (support/supports) asynchronous programming.
10. The number of active users (increase/increases) daily.

Exercise 2.2: Correct the SVA errors

1. The software for managing databases are expensive.
2. Each of the test cases have passed successfully.
3. The list of requirements are available in the documentation.
4. Neither the algorithm nor the data structures was optimized.
5. The team of developers are working remotely.
6. One of the servers were down yesterday.
7. The information about security vulnerabilities are classified.
8. Every student in the class have completed the assignment.

Exercise 2.3: Advanced - Write complete sentences

Create sentences using these subjects and ensuring proper SVA:

1. The collection of programming languages...
2. Neither the hardware nor the software...
3. Each of the network protocols...
4. The data received from multiple sources...
5. A group of researchers...

EXERCISE 2.4: PARAGRAPH COMPLETION

Choose the correct verb form for each blank. Pay careful attention to the actual subject of each verb.

Paragraph 1: The development of artificial intelligence systems (require/requires) _____ significant computational resources. Each of the neural networks we tested (was/were) _____ trained on datasets containing millions of examples. The accuracy of predictions (depend/depends) _____ on the quality and quantity of training data. Neither overfitting nor underfitting (is/are) _____ desirable outcomes in machine learning. The team of researchers (has/have) _____ published their findings in several journals. A combination of supervised and unsupervised learning techniques (provide/provides) _____ the best results for this problem.

Paragraph 2: The number of cybersecurity threats (continue/continues) _____ to grow exponentially. Everyone working in IT security (need/needs) _____ to stay updated on emerging vulnerabilities. The data collected from various sources (show/shows) _____ patterns that help identify potential attacks. Either the firewall or the intrusion detection systems (need/needs) _____ immediate updating. The committee responsible for security protocols (meet/meets) _____ monthly to review incidents. Each of the security measures implemented last year (has/have) _____ proven effective.

EXERCISE 2.5: IDENTIFY AND CORRECT SVA ERRORS

Each sentence contains **one** SVA error. Identify the subject, the verb, and correct the error.

1. The framework for building web applications have gained popularity among developers.
 - **Subject:** _____
 - **Incorrect verb:** _____
 - **Correction:** _____

2. A significant portion of the code were rewritten for better performance.
3. The series of lectures on database design are scheduled for next month.
4. One of the most challenging aspects of programming are debugging complex systems.
5. The documentation, along with the source code and examples, are available on GitHub.
6. Each of the students who completed the course have received a certificate.
7. The set of instructions for installing the software were unclear.
8. Neither the project manager nor the team members was satisfied with the timeline.
9. The statistics from our user testing shows that mobile users prefer simpler interfaces.
10. Every one of the API endpoints need authentication tokens.

EXERCISE 2.6: QUANTIFIERS AND DETERMINERS WITH SVA

Choose the correct verb form based on the quantifier/determiner used.

1. **Each** of the microservices (communicate/communicates) _____ through REST APIs.
2. **Every** developer on the team (has/have) _____ access to the production environment.
3. **Some** of the code (need/needs) _____ refactoring.
4. **Some** of the functions (return/returns) _____ null values.
5. **All** of the data (is/are) _____ encrypted before transmission.

6. **All** of the test cases (pass/passes) _____ successfully.
7. **None** of the security vulnerabilities (was/were) _____ critical.
8. **None** of the software (was/were) _____ compatible with older systems.
9. **Half** of the repository (consist/consists) _____ of third-party libraries.
10. **Half** of the developers (prefer/prefers) _____ working remotely.
11. **Most** of the processing time (is/are) _____ spent on database queries.
12. **Most** of the users (access/accesses) _____ the platform via mobile devices.

EXERCISE 2.7: COMPLEX SUBJECT STRUCTURES

These sentences have complex subjects with multiple modifiers. Identify the **head noun** of the subject and choose the correct verb.

1. The implementation of new security features across all our applications (is/are) _____ scheduled for Q3.
 - **Head noun:** _____
2. The challenges associated with scaling distributed systems (require/requires) _____ careful architectural planning.
 - **Head noun:** _____
3. The percentage of users who abandon their shopping carts (has/have) _____ decreased significantly.
 - **Head noun:** _____
4. The way modern frameworks handle state management (differ/differs) _____ from traditional approaches.
 - **Head noun:** _____

5. The company's approach to continuous integration and deployment (involve/involves) _____ automated testing at every stage.
- **Head noun:** _____
6. The consequences of not following coding standards (become/becomes) _____ evident in large projects.
- **Head noun:** _____

EXERCISE 2.8: TRICKY CASES - DATA, INFORMATION, AND TECHNICAL TERMS

Choose the correct verb. Note: "Data" can be singular or plural depending on context and formality.

1. The data from the experiment (is/are) _____ inconclusive. (*In modern technical writing, "data" is often treated as singular*)
2. These data (show/shows) _____ a clear correlation between variables. (*Formal scientific usage treating "data" as plural*)
3. Big data (has/have) _____ transformed business intelligence.
4. The criteria for selection (is/are) _____ clearly documented.
5. This criterion (is/are) _____ the most important factor.
6. The media coverage of the technology conference (was/were) _____ extensive.
7. Social media (has/have) _____ changed how companies interact with customers.
8. The metadata (is/are) _____ stored separately from the content.

EXERCISE 2.9: RELATIVE CLAUSES AND SVA

The verb in the relative clause must agree with the noun it modifies. Choose the correct verb.

1. The developer **who** (write/writes) _____ clean code (is/are) _____ valued by employers.
2. The functions **that** (handle/handles) _____ user input (need/needs) _____ validation.
3. Python, **which** (is/are) _____ an interpreted language, (offer/offers) _____ rapid development.
4. The engineers **who** (was/were) _____ hired last month (has/have) _____ already contributed significantly.
5. The algorithm **that** (work/works) _____ best for this problem (is/are) _____ not the most intuitive one.
6. One of the libraries **that** (is/are) _____ most widely used (provide/provides) _____ excellent documentation.

EXERCISE 2.10: "THERE IS" VS. "THERE ARE"

Choose the correct form based on what follows.

1. There (is/are) _____ several approaches to solving this problem.
2. There (is/are) _____ a bug in the authentication module.
3. There (has/have) _____ been significant improvements in performance.
4. There (was/were) _____ three critical errors in the logs.
5. There (appear/appears) _____ to be a memory leak in the application.
6. There (exist/exists) _____ multiple frameworks for building mobile apps.
7. There (is/are) _____ no easy solution to this security vulnerability.
8. There (has/have) _____ been complaints about the new interface.

EXERCISE 2.11: COLLECTIVE NOUNS AND TEAM/COMPANY NAMES

Decide whether to treat these as singular or plural based on context (US vs. UK usage may differ).

1. The team (is/are) _____ divided on which technology stack to use.
(*Emphasis on members disagreeing*)
2. The team (is/are) _____ launching the product next month. (*Emphasis on team as single unit*)
3. Microsoft (has/have) _____ released a new version of their operating system.
4. The staff (was/were) _____ all given training on the new procedures.
5. The government (is/are) _____ implementing new data protection regulations.
6. The committee (has/have) _____ not yet reached consensus on the proposal.
7. Google (announce/announces) _____ new AI features regularly.

EXERCISE 2.12: GERUNDS AND INFINITIVES AS SUBJECTS

Gerund and infinitive subjects are always singular. Choose the correct verb.

1. **Testing** code thoroughly (is/are) _____ essential for quality assurance.
2. **To learn** multiple programming languages (take/takes) _____ years of practice.
3. **Deploying** applications to the cloud (require/requires) _____ specific expertise.
4. **Writing** and **maintaining** documentation (is/are) _____ often overlooked. (*Two gerunds joined by "and" = plural*)

5. **To understand** how neural networks work (help/helps) _____ in debugging them.
6. **Refactoring** legacy code (present/presents) _____ unique challenges.

EXERCISE 2.13: PARAGRAPH ERROR CORRECTION

This paragraph contains **8 SVA errors**. Find and correct them all.

The process of developing software have become increasingly complex. Each of the stages in the development cycle require careful attention. The team of developers, along with the project manager, are responsible for meeting deadlines. Neither the budget constraints nor the timeline were realistic given the project scope. The data collected during user testing show that most users prefers the original interface. One of the biggest challenges are integrating the new features with existing code. The number of bugs reported have decreased since we implemented automated testing. Every one of the team members feel confident about the upcoming release.

Corrections:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

EXERCISE 2.14: ADVANCED PRODUCTION EXERCISE

Write 6 sentences about a technical project or system. Each sentence must correctly demonstrate SVA in one of these challenging situations:

- **Sentence 1:** Subject with a long modifying phrase
- **Sentence 2:** Compound subject with "and"
- **Sentence 3:** Compound subject with "or" or "neither...nor"
- **Sentence 4:** Collective noun as subject
- **Sentence 5:** Quantifier (each, every, some, etc.) with subject
- **Sentence 6:** "There is/are" structure

Example: "The integration of machine learning algorithms into our existing platform requires significant computational resources."

Your sentences:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

EXERCISE 2.15: CRITICAL ANALYSIS

Explain why the verb form is correct in each sentence. Identify the subject and any distractors.

1. "The use of cloud services has increased dramatically."
 - **Subject:** _____
 - **Distractors:** _____
 - **Why 'has' is correct:** _____

2. "Neither the initial tests nor the final evaluation shows any problems."
 - **Subject:** _____
 - **Rule applied:** _____
3. "Each of the algorithms we compared performs differently under load."
 - **Subject:** _____
 - **Why 'performs' is correct:** _____
4. "The committee reviewing the proposals meets every Thursday."
 - **Subject:** _____
 - **Why 'meets' is correct:** _____

EXERCISE 2.16: REAL-WORLD TECHNICAL WRITING

These sentences are from technical documentation. Choose the correct verb and explain your choice.

1. The following steps (describe/describes) _____ how to configure the server.
2. A list of supported browsers (is/are) _____ available in Appendix B.
3. The number of concurrent connections (affect/affects) _____ overall performance.
4. Either updating the drivers or reinstalling the software (fix/fixes) _____ most issues.
5. The class of algorithms known as greedy algorithms (provide/provides) _____ approximate solutions.
6. Physics (is/are) _____ not required for this computer science course.
7. Ten milliseconds (is/are) _____ the maximum acceptable latency.
8. The headquarters (is/are) _____ located in Silicon Valley.

CHALLENGE EXERCISE 2.17: MIXED COMPLEXITY

These sentences combine multiple SVA challenges. Choose all correct verbs and be prepared to explain your choices.

1. The team of developers who (work/works) _____ on the backend (has/have) _____ implemented several optimizations that (improve/improves) _____ response time.
2. Each of the microservices that (handle/handles) _____ payment processing (need/needs) _____ to be PCI compliant.
3. The data that (is/are) _____ collected from IoT sensors (is/are) _____ analyzed in real-time, and the insights (is/are) _____ displayed on the dashboard.
4. Neither the complexity of the algorithm nor the limitations of the hardware (prevent/prevents) _____ us from achieving our performance goals.
5. There (is/are) _____ several factors that (contribute/contributes) _____ to the success of a software project, but the most important (is/are) _____ clear communication.

UNIT 3: VERB TENSES IN TECHNICAL WRITING

3.1 GRAMMAR EXPLANATION

PRESENT SIMPLE

Use for:

- General truths and facts
- Current states
- Regular occurrences
- Describing how systems work

Examples:

- *Neural networks **learn** from training data.*
- *The algorithm **sorts** elements in ascending order.*
- *This function **returns** an integer value.*

PRESENT PERFECT

Use for:

- Actions completed at an unspecified time
- Past actions with present relevance
- Recent developments

Examples:

- *Researchers **have developed** a new encryption method.*
- *The system **has processed** over 1 million requests.*
- *We **have tested** the application extensively.*

PAST SIMPLE

Use for:

- Completed actions at specific times
- Describing methodology
- Literature review

Examples:

- *Smith (2020) **developed** a novel approach.*
- *We **implemented** the algorithm last month.*
- *The experiment **took** three weeks.*

FUTURE SIMPLE

Use for:

- Predictions
- Plans
- Future work sections

Examples:

- *The system **will support** additional features.*
- *We **will investigate** alternative approaches.*

3.2 TENSES IN DIFFERENT SECTIONS

Abstract: Present simple for general statements, past simple for what you did

Introduction: Present simple for facts, present perfect for recent work

Methodology: Past simple for what you did

Results: Past simple for findings

Discussion: Present simple for interpretation, modal verbs for speculation

Conclusion/Future Work: Future simple, present perfect

3.3 COMMON ERRORS

 Python was created in 1991 and still is popular today.

 Python was created in 1991 and is still popular today.

 We develop the system and test it thoroughly.

 We developed the system and tested it thoroughly. (completed research)

 The algorithm will work efficiently in all test cases.

 The algorithm works efficiently in all test cases. (demonstrated fact)

3.4 EXERCISES

Exercise 3.1: Choose the correct tense

1. Machine learning (transforms/transformed/has transformed) many industries in recent years.
2. In 1983, the Internet (adopted/adopts/has adopted) TCP/IP protocols.
3. Currently, cloud computing (provides/provided/will provide) scalable infrastructure.
4. We (implement/implemented/have implemented) the solution last semester.
5. The next version (includes/included/will include) enhanced security features.
6. Quantum computers (solve/solved/will solve) certain problems exponentially faster.
7. The researchers (test/tested/have tested) their hypothesis multiple times before publication.
8. Blockchain technology (gains/gained/has gained) significant attention since 2017.

Exercise 3.2: Correct the tense errors

1. We develop a new algorithm that improves performance by 30% last year.
2. The Internet of Things is connecting billions of devices since 2010.
3. Currently, the system will process 10,000 transactions per second.
4. In our previous study, we are finding significant correlation between variables.
5. Machine learning has revolutionized data analysis in 2012.
6. The application currently supports multiple languages and will add more soon.

Exercise 3.3: Write sentences with specific tenses

Write one sentence for each tense in a CS context:

1. Present Simple: (describing how an algorithm works)
2. Past Simple: (describing what you did in your project)
3. Present Perfect: (discussing recent advances in AI)
4. Future Simple: (discussing future improvements)
5. Present Continuous: (describing ongoing research)

EXERCISE 3.4: MULTI-PARAGRAPH TENSE SELECTION

Choose the correct tense for each blank. Pay attention to which section of a research paper/technical document each paragraph represents.

Abstract: This paper (present/presents/presented) _____ a novel approach to image recognition using convolutional neural networks. We (develop/developed/have developed) _____ a system that (achieve/achieved/achieves) _____ 95% accuracy on standard benchmarks.

Our results (show/showed/have shown) _____ that deep learning architectures (can/could) _____ outperform traditional methods when trained on large datasets. The proposed model (is/was/will be) _____ significantly more efficient than existing solutions.

Introduction: Computer vision (is/was/has been) _____ a rapidly evolving field for several decades. Traditional approaches (rely/relied/have relied) _____ on hand-crafted features, which (require/required/have required) _____ extensive domain expertise. In recent years, deep learning methods (revolutionize/revolutionized/have revolutionized) _____ image processing tasks. LeCun et al. (1998) (introduce/introduced/have introduced) _____ convolutional neural networks that (become/became/have become) _____ the foundation for modern computer vision. Despite these advances, current systems still (face/faced/will face) _____ challenges with limited training data.

Methodology: We (conduct/conducted/have conducted) _____ experiments using the ImageNet dataset, which (contains/contained/has contained) _____ over 14 million images. First, we (preprocess/preprocessed/have preprocessed) _____ the images by resizing them to 224×224 pixels. We then (split/have split/had split) _____ the data into training (80%) and testing (20%) sets. The model (train/trained/was trained) _____ for 50 epochs using stochastic gradient descent. Each training session (take/took/has taken) _____ approximately 12 hours on our GPU cluster.

Results: Our model (achieve/achieved/has achieved) _____ an accuracy of 95.3% on the test set. This result (is/was/has been) _____ significantly better than the baseline model, which only (reach/reached/has reached) _____ 87.2% accuracy. Figure 1 (show/shows/showed) _____ the learning curves for both models. We (observe/observed/have observed) _____ that increasing the depth of the network (improve/improved/improves) _____ performance up to a certain point.

Discussion: Our findings (demonstrate/demonstrated/have demonstrated) _____ that deeper architectures (are/were/have been) _____ more effective for this task. The improved accuracy (suggest/suggests/suggested) _____ that the additional layers (help/helped/have helped) _____ capture more complex patterns. However, we (note/noted/have noted) _____ that very deep networks (can/could) _____ suffer from overfitting without proper regularization. This observation (is/was/will be) _____ consistent with prior research in the field.

Conclusion and Future Work: We (present/presented/have presented) _____ a deep learning approach that (outperform/outperformed/outperforms) _____ previous methods on image recognition tasks. In future work, we (plan/planned/will plan) _____ to extend this approach to video analysis. We also (intend/intended/will intend) _____ to investigate transfer learning techniques that (may/might) _____ reduce training time.

EXERCISE 3.5: IDENTIFY AND CORRECT TENSE ERRORS

Each sentence contains **one or more** tense errors. Correct them and explain why.

1. The researchers are developing a new framework in 2019 that transforms data processing.
 - **Correction:** _____
 - **Explanation:** _____
2. We have implemented the algorithm last week and it performs well in all tests.
 - **Correction:** _____
 - **Explanation:** _____
3. Currently, artificial intelligence is used in healthcare, and it will improve diagnosis accuracy significantly.
 - **Correction:** _____
 - **Explanation:** _____
4. The system was processing over 10,000 requests per second and will be very reliable.
 - **Correction:** _____
 - **Explanation:** _____

5. Since 2015, blockchain technology gained widespread adoption in financial services.
- **Correction:** _____
 - **Explanation:** _____
6. The study showed that users will prefer simpler interfaces and are completing tasks faster.
- **Correction:** _____
 - **Explanation:** _____
7. We conduct extensive testing before we deploy the application to production next month.
- **Correction:** _____
 - **Explanation:** _____
8. Python is created by Guido van Rossum and has become one of the most popular programming languages.
- **Correction:** _____
 - **Explanation:** _____

EXERCISE 3.6: PRESENT PERFECT VS. PAST SIMPLE

Choose between present perfect and past simple. Remember: present perfect connects past to present; past simple is for completed actions at specific times.

1. Over the past decade, cloud computing (has transformed/transformed) _____ how businesses store data.
2. In 2007, Apple (has released/released) _____ the first iPhone.
3. Researchers (have made/made) _____ significant progress in natural language processing in recent years.

4. Last month, we (have conducted/conducted) _____ a survey of 500 users.
5. Since its introduction, the framework (has been/was) _____ adopted by thousands of developers.
6. The team (has completed/completed) _____ the project last Friday.
7. Machine learning models (have become/became) _____ increasingly sophisticated over time.
8. During the testing phase, we (have identified/identified) _____ several critical bugs.
9. The company (has invested/invested) _____ heavily in AI research, spending \$50 million in 2023 alone.
10. We (have never encountered/never encountered) _____ this type of error before.

EXERCISE 3.7: TENSE CONSISTENCY IN PARAGRAPHS

The following paragraphs have tense consistency issues. Rewrite them with appropriate tense usage.

Paragraph 1 (Methodology section): We are using a dataset of 10,000 images for our experiments. First, we preprocess the images by removing noise and adjusting brightness. Then we have split the data into training and validation sets. The model trains for 100 epochs, and we are evaluating its performance using standard metrics. Each experiment will take approximately 6 hours to complete.

Your rewrite: _____

Paragraph 2 (Literature review): Johnson (2020) has developed a new algorithm for graph traversal. His approach is based on breadth-first search but includes optimizations that reduced memory usage. Several researchers are testing this algorithm and found it to be effective. Smith and Lee (2021) were

building on this work and propose further improvements. Their method is showing promising results in initial tests.

Your rewrite: _____

Paragraph 3 (Results and Discussion): Figure 2 showed the performance comparison between our model and baseline methods. Our approach will achieve 92% accuracy, while the baseline only reaches 85%. This difference was statistically significant ($p < 0.05$). The results are suggesting that our modifications have improved the model's ability to generalize. We have observed similar patterns across all test scenarios.

Your rewrite: _____

EXERCISE 3.8: TECHNICAL WRITING - SECTION-SPECIFIC TENSE USAGE

Write two sentences for each section of a technical paper, using appropriate tenses.

Abstract:

- 1.
- 2.

Introduction (stating current facts/recent developments):

- 1.
- 2.

Literature Review (discussing past research):

- 1.
- 2.

Methodology (describing what you did):

- 1.
- 2.

Results (presenting findings):

- 1.
- 2.

Discussion (interpreting results):

- 1.
- 2.

Future Work:

- 1.
- 2.

EXERCISE 3.9: PRESENT SIMPLE VS. PRESENT CONTINUOUS

Choose the correct form. Remember: present simple for general truths/regular actions; present continuous for actions happening now or temporary situations.

1. Currently, our team (develops/is developing) _____ a mobile application for Android.
2. The algorithm (sorts/is sorting) _____ data using a divide-and-conquer approach.
3. Researchers worldwide (work/are working) _____ on quantum computing applications this year.
4. The system (uses/is using) _____ machine learning to detect anomalies.
5. This week, we (test/are testing) _____ the new features with a focus group.

6. Neural networks (learn/are learning) _____ patterns through backpropagation.
7. The company (invests/is investing) _____ heavily in AI research these days.
8. HTTP (transfers/is transferring) _____ data between web servers and clients.

EXERCISE 3.10: MODAL VERBS WITH DIFFERENT TENSES

Complete the sentences with appropriate modal verbs (can, could, may, might, will, would, should) and correct tense forms.

1. Our experiments (show/showed/have shown) _____ that the algorithm _____ (can/could) process data 50% faster than existing methods.
2. Future research _____ (may/might/will) explore hybrid approaches that combine deep learning with traditional algorithms.
3. The results (suggest/suggested/have suggested) _____ that increasing training data _____ (could/can/may) improve accuracy.
4. We (believe/believed/have believed) _____ that this technique _____ (should/would/will) be applicable to other domains.
5. The system _____ (can/could) theoretically handle millions of concurrent users, although we (test/tested/have tested) _____ it with only 100,000.

EXERCISE 3.11: TIME MARKERS AND TENSE SELECTION

Choose the correct tense based on the time marker in each sentence.

1. **Recently**, deep learning (has made/made/makes) _____ remarkable progress in speech recognition.

2. **In 2012**, Google (has developed/developed/develops) _____ the Knowledge Graph.
3. **Currently**, the system (processed/processes/is processing) _____ requests in real-time.
4. **Over the past five years**, cybersecurity threats (have increased/increased/increase) _____ dramatically.
5. **Last semester**, we (have implemented/implemented/implement) _____ a chatbot for customer service.
6. **Next quarter**, the company (has released/released/will release) _____ version 2.0 of the software.
7. **Since 2015**, the framework (has been/was/is) _____ the industry standard.
8. **At this moment**, engineers (are testing/test/tested) _____ the prototype in the lab.
9. **By the end of this year**, we (will complete/completed/complete) _____ the migration to cloud infrastructure.
10. **So far**, the results (have been/were/are) _____ encouraging.

EXERCISE 3.12: PAST PERFECT FOR SEQUENCING

Use past perfect to show that one past action occurred before another past action.

Example: We deployed the system after we (*had tested*) it thoroughly.

Complete these sentences:

1. Before we launched the application, we _____ (conduct) extensive user testing.
2. The error occurred because the developer _____ (not validate) the input data.

3. We discovered that someone _____ (already report) the bug two weeks earlier.
4. After the team _____ (complete) the code review, they merged the changes into the main branch.
5. The system crashed because it _____ (run) out of memory.

EXERCISE 3.13: FUTURE FORMS - WILL VS. GOING TO VS. PRESENT CONTINUOUS

Choose the most appropriate future form.

1. Based on current trends, AI (will transform/is going to transform/is transforming) _____ healthcare over the next decade.
2. We (will meet/are going to meet/are meeting) _____ with the client tomorrow at 2 PM. (*scheduled*)
3. Look at those server logs – the system (will crash/is going to crash/is crashing) _____ soon!
4. In the next section, we (will discuss/are going to discuss/are discussing) _____ the methodology.
5. The conference (will start/is going to start/is starting) _____ next Monday.
6. Quantum computers (will probably revolutionize/are probably going to revolutionize) _____ cryptography.

EXERCISE 3.14: MIXED TENSE ERROR CORRECTION

This technical report excerpt contains **10 tense errors**. Find and correct them.

Report Excerpt:

Cloud computing has emerged as a dominant paradigm in recent years. Companies are adopting cloud infrastructure since the early 2000s to reduce

costs and improve scalability. In our study, we are analyzing data from 50 organizations that have migrated to the cloud between 2020 and 2023.

We have conducted surveys last month and interviewed IT managers to understand their experiences. The results showed that 80% of organizations reported cost savings, though initial migration has been challenging. Most companies are facing difficulties with data security during the transition, but these issues have been resolved over time.

Currently, cloud adoption continues to grow, and analysts are predicting that 90% of enterprises used cloud services by 2025. Our findings are suggesting that proper planning is essential for successful migration. Organizations that invested in training their staff have better outcomes than those that didn't.

Corrections:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

EXERCISE 3.15: TENSE IN CITATIONS AND LITERATURE REVIEW

Complete these sentences with appropriate tenses for literature reviews.

1. Smith (2019) _____ (argue) that machine learning models require large datasets.

2. Recent studies _____ (show) that transfer learning can reduce training time significantly.
3. According to Johnson et al. (2020), neural networks _____ (be) effective for image classification tasks.
4. Previous research _____ (demonstrate) that deep learning approaches outperform traditional methods.
5. Lee (2021) _____ (develop) a framework that _____ (address) scalability issues.
6. Several researchers _____ (investigate) this problem, but no consensus _____ (emerge) yet.

EXERCISE 3.16: REAL-WORLD TECHNICAL DOCUMENTATION

These sentences are from different types of technical documents. Choose the correct tense and identify the document type.

1. The function (accepts/accepted/has accepted) _____ two parameters and (returns/returned/has returned) _____ a Boolean value.
 - **Document type:** _____
2. Version 3.0 (will include/includes/included) _____ support for dark mode and (improves/will improve/improved) _____ performance by 30%.
 - **Document type:** _____
3. To install the package, first (download/downloaded/have downloaded) _____ the installer from our website.
 - **Document type:** _____
4. The bug (occurs/occurred/has occurred) _____ when users (try/tried/have tried) _____ to upload files larger than 10MB.
 - **Document type:** _____

5. Our analysis (shows/showed/will show) _____ that the new algorithm (is/was/has been) _____ 40% faster than the previous version.

○ **Document type:** _____

EXERCISE 3.17: ADVANCED PRODUCTION EXERCISE

Write a 150-200 word technical abstract about a project or research topic you're familiar with. Your abstract must:

- Use **present simple** to state general truths or describe what the system does
- Use **past simple** to describe what you did in your research/project
- Use **present perfect** at least once to connect past work to present relevance
- Use **modal verbs** (can, may, will, should) appropriately for claims and future work
- Maintain consistent and appropriate tense usage throughout

Your abstract:

EXERCISE 3.18: CRITICAL ANALYSIS - TENSE JUSTIFICATION

For each sentence, explain **why** that particular tense is used.

1. "The Internet has fundamentally changed how people communicate."
 - **Tense:** _____
 - **Why this tense:** _____
2. "TCP/IP was developed by Vint Cerf and Bob Kahn in the 1970s."
 - **Tense:** _____

- **Why this tense:** _____
3. "Neural networks learn by adjusting weights during training."
 - **Tense:** _____
 - **Why this tense:** _____
 4. "We implemented the algorithm and tested it on various datasets."
 - **Tense:** _____
 - **Why this tense:** _____
 5. "The results suggest that our approach is more efficient."
 - **Tense:** _____
 - **Why this tense:** _____
 6. "Future versions will include support for additional file formats."
 - **Tense:** _____
 - **Why this tense:** _____

EXERCISE 3.19: TENSE SEQUENCING IN COMPLEX SENTENCES

Complete these complex sentences with appropriate tenses in both clauses.

1. The algorithm _____ (fail) because we _____ (not consider) edge cases during development.
2. Although previous methods _____ (achieve) good results, our approach _____ (be) more efficient.
3. We _____ (discover) that the system _____ (perform) better when we _____ (increase) the batch size.
4. The framework _____ (become) popular after developers _____ (realize) how easy it _____ (be) to use.

5. If the trend _____ (continue), quantum computers _____ (be) commercially available within a decade.

EXERCISE 3.20: PEER REVIEW EXERCISE

Read this paragraph from a student's technical report. Identify **all tense errors** and suggest improvements for clarity and consistency.

Student's paragraph:

"In this project, we are developing a recommendation system using collaborative filtering. First, we have collected data from 1,000 users over a three-month period last year. The data contains user ratings for various products. We then process this data and build a matrix factorization model. The model is trained using stochastic gradient descent, which was taking approximately 2 hours. Our results showed that the system will achieve 85% accuracy on the test set. Currently, collaborative filtering is one of the most effective techniques for building recommendation systems. We believed that our approach was better than content-based methods because it is capturing implicit user preferences."

Your analysis:

- **Number of tense errors:** _____
- **Corrected version:** _____
- **Explanation of main issues:** _____

UNIT 4: ACTIVE VS. PASSIVE VOICE

4.1 GRAMMAR EXPLANATION

ACTIVE VOICE STRUCTURE

Subject + Verb + Object

The developer writes the code.

(Actor performs action)

PASSIVE VOICE STRUCTURE

Object + be + Past Participle + (by + Actor)

The code is written by the developer.

(Action happens to object)

4.2 WHEN TO USE EACH

USE ACTIVE VOICE WHEN:

- Writing instructions or procedures (required in STE)
- Clarity and directness are priorities
- The actor is important
- Writing technical documentation

Examples:

- *Click the Submit button.*
- *The algorithm processes the input data.*
- *We implemented three security measures.*

USE PASSIVE VOICE WHEN:

- The actor is unknown or unimportant

- Focusing on the action or result
- Writing descriptive sections in academic papers
- Describing what was done to something

Examples:

- *The data was collected over six months.* (who collected it is less important)
- *The system is designed to handle 1000 concurrent users.*
- *Errors were detected during testing.*

4.3 CONVERTING BETWEEN VOICES

Active → Passive:

1. Object becomes subject
2. Add appropriate form of "be"
3. Change main verb to past participle
4. Original subject becomes "by" phrase (optional)

The team developed the application.

→ *The application was developed by the team.*

Passive → Active:

1. Identify the actor (or add one)
2. Make actor the subject
3. Remove "be" + use active verb
4. Former subject becomes object

The bug was fixed.

→ *The developer fixed the bug.*

4.4 COMMON ERRORS

✗ The code was wrote by the programmer. (incorrect past participle)

✓ The code was written by the programmer.

✗ The system was design to be scalable. (missing past participle)

✓ The system was designed to be scalable.

✗ Data is being store in the database. (incorrect form)

✓ Data is being stored in the database.

4.5 EXERCISES

Exercise 4.1: Identify active or passive voice

1. The algorithm sorts the array in ascending order.
2. The database was updated at midnight.
3. Programmers use version control systems.
4. The error was caused by incorrect input.
5. The application encrypts user data.
6. Several vulnerabilities were discovered during testing.
7. Machine learning models require large datasets.
8. The server is monitored 24/7.

Exercise 4.2: Convert from active to passive

1. The developers released the new version yesterday.
2. The system processes thousands of transactions daily.
3. Hackers attacked the network last week.

4. The team will complete the project by Friday.
5. The algorithm analyzes the data in real-time.

Exercise 4.3: Convert from passive to active

1. The software is maintained by our IT department.
2. The vulnerability was exploited by cybercriminals.
3. The code has been reviewed by senior developers.
4. The system will be upgraded next month.
5. Passwords are encrypted before storage.

Exercise 4.4: Choose the better voice (active or passive)

Rewrite these sentences using the more appropriate voice:

1. The button should be clicked by you to save the file. (instruction)
2. The programmer fixed the bug. (focus on result, not actor)
3. Great improvements in AI have been made by researchers. (focus on progress)
4. You should enter your password in the login field. (instruction)
5. The report was generated by the system automatically. (obvious actor)

EXERCISE 4.5: IDENTIFY VOICE AND JUSTIFY USAGE

Identify whether each sentence is active or passive, then explain why that voice is appropriate in the given context.

1. "The encryption algorithm was developed in the 1970s and is still widely used today."
 - **Voice:** _____
 - **Why appropriate:** _____

2. "Click the 'Download' button to install the software."
 - **Voice:** _____
 - **Why appropriate:** _____
3. "We conducted experiments using three different datasets."
 - **Voice:** _____
 - **Why appropriate:** _____
4. "Significant improvements in processing speed were observed."
 - **Voice:** _____
 - **Why appropriate:** _____
5. "The database administrator monitors server performance daily."
 - **Voice:** _____
 - **Why appropriate:** _____

EXERCISE 4.6: MIXED VOICE CORRECTION

These sentences use inappropriate voice for their context. Rewrite them using the more suitable voice and explain your choice.

1. **Context: User manual instruction** "The 'Save' button should be clicked by users after completing the form."
 - **Rewrite:** _____
 - **Why:** _____
2. **Context: Research methodology** "We collected the data, we analyzed the results, and we validated the findings."
 - **Rewrite:** _____
 - **Why:** _____

3. **Context: System description (focus on system capability)**
"Administrators can configure the firewall rules through the control panel."

○ **Rewrite:** _____

○ **Why:** _____
4. **Context: Academic paper results section** "We found that the algorithm reduced processing time by 40%."

○ **Rewrite:** _____

○ **Why:** _____
5. **Context: Error message (focus on action needed)** "The connection to the server could not be established by the system."

○ **Rewrite:** _____

○ **Why:** _____

EXERCISE 4.7: PASSIVE VOICE FORMS - ALL TENSES

Complete these sentences with the correct passive voice form of the verb in parentheses.

Present Simple Passive:

1. User data _____ (encrypt) before transmission.
2. Backups _____ (perform) daily at midnight.

Present Continuous Passive: 3. The system _____ (upgrade) right now. 4. New features _____ (add) to the platform.

Present Perfect Passive: 5. The bug _____ (fix) in the latest patch. 6. Several vulnerabilities _____ (identify) during the audit.

Past Simple Passive: 7. The database _____ (compromise) last week. 8. The application _____ (design) to handle high traffic.

Past Continuous Passive: 9. The servers _____ (monitor) when the outage occurred. 10. Data _____ (transfer) to the new system during migration.

Past Perfect Passive: 11. The code _____ (review) before it was merged. 12. All tests _____ (complete) by the time we deployed.

Future Simple Passive: 13. The update _____ (release) next month. 14. Additional servers _____ (deploy) to handle increased load.

Modal Passive: 15. Passwords _____ (should/change) every 90 days. 16. The file _____ (can/access) by authorized users only.

EXERCISE 4.8: CONTEXT-SPECIFIC VOICE SELECTION

For each scenario, write two sentences: one using active voice and one using passive voice. Then indicate which is more appropriate for that context.

Scenario 1: Technical documentation describing a system's security features

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 2: User manual - step-by-step installation instructions

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 3: Research paper methodology - describing data collection

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 4: Bug report - describing what caused an error

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

EXERCISE 4.9: PASSIVE VOICE ERROR CORRECTION

Each sentence contains an error in passive voice formation. Correct the error and explain what was wrong.

1. The application was develop by our team last year.

○ **Correction:** _____

○ **Error type:** _____

2. Data is being store in the cloud for backup purposes.

○ **Correction:** _____

○ **Error type:** _____

3. The system has been optimize for mobile devices.

○ **Correction:** _____

○ **Error type:** _____

4. New features will be add in the next release.

○ **Correction:** _____

○ **Error type:** _____

5. The code was wrote by inexperienced developers.

○ **Correction:** _____

○ **Error type:** _____

6. Security protocols must be follow at all times.

○ **Correction:** _____

○ **Error type:** _____

7. The database is maintain by the IT department.

○ **Correction:** _____

○ **Error type:** _____

8. Several bugs has been fix in this version.

○ **Correction:** _____

○ **Error type:** _____

EXERCISE 4.10: "BY" PHRASE - WHEN TO INCLUDE OR OMIT

Decide whether the "by" phrase should be included, omitted, or is optional.
Rewrite if necessary.

1. The software was developed by developers.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

2. The vulnerability was discovered by our security team.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

3. Python was created by Guido van Rossum in 1991.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

4. The error was caused by insufficient memory.

- **Decision:** _____
- **Rewrite (if needed):** _____

5. The system is monitored by monitoring tools 24/7.

- **Decision:** _____
- **Rewrite (if needed):** _____

EXERCISE 4.11: PARAGRAPH VOICE CONSISTENCY

These paragraphs have inconsistent voice usage. Rewrite them to maintain appropriate voice throughout.

Paragraph 1 (Technical documentation - system description): The authentication system was designed to provide secure access. Users enter their credentials, and the system validates them against the database. Two-factor authentication is supported. The system generates a temporary code, and it is sent to the user's mobile device by the system. Access is granted after the code has been verified.

Your rewrite: _____

Paragraph 2 (User manual - installation instructions): First, the installer should be downloaded from our website. Then, you should run the setup file. Installation options will be presented to you by the installer. The default settings can be selected, or custom options should be chosen by you if preferred. After the installation is completed by you, you need to restart your computer.

Your rewrite: _____

Paragraph 3 (Research methodology): We collected data from 500 participants over six months. Surveys were distributed online, and participants completed them anonymously. The data was then analyzed using statistical software. We performed correlation analysis to identify relationships between variables. Outliers were removed by us before the final analysis. The results showed significant patterns.

Your rewrite: _____

EXERCISE 4.12: ACTIVE VS. PASSIVE IN DIFFERENT DOCUMENT TYPES

Write three sentences for each document type, using the appropriate voice.

A) Technical Specifications (mix of both voices as appropriate):

- 1.
- 2.
- 3.

B) API Documentation (primarily active for clarity):

- 1.
- 2.
- 3.

C) Research Paper Abstract (mix, with passive for methodology):

- 1.
- 2.
- 3.

D) Quick Start Guide (active imperative for instructions):

- 1.
- 2.
- 3.

E) System Architecture Description (passive for describing components):

- 1.
- 2.
- 3.

EXERCISE 4.13: COMPLEX PASSIVE CONSTRUCTIONS

Transform these complex active sentences into passive voice, maintaining all information.

1. The development team has been implementing new security features throughout the entire application.
 - **Passive:** _____
2. Artificial intelligence algorithms are continuously analyzing user behavior patterns to improve recommendations.
 - **Passive:** _____
3. The company will have completed the cloud migration by the end of Q3.
 - **Passive:** _____
4. Cybersecurity experts recommend that organizations should update their systems regularly.
 - **Passive:** _____
5. The research team had been testing the prototype for three months before they discovered the flaw.
 - **Passive:** _____

EXERCISE 4.14: GET-PASSIVE (INFORMAL PASSIVE)

The "get-passive" (get + past participle) is more informal than "be-passive." Identify which sentences use get-passive and rewrite them in formal be-passive for technical writing.

1. The system got infected by malware yesterday.
 - **Type:** _____
 - **Formal version:** _____
2. Our proposal got rejected by the review committee.
 - **Type:** _____
 - **Formal version:** _____
3. The application was downloaded over a million times.
 - **Type:** _____
 - **Formal version:** _____
4. Several files got corrupted during the transfer.
 - **Type:** _____
 - **Formal version:** _____
5. The issue was resolved by the support team within hours.
 - **Type:** _____
 - **Formal version:** _____

EXERCISE 4.15: DOUBLE PASSIVE (ADVANCED)

Some sentences incorrectly use double passives. Identify the error and correct it.

1.  The report is being attempted to be generated by the system.
 - **Problem:** _____
 - **Correction:** _____
2.  The code needs to be tried to be optimized further.
 - **Problem:** _____
 - **Correction:** _____
3.  The data needs to be analyzed before conclusions can be drawn.
 - **Status:** _____
4.  The password should be tried to be reset by users if they forget it.
 - **Problem:** _____
 - **Correction:** _____

EXERCISE 4.16: AGENT VS. INSTRUMENT IN PASSIVE VOICE

Identify whether the "by" phrase introduces an agent (doer) or an instrument (tool), and determine if it should be included.

1. The file was deleted by the system administrator. (Agent/Instrument?)

 - **Should it be included?** _____

2. The file was deleted by an automated script. (Agent/Instrument?) _____
 - **Should it be included?** _____
3. The vulnerability was exploited by hackers using malware. (Agent/Instrument?) _____
 - **Should it be included?** _____
4. The calculation was performed by a quantum computer. (Agent/Instrument?) _____
 - **Should it be included?** _____
5. The image was processed by an AI algorithm. (Agent/Instrument?) _____
 - **Should it be included?** _____

EXERCISE 4.17: MIXED PARAGRAPH REVISION

This technical report excerpt contains 15 voice-related issues (unnecessary passive, unclear active, missing agents, etc.). Identify and correct them.

Original paragraph:

"In this study, cloud computing security was investigated by us. Data was collected from 100 companies, and interviews were conducted by researchers with IT managers. Several common vulnerabilities were identified, including weak authentication and insufficient encryption. It was found by us that many organizations don't implement basic security measures. Recommendations are being made for improving cloud security. A framework was developed that can be used by companies to assess their security posture. The framework was tested in pilot studies, and positive results were received. It is believed by many experts that cloud security will remain a critical concern. More research needs to be done by the academic community to address emerging threats."

Your revised version:

List of changes made:

- 1.
- 2.
- 3.

(continue as needed)

EXERCISE 4.18: STATIVE PASSIVES VS. DYNAMIC PASSIVES

Distinguish between stative passive (describing a state) and dynamic passive (describing an action). Then convert as requested.

Examples:

- **Stative:** "The office is located in Silicon Valley." (describes state)
- **Dynamic:** "The office was relocated last year." (describes action)

Identify and explain:

1. The database is stored on secure servers.
 - **Type:** _____
 - **Explanation:** _____
2. The database was backed up at midnight.
 - **Type:** _____
 - **Explanation:** _____
3. The code is written in Python.
 - **Type:** _____
 - **Explanation:** _____
4. The code was written by junior developers.

- **Type:** _____
- **Explanation:** _____

Now write two sentences (one stative passive, one dynamic passive) for these verbs:

5. **design**

- Stative: _____
- Dynamic: _____

6. **connect**

- Stative: _____
- Dynamic: _____

EXERCISE 4.19: VOICE IN DIFFERENT SECTIONS OF ACADEMIC PAPERS

For each section of a research paper, determine whether active or passive voice is more common/appropriate. Then write an example sentence.

Section	Preferred Voice	Example Sentence
Abstract (describing what was done)	_____	_____
Introduction (stating facts/context)	_____	_____

Literature Review (discussing others' work) _____

Methodology (describing procedures) _____

Results (presenting findings) _____

Discussion (interpreting results) _____

Conclusion (summarizing contributions) _____

EXERCISE 4.20: REAL-WORLD DOCUMENT ANALYSIS

Read these authentic technical writing samples and analyze voice usage.

Sample A (Error message): "An error has been encountered by the system while processing your request. The operation could not be completed. Please try again later."

- **Problems with voice usage:** _____
- **Improved version:** _____

Sample B (API documentation): "The authenticate() method should be called first. Then, the getData() method can be used to retrieve information. Results are returned in JSON format."

- **Voice consistency:** _____
- **Any improvements needed?** _____

Sample C (Research abstract): "Machine learning techniques have been applied by researchers to predict system failures. In this study, three different algorithms are compared. The results show that neural networks achieve the highest accuracy."

- **Voice usage assessment:** _____
- **Suggested revisions:** _____

EXERCISE 4.21: PRODUCTION EXERCISE - WRITING WITH PURPOSE

Write a 150-word paragraph for **each** scenario below, using appropriate voice choices:

Scenario A: User Manual Section Write instructions for resetting a password in a mobile app. Use primarily active voice with imperative mood.

Your paragraph: _____

Scenario B: Research Methodology Describe how you collected and analyzed data for a software testing project. Use appropriate mix of active and passive voice.

Your paragraph: _____

Scenario C: System Description Describe the architecture and capabilities of a web application. Use passive voice where appropriate to focus on the system rather than developers.

Your paragraph: _____

EXERCISE 4.22: CRITICAL ANALYSIS - VOICE EFFECTIVENESS

For each pair of sentences, explain which is more effective and why, considering clarity, formality, and focus.

Pair 1:

- A: "We developed the algorithm to minimize computational complexity."
- B: "The algorithm was developed to minimize computational complexity."

Analysis: _____

Pair 2:

- A: "Click the Submit button."
- B: "The Submit button should be clicked."

Analysis: _____

Pair 3:

- A: "The system encrypts all user data automatically."
- B: "All user data is encrypted automatically by the system."

Analysis: _____

Pair 4:

- A: "Researchers have made significant advances in AI."
- B: "Significant advances have been made in AI."

Analysis: _____

EXERCISE 4.23: TRANSFORMATION CHALLENGE

Rewrite this entire paragraph THREE times:

1. **Version A:** Maximize active voice
2. **Version B:** Maximize passive voice
3. **Version C:** Optimal mix based on context and clarity

Original paragraph: "Our team developed a new algorithm for image recognition. The algorithm uses deep learning techniques. We trained the model on 10,000 images. The training process took 48 hours. We tested the system on various datasets. The results showed 95% accuracy. This performance exceeds previous benchmarks. We plan to implement the algorithm in production systems next quarter."

Version A (Maximized Active): _____

Version B (Maximized Passive): _____

Version C (Optimal Mix): _____

Reflection: Which version is most effective? Why? _____

EXERCISE 4.24: COMMON PASSIVE PITFALLS

Identify and correct the problem in each sentence.

1. **Dangling modifier:** "While being tested, several bugs were discovered."
 - **Problem:** _____
 - **Correction:** _____
2. **Unclear agent:** "The project was delayed."
 - **Problem:** _____
 - **Better alternatives:** _____
3. **Wordy passive:** "The decision was made by the committee to postpone the launch."
 - **Problem:** _____
 - **Correction:** _____
4. **Passive + weak verb:** "An investigation of the issue was conducted."

- **Problem:** _____
- **Correction:** _____

5. **Unnecessary formality:** "The file can be opened by clicking on the icon."

- **Problem:** _____
- **Correction:** _____

EXERCISE 4.25: FINAL MASTERY EXERCISE

You're editing a technical document. For each sentence:

- Identify if it uses active or passive voice
 - Evaluate if the voice choice is appropriate
 - If not, rewrite it with justification
 - If appropriate, explain why
1. "The application was designed by our team to meet industry standards."
 2. "Enter your username and password to log in."
 3. "Significant improvements were observed in system performance."
 4. "We recommend that users should change their passwords regularly."
 5. "The algorithm processes data in real-time to detect anomalies."
 6. "A comprehensive analysis of the results was performed by us."
 7. "The database stores customer information securely."
 8. "New features will be added in future updates."

Your analysis:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

UNIT 5: MODAL VERBS IN ACADEMIC WRITING

5.1 GRAMMAR EXPLANATION

Modal verbs (can, could, may, might, must, should, will, would) express:

- Ability
- Permission
- Possibility/Probability
- Necessity/Obligation
- Advice/Recommendation

STRUCTURE

Subject + Modal + Base Verb (no "to")

*The system **can process** 1000 requests per second.*

5.2 COMMON MODALS IN TECHNICAL WRITING

CAN/COULD (ABILITY, POSSIBILITY)

- *The algorithm **can** solve the problem in linear time.*
- *This approach **could** improve efficiency. (less certain)*

MAY/MIGHT (POSSIBILITY, PERMISSION)

- *This **may** lead to security vulnerabilities. (possible)*
- *The results **might** vary depending on input. (less certain)*

MUST/SHOULD (NECESSITY, RECOMMENDATION)

- *Users **must** change their passwords regularly. (strong obligation)*
- *Developers **should** follow coding standards. (recommendation)*

WILL/WOULD (PREDICTION, HYPOTHESIS)

- The system **will** scale to meet demand. (confident prediction)
- The algorithm **would** fail with negative input. (hypothetical)

5.3 STRENGTH OF CERTAINTY

Strongest → Weakest:

1. Will, must (certain)
2. Should (expected)
3. Can, may (possible)
4. Could, might (less certain)

In academic writing:

- Use weaker modals when discussing limitations or speculating
- Use stronger modals for established findings or requirements

5.4 COMMON ERRORS

✗ The program can runs on Windows.

✓ The program can run on Windows.

✗ Users must to update their software.

✓ Users must update their software.

✗ This could to cause errors.

✓ This could cause errors.

5.5 EXERCISES

Exercise 5.1: Choose the correct modal

1. The algorithm (can/must) sort arrays efficiently.
2. This vulnerability (should/will) be fixed immediately.

3. The results (may/must) vary depending on configuration.
4. Developers (could/must) follow security best practices.
5. The system (might/will) crash under heavy load if not optimized.
6. This approach (should/might) reduce processing time.
7. Users (can/must) authenticate before accessing the system.
8. Future research (could/will) explore alternative methods.

Exercise 5.2: Correct the modal verb errors

1. The software can runs on multiple operating systems.
2. You must to install the latest version.
3. This might to improve performance significantly.
4. Developers should tests their code thoroughly.
5. The system will can handle increased traffic.
6. Users may to encounter compatibility issues.

Exercise 5.3: Choose the appropriate strength

Rewrite using a modal verb with appropriate certainty:

1. It is certain that quantum computers ____ revolutionize cryptography. (will/might)
2. It is possible that the algorithm ____ perform better with optimization. (must/could)
3. It is strongly recommended that users ____ enable two-factor authentication. (should/might)
4. There is a slight possibility that errors ____ occur. (may/will)
5. It is necessary that the data ____ be encrypted. (could/must)

Exercise 5.4: Formal academic writing

Replace informal expressions with appropriate modal verbs:

1. Maybe this will cause problems.
2. It's possible to optimize the code.
3. You need to back up your data regularly.
4. Perhaps future research will find better solutions.
5. It's likely that AI will transform the industry.

EXERCISE 5.5: MODAL MEANINGS IN CONTEXT

Choose the correct modal based on the intended meaning in each technical context.

Meaning: Ability/Capability

1. Modern smartphones (can/must/should) _____ run complex AI algorithms locally.
2. Quantum computers (could/must/would) _____ theoretically solve problems that classical computers cannot.

Meaning: Permission 3. Authenticated users (may/should/will) _____ access the admin panel. 4. With proper credentials, developers (can/must/might) _____ modify the source code.

Meaning: Necessity/Strong Obligation 5. All passwords (must/should/may) _____ contain at least 12 characters. 6. The system (must/could/might) _____ validate input before processing.

Meaning: Recommendation/Advice 7. Organizations (should/must/can) _____ implement regular security audits. 8. Developers (ought to/must/will) _____ comment their code for maintainability.

Meaning: Possibility/Uncertainty 9. The algorithm (might/must/will) _____ fail with extremely large datasets. 10. This approach (may/must/shall) _____ produce different results on different platforms.

Meaning: Future Prediction 11. Artificial intelligence (will/might/should) _____ become more sophisticated over time. 12. The update (will/could/may) _____ be released next Tuesday.

Meaning: Hypothetical Situation 13. If we increased the buffer size, the system (would/will/could) _____ handle more requests. 14. Without encryption, data (would/will/might) _____ be vulnerable to attacks.

EXERCISE 5.6: CERTAINTY SCALE

Arrange these modal expressions from **most certain** to **least certain**, then write a technical sentence for each.

Modals to arrange: must, will, should, can, may, could, might

Your ranking:

1. _____ (most certain) - Example: _____
2. _____ - Example: _____
3. _____ - Example: _____
4. _____ - Example: _____
5. _____ - Example: _____
6. _____ - Example: _____
7. _____ (least certain) - Example: _____

EXERCISE 5.7: PAST MODALS

Complete these sentences with appropriate past modal constructions (modal + have + past participle).

1. The system crashed. The developers _____ (should/test) it more thoroughly before deployment.
2. The data is corrupted. Someone _____ (must/modify) the database without authorization.
3. The project succeeded. The team _____ (may/work) overtime to meet the deadline.
4. We found a bug. This error _____ (could/cause) serious security vulnerabilities.
5. The algorithm performs well. The researchers _____ (must/optimize) it carefully.
6. The application is slow. We _____ (should/use) caching to improve performance.
7. The test results are surprising. There _____ (might/be) an error in our methodology.
8. The system is down. The servers _____ (could/crash) due to high traffic.

EXERCISE 5.8: MODAL + PASSIVE VOICE

Combine modals with passive voice (modal + be + past participle). Complete these technical writing examples.

1. User data _____ (must/encrypt) before transmission.
2. The code _____ (should/review) by senior developers before merging.
3. Security updates _____ (should/install) as soon as they are released.
4. This vulnerability _____ (could/exploit) by malicious actors.
5. The algorithm _____ (can/optimize) further to reduce complexity.
6. All API endpoints _____ (must/authenticate) to prevent unauthorized access.
7. The results _____ (may/affect) by environmental factors.

8. Legacy code _____ (might/need/refactor) for better maintainability.
9. The system _____ (will/upgrade) during the maintenance window.
10. These findings _____ (should/interpret) with caution due to sample size limitations.

EXERCISE 5.9: HEDGING IN ACADEMIC WRITING

Academic writing often uses "hedging" (cautious language) to avoid overstating claims. Rewrite these overly strong statements using appropriate modals.

1. **Too strong:** "This approach solves all security problems."
 - **Hedged version:** _____
2. **Too strong:** "The algorithm always produces optimal results."
 - **Hedged version:** _____
3. **Too strong:** "Machine learning transforms every industry."
 - **Hedged version:** _____
4. **Too strong:** "Our method is the best solution for this problem."
 - **Hedged version:** _____
5. **Too strong:** "The results prove that cloud computing is superior."
 - **Hedged version:** _____
6. **Too strong:** "This finding applies to all programming languages."
 - **Hedged version:** _____

EXERCISE 5.10: CONTEXT-SPECIFIC MODAL SELECTION

Choose the appropriate modal based on the document type and purpose.

Context A: Technical Requirements Document (strong obligations)

1. The system _____ (must/should/may) support at least 10,000 concurrent users.
2. All transactions _____ (must/could/might) be logged for audit purposes.
3. Data _____ (should/must/can) be backed up daily.

Context B: Research Discussion Section (tentative conclusions) 4. These findings _____ (suggest/will/might) that deep learning approaches are more effective. 5. The discrepancy _____ (could/must/will) be due to differences in dataset composition. 6. Future improvements _____ (may/must/should) be achieved through hyperparameter tuning.

Context C: User Documentation (instructions and recommendations) 7. You _____ (can/must/might) reset your password by clicking "Forgot Password." 8. Users _____ (should/must/will) save their work frequently to avoid data loss. 9. For best performance, you _____ (should/must/will) close unnecessary applications.

Context D: Technical Proposal (capabilities and predictions) 10. Our solution _____ (can/must/might) reduce processing time by up to 50%. 11. The implementation _____ (will/could/should) be completed within six months. 12. This approach _____ (may/must/will) provide better scalability than current methods.

EXERCISE 5.11: MODAL VERB ERRORS - IDENTIFICATION AND CORRECTION

Each sentence contains one or more errors with modal verb usage. Identify and correct them.

1. The software can runs on both Windows and macOS platforms.
 - **Error:** _____
 - **Correction:** _____

2. Developers must to follow the coding guidelines outlined in the documentation.
 - **Error:** _____
 - **Correction:** _____
3. This approach might to reduce the computational complexity significantly.
 - **Error:** _____
 - **Correction:** _____
4. Users should tests the application before deploying to production.
 - **Error:** _____
 - **Correction:** _____
5. The algorithm will can process large datasets efficiently.
 - **Error:** _____
 - **Correction:** _____
6. We could have to optimize the code for better performance.
 - **Error:** _____
 - **Correction:** _____
7. The system may not to support older browsers.
 - **Error:** _____
 - **Correction:** _____
8. Researchers must tests their hypotheses through experimentation.
 - **Error:** _____
 - **Correction:** _____

EXERCISE 5.12: MODAL COMBINATIONS AND VARIATIONS

Some situations require modal combinations or alternatives. Complete these sentences appropriately.

1. The system _____ (be able to) handle increased traffic after the upgrade. (Use "be able to" instead of "can" for future ability)
2. Developers _____ (have to) meet the project deadline despite technical challenges. (Use "have to" for external obligation)
3. You _____ (be supposed to) back up your data before updating the system. (Use "be supposed to" for expectations)
4. The team _____ (ought to) have conducted more thorough testing. (Use "ought to" for past advice)
5. We _____ (be going to) implement new security features next quarter. (Use "be going to" for planned future action)
6. The algorithm _____ (be likely to) perform well on large datasets. (Use "be likely to" for probability)

EXERCISE 5.13: MODALS IN DIFFERENT PAPER SECTIONS

Write appropriate sentences using modals for each section of a research paper.

Abstract (stating capabilities and findings): Example: "The proposed algorithm can reduce processing time by 40%."

- 1.
- 2.

Introduction (identifying needs and gaps): Example: "Current approaches cannot handle real-time processing efficiently." 3. _____ 4. _____

Literature Review (discussing others' claims cautiously): Example: "Smith (2020) suggests that machine learning may improve accuracy." 5. _____ 6. _____

Methodology (describing procedures and requirements): Example: "Participants must be at least 18 years old." 7. _____ 8. _____

Results (presenting findings with appropriate certainty): Example: "The results indicate that the treatment might be effective." 9. _____ 10. _____

Discussion (interpreting with hedging): Example: "This finding could suggest that..." 11. _____ 12. _____

Limitations (acknowledging constraints): Example: "The sample size may limit the generalizability of our findings." 13. _____ 14. _____

Future Work (suggesting possibilities): Example: "Future research should investigate alternative approaches." 15. _____ 16. _____

EXERCISE 5.14: REFORMULATION EXERCISE

Rewrite each sentence using the modal verb in parentheses while maintaining the original meaning.

1. It is possible that the algorithm will fail with negative inputs. (**might**)
☐
2. It is necessary for users to authenticate before accessing data. (**must**)
☐
3. There is a possibility that caching will improve performance. (**could**)
☐
4. It is advisable for developers to write unit tests. (**should**)
☐
5. The system has the ability to process 1000 requests per second. (**can**)

- ☐
- 6. In the hypothetical case of a power failure, data would be at risk. **(would)**
☐
- 7. It is likely that AI will transform healthcare. **(will)**
☐
- 8. It was probably a configuration error that caused the crash. **(must have)**
☐

EXERCISE 5.15: NEGATIVE MODAL FORMS

Complete these sentences with appropriate negative modal forms.

1. The system _____ (must not/doesn't have to) store passwords in plain text. *(Which expresses prohibition vs. lack of obligation?)*
2. Users _____ (cannot/may not) access admin features without authorization.
3. The algorithm _____ (might not/will not) work correctly with malformed input.
4. Developers _____ (shouldn't/mustn't) skip code reviews.
5. We _____ (could not/might not) replicate the results in our environment.
6. The application _____ (won't/can't) run on devices with less than 2GB RAM.
7. Organizations _____ (don't have to/must not) use outdated encryption methods.
8. The findings _____ (may not/cannot) be applicable to all scenarios.

EXERCISE 5.16: MODAL NUANCES - CHOOSE AND JUSTIFY

For each situation, choose between the two modals and explain why your choice is better.

1. **Situation:** Writing a security policy document "Users (should/must) _____ change their passwords every 90 days."
 - **Choice:** _____
 - **Justification:** _____
2. **Situation:** Discussing preliminary research findings "Our results (suggest/might suggest) _____ that the new algorithm is more efficient."
 - **Choice:** _____
 - **Justification:** _____
3. **Situation:** Describing a system's theoretical capability "The architecture (can/could) _____ theoretically support millions of users."
 - **Choice:** _____
 - **Justification:** _____
4. **Situation:** Making a prediction in a technical proposal "Implementation (will/should) _____ be completed by Q3."
 - **Choice:** _____
 - **Justification:** _____
5. **Situation:** Offering advice in documentation "For optimal performance, you (should/must) _____ close background applications."
 - **Choice:** _____
 - **Justification:** _____

EXERCISE 5.17: PARAGRAPH COMPLETION

Fill in ALL blanks with appropriate modal verbs. Consider the context and desired level of certainty.

Paragraph 1: Research Discussion Our findings suggest that machine learning approaches _____ be more effective than traditional methods for this task. However, the results _____ vary depending on dataset characteristics. The observed performance improvements _____ be attributed to the model's ability to learn complex patterns. Future research _____ investigate whether these benefits extend to other domains. It _____ also be noted that our study has certain limitations that _____ affect the generalizability of the conclusions.

Paragraph 2: Technical Requirements The system _____ support at least 5,000 concurrent users during peak hours. All user data _____ be encrypted both in transit and at rest. The application _____ maintain 99.9% uptime, excluding scheduled maintenance. Users _____ be able to recover their accounts through multi-factor authentication. The interface _____ be intuitive enough that users _____ complete common tasks without training. Error messages _____ provide clear guidance on how to resolve issues.

Paragraph 3: System Capabilities The proposed architecture _____ scale horizontally to accommodate increased load. Under optimal conditions, the system _____ process up to 10,000 transactions per second. However, performance _____ degrade if multiple components fail simultaneously. The caching layer _____ reduce database queries by up to 70%. With proper configuration, response times _____ be kept under 100 milliseconds. The system _____ also handle graceful degradation when backend services are unavailable.

EXERCISE 5.18: MODAL VERBS IN CONDITIONAL SENTENCES

Complete these conditional sentences with appropriate modals.

First Conditional (real possibility in the future):

1. If we optimize the algorithm, it _____ run 30% faster.

2. If users don't update their software, they _____ experience compatibility issues.

Second Conditional (hypothetical present/future): 3. If the system had more memory, it _____ handle larger datasets. 4. If we used a different framework, development _____ be easier.

Third Conditional (hypothetical past): 5. If we had tested more thoroughly, we _____ (avoid) this bug. 6. If the team had more time, they _____ (implement) additional features.

Mixed Conditional: 7. If we had chosen a better architecture initially, we _____ (not have) these scalability issues now.

EXERCISE 5.19: FORMALITY LEVELS WITH MODALS

Rewrite each sentence at three different formality levels using different modal expressions.

Situation: Advising users to back up their data

1. **Informal:** _____
2. **Neutral:** _____
3. **Formal/Academic:** _____

Situation: Expressing possibility of system failure

4. **Informal:** _____
5. **Neutral:** _____
6. **Formal/Academic:** _____

Situation: Stating a requirement for authentication

7. **Informal:** _____
8. **Neutral:** _____

9. **Formal/Academic:** _____

EXERCISE 5.20: ERROR ANALYSIS - STUDENT WRITING

This paragraph is from a student's technical report. Identify all modal-related errors and suggest improvements.

Student's Paragraph:

"In this project, we developed a system that can processes large amounts of data in real-time. Users must to authenticate before accessing the system. The algorithm might to improve performance by up to 50% compared to existing solutions. We could observed that the system will can handle 5,000 concurrent users without issues. Future versions should includes additional security features. The implementation must completes before the end of the semester. This approach may to be useful for other applications as well."

Error Analysis:

1. **Error:** _____ **Correction:** _____
2. **Error:** _____ **Correction:** _____
3. **Error:** _____ **Correction:** _____
4. **Error:** _____ **Correction:** _____
5. **Error:** _____ **Correction:** _____
6. **Error:** _____ **Correction:** _____
7. **Error:** _____ **Correction:** _____

Revised Paragraph: _____

EXERCISE 5.21: MUST VS. SHOULD VS. HAVE TO

Explain the difference in meaning and choose the most appropriate option for each context.

Understanding the differences:

- **Must:** Strong obligation/logical necessity (speaker's authority)
- **Have to:** External obligation/requirement (external rules)
- **Should:** Recommendation/expectation (not as strong as must)

Choose and explain:

1. Security protocols _____ (must/should/have to) be followed at all times.
 - **Choice:** _____
 - **Why:** _____
2. Employees _____ (must/should/have to) complete the training course by Friday or they will lose access. (*company policy*)
 - **Choice:** _____
 - **Why:** _____
3. For best results, you _____ (must/should/have to) configure the settings manually.
 - **Choice:** _____
 - **Why:** _____
4. The password _____ (must/should/have to) contain at least one special character. (*system requirement*)
 - **Choice:** _____
 - **Why:** _____

EXERCISE 5.22: COULD VS. WAS/WERE ABLE TO

"Could" and "was/were able to" both express past ability, but they're used differently. Complete these sentences correctly.

Rule: Use "was/were able to" (not "could") for specific achievements in the past.

1. In 1969, NASA _____ (could/was able to) land astronauts on the moon. (*specific achievement*)
2. Before the update, the system _____ (couldn't/wasn't able to) handle concurrent requests efficiently. (*general inability in the past*)
3. After hours of debugging, the team _____ (could/was able to) finally identify the source of the error. (*specific success*)
4. The early algorithms _____ (could/were able to) only process small datasets. (*general ability in the past*)
5. Despite the limitations, researchers _____ (could/were able to) achieve significant improvements. (*specific achievement*)

EXERCISE 5.23: MODALS FOR SPECULATION AND DEDUCTION

Use modals to express different levels of certainty about past events or situations.

Levels of certainty:

- **must have:** very certain (logical deduction)
- **may/might have:** possible
- **could have:** possible alternative
- **can't/couldn't have:** impossible

Complete these deductions:

1. The system is down. The servers _____ crashed during the night shift.
(You're 95% certain based on the logs)
2. The algorithm performed poorly. There _____ been an error in our implementation. (It's one possible explanation)
3. The data is accurate. The error _____ come from the collection process.
(This is impossible based on verification)
4. Performance improved dramatically. The team _____ optimized the code very carefully. (This is the only logical explanation)
5. The project succeeded. The developers _____ worked overtime to meet the deadline. (This is a possibility among several)

EXERCISE 5.24: PRODUCTION EXERCISE - WRITING WITH MODALS

Write a 200-word technical abstract about a software project or research topic. Your abstract must include:

- At least 3 different modal verbs
- At least 1 past modal (modal + have + past participle)
- At least 1 modal + passive construction
- Appropriate hedging for claims
- Varied levels of certainty

Your abstract:

EXERCISE 5.25: CRITICAL ANALYSIS - MODAL EFFECTIVENESS

Analyze these pairs of sentences and explain which is more appropriate for academic/technical writing and why.

Pair 1:

- A: "The system can definitely solve all problems."
- B: "The system may be able to address these challenges."

Analysis: _____

Pair 2:

- A: "We proved that the algorithm is better."
- B: "Our results suggest that the algorithm could be more effective."

Analysis: _____

Pair 3:

- A: "Users have got to update their software immediately."
- B: "Users must update their software immediately."

Analysis: _____

Pair 4:

- A: "This might possibly perhaps improve performance."
- B: "This could improve performance."

Analysis: _____

Pair 5:

- A: "The error must have occurred during data transfer."

- B: "The error probably occurred during data transfer."

Analysis: _____

EXERCISE 5.26: REAL-WORLD TECHNICAL WRITING

For each type of technical document, write 3 sentences using modals appropriately.

A) Software Requirements Specification:

- 1.
- 2.
- 3.

B) Research Paper Limitations Section:

- 1.
- 2.
- 3.

C) API Documentation:

- 1.
- 2.
- 3.

D) Troubleshooting Guide:

- 1.
- 2.
- 3.

E) Project Proposal (predicting outcomes):

- 1.
- 2.
- 3.

EXERCISE 5.27: COMPLEX MODAL CONSTRUCTIONS

Complete these sentences with complex modal structures.

1. The bug _____ (should/report) to the development team as soon as it was discovered. (*past modal passive - should have been reported*)
2. With proper optimization, the algorithm _____ (can/make) to run twice as fast. (*modal passive - can be made*)
3. The security vulnerability _____ (may/exploit) by hackers if left unpatched. (*modal passive - may be exploited*)
4. All code changes _____ (must/review) before being merged into the main branch. (*modal passive - must be reviewed*)
5. The project deadline _____ (could/extend) if additional resources are not allocated. (*modal passive - could be extended*)

EXERCISE 5.28: FINAL MASTERY CHALLENGE

Rewrite this paragraph to improve modal verb usage. The paragraph has issues with:

- Incorrect modal forms
- Inappropriate certainty levels
- Missing hedging where needed
- Overconfident claims
- Informal modal expressions

Original Paragraph:

"Our system can definitely handles all types of data without any problems. Users have got to install version 2.0 or they will probably maybe have issues. The algorithm must improves performance by exactly 50% in all cases. Previous research couldn't never achieve these results. Our findings prove that this is the best solution that exists. The system might to be used by thousands of companies soon. This approach will can solve every problem in the field. Users must to follow our recommendations without question."

Your revised paragraph:**List of changes made:**

- 1.
- 2.
- 3.

(continue as needed)

UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS

6.1 GRAMMAR EXPLANATION

Prepositions show relationships between nouns, verbs, and other words. They indicate:

- Time (at, on, in, during)
- Place (at, on, in, above, below)
- Direction (to, from, into)
- Method (by, with, through)

6.2 COMMON PREPOSITION USAGE

TIME PREPOSITIONS

- **AT:** specific times → *at 3:00 PM, at runtime*
- **ON:** days/dates → *on Monday, on March 15th*
- **IN:** months/years/periods → *in 2024, in the morning*
- **DURING:** throughout a period → *during testing, during execution*
- **FOR:** duration → *for three hours, for several years*

PLACE/POSITION

- **AT:** specific points → *at the university, at line 42*
- **ON:** surfaces, devices → *on the server, on the screen*
- **IN:** enclosed spaces, systems → *in the database, in memory*

TECHNICAL CONTEXTS

- **ON:** platforms/systems → *on Linux, on the cloud*
- **IN:** programming languages → *in Python, in C++*
- **WITH:** tools/methods → *with machine learning, with encryption*
- **BY:** methods/agents → *by using algorithms, by the system*
- **THROUGH:** processes → *through iteration, through testing*
- **FROM/TO:** data flow → *from the user to the server*

6.3 COMMON PREPOSITIONAL PHRASES IN CS

- *according to the specifications*
- *in terms of performance*
- *with respect to security*
- *by means of encryption*
- *in contrast to previous methods*
- *in accordance with standards*
- *in addition to features*
- *due to high demand*
- *based on empirical data*

6.4 COMMON ERRORS

✗ The meeting is on 3 PM.

✓ The meeting is at 3 PM.

✗ The program runs in Windows.

✓ The program runs on Windows.

✗ We wrote the code with Python.

✓ We wrote the code in Python.

✗ Send the data from the server.

✓ Send the data to the server. (or from, depending on direction)

6.5 EXERCISES

Exercise 6.1: Fill in the correct preposition

1. The algorithm runs ____ $O(n \log n)$ time.
2. The conference will be held ____ June 15th ____ 2:00 PM.
3. The data is stored ____ the cloud.
4. We implemented the system ____ Python.
5. The application runs ____ multiple platforms.
6. The error occurred ____ runtime ____ testing.
7. ____ accordance ____ best practices, we encrypted all data.
8. The performance improved ____ 40% ____ optimization.
9. Information flows ____ the client ____ the server.
10. ____ contrast ____ previous versions, this release is more secure.

Exercise 6.2: Correct the preposition errors

1. The program was developed in Java language.
2. The server crashed in midnight.
3. We will deploy the application at Monday.
4. The code runs in the operating system.
5. The data is transmitted from the client on the server.
6. In terms in performance, the new algorithm is superior.
7. The meeting is scheduled on 10:00 AM.
8. We worked in the project during three months.

Exercise 6.3: Advanced - Choose the correct preposition

1. The complexity is measured (in/by/with) terms of time and space.
2. (At/On/In) accordance (with/to/for) the requirements, we added validation.
3. The system operates (in/on/at) real-time.
4. (During/For/In) the past decade, cloud computing has grown significantly.
5. The algorithm is based (in/on/at) machine learning techniques.
6. Data flows (from/to/by) multiple sources (to/from/in) the analytics engine.

Exercise 6.4: Complete the sentences

Use appropriate prepositions to complete these technical sentences:

1. The application is compatible ____ Windows, macOS, and Linux.
2. ____ our experiments, the system performed well ____ high load.
3. The data is encrypted ____ transmission and stored ____ rest.
4. ____ comparison ____ traditional methods, our approach is more efficient.
5. The error occurs ____ specific conditions ____ runtime.

EXERCISE 6.5: TIME PREPOSITIONS IN TECHNICAL WRITING

Choose the correct preposition for these time expressions.

1. The system was deployed _____ (at/on/in) March 2024.
2. The backup runs automatically _____ (at/on/in) midnight.
3. We will release the update _____ (at/on/in) Friday.
4. The project was completed _____ (during/for/in) three months.

5. _____ (During/For/In) the testing phase, we identified several bugs.
6. The server has been running _____ (for/since/from) 2020.
7. Development began _____ (at/on/in) the beginning of the year.
8. The application crashed _____ (at/on/in) runtime.
9. We worked on optimization _____ (during/for/in) the entire week.
10. The conference takes place _____ (at/on/in) the morning _____ (at/on/in) 9:00 AM.
11. _____ (In/On/At) the past decade, AI has advanced significantly.
12. The system will be unavailable _____ (during/for/while) maintenance.

EXERCISE 6.6: PLACE AND PLATFORM PREPOSITIONS

Complete these sentences with appropriate prepositions (at, on, in, to, from).

1. The application runs _____ Linux, Windows, and macOS.
2. Data is stored _____ the cloud _____ multiple data centers.
3. The file is located _____ the server _____ the /var/www directory.
4. The error message appears _____ the screen _____ the top right corner.
5. The code is hosted _____ GitHub _____ our organization's repository.
6. Users can access the system _____ any device connected _____ the internet.
7. The function is defined _____ line 247 _____ the main.py file.
8. The application is deployed _____ AWS _____ the us-east-1 region.
9. The database runs _____ a dedicated server _____ the data center.

10. Information is displayed _____ the dashboard _____ real-time.

EXERCISE 6.7: METHOD AND MEANS PREPOSITIONS

Choose the correct preposition to describe methods, tools, and means.

1. We implemented the solution _____ (by/with/through) using machine learning algorithms.
2. The data is encrypted _____ (by/with/in) AES-256 encryption.
3. Security is enhanced _____ (by/through/with) implementing multi-factor authentication.
4. The algorithm sorts the array _____ (by/with/through) comparing adjacent elements.
5. We communicated _____ (by/through/with) the team _____ (by/via/through) Slack.
6. The system operates _____ (in/on/by) following a client-server architecture.
7. Performance was improved _____ (by/with/through) optimization techniques.
8. The application was built _____ (in/with/by) React and Node.js.
9. Data flows _____ (through/by/with) multiple processing stages.
10. Authentication is handled _____ (by/with/through) OAuth 2.0.

EXERCISE 6.8: COMMON TECHNICAL PREPOSITIONAL PHRASES

Complete these sentences with the correct prepositional phrase from the box.

Box: according to | in terms of | with respect to | by means of | in contrast to
| in accordance with | in addition to | due to | based on | in relation to

1. _____ the documentation, the API supports JSON and XML formats.
2. _____ performance, the new algorithm is 50% faster.
3. _____ security, all endpoints must be authenticated.
4. Encryption is achieved _____ cryptographic protocols.
5. _____ previous versions, this release includes dark mode.
6. The system was designed _____ industry standards.
7. _____ the core features, we added several plugins.
8. The server crashed _____ insufficient memory.
9. The model is trained _____ historical data.
10. The complexity is measured _____ the size of the input.

EXERCISE 6.9: DEPENDENT PREPOSITIONS - VERBS

Match verbs with their correct dependent prepositions, then write technical sentences.

Verb + Preposition combinations:

- consist _____ (of)
- depend _____ (on)
- result _____ (in/from)
- contribute _____ (to)
- focus _____ (on)
- rely _____ (on)

- lead _____ (to)
- protect _____ (from/against)
- comply _____ (with)
- suffer _____ (from)

Write sentences:

1. (consist of) _____
2. (depend on) _____
3. (result in) _____
4. (contribute to) _____
5. (focus on) _____

EXERCISE 6.10: DEPENDENT PREPOSITIONS - ADJECTIVES

Complete with the correct preposition after these adjectives.

1. The system is compatible _____ (with) all major browsers.
2. The algorithm is capable _____ processing large datasets.
3. The developers are responsible _____ maintaining the codebase.
4. The error is related _____ memory allocation issues.
5. The framework is suitable _____ enterprise applications.
6. Our approach is different _____ traditional methods.
7. The result is similar _____ what we expected.
8. The team is familiar _____ Agile methodologies.
9. The API is independent _____ specific programming languages.

10. Machine learning is applicable _____ various domains.
11. The solution is superior _____ existing alternatives.
12. This version is identical _____ the previous release.
13. The system is vulnerable _____ SQL injection attacks.
14. The developer is proficient _____ Python and JavaScript.
15. The architecture is based _____ microservices.

EXERCISE 6.11: DEPENDENT PREPOSITIONS - NOUNS

Complete these noun + preposition combinations.

1. The advantage _____ (of) cloud computing is scalability.
2. There is a need _____ better security measures.
3. The impact _____ AI _____ healthcare has been significant.
4. The relationship _____ input size and processing time is linear.
5. The solution _____ the problem was found through debugging.
6. Our approach _____ software development emphasizes testing.
7. The difference _____ these two algorithms is complexity.
8. There is a demand _____ skilled developers in the industry.
9. The effect _____ caching _____ performance is substantial.
10. The increase _____ traffic caused the server overload.

EXERCISE 6.12: PREPOSITION ERROR IDENTIFICATION

Each sentence contains **one or two** preposition errors. Find and correct them.

1. The algorithm was implemented with Java and tested in various scenarios.
 - **Error(s):** _____
 - **Correction:** _____
2. The meeting is scheduled at Monday in 2:00 PM at the conference room.
 - **Error(s):** _____
 - **Correction:** _____
3. According with the requirements, the system must operate in real-time.
 - **Error(s):** _____
 - **Correction:** _____
4. The data flows to the database from the analytics engine.
 - **Error(s):** _____
 - **Correction:** _____
5. In terms in performance, our solution is superior from the baseline.
 - **Error(s):** _____
 - **Correction:** _____
6. The application runs in multiple operating systems and is available at the cloud.
 - **Error(s):** _____
 - **Correction:** _____
7. We worked in this project during three years until we completed it at 2023.
 - **Error(s):** _____

- **Correction:** _____
- 8. The error occurred in runtime during the deployment of the new version.
 - **Error(s):** _____
 - **Correction:** _____

EXERCISE 6.13: CONTEXT-DEPENDENT PREPOSITION CHOICE

Some prepositions change meaning based on context. Choose the correct one.

1. The program runs ____ (in/on/at) the background. (*continuous operation*)
2. The system operates ____ (in/on/at) high efficiency. (*manner/state*)
3. The function executes ____ (in/on/at) $O(n)$ time. (*complexity measurement*)
4. The code is written ____ (in/with/by) Python. (*programming language*)
5. The application was developed ____ (in/with/by) our team. (*agent*)
6. Security is implemented ____ (in/with/by) encryption. (*method/tool*)
7. Data is sent _____ (**from/to/at**) the client _____ (**from/to/at**) the server. (*direction of flow*)
8. The server is located _____ (**in/on/at**) Silicon Valley. (*general location*)
9. The server is located _____ (**in/on/at**) 123 Main Street. (*specific address*)
10. The bug was discovered _____ (**during/for/in**) testing. (*time period when something happened*)

EXERCISE 6.14: PHRASAL VERBS AND PREPOSITIONS

Complete these technical phrasal verbs with the correct preposition(s).

1. The system shut _____ unexpectedly during peak hours.
2. We need to set _____ a new development environment.
3. The developers are working _____ a critical bug fix.
4. The application crashed and we had to start _____ from scratch.
5. Make sure to back _____ your data before updating.
6. The team is looking _____ the error logs to find the cause.
7. We should break _____ the problem into smaller components.
8. The server can't keep _____ with the increased traffic.
9. Log _____ to your account to access premium features.
10. The update will roll _____ gradually over the next week.
11. We need to figure _____ why the algorithm is failing.
12. The old API will be phased _____ next quarter.
13. Developers rely _____ version control for collaboration.
14. The database filled _____ and stopped accepting new records.
15. We should focus _____ optimizing the critical sections first.

EXERCISE 6.15: PARAGRAPH COMPLETION

Fill in **all** prepositions in these technical paragraphs.

Paragraph 1: System Description Our web application runs _____ AWS _____ multiple availability zones. The frontend is built _____ React and deployed _____ CloudFront _____ global distribution. Data is stored _____ a PostgreSQL database _____ the backend. Communication _____ the client and server occurs _____ REST APIs _____ JSON format. _____ terms _____ security, all traffic is

encrypted ____ TLS 1.3. The system operates ____ accordance ____ GDPR requirements and can handle up ____ 10,000 concurrent users.

Paragraph 2: Research Methodology ____ this study, we conducted experiments ____ three different datasets. Data was collected ____ six months ____ January ____ June 2024. The experiments were performed ____ a GPU cluster ____ 8 NVIDIA A100 GPUs. ____ contrast ____ previous research, we focused ____ real-time processing. The algorithm was implemented ____ Python using TensorFlow. Results were analyzed ____ statistical methods and visualized ____ means ____ matplotlib. ____ accordance ____ ethical guidelines, all participant data was anonymized.

Paragraph 3: Problem and Solution The main challenge ____ distributed systems is maintaining consistency ____ multiple nodes. ____ our previous approach, data synchronization relied ____ a centralized coordinator, which resulted ____ a single point ____ failure. ____ addition ____ this limitation, the system suffered ____ high latency ____ peak hours. Our new solution is based ____ a consensus algorithm that distributes coordination ____ all nodes. This leads ____ improved reliability and performance ____ terms ____ throughput and response time.

EXERCISE 6.16: PREPOSITIONS IN ACADEMIC WRITING PHRASES

Complete these common academic phrases with appropriate prepositions.

1. ____ accordance ____ previous research...
2. ____ contrast ____ traditional approaches...
3. ____ addition ____ the core functionality...
4. ____ terms ____ efficiency...
5. ____ respect ____ security concerns...
6. ____ comparison ____ existing methods...
7. ____ means ____ experimentation...
8. ____ the basis ____ our findings...

9. _____ order _____ improve performance...
10. _____ spite _____ these limitations...
11. _____ account _____ recent developments...
12. _____ particular, _____ regard _____ scalability...
13. _____ the context _____ machine learning...
14. _____ the perspective _____ software engineering...
15. _____ the exception _____ edge cases...

EXERCISE 6.17: PREPOSITIONS WITH NUMBERS AND MEASUREMENTS

Choose the correct preposition for expressing quantities and measurements.

1. The algorithm runs _____ (in/at/on) $O(n^2)$ time complexity.
2. Performance improved _____ (by/with/to) 40%.
3. The system can scale _____ (to/up to/until) millions of users.
4. Response time decreased _____ (from/by/to) 500ms _____ (from/by/to) 100ms.
5. The accuracy increased _____ (by/from/to) 85% _____ (by/from/to) 95%.
6. The server operates _____ (at/on/in) 90% capacity.
7. The dataset consists _____ (of/from/with) over 10,000 samples.
8. Processing time varies _____ (from/between/among) 1 _____ (from/between/to) 5 seconds.
9. The application uses _____ (between/around/approximately) 2GB of memory.
10. The price ranges _____ (from/between) \$50 _____ (to/and) \$100.

EXERCISE 6.18: FIXED EXPRESSIONS AND COLLOCATIONS

Match the beginning of each technical expression with its correct prepositional ending.

Beginnings:

1. access to
2. solution to
3. approach to
4. alternative to
5. impact on
6. effect on
7. relationship between
8. difference between
9. connection between
10. advantage over

Write complete sentences using 5 of these collocations:

- 1.
- 2.
- 3.
- 4.
- 5.

EXERCISE 6.19: PREPOSITION OMISSION AND ADDITION

Some sentences incorrectly include or omit prepositions. Correct them.

1. We discussed about the implementation details.
 - **Correction:** _____
2. The system lacks of proper error handling.
 - **Correction:** _____
3. The algorithm resembles to the one proposed by Smith (2020).
 - **Correction:** _____
4. We should focus on optimization the critical path.
 - **Correction:** _____
5. The application provides users real-time updates.
 - **Correction:** _____
6. The team consists five developers and two designers.
 - **Correction:** _____
7. This approach differs from traditional methods.
 - **Correction:** _____ (*Is this correct or incorrect?*)
8. We need to comply the security regulations.
 - **Correction:** _____

EXERCISE 6.20: PREPOSITIONS IN DIFFERENT DOCUMENT TYPES

Write appropriate sentences with correct prepositions for each document type.

A) Technical Specification (3 sentences with prepositions):

- 1.
- 2.
- 3.

B) User Manual (3 sentences with prepositions):

- 1.
- 2.
- 3.

C) Research Abstract (3 sentences with prepositions):

- 1.
- 2.
- 3.

D) Bug Report (3 sentences with prepositions):

- 1.
- 2.
- 3.

EXERCISE 6.21: COMPLEX PREPOSITIONAL PHRASES

Complete these complex sentences with multiple prepositions.

1. _____ accordance _____ the requirements specified _____ the documentation, the system must operate _____ real-time _____ latency _____ less than 100ms.

2. _____ contrast _____ our previous approach, which relied _____ centralized processing, the new architecture distributes workload _____ multiple nodes.
3. _____ terms _____ security, data must be encrypted _____ transit _____ TLS and _____ rest _____ AES-256.
4. The relationship _____ input size and execution time varies _____ $O(n)$ _____ best-case scenarios _____ $O(n^2)$ _____ worst-case scenarios.
5. _____ addition _____ the core functionality, the system provides APIs _____ integration _____ third-party services.

EXERCISE 6.22: ERROR ANALYSIS - STUDENT WRITING

This paragraph from a student's technical report contains **12 preposition errors**. Find and correct them all.

Student's Paragraph:

"In this project, we developed a mobile application in React Native that runs in both iOS and Android. The app was deployed at the cloud in AWS. Development started at March and was completed after three months at June. The application communicates to the backend server by REST APIs. Data is stored at a MongoDB database and cached in Redis for better performance. In terms in speed, the app loads at less than 2 seconds. According with user feedback, the interface is intuitive and easy to use. We worked in this project during the entire semester and presented our results at the final presentation in 10:00 AM."

Corrections:

- 1.
- 2.
- 3.
- 4.

- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

Corrected paragraph: _____

EXERCISE 6.23: PREPOSITION CHOICE - SUBTLE DIFFERENCES

Explain the difference in meaning or usage between these pairs.

1. **"The program runs on Windows" vs. "The program runs in Windows"**
 - Explanation: _____
2. **"We worked for three months" vs. "We worked during three months"**
 - Explanation: _____
3. **"Written in Python" vs. "Written with Python"**
 - Explanation: _____
4. **"Based on data" vs. "Based in data"**
 - Explanation: _____
5. **"At the end of the day" vs. "By the end of the day"**

○ Explanation: _____

6. **"Communicate with the server" vs. "Communicate to the server"**

○ Explanation: _____

EXERCISE 6.24: PREPOSITIONS IN INSTRUCTIONS

Write step-by-step instructions for a technical task (e.g., installing software, configuring a system). Use at least 10 different prepositions correctly.

Task: Installing and configuring a web server

Your instructions (8-10 steps):

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Prepositions used: _____ (list them)

EXERCISE 6.25: PRODUCTION EXERCISE - TECHNICAL DESCRIPTION

Write a 200-word description of a software system or technology. Your description must include:

- At least 15 different prepositions
- At least 5 dependent preposition combinations (verb+prep, adj+prep, or noun+prep)
- At least 3 common academic prepositional phrases (e.g., "in terms of," "with respect to")
- Correct usage throughout

Your description:

Self-check list:

- Different prepositions used: _____ (list them)
- Dependent preposition combinations: _____
- Academic phrases: _____

EXERCISE 6.26: COMPARATIVE ANALYSIS

Compare these two versions of the same technical sentence. Which uses prepositions more effectively?

Version A: "The algorithm processes data through iteration using multiple stages with optimization techniques for improving performance in terms of speed and efficiency."

Version B: "The algorithm processes data iteratively through multiple optimization stages to improve performance in both speed and efficiency."

Analysis:

- Which is better? _____

- Why? _____
- Any improvements? _____

EXERCISE 6.27: REAL-WORLD TECHNICAL WRITING

These sentences are from actual technical documents. Fill in the missing prepositions.

1. "The API is designed _____ RESTful principles and communicates _____ JSON format."
2. "_____ order _____ ensure compatibility _____ older systems, we maintained backward compatibility _____ version 1.0."
3. "The algorithm operates _____ $O(n \log n)$ time complexity _____ average-case scenarios."
4. "Data flows _____ the ingestion layer _____ the processing pipeline and finally _____ the storage layer."
5. "_____ accordance _____ industry standards, all passwords are hashed _____ bcrypt _____ a cost factor _____ 12."

EXERCISE 6.28: PREPOSITION SUBSTITUTION

For each sentence, suggest alternative prepositions that would also be grammatically correct but might change the meaning slightly.

1. "The system operates **in** real-time."
 - Alternative: _____
 - Meaning change: _____
2. "We implemented the feature **by** using microservices."
 - Alternative: _____
 - Meaning change: _____

3. "The application runs **on** AWS."

- Alternative: _____
- Meaning change: _____

4. "Performance improved **by** 40%."

- Alternative: _____
- Meaning change: _____

EXERCISE 6.29: CRITICAL ANALYSIS - PREPOSITION DENSITY

Analyze this sentence for preposition overuse and rewrite it more concisely.

Original: "In the context of our research on the impact of machine learning algorithms on the performance of systems in the domain of natural language processing, we conducted experiments with the use of various models from the field of deep learning."

Analysis:

- Number of prepositions: _____
- Is it overused? _____
- Improved version: _____

EXERCISE 6.30: FINAL MASTERY EXERCISE

Edit this technical abstract to correct all preposition errors and improve preposition usage. The abstract contains multiple error types: wrong prepositions, missing prepositions, unnecessary prepositions, and awkward phrasing.

Original Abstract:

"In this paper, we present a novel approach of image recognition using deep learning. The system was implemented with Python and trained in a dataset at over 100,000 images. Experiments were conducted during six months period from January until June 2024. According our results, the algorithm achieves 95% accuracy that is superior from existing methods. In terms in computational efficiency, our approach reduces processing time with 40%. The system operates in real-time and can be deployed at edge devices. In accordance of industry standards, we evaluated the model in various benchmark datasets. The results demonstrate the effectiveness from our approach in terms in both accuracy and speed. This work contributes in the field by providing a solution of the challenge with real-time processing in resource-constrained environments."

Your corrected version:

Summary of changes:

1. Errors found: _____ (number)
2. Main error types: _____
3. Key improvements: _____

UNIT 7: SENTENCE STRUCTURE AND WORD ORDER

7.1 GRAMMAR EXPLANATION

English follows a strict Subject-Verb-Object (SVO) word order.

Basic Pattern:

Subject + Verb + Object + (Complement/Modifier)

The programmer (S) wrote (V) the code (O) efficiently (Adv).

7.2 ESSENTIAL ELEMENTS

Every complete sentence must have:

1. **Subject:** Who/what performs the action
2. **Verb:** The action or state
3. **Complete thought**

7.3 COMMON SENTENCE PATTERNS IN TECHNICAL WRITING

Pattern 1: S + V

The system crashed.

Pattern 2: S + V + O

The algorithm processes data.

Pattern 3: S + V + O + O (indirect + direct)

The API sends the client a response.

Pattern 4: S + V + C (complement)

The result is accurate.

Pattern 5: S + V + O + C

The test proved the hypothesis correct.

7.4 WORD ORDER RULES

ADJECTIVES BEFORE NOUNS:

*The **efficient algorithm** processes data.*

ADVERBS:

- Manner: after verb/object → *works **efficiently***
- Frequency: before main verb → ***often** crashes*
- Time: usually at end → *deployed **yesterday***

QUESTIONS:

Auxiliary/Modal + Subject + Main Verb

Does the system support encryption?

Can the algorithm handle large datasets?

7.5 COMMON ERRORS

- ✗ Processes the algorithm data quickly.
✓ The algorithm processes data quickly.
- ✗ Was developed the system last year.
✓ The system was developed last year.
- ✗ What this function does?
✓ What does this function do?
- ✗ The efficient very algorithm.
✓ The very efficient algorithm.

7.6 SENTENCE FRAGMENTS AND RUN-ONS

Fragment: Incomplete sentence lacking subject or verb



Because the server was down.



Because the server was down, users could not access the system.

Run-on/Comma Splice: Two independent clauses incorrectly joined



The code compiled, it had errors.



The code compiled, but it had errors.



The code compiled; however, it had errors.

7.7 EXERCISES

Exercise 7.1: Identify the sentence pattern (S, V, O, C)

1. The database stores user information.
2. The system is robust.
3. Developers write clean code.
4. The algorithm proved the theorem correct.
5. The API returns JSON data.

Exercise 7.2: Correct the word order

1. Efficiently runs the program on modern hardware.
2. Was created Python by Guido van Rossum.
3. The secure very system protects data.
4. Often crashes the application under load.
5. What does mean this error?
6. Installed we the software yesterday.
7. The well-written documentation helps users.

8. Can process the system requests how many?

Exercise 7.3: Fix fragments and run-ons

1. Because the network was slow.
2. The test failed, we fixed the bug.
3. Although the code is complex.
4. The system crashed, the data was lost, users complained.
5. When the server rebooted.
6. The algorithm is efficient, it requires less memory.

Exercise 7.4: Build complete sentences

Arrange these words into correct sentences:

1. quickly / the / data / analyzes / algorithm / the
2. yesterday / deployed / the / was / application
3. users / the / interface / intuitive / find / the
4. encryption / supports / the / system / does / ?
5. efficiently / runs / modern / on / hardware / the / program / very

Exercise 7.5: Advanced - Create complex sentences

Combine these simple sentences using conjunctions, relative clauses, or subordination:

1. The algorithm is efficient. It uses dynamic programming.
2. The system crashed. The database was corrupted. We restored from backup.
3. Python is popular. It has simple syntax. It has extensive libraries.
4. The test failed. We debugged the code. We found the error.

5. The network is slow. Users experience delays. We need to upgrade infrastructure.

EXERCISE 7.6: SENTENCE PATTERN IDENTIFICATION AND ANALYSIS

Identify the sentence pattern (S=Subject, V=Verb, O=Object, C=Complement, A=Adverbial) and label each component.

Pattern Key:

- **Pattern 1:** S + V
- **Pattern 2:** S + V + O
- **Pattern 3:** S + V + O + O (indirect + direct object)
- **Pattern 4:** S + V + C
- **Pattern 5:** S + V + O + C

Identify and label:

1. The neural network learns patterns from data.
 - **Pattern:** _____
 - **Components:** S = _____ | V = _____ | O = _____ | Other = _____
2. The system became unstable.
 - **Pattern:** _____
 - **Components:** _____
3. The API sends developers error messages.
 - **Pattern:** _____
 - **Components:** _____

4. Machine learning algorithms require substantial computational resources.
- **Pattern:** _____
 - **Components:** _____
5. The testing process proved our hypothesis incorrect.
- **Pattern:** _____
 - **Components:** _____
6. Quantum computers exist.
- **Pattern:** _____
 - **Components:** _____
7. The framework provides users extensive documentation.
- **Pattern:** _____
 - **Components:** _____
8. The results seem promising.
- **Pattern:** _____
 - **Components:** _____

EXERCISE 7.7: WORD ORDER CORRECTION - MULTIPLE ERRORS

Each sentence has multiple word order errors. Rewrite them correctly.

1. Efficiently processes very the algorithm large datasets quickly.
- **Correction:** _____
2. Was implemented the security protocol by the team last month successfully.

- **Correction:** _____
- 3. The robust extremely system prevents attacks malicious effectively.
 - **Correction:** _____
- 4. Can handle how many the server requests per second?
 - **Correction:** _____
- 5. Often fail tests the when not is configured properly the environment.
 - **Correction:** _____
- 6. The well-designed interface allows users to complete easily tasks.
 - **Correction:** _____
- 7. Provides the API to developers access to resources various.
 - **Correction:** _____
- 8. Must be tested thoroughly all code before deployment to production.
 - **Correction:** _____

EXERCISE 7.8: ADVERB PLACEMENT

Place the adverb in parentheses in the correct position(s). Sometimes multiple positions are possible.

1. The system crashes under heavy load. (**frequently**)
 - **Correct position(s):** _____
2. The algorithm has been optimized for performance. (**recently**)
 - **Correct position(s):** _____
3. We deploy updates to production. (**never, without testing**)
 - **Correct position(s):** _____

4. The database can handle concurrent requests. (**easily, thousands of**)
 - **Correct position(s):** _____
5. The developers work on bug fixes. (**currently**)
 - **Correct position(s):** _____
6. The application runs on mobile devices. (**smoothly**)
 - **Correct position(s):** _____
7. Machine learning has transformed data analysis. (**completely**)
 - **Correct position(s):** _____
8. The system was tested before deployment. (**thoroughly, yesterday**)
 - **Correct position(s):** _____

EXERCISE 7.9: QUESTION FORMATION

Convert these statements into questions using the indicated question words.

1. The algorithm processes 1000 requests per second. (**How many**)
 -
2. The system crashed because of insufficient memory. (**Why**)
 -
3. The developers are working on the authentication module. (**What**)
 -
4. The application was deployed last Friday. (**When**)
 -
5. The senior architect designed the system architecture. (**Who**)

☐

6. The data is stored in the cloud. (**Where**)

☐

7. The team can complete the project in three months. (**How long**)

☐

8. The API supports JSON and XML formats. (**Which formats**)

☐

Now create Yes/No questions:

9. The system supports encryption. → _____

10. The algorithm can handle large datasets. → _____

11. The team has completed the testing phase. → _____

12. The application will be released next month. → _____

EXERCISE 7.10: FRAGMENT IDENTIFICATION AND CORRECTION

Identify whether each is a complete sentence or a fragment. Correct all fragments.

1. Although the algorithm is efficient and runs in linear time.

☐ **Status:** _____

☐ **Correction (if needed):** _____

2. Because the server was experiencing high traffic.

☐ **Status:** _____

☐ **Correction (if needed):** _____

3. The system that processes user requests in real-time.
 - **Status:** _____
 - **Correction (if needed):** _____
4. When developers follow best practices and write clean code.
 - **Status:** _____
 - **Correction (if needed):** _____
5. While the database was being migrated to the new server.
 - **Status:** _____
 - **Correction (if needed):** _____
6. Which significantly improved the application's performance.
 - **Status:** _____
 - **Correction (if needed):** _____
7. The API, providing access to various endpoints and supporting multiple authentication methods.
 - **Status:** _____
 - **Correction (if needed):** _____
8. To optimize the algorithm for better performance.
 - **Status:** _____
 - **Correction (if needed):** _____

EXERCISE 7.11: RUN-ON SENTENCES AND COMMA SPLICES

Identify the error type and correct using **three different methods**: (1) period + capital, (2) semicolon, (3) coordinating/subordinating conjunction.

Example: Original: "The code compiled, it had errors."

- Method 1: The code compiled. It had errors.
- Method 2: The code compiled; it had errors.
- Method 3: The code compiled, but it had errors.

Correct these:

1. The system crashed, the data was lost.
 - **Method 1:** _____
 - **Method 2:** _____
 - **Method 3:** _____
2. The algorithm is efficient it uses dynamic programming.
 - **Method 1:** _____
 - **Method 2:** _____
 - **Method 3:** _____
3. We tested the application, we found several bugs, we fixed them immediately.
 - **Method 1:** _____
 - **Method 2:** _____
 - **Method 3:** _____
4. The server handles thousands of requests per second, it rarely crashes.
 - **Method 1:** _____

- **Method 2:** _____
 - **Method 3:** _____
5. Python is beginner-friendly, Java is more verbose, C++ offers better performance.
- **Best correction:** _____

EXERCISE 7.12: ADJECTIVE ORDER

English has a specific order for multiple adjectives. The general order is:

**Opinion → Size → Age → Shape → Color → Origin → Material → Purpose
+ NOUN**

Arrange these adjectives in the correct order before the noun.

1. algorithm / efficient / new / sorting
 - **Correct order:** _____
2. interface / user-friendly / modern / web
 - **Correct order:** _____
3. database / large / relational / enterprise
 - **Correct order:** _____
4. system / powerful / distributed / computing
 - **Correct order:** _____
5. framework / lightweight / JavaScript / open-source
 - **Correct order:** _____
6. servers / reliable / high-performance / dedicated / multiple
 - **Correct order:** _____

EXERCISE 7.13: INVERTED WORD ORDER

In certain cases, English uses inverted word order. Identify whether inversion is correct or incorrect.

Cases where inversion occurs:

- After negative adverbs (Never, Rarely, Seldom, etc.)
- In conditional sentences without "if"
- After "Only" at the beginning
- In questions

Evaluate these sentences:

1. Never have I seen such an efficient algorithm.
 - **Status:** _____ (Correct/Incorrect)
2. Rarely crashes the system under normal conditions.
 - **Status:** _____ (Correct/Incorrect)
 - **Correction (if needed):** _____
3. Only when the data is validated can the system proceed.
 - **Status:** _____ (Correct/Incorrect)
4. Had we tested more thoroughly, we would have found the bug.
 - **Status:** _____ (Correct/Incorrect)
5. Not only the algorithm is fast, but it is also memory-efficient.
 - **Status:** _____ (Correct/Incorrect)
 - **Correction (if needed):** _____
6. Seldom do developers write perfect code on the first attempt.

- **Status:** _____ (Correct/Incorrect)

EXERCISE 7.14: BUILDING COMPLEX SENTENCES

Combine these simple sentences into one complex sentence. Use relative clauses, subordinating conjunctions, or participial phrases.

1. **Simple sentences:** The algorithm sorts data. The algorithm uses merge sort. Merge sort is efficient for large datasets.

- **Complex sentence:** _____

2. **Simple sentences:** The system crashed. The crash occurred at midnight. The crash was caused by a memory leak.

- **Complex sentence:** _____

3. **Simple sentences:** Python is popular. Python has simple syntax. Python is used in data science. Data science is a growing field.

- **Complex sentence:** _____

4. **Simple sentences:** The team deployed the application. The deployment happened last week. The application runs on AWS. AWS is a cloud platform.

- **Complex sentence:** _____

5. **Simple sentences:** The API provides access to data. The data is stored in the database. The database is replicated. The replication ensures reliability.

- **Complex sentence:** _____

EXERCISE 7.15: PARALLEL STRUCTURE

Parallel structure means using the same grammatical form for items in a list or series. Correct the faulty parallelism.

1. The system is fast, reliable, and has scalability.
 - **Correction:** _____
2. The developer fixed the bug, tested the code, and deployment to production.
 - **Correction:** _____
3. We need to optimize the algorithm, reducing memory usage, and improve response time.
 - **Correction:** _____
4. The application supports authentication, authorization, and encrypts data.
 - **Correction:** _____
5. The framework is easy to use, well-documented, and has an active community.
 - **Correction:** _____
6. Good code is readable, maintainable, and you can test it easily.
 - **Correction:** _____
7. The project requires planning carefully, executing efficiently, and to monitor continuously.
 - **Correction:** _____
8. Machine learning involves collecting data, training models, and to evaluate performance.
 - **Correction:** _____

EXERCISE 7.16: SUBJECT-VERB SEPARATION

Long modifiers between subject and verb can cause confusion. Identify the subject and verb, then verify agreement.

1. The algorithm, which processes millions of data points in real-time using advanced machine learning techniques, (is/are) highly efficient.
 - ☐ **Subject:** _____
 - ☐ **Verb:** _____
 - ☐ **Correct choice:** _____
2. The team of developers who have been working on this project for six months (has/have) completed the implementation.
 - ☐ **Subject:** _____
 - ☐ **Verb:** _____
 - ☐ **Correct choice:** _____
3. One of the most challenging aspects of distributed systems, including consensus algorithms and data replication, (is/are) maintaining consistency.
 - ☐ **Subject:** _____
 - ☐ **Verb:** _____
 - ☐ **Correct choice:** _____
4. The system, along with all its components and dependencies, (need/needs) to be updated.
 - ☐ **Subject:** _____
 - ☐ **Verb:** _____
 - ☐ **Correct choice:** _____

EXERCISE 7.17: SENTENCE VARIETY

Rewrite this paragraph to include varied sentence structures (simple, compound, complex, compound-complex).

Original paragraph (all simple sentences):

"Cloud computing is popular. It offers scalability. It reduces costs. Companies adopt cloud solutions. They migrate their infrastructure. The migration process is complex. It requires careful planning. Security is a concern. Data must be protected. Encryption helps. Multi-factor authentication is important. Companies must comply with regulations. They need skilled personnel. Training is essential."

Your revised paragraph with varied structures:

Identify your sentence types:

- Simple: _____
- Compound: _____
- Complex: _____
- Compound-complex: _____

EXERCISE 7.18: DANGLING AND MISPLACED MODIFIERS

Identify and correct dangling or misplaced modifiers.

1. Running the tests, several bugs were discovered.
 - **Problem:** _____
 - **Correction:** _____
2. The developer fixed the bug using advanced debugging techniques that had been causing crashes.
 - **Problem:** _____

- **Correction:** _____
- 3. After deploying to production, the system experienced issues.
 - **Problem:** _____ (Correct or incorrect?)
 - **Correction (if needed):** _____
- 4. We found a solution to the problem walking through the code.
 - **Problem:** _____
 - **Correction:** _____
- 5. To optimize performance, caching was implemented by the team.
 - **Problem:** _____
 - **Correction:** _____
- 6. The algorithm only processes data when needed.
 - **Problem:** _____ (Consider placement of "only")
 - **Alternative meaning:** _____

EXERCISE 7.19: SENTENCE EXPANSION

Expand these basic sentences by adding modifiers, clauses, and details while maintaining correct word order.

Example: Basic: "The algorithm works." Expanded: "The sorting algorithm, which was developed by our team last year, works efficiently on large datasets by utilizing a divide-and-conquer approach."

Expand these:

1. The system crashed.
 - **Expanded:** _____
2. Developers write code.

- **Expanded:** _____
- 3. The API returns data.
 - **Expanded:** _____
- 4. Machine learning is useful.
 - **Expanded:** _____
- 5. The application runs.
 - **Expanded:** _____

EXERCISE 7.20: SENTENCE COMBINING STRATEGIES

Combine each set of sentences using the specified method.

Set 1 (Use a relative clause):

- The framework is popular.
- The framework was developed by Facebook.
- Combined: _____

Set 2 (Use a participial phrase):

- The system monitors traffic.
- The system detects anomalies automatically.
- Combined: _____

Set 3 (Use a subordinating conjunction):

- The algorithm is complex.
- It produces accurate results.
- Combined: _____

Set 4 (Use an appositive):

- Python is widely used.
- Python is a high-level programming language.
- Combined: _____

Set 5 (Use coordination with a conjunctive adverb):

- The test failed.
- We decided to debug the code.
- Combined: _____

EXERCISE 7.21: TECHNICAL INSTRUCTIONS - IMPERATIVE SENTENCES

Imperative sentences (commands) have an implied subject "you." Write 8 technical instructions using correct imperative structure.

Example: "Install the dependencies before running the application."

Your instructions (for setting up a development environment):

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

EXERCISE 7.22: CLEFT SENTENCES FOR EMPHASIS

Cleft sentences emphasize specific information by restructuring. Practice both types.

Type 1: It-cleft (It + be + emphasized element + relative clause) Example:

"Python is popular." → "It is Python that is popular for data science."

Type 2: Wh-cleft (What-clause + be + emphasized element) Example:

"We need better security." → "What we need is better security."

Create cleft sentences for emphasis:

1. Original: The memory leak caused the crash.
 - **It-cleft (emphasize "memory leak"):** _____
 - **Wh-cleft (emphasize "caused the crash"):** _____
2. Original: The algorithm's efficiency matters most.
 - **Wh-cleft:** _____
3. Original: The team discovered the bug during testing.
 - **It-cleft (emphasize "during testing"):** _____
4. Original: We need scalable infrastructure.
 - **Wh-cleft:** _____

EXERCISE 7.23: PARAGRAPH COHERENCE - WORD ORDER AND FLOW

This paragraph has choppy sentences and poor word order. Rewrite it for better flow and coherence.

Original:

"Is cloud computing efficient. Many companies use it. Reduces costs it. Is scalable also. Must migrate companies their infrastructure. Is complex the process. Planning requires it careful. Security is important. Must be protected data. Use companies encryption. Important is also authentication."

Your revised paragraph:

EXERCISE 7.24: ERROR ANALYSIS - MULTIPLE ISSUES

This technical description contains various word order errors, fragments, run-ons, and structural issues. Identify **all** errors and provide a corrected version.

Original text:

"The distributed system handles efficiently requests from users multiple. Was designed it to be scalable and reliable. Each node in the cluster processes independently data this prevents single points of failure. When increases the traffic. The load balancer distributes automatically requests across nodes available. The system uses a consensus algorithm. For ensuring consistency across nodes. Rarely fail nodes, the system continues operating. Because of redundancy built-in. Can handle the architecture easily thousands of concurrent users it has been tested thoroughly."

Error analysis:

1. Type and location of errors: _____
2. Total errors found: _____

Corrected version:

EXERCISE 7.25: SENTENCE REDUCTION

Sometimes sentences are too wordy. Reduce these sentences while maintaining meaning and grammatical correctness.

1. **Wordy:** "The algorithm that we developed is one that can process data in a way that is efficient."

- **Concise:** _____
- 2. **Wordy:** "There are several features that have been implemented by the team."
- **Concise:** _____
- 3. **Wordy:** "It is important to note that the system requires regular maintenance."
- **Concise:** _____
- 4. **Wordy:** "The reason why the application crashed is due to the fact that there was insufficient memory."
- **Concise:** _____
- 5. **Wordy:** "In spite of the fact that the code was complex, the developers were able to understand it."
- **Concise:** _____

EXERCISE 7.26: CONDITIONAL SENTENCE STRUCTURE

Write correctly structured conditional sentences for each type.

Type 0 (General truths): If + present simple, present simple Example: "If you divide by zero, the program crashes."

Type 1 (Real future possibility): If + present simple, will + base verb Example: "If we optimize the code, performance will improve."

Type 2 (Hypothetical present/future): If + past simple, would + base verb Example: "If the system had more memory, it would run faster."

Type 3 (Hypothetical past): If + past perfect, would have + past participle Example: "If we had tested thoroughly, we would have found the bug."

Write one sentence for each type:

1. **Type 0:** _____
2. **Type 1:** _____
3. **Type 2:** _____
4. **Type 3:** _____
5. **Mixed conditional:** _____ (If + past perfect, would + base verb)

EXERCISE 7.27: NEGATIVE SENTENCE FORMATION

Form negative sentences correctly. Watch for common errors with auxiliaries.

1. The system supports encryption. (Make negative)
☐
2. The developers have completed the testing. (Make negative)
☐
3. The algorithm can handle large datasets. (Make negative)
☐
4. We optimized the code. (Make negative)
☐
5. The application runs on mobile devices. (Make negative)
☐

Common error to avoid:  The system not supports encryption.  The system does not support encryption.

EXERCISE 7.28: SENTENCE DIAGRAMMING (ADVANCED)

For these complex sentences, identify all clauses and their relationships.

Example: "When the system crashed, the administrators restarted the servers that had failed."

- Main clause: "the administrators restarted the servers"
- Subordinate clause (time): "When the system crashed"
- Relative clause: "that had failed"

Diagram these:

1. "The algorithm that we developed yesterday processes data more efficiently than the one that was used previously."
 - Main clause: _____
 - Subordinate clauses: _____
 - Relationships: _____
2. "Although the code is complex, developers who have experience with functional programming can understand it easily."
 - Main clause: _____
 - Subordinate clauses: _____
 - Relationships: _____

EXERCISE 7.29: PRODUCTION EXERCISE - TECHNICAL PROCESS DESCRIPTION

Write a 200-word description of a technical process (e.g., how an algorithm works, how a system handles requests, how authentication works). Your description must demonstrate:

- Correct SVO word order throughout
- At least 3 different sentence patterns
- At least 2 complex sentences
- At least 1 compound sentence
- Proper adverb placement
- No fragments or run-ons
- Varied sentence beginnings

Your description:

Self-check:

- Sentence patterns used: _____
- Complex sentences: _____
- Compound sentences: _____
- Any fragments or run-ons? _____

EXERCISE 7.30: CRITICAL ANALYSIS - SENTENCE STRUCTURE EFFECTIVENESS

Compare these three versions of the same technical paragraph. Analyze which is most effective and why.

Version A (All simple sentences): "The system is distributed. It handles thousands of requests. Each request is processed independently. The load balancer distributes traffic. Nodes can fail. The system continues operating. Redundancy ensures reliability. The architecture is scalable. It meets enterprise requirements."

Version B (All complex sentences): "The system, which is distributed, handles thousands of requests, each of which is processed independently by nodes that are coordinated by a load balancer that distributes traffic, and even when nodes fail, the system, which has redundancy, continues operating while maintaining the scalability that enterprises require."

Version C (Varied structures): "The distributed system handles thousands of requests, processing each independently. While the load balancer distributes traffic across multiple nodes, redundancy ensures that the system continues operating even when individual nodes fail. This scalable architecture meets enterprise requirements."

Your analysis:

1. **Most effective version:** _____
2. **Reasons:** _____
3. **Weaknesses of other versions:** _____
4. **Improvements you would suggest:** _____

EXERCISE 7.31: REAL-WORLD EDITING

Edit this excerpt from a student's technical report. Focus on sentence structure issues: fragments, run-ons, word order, and overall clarity.

Student's draft:

"In this project developed we a machine learning model. That classifies images with high accuracy. The model uses convolutional neural networks, these are effective for image processing, they can learn complex patterns. Was trained the model on 50,000 images. For achieving optimal performance. The training process it took 24 hours on our GPU cluster very powerful. Although initially the model overfitted. Added we regularization techniques. Which improved generalization. The final model achieves 94% accuracy this is better than baseline models significantly. Can be deployed the system in production environments, will handle it real-time inference efficiently."

Your edited version:

List of major corrections:

- 1.
- 2.
- 3.
- 4.
- 5.

EXERCISE 7.32: FINAL MASTERY EXERCISE

Write a complete technical abstract (150-200 words) about a software project, algorithm, or system. Your abstract must demonstrate mastery of:

- All basic sentence patterns (S+V, S+V+O, S+V+O+O, S+V+C, S+V+O+C)
- Correct word order throughout
- Varied sentence structures (simple, compound, complex)
- No fragments or run-ons
- Proper adverb placement
- Parallel structure where appropriate
- Clear subject-verb relationships
- Professional technical writing style

Your abstract:

Self-assessment checklist:

- ✓ Correct SVO order throughout? _____

- ✓ Sentence variety (at least 3 types)? _____
- ✓ No fragments or run-ons? _____
- ✓ Proper adverb placement? _____
- ✓ Clear and professional? _____

UNIT 8: PARALLEL STRUCTURE

8.1 GRAMMAR EXPLANATION

When expressing similar ideas in a list or series, all items must have the same grammatical form. This is called parallel structure or parallelism.

Parallel: Items in a series have the same grammatical structure

Not Parallel: Items have different structures

8.2 COMMON PATTERNS

LISTS WITH VERBS (SAME FORM)

✗ *The system can store data, processing requests, and to analyze patterns.*

✓ *The system can **store** data, **process** requests, and **analyze** patterns. (all base verbs)*

LISTS WITH NOUNS

✗ *The advantages include speed, efficient, and being reliable.*

✓ *The advantages include **speed**, **efficiency**, and **reliability**. (all nouns)*

LISTS WITH -ING FORMS (GERUNDS)

✓ *The tasks involve **coding**, **testing**, and **debugging**.*

LISTS WITH PHRASES

✗ *The requirements are to improve security, faster performance, and user-friendly.*

✓ *The requirements are **to improve security**, **to enhance performance**, and **to increase user-friendliness**.*

8.3 PARALLEL STRUCTURE IN COMPARISONS

When using "than" or "as...as", maintain parallel structure:

- ✗ *Writing code is easier than to debug it.*
- ✓ *Writing code is easier than debugging it.*

- ✗ *The new algorithm is as fast as using the old one.*
- ✓ *The new algorithm is as fast as the old one.*

8.4 CORRELATIVE CONJUNCTIONS

Use parallel structure with: both...and, either...or, neither...nor, not only...but also

- ✗ *The system is both efficient and has reliability.*
- ✓ *The system is both **efficient** and **reliable**.*

- ✗ *Developers must either fix the bug or rewriting the module.*
- ✓ *Developers must either **fix the bug** or **rewrite the module**.*

8.5 COMMON ERRORS

- ✗ *The API is fast, reliable, and has security.*
- ✓ *The API is fast, reliable, and secure.*

- ✗ *Our goals are improving performance, to reduce costs, and increased security.*
- ✓ *Our goals are to improve performance, to reduce costs, and to increase security.*

8.6 EXERCISES

Exercise 8.1: Identify parallel or not parallel

1. The software is efficient, reliable, and has cost-effectiveness.
2. The tasks include designing, implementing, and testing the system.

3. Python is used for web development, data analysis, and to automate tasks.
4. The algorithm is faster than the old one, more accurate, and using less memory.
5. We need to install updates, restarting the server, and configure settings.

Exercise 8.2: Correct the parallel structure errors

1. The advantages are speed, being secure, and reliability.
2. The system can collect data, analyzes it, and to generate reports.
3. Machine learning involves training models, to test them, and deployment.
4. The requirements include improving security, faster performance, and to enhance usability.
5. Developers should write clean code, testing thoroughly, and documenting their work.
6. The application is not only fast but also has reliability.
7. Either we can optimize the algorithm or rewriting it completely.
8. The process involves collecting data, to process it, and storing results.

Exercise 8.3: Complete with parallel structure

1. The three main tasks are ____, ____, and _____. (use: design, implement, test)
2. The system is ____, ____, and _____. (use adjectives)
3. Our objectives are to ____, to ____, and to _____. (use verbs)

4. The advantages include ____, ____, and _____. (use nouns)
5. Programming requires ____, ____, and _____. (use gerunds)

Exercise 8.4: Create parallel sentences

Write sentences using parallel structure for these topics:

1. Three programming languages you know (use noun phrases)
2. Steps in the software development process (use gerunds)
3. Features of a good algorithm (use adjectives)
4. Your goals as a programmer (use infinitives: to + verb)
5. Tasks in database management (use base verbs after "can")

EXERCISE 8.5: PARALLEL STRUCTURE TYPE IDENTIFICATION

Identify what type of parallel structure is used (verbs, nouns, adjectives, gerunds, infinitives, phrases, clauses).

1. "The framework is lightweight, flexible, and extensible."
 - **Type:** _____
 - **Parallel elements:** _____
2. "The process involves collecting data, cleaning it, and analyzing results."
 - **Type:** _____
 - **Parallel elements:** _____
3. "Our objectives are to improve performance, to enhance security, and to reduce costs."

- **Type:** _____
 - **Parallel elements:** _____
4. "The system demonstrates speed, reliability, and scalability."
- **Type:** _____
 - **Parallel elements:** _____
5. "The algorithm can sort arrays, search databases, and optimize queries."
- **Type:** _____
 - **Parallel elements:** _____
6. "What developers need is clear documentation, responsive support, and regular updates."
- **Type:** _____
 - **Parallel elements:** _____

EXERCISE 8.6: MULTI-LEVEL PARALLEL STRUCTURE

These sentences require parallel structure at multiple levels. Correct all parallelism errors.

1. The system is designed to be fast, have reliability, and being secure.
 - **Correction:** _____
2. We need developers who can code efficiently, testing thoroughly, and to document clearly.
 - **Correction:** _____
3. The API supports JSON format, XML responses, and to return data in CSV.
 - **Correction:** _____

4. Machine learning requires large datasets, powerful hardware, and having expertise.

○ **Correction:** _____

5. The advantages include reduced costs, improving performance, and that it's more scalable.

○ **Correction:** _____

6. The team is responsible for developing features, to fix bugs, and testing the application.

○ **Correction:** _____

EXERCISE 8.7: CORRELATIVE CONJUNCTIONS - ADVANCED

Complete these sentences using parallel structure with correlative conjunctions.

Both...and

1. The system is both _____ and _____.

○ Example: efficient and reliable (adjectives)

2. Cloud computing offers both _____ and _____.

○ Use nouns: _____

Either...or 3. Developers must either _____ or _____.

● Use verbs: _____

4. The error occurs either _____ or _____.

○ Use prepositional phrases: _____

Neither...nor 5. The algorithm is neither _____ nor _____.

● Use adjectives: _____

6. The system can neither _____ nor _____.

- Use verbs: _____

Not only...but also 7. Machine learning is not only _____ but also _____.

- Use adjectives: _____

8. The framework not only _____ but also _____.

- Use verb phrases: _____

9. Not only _____, but _____ as well.

- Use clauses: _____

Whether...or 10. Whether _____ or _____, the system continues operating. -
Use clauses: _____

EXERCISE 8.8: PARALLEL COMPARISONS

Correct the parallel structure in these comparison sentences.

1. Writing clean code is more important than to write it quickly.

- **Correction:** _____

2. The new algorithm is as efficient as using the previous version.

- **Correction:** _____

3. Debugging is harder than to write the initial code.

- **Correction:** _____

4. Testing the application is as critical as developing it.

- **Correction:** _____ (Check if correct)

5. The team prefers working remotely rather than to commute to the office.

- **Correction:** _____
- 6. Machine learning is more complex than traditional programming was.
 - **Correction:** _____
- 7. Optimizing code for speed is different from to optimize for memory.
 - **Correction:** _____
- 8. The system handles more requests than the old system could handle.
 - **Correction:** _____ (Check if correct or if it can be improved)

EXERCISE 8.9: PARALLEL STRUCTURE ACROSS CLAUSES

Maintain parallel structure when multiple clauses follow the same pattern.

Example: "We found that the algorithm was efficient, that it used less memory, and that it produced accurate results."

Complete or correct these:

1. The research shows that _____, that _____, and that _____.
 - (machine learning is effective, deep learning outperforms traditional methods, neural networks require large datasets)
 - **Your sentence:** _____
2. The system ensures _____, guarantees _____, and provides _____.
 - (Use noun phrases)
 - **Your sentence:** _____
3. We discovered that the bug occurred during runtime, the error was logged, and _____.
 - **Complete with parallel clause:** _____

4. The developer who wrote the code, who tested it thoroughly, and _____ received recognition.
- **Complete with parallel relative clause:** _____
5. Whether we use SQL or NoSQL, whether we deploy on-premise or in the cloud, and _____, the architecture must be scalable.
- **Complete with parallel clause:** _____

EXERCISE 8.10: FAULTY PARALLELISM - MIXED FORMS

These sentences mix different grammatical forms. Identify the error type and correct it.

1. **Error:** "The goals are to increase efficiency, reducing costs, and improved security."
- **Problem:** _____
 - **Correction:** _____
2. **Error:** "The system is fast, has reliability, and secure."
- **Problem:** _____
 - **Correction:** _____
3. **Error:** "Developers enjoy coding, to solve problems, and working in teams."
- **Problem:** _____
 - **Correction:** _____
4. **Error:** "The advantages include scalability, being cost-effective, and that it's reliable."
- **Problem:** _____

- **Correction:** _____
- 5. **Error:** "We can either optimize the existing code or to rewrite it from scratch."
 - **Problem:** _____
 - **Correction:** _____
- 6. **Error:** "The framework is not only powerful but also has flexibility."
 - **Problem:** _____
 - **Correction:** _____

EXERCISE 8.11: PARALLEL STRUCTURE IN TECHNICAL LISTS

Create properly parallel lists for these technical scenarios.

Scenario A: Describing system capabilities Write a sentence listing what a cloud platform can do (use base verbs):

•

Scenario B: Listing software features Write a sentence listing features of a mobile app (use noun phrases):

•

Scenario C: Describing algorithm characteristics Write a sentence describing qualities of an efficient algorithm (use adjectives):

•

Scenario D: Outlining development phases Write a sentence listing phases of software development (use gerunds):

•

Scenario E: Stating project objectives Write a sentence listing project goals (use infinitives):

•

EXERCISE 8.12: PARALLEL STRUCTURE IN COMPLEX SENTENCES

Maintain parallelism in these complex sentence structures.

1. **Conditional with multiple consequences:** "If the system crashes, we will _____, we will _____, and we will _____."
 - (lose data, need to restart, have to restore from backup)
 - **Your sentence:** _____
2. **Multiple reasons with "because":** "The algorithm is efficient because it _____, because it _____, and because it _____."
 - Use parallel clauses: _____
3. **Series of actions with time sequence:** "First, _____ ; next, _____ ; finally, _____."
 - Use parallel imperative verbs: _____
4. **Multiple characteristics introduced by "that":** "We need a system that _____, that _____, and that _____."
 - Use parallel verb phrases: _____

EXERCISE 8.13: PARALLEL STRUCTURE IN HEADERS AND OUTLINES

Headers and outline items should be parallel. Correct these outlines.

Outline A (Section headers):

1. Introduction to Cloud Computing

2. Understanding the Benefits
3. How to Deploy Applications
4. Security Considerations

Evaluation: Are these parallel? _____ **Correction (if needed):** _____

Outline B (Steps in a process):

1. Installing the software
2. Configuration of settings
3. To test the application
4. Deploy to production

Evaluation: Are these parallel? _____ **Correction:** _____

Outline C (Feature list):

1. Real-time data processing
2. Scalable architecture
3. It has advanced security
4. User-friendly interface

Evaluation: Are these parallel? _____ **Correction:** _____

EXERCISE 8.14: PARALLEL STRUCTURE WITH PREPOSITIONS

When using parallel structure, be careful with preposition repetition.

Rule: You can omit repeated prepositions, but don't mix styles.

Examples:

-  "The data is stored in the database, in the cache, and in the logs."
-  "The data is stored in the database, the cache, and the logs."
-  "The data is stored in the database, cache, and in the logs."

Evaluate and correct if needed:

1. The application runs on Windows, macOS, and on Linux.
 - **Evaluation:** _____
 - **Better version:** _____
2. We searched for the bug in the code, the database, and in the logs.
 - **Evaluation:** _____
 - **Better version:** _____
3. The system communicates with the server, with the database, and the cache.
 - **Evaluation:** _____
 - **Correction:** _____
4. Security is important for users, for developers, and companies.
 - **Evaluation:** _____
 - **Correction:** _____

EXERCISE 8.15: PARALLEL STRUCTURE IN ACADEMIC WRITING

Correct the parallel structure in these academic writing examples.

1. **Research objectives:** "The objectives of this study are to analyze system performance, evaluating security measures, and to compare different architectures."
 - **Correction:** _____
2. **Methodology description:** "Data was collected through surveys, by conducting interviews, and observing user behavior."
 - **Correction:** _____
3. **Results presentation:** "The results indicate that the algorithm is efficient, that it requires less memory, and accuracy is improved."
 - **Correction:** _____
4. **Literature review:** "Previous research has focused on improving speed, to enhance security, and reliability."
 - **Correction:** _____
5. **Conclusion:** "In conclusion, our system offers better performance, has lower costs, and is more scalable."
 - **Correction:** _____

EXERCISE 8.16: PARALLEL STRUCTURE - SENTENCE COMBINING

Combine these sentences while maintaining parallel structure.

Set 1:

- The system is fast.
- The system is reliable.
- The system is secure.

Combined: _____

Set 2:

- The algorithm can sort data.
- The algorithm can search databases.
- The algorithm can optimize queries.

Combined: _____

Set 3:

- Machine learning requires data collection.
- Machine learning requires model training.
- Machine learning requires performance evaluation.

Combined: _____

Set 4:

- Developers must write clean code.
- Developers must test thoroughly.
- Developers must document their work.

Combined: _____

EXERCISE 8.17: PARAGRAPH-LEVEL PARALLEL STRUCTURE

This paragraph lacks parallel structure in multiple places. Rewrite it with proper parallelism.

Original:

"Our cloud platform offers three main advantages. First, it provides scalability that allows businesses to grow. Second, there is cost reduction because infrastructure expenses are minimized. Third, you get enhanced security through advanced encryption. The platform is designed to be user-friendly, having reliability, and secure. Users can deploy applications, managing resources, and to monitor performance through a single dashboard. The system supports both small startups and enterprises that are large. Whether you need basic hosting or to have advanced features, our platform meets your requirements."

Your rewritten version:

EXERCISE 8.18: PARALLEL STRUCTURE WITH ARTICLES

When using parallel structure, maintain consistency with articles (a, an, the).

Examples:

-  "We need a developer, a designer, and a project manager."
-  "We need a developer, designer, and project manager."
(articles omitted)
-  "We need a developer, designer, and a project manager."
(inconsistent)

Correct these:

1. The system requires a database, server, and a load balancer.
 - **Correction:** _____
2. The project involves an architect, a developer, tester, and a manager.
 - **Correction:** _____
3. We used the Python library, the Java framework, and Ruby gem.
 - **Correction:** _____

EXERCISE 8.19: COMPLEX PARALLEL STRUCTURES

These sentences require maintaining parallelism across complex structures. Correct them.

1. "The system not only processes data in real-time but also it stores it securely and analyzing patterns efficiently."
 - **Correction:** _____
2. "Developers who write clean code, who are testing thoroughly, and documenting their work are valued."
 - **Correction:** _____
3. "The algorithm is designed to minimize memory usage, to maximize processing speed, and for improving accuracy."
 - **Correction:** _____
4. "We found that the system was efficient, it used less memory, and that performance exceeded expectations."
 - **Correction:** _____
5. "The advantages include not only cost savings but also improved performance, enhanced security, and it's reliable."

- **Correction:** _____

EXERCISE 8.20: PARALLEL STRUCTURE IN DIFFERENT CONTEXTS

Write parallel sentences for each context.

A) Technical Specifications (listing requirements): "The system must _____, _____, and _____."

- Your sentence: _____

B) User Documentation (listing steps): "To complete the installation: _____, _____, and _____."

- Your sentence: _____

C) Research Paper (stating contributions): "This paper contributes to the field by _____, _____, and _____."

- Your sentence: _____

D) Marketing Copy (highlighting benefits): "Our solution provides _____, _____, and _____."

- Your sentence: _____

E) Code Comments (describing function behavior): "This function _____, _____, and _____."

- Your sentence: _____

EXERCISE 8.21: ERROR ANALYSIS - STUDENT WRITING

This excerpt from a student's technical report contains **10 parallel structure errors**. Find and correct them all.

Student's Report:

"In this project, we developed a web application with three main goals: improving user experience, to enhance security, and performance optimization. The application is fast, reliable, and has scalability. The development process involved designing the architecture, to implement features, testing thoroughly, and deployment to production. Our team consisted of developers who could code efficiently, testers who tested carefully, and managers who were managing the project. The system supports multiple platforms, can handle high traffic, and storing data securely. Both users and administrators appreciate the interface for being intuitive, responsive, and it's accessible. The main challenges were integrating third-party APIs, to optimize database queries, and ensuring compatibility. We chose React because it's flexible, has a large community, and being well-documented. The final product not only meets requirements but also it exceeds expectations and providing additional features."

Corrections:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Corrected paragraph:

EXERCISE 8.22: PARALLEL STRUCTURE WITH NUMBERS AND LISTS

When introducing lists with numbers, maintain parallelism.

Correct these:

1. "The system has three components: (1) a database for storage, (2) processing server, and (3) to have a user interface."
 - **Correction:** _____
2. "The process involves four steps: first, collecting data; second, to clean it; third, analysis; and fourth, visualization."
 - **Correction:** _____
3. "We identified five issues: 1) performance is slow, 2) security vulnerabilities, 3) the interface is not user-friendly, 4) lack of documentation, and 5) bugs."
 - **Correction:** _____

EXERCISE 8.23: PARALLEL STRUCTURE - QUESTION FORMS

Maintain parallelism in questions as well.

Correct these:

1. "How does the algorithm work, what are its advantages, and can it scale?"
 - **Correction:** _____
2. "Where is the data stored, how is it secured, and what about backup?"
 - **Correction:** _____

3. "Who developed the system, when was it deployed, and what does it cost?"

○ **Correction:** _____ (Check if correct)

EXERCISE 8.24: PARALLEL STRUCTURE WITH TRANSITIONS

Maintain parallelism when using transitional phrases.

Complete these with parallel structures:

1. "First, the system _____ ; second, it _____ ; finally, it _____."
 - (collect, process, store data)
 - **Your sentence:** _____
2. "On one hand, the algorithm _____ ; on the other hand, it _____."
 - (Use parallel clauses)
 - **Your sentence:** _____
3. "In addition to _____, the platform provides _____ and _____."
 - (Use noun phrases)
 - **Your sentence:** _____
4. "Not only _____, but moreover _____, and furthermore _____."
 - (Use clauses)
 - **Your sentence:** _____

EXERCISE 8.25: ADVANCED PRODUCTION EXERCISE - TECHNICAL ABSTRACT

Write a 150-200 word technical abstract about a software project or research topic. Your abstract must demonstrate:

- At least THREE instances of parallel structure using different forms (verbs, nouns, adjectives, infinitives, or gerunds)
- At least ONE use of correlative conjunctions (both...and, either...or, not only...but also)
- At least ONE parallel comparison
- Perfect parallelism throughout (no errors)
- Professional technical writing style

Your abstract:

Self-check:

- Parallel structure #1 (type and location): _____
- Parallel structure #2 (type and location): _____
- Parallel structure #3 (type and location): _____
- Correlative conjunction used: _____
- Parallel comparison: _____

EXERCISE 8.26: PARALLEL STRUCTURE IN DEFINITIONS

Technical definitions often use parallel structure. Write definitions using the specified forms.

Example: "Machine learning is the process of training models, analyzing data, and making predictions."

Write definitions for:

1. **Cloud computing** (use three gerund phrases):

○

2. **Agile development** (use three noun phrases):

○

3. **Cybersecurity** (use three infinitive phrases):

○

4. **API** (use three adjective clauses with "that"):

○

EXERCISE 8.27: PARALLEL STRUCTURE - BEFORE AND AFTER

Rewrite these non-parallel sentences in two ways: (1) using one grammatical form, (2) using a different grammatical form.

Example: Original: "The system is fast, reliable, and has security."

- Version 1 (adjectives): "The system is fast, reliable, and secure."
- Version 2 (nouns): "The system offers speed, reliability, and security."

Rewrite these:

1. Original: "The goals are to improve performance, reducing costs, and enhanced security."

○ **Version 1:** _____

○ **Version 2:** _____

2. Original: "Programming involves writing code, to test it, and debugging."
 - **Version 1:** _____
 - **Version 2:** _____
3. Original: "The framework is lightweight, has flexibility, and extensible."
 - **Version 1:** _____
 - **Version 2:** _____

EXERCISE 8.28: PARALLEL STRUCTURE IN CAUSE-EFFECT RELATIONSHIPS

Maintain parallelism when expressing multiple causes or effects.

Complete these:

1. "The system crashed because _____, because _____, and because _____."
 - (Use parallel clauses)
 - **Your sentence:** _____
2. "Optimizing the code resulted in _____, _____, and _____."
 - (Use noun phrases)
 - **Your sentence:** _____
3. "The error occurred due to _____, _____, or _____."
 - (Use noun phrases)
 - **Your sentence:** _____

EXERCISE 8.29: CRITICAL ANALYSIS - EFFECTIVENESS OF PARALLEL STRUCTURE

Analyze these pairs and explain which version is more effective and why.

Pair 1:

- A: "The system provides speed, reliability, and is secure."
- B: "The system provides speed, reliability, and security."

Analysis: _____

Pair 2:

- A: "The algorithm can sort data, search databases, and query optimization."
- B: "The algorithm can sort data, search databases, and optimize queries."

Analysis: _____

Pair 3:

- A: "We need to collect data, analyze it, and then we should visualize results."
- B: "We need to collect data, analyze it, and visualize results."

Analysis: _____

EXERCISE 8.30: FINAL MASTERY CHALLENGE

Edit this technical description to correct all parallel structure errors while maintaining the original meaning. The text contains multiple types of parallelism issues.

Original Text:

"Our distributed system architecture offers several key advantages for enterprise applications. The system is designed to be scalable, having high availability, and secure. It can handle thousands of concurrent users, processing large volumes of data, and to maintain low latency. The architecture consists of three main components: a load balancer that distributes traffic, application servers for processing requests, and databases that are storing data. Each component is optimized for performance, reliability, and to ensure fault tolerance. The load balancer not only distributes traffic evenly but also it monitors server health and rerouting requests when failures occur. Application servers can process requests independently, to scale horizontally, and communicate through message queues. The database layer provides data persistence, ensures consistency, and implementing replication for redundancy. Administrators can monitor system performance, managing resources, and to configure settings through a centralized dashboard. The system supports both synchronous and asynchronous processing, can integrate with third-party services, and providing RESTful APIs. Our benchmarks show that the architecture is faster than traditional monolithic systems, more reliable, and costs less to maintain. Whether you need basic functionality or to have advanced features, our platform meets your requirements. In conclusion, the system offers improved performance, enhanced security, it's cost-effective, and provides excellent scalability for growing businesses."

Your corrected version:

Summary of corrections:

- Total errors found: _____
- Main error types: _____

- Most challenging correction: _____

EXERCISE 8.31: REAL-WORLD APPLICATION - JOB DESCRIPTION

Write a job description for a software developer position (150 words) that demonstrates excellent use of parallel structure. Include:

- List of responsibilities (use parallel verbs)
- Required qualifications (use parallel noun phrases or adjectives)
- Desired skills (use parallel items)
- What the company offers (use parallel benefits)

Your job description:

EXERCISE 8.32: PEER REVIEW EXERCISE

Exchange paragraphs with a partner (or use the sample below) and identify all parallel structure issues.

Sample paragraph for review:

"Modern web development requires mastery of multiple technologies. Frontend developers must know HTML for structure, CSS for styling, and to write JavaScript for interactivity. They should be familiar with frameworks like React, Vue, or using Angular. Backend development involves working with databases, to create APIs, and server configuration. Full-stack developers combine both skillsets, can work independently, and often leading small teams. The best developers are those who write clean code, testing thoroughly, document well, and who are continuously learning. Whether you're building simple websites or to develop complex applications, understanding these fundamentals and having practical experience is essential for success in the field."

Your analysis:

- Number of parallel structure errors: _____
- Errors identified with corrections:
 - 1.
 - 2.
 - 3.
- (continue as needed)

UNIT 9: REPORTING VERBS AND CITATIONS

9.1 GRAMMAR EXPLANATION

Reporting verbs are used to cite sources, present research findings, and discuss other authors' work.

9.2 CATEGORIES BY STRENGTH

NEUTRAL (PRESENTING INFORMATION):

- state, describe, show, present, report, note, observe, find, explain, define

Smith (2023) **describes** the algorithm as efficient.

STRONG (CONFIDENT ASSERTION):

- argue, claim, assert, demonstrate, prove, confirm, establish, emphasize, maintain

The researchers **demonstrate** that the method improves accuracy.

WEAK/TENTATIVE (SUGGESTION/HYPOTHESIS):

- suggest, indicate, propose, hypothesize, speculate, imply, hint

The results **suggest** that further testing is needed.

CRITICAL/NEGATIVE:

- criticize, challenge, question, dispute, reject, refute, contradict

Johnson (2022) **challenges** the assumption that...

9.3 COMMON GRAMMAR PATTERNS

Pattern 1: Verb + that + clause *The authors argue **that** machine learning improves accuracy.*

Pattern 2: Verb + noun phrase *The study presents **a new approach** to encryption.*

Pattern 3: According to + author ***According to** Martinez (2024), cloud computing offers scalability.*

Pattern 4: Author + verb + that/how/whether *Kumar (2023) explains **how** blockchain ensures security.*

9.4 TENSE WITH REPORTING VERBS

Present simple: For current relevance or established ideas
Smith argues that security is crucial.

Past simple: For completed research
The researchers demonstrated the effectiveness of the algorithm.

Present perfect: For recent work with current relevance
Several studies have shown improvements in performance.

9.5 COMMON ERRORS

✗ **According to the research, it shows that...**

✓ **The research shows that...** OR **According to the research,...**

✗ **Smith argues the algorithm is efficient.**

✓ **Smith argues that the algorithm is efficient.**

✗ **The study suggest that more testing needs.**

✓ **The study suggests that more testing is needed.**

9.6 EXERCISES

Exercise 9.1: Choose the appropriate reporting verb

1. The researchers (argue/suggest/note) that quantum computing will revolutionize cryptography. (strong claim)
2. The paper (describes/demonstrates/challenges) three optimization techniques. (neutral)
3. Johnson (2023) (questions/states/confirms) the validity of previous assumptions. (critical)
4. The data (indicates/proves/claims) a positive correlation. (tentative)
5. The authors (establish/speculate/present) that the algorithm is optimal. (strong)

Exercise 9.2: Complete with correct patterns

1. According ____ Martinez (2024), AI ____ transform healthcare.
2. The study suggests ____ further research ____ needed.
3. The researchers demonstrate ____ their method reduces errors ____ 30%.
4. Smith argues ____ security should be a priority.
5. The paper explains ____ blockchain works.

Exercise 9.3: Choose the correct tense

1. Kumar (2023) (demonstrates/demonstrated) that the algorithm is efficient.
2. Several studies (show/showed/have shown) improvements in recent years.
3. In 1991, Berners-Lee (creates/created/has created) the World Wide Web.
4. Recent research (indicates/indicated/has indicated) new possibilities.

5. Thompson (argues/argued/has argued) consistently throughout his career that...

Exercise 9.4: Correct the errors

1. According to the research, it argues that AI is important.
2. The study suggest more testing needs.
3. Smith demonstrates the algorithm's efficiency in his paper of 2022.
4. The authors explains how the system work.
5. According Johnson, security should be priority.
6. The research shows about the benefits of cloud computing.

Exercise 9.5: Write citation sentences

Create sentences using these reporting verbs to cite fictional sources:

1. argue (Chen, 2024 / machine learning / improve predictions)
2. suggest (the study / further research / required)
3. demonstrate (Rodriguez, 2023 / new algorithm / reduce complexity)
4. challenge (the authors / previous assumptions / scalability)
5. according to (the report / cybersecurity threats / increasing)

EXERCISE 9.6: REPORTING VERB CLASSIFICATION

Categorize these reporting verbs by strength and function. Then use each in a sentence.

Verbs to classify: acknowledge, contend, highlight, observe, posit, reveal, stress, submit, warn, advocate

Category	Verbs	Example Sentence
----------	-------	------------------

Neutral

Strong

Tentative

Critical

Emphasis

EXERCISE 9.7: REPORTING VERB NUANCES

Explain the subtle difference in meaning between these pairs of reporting verbs, then write example sentences.

1. **argue vs. claim**

- **Difference:** _____
- **Example with "argue":** _____
- **Example with "claim":** _____

2. **suggest vs. propose**

- **Difference:** _____

○ Example with "suggest": _____

○ Example with "propose": _____

3. **show vs. demonstrate**

○ Difference: _____

○ Example with "show": _____

○ Example with "demonstrate": _____

4. **question vs. challenge**

○ Difference: _____

○ Example with "question": _____

○ Example with "challenge": _____

5. **find vs. discover**

○ Difference: _____

○ Example with "find": _____

○ Example with "discover": _____

EXERCISE 9.8: GRAMMAR PATTERNS WITH REPORTING VERBS

Complete these sentences using the correct pattern for each reporting verb.

Pattern A: Verb + that + clause

1. Smith (2024) argues _____ machine learning _____ transforming healthcare.

2. The researchers found _____ the algorithm _____ 95% accuracy.

Pattern B: Verb + noun/noun phrase 3. The study presents _____ (new framework / data encryption) 4. Martinez (2023) proposes _____ (innovative solution / this problem)

Pattern C: Verb + how/what/whether/why + clause 5. The paper explains _____ neural networks _____ patterns. 6. Johnson questions _____ the approach _____ scalable.

Pattern D: Verb + preposition + noun 7. The authors focus _____ security vulnerabilities. 8. Recent research points _____ the need for better protocols.

Pattern E: Verb + object + preposition 9. The study attributes the improvement _____ better algorithms. 10. Critics blame the failure _____ poor design.

EXERCISE 9.9: STRENGTH APPROPRIATENESS

Choose the reporting verb with appropriate strength for each context.

1. **Context:** Citing well-established, peer-reviewed findings "The research _____ (suggests/demonstrates/speculates) that encryption is essential for data security."
 - **Best choice:** _____
 - **Why:** _____
2. **Context:** Presenting preliminary, exploratory findings "Our pilot study _____ (proves/indicates/establishes) that this approach may be effective."
 - **Best choice:** _____
 - **Why:** _____
3. **Context:** Citing a controversial or disputed claim "The author _____ (shows/claims/notes) that quantum computers will replace classical computers within five years."
 - **Best choice:** _____
 - **Why:** _____

4. **Context:** Presenting objectively reported data "The report _____ (asserts/presents/argues) statistics on cybersecurity incidents."
- **Best choice:** _____
 - **Why:** _____
5. **Context:** Criticizing a flawed methodology "Several researchers _____ (describe/challenge/note) the validity of this experimental design."
- **Best choice:** _____
 - **Why:** _____

EXERCISE 9.10: TENSE SELECTION WITH REPORTING VERBS

Choose the appropriate tense based on context.

1. Turing _____ (describes/described/has described) the concept of universal computation in 1936.
- **Choice:** _____
 - **Reason:** _____
2. Recent studies _____ (show/showed/have shown) significant improvements in AI performance.
- **Choice:** _____
 - **Reason:** _____
3. Smith (2024) _____ (argues/argued/has argued) that cloud computing offers cost benefits.
- **Choice:** _____
 - **Reason:** _____

4. Since 2010, researchers _____ (develop/developed/have developed) numerous deep learning architectures.
- **Choice:** _____
 - **Reason:** _____
5. The seminal paper published last year _____ (demonstrates/demonstrated/has demonstrated) the effectiveness of this approach.
- **Choice:** _____
 - **Reason:** _____
6. Thompson _____ (maintains/maintained/has maintained) throughout his career that security should be prioritized.
- **Choice:** _____
 - **Reason:** _____

EXERCISE 9.11: "ACCORDING TO" PATTERN - COMMON ERRORS

Correct these common errors with "according to" constructions.

1. According to the research, it shows that AI improves efficiency.
- **Error:** _____
 - **Correction:** _____
2. According Smith (2024), security is crucial.
- **Error:** _____
 - **Correction:** _____
3. According to Johnson, he argues that testing is important.

- **Error:** _____
- **Correction:** _____

4. According to the study shows increased performance.

- **Error:** _____
- **Correction:** _____

5. The system is efficient according to the research suggests.

- **Error:** _____
- **Correction:** _____

EXERCISE 9.12: REPORTING VERB + THAT-CLAUSE

Some reporting verbs require "that," while others can omit it. Determine if "that" is required, optional, or incorrect.

Rule of thumb: "That" is usually optional but clearer when included, especially in formal academic writing.

Evaluate these:

1. The study suggests (that) further research is needed.

- **Status:** _____

2. Smith argues the algorithm is efficient.

- **Status:** _____
- **Better version:** _____

3. The data shows that performance improved.

- **Status:** _____

4. According to Martinez that the system is reliable.

- **Status:** _____
- **Correction:** _____

5. The researchers demonstrate how that the method works.

- **Status:** _____
- **Correction:** _____

EXERCISE 9.13: REPORTING VERBS IN LITERATURE REVIEWS

Write literature review sentences using the specified reporting verbs and patterns.

Topic: Machine Learning in Healthcare

1. Use **"argue"** (strong claim, present tense): Chen (2024) _____
2. Use **"demonstrate"** (evidence-based, past tense): The study by Rodriguez et al. (2023) _____
3. Use **"suggest"** (tentative, present perfect): Several researchers _____
4. Use **"challenge"** (critical, present tense): However, Thompson (2024) _____
5. Use **"highlight"** (emphasis, past tense): Martinez's review (2022) _____
6. Use **"propose"** (suggestion, past tense): Kumar and Lee (2023) _____

EXERCISE 9.14: MULTIPLE CITATIONS IN ONE SENTENCE

Combine information from multiple sources using appropriate reporting verbs.

Example: "While Smith (2023) argues that cloud computing is cost-effective, Johnson (2024) suggests that security concerns may outweigh the benefits."

Combine these:

1. **Sources:** Chen (2024): AI improves diagnosis accuracy | Rodriguez (2023): AI has limitations in rare diseases
 - **Your sentence:** _____
2. **Sources:** Multiple studies: machine learning is effective | Critics: more validation needed
 - **Your sentence:** _____
3. **Sources:** Thompson (2023): quantum computing will revolutionize cryptography | Martinez (2024): practical applications are decades away
 - **Your sentence:** _____

EXERCISE 9.15: INTEGRAL VS. NON-INTEGRAL CITATIONS

Integral citation: Author is part of the sentence structure

- Example: "Smith (2024) argues that encryption is essential."

Non-integral citation: Author is in parentheses

- Example: "Encryption is essential (Smith, 2024)."

Convert between forms:

1. **Integral → Non-integral:** "Kumar (2023) demonstrates that the algorithm reduces complexity."
 - **Non-integral version:** _____

2. **Non-integral → Integral:** "Cloud computing offers significant cost savings (Martinez, 2024)."
 - **Integral version:** _____
3. **Integral → Non-integral:** "Johnson and Lee (2022) suggest that further research is needed."
 - **Non-integral version:** _____
4. **When to use which?**
 - Use integral when: _____
 - Use non-integral when: _____

EXERCISE 9.16: REPORTING QUESTIONS AND UNCERTAINTIES

Use appropriate reporting verbs to discuss research questions and uncertainties.

Reporting verbs for questions: question, wonder, ask, inquire, examine, investigate, explore

Complete these:

1. The researchers _____ whether machine learning can improve prediction accuracy.
2. Smith (2024) _____ the assumption that more data always leads to better models.
3. The study _____ the relationship between algorithm complexity and performance.
4. Several authors _____ how blockchain can ensure data integrity.
5. Martinez _____ if quantum computing will make current encryption obsolete.

EXERCISE 9.17: REPORTING METHODOLOGIES

Use appropriate verbs to describe research methods.

Common verbs: use, employ, apply, adopt, implement, conduct, perform, carry out, utilize

Write sentences describing methodology:

1. **Data collection method:**
2. **Analytical approach:**
3. **Experimental procedure:**
4. **Testing methodology:**

EXERCISE 9.18: REPORTING RESULTS AND FINDINGS

Use appropriate verbs to present results.

Common verbs: find, reveal, show, indicate, demonstrate, discover, observe, detect, identify

Write result sentences:

1. **Statistical finding:** The analysis _____
2. **Experimental outcome:** The experiments _____
3. **Observational data:** The study _____
4. **Comparison result:** The comparison _____

EXERCISE 9.19: HEDGING WITH REPORTING VERBS

Academic writing often requires hedging (cautious language). Compare strong vs. hedged versions.

Rewrite these strong claims with appropriate hedging:

1. **Strong:** "The research proves that AI will replace human programmers."
☐ **Hedged:** _____
2. **Strong:** "The data shows that cloud computing is always more cost-effective."
☐ **Hedged:** _____
3. **Strong:** "The study establishes that quantum computers will solve all cryptographic problems."
☐ **Hedged:** _____
4. **Strong:** "The experiments confirm that this approach is optimal in all cases."
☐ **Hedged:** _____

EXERCISE 9.20: ERROR CORRECTION - MULTIPLE ISSUES

Each sentence has one or more errors with reporting verbs. Correct them.

1. According to Smith, he argues that security should be priority.
☐ **Correction:** _____
2. The study suggest that more data is needed for training the model.
☐ **Correction:** _____
3. Johnson (2023) demonstrates about how the algorithm works efficiently.
☐ **Correction:** _____
4. The researchers explains the system's architecture in their paper.

- **Correction:** _____
- 5. According to the report shows increased cybersecurity threats.
 - **Correction:** _____
- 6. Martinez argues the new framework is more scalable than existing solutions.
 - **Correction:** _____
- 7. The data indicates about a positive correlation between variables.
 - **Correction:** _____
- 8. According Thompson, encryption is essential for data protection.
 - **Correction:** _____

EXERCISE 9.21: PARAGRAPH-LEVEL CITATIONS

Write a literature review paragraph (100-150 words) on a technical topic.
Include:

- At least 5 different reporting verbs
- At least 3 different citation patterns
- Appropriate tense usage
- Both integral and non-integral citations
- A mix of neutral, strong, and tentative verbs

Topic: Artificial Intelligence in Cybersecurity (or choose your own)

Your paragraph:

Self-check:

- Reporting verbs used: _____
- Citation patterns: _____
- Tenses used: _____

EXERCISE 9.22: SYNTHESIZING MULTIPLE SOURCES

Academic writing often requires synthesizing information from multiple sources. Practice this skill.

Given these source findings:

- Source A (Chen, 2024): Deep learning improves image recognition accuracy
- Source B (Rodriguez, 2023): Deep learning requires large datasets
- Source C (Thompson, 2024): Deep learning training is computationally expensive
- Source D (Kumar, 2022): Some tasks don't require deep learning

Write a synthesis paragraph using appropriate reporting verbs:

EXERCISE 9.23: REPORTING VERBS WITH DIFFERENT STRUCTURES

Match the reporting verb with its typical grammatical structure(s).

Verbs: argue, describe, suggest, explain, demonstrate, propose, indicate, challenge, emphasize, examine

Structures:

- that + clause
- noun phrase
- how/what/why/whether + clause

- preposition + noun

Create a reference table and example for each:

Verb	Typical Structure(s)	Example
argue		
describe		
suggest		

EXERCISE 9.24: REPORTING CONFLICTING VIEWS

Use reporting verbs to present contrasting or conflicting research findings.

Useful phrases:

- While X argues..., Y suggests...
- Although X demonstrates..., Y questions...
- X claims..., however, Y challenges...
- Contrary to X's findings, Y shows...

Write sentences showing conflict between:

1. **Optimistic vs. pessimistic views on AI:**
2. **Different methodological approaches:**

3. **Theoretical vs. practical perspectives:**
4. **Competing hypotheses:**

EXERCISE 9.25: REPORTING VERB CHAINS

Sometimes you need to report what one author says about another author's work.

Example: "Smith (2024) challenges Johnson's (2022) assertion that quantum computing will revolutionize cryptography."

Create reporting chains for these scenarios:

1. Author A criticizes Author B's methodology:
2. Author C builds on Author D's findings:
3. Author E questions Author F's interpretation:

EXERCISE 9.26: REPORTING VERBS IN DIFFERENT PAPER SECTIONS

Different sections of research papers use reporting verbs differently. Write appropriate sentences for each section.

Introduction (citing background and gaps):

1. _____

Literature Review (presenting and evaluating previous work): 2. _____

Methodology (describing your approach, possibly citing methods): 3. _____

Results (presenting findings, possibly comparing to others): 4. _____

Discussion (interpreting and contextualizing): 5. _____

Conclusion (summarizing contributions, possibly citing future work): 6. _____

EXERCISE 9.27: NOMINALIZATION WITH REPORTING VERBS

Academic writing often uses noun forms of reporting verbs.

Verb → Noun transformations:

- argue → argument
- suggest → suggestion
- demonstrate → demonstration
- propose → proposal
- analyze → analysis

Rewrite using nominalization:

1. **Verb form:** "Smith argues that security should be prioritized."
 - **Noun form:** "Smith's argument is that..." OR "Smith makes the argument that..."
 - **Your version:** _____
2. **Verb form:** "The study suggests that further research is needed."
 - **Noun form:** _____
3. **Verb form:** "Johnson proposes a new framework for data encryption."
 - **Noun form:** _____
4. **Verb form:** "The researchers demonstrate the algorithm's effectiveness."
 - **Noun form:** _____

EXERCISE 9.28: REPORTING STATISTICAL INFORMATION

Use appropriate verbs and structures to report statistical findings.

Common patterns:

- The study found/showed/revealed that X% of...
- The data indicates/suggests that there is a correlation between...
- The analysis demonstrates/shows a significant difference...

Report these findings:

1. **Finding:** 85% of participants preferred the new interface
 - **Your sentence:** _____
2. **Finding:** Strong positive correlation ($r=0.87$) between training data size and accuracy
 - **Your sentence:** _____
3. **Finding:** Statistically significant improvement ($p<0.05$) with new algorithm
 - **Your sentence:** _____
4. **Finding:** Performance increased by 40% after optimization
 - **Your sentence:** _____

EXERCISE 9.29: REPORTING DEFINITIONS AND EXPLANATIONS

Use appropriate verbs to report how authors define or explain concepts.

Useful verbs: define, explain, describe, characterize, conceptualize, term, refer to

Write sentences:

1. **Defining a technical term:** Smith (2024) _____ machine learning as _____
2. **Explaining a concept:** The paper _____ how blockchain _____
3. **Characterizing a phenomenon:** Johnson _____ cybersecurity threats as _____
4. **Describing a process:** The study _____ the steps involved in _____

EXERCISE 9.30: ERROR ANALYSIS - STUDENT LITERATURE REVIEW

This excerpt from a student's literature review contains **10 errors** with reporting verbs and citations. Identify and correct them.

Student's Text:

"According to the research shows that machine learning is effective for image recognition. Smith argues about deep learning requires large datasets. The study suggest that convolutional neural networks performs well on this task. Johnson (2023) describes about how the algorithm works. According to Martinez, he claims that more research is needed. The data indicates about a positive trend. Several researchers has demonstrated the effectiveness of this approach. Thompson explains the benefits of using GPU acceleration in his paper of 2022. According the report, cybersecurity threats is increasing. The authors argues that quantum computing will revolutionize the field."

Errors and corrections:

- 1.
- 2.
- 3.
- 4.
- 5.

- 6.
- 7.
- 8.
- 9.
- 10.

Corrected version:

EXERCISE 9.31: REPORTING DIRECT QUOTES VS. PARAPHRASING

Academic writing typically favors paraphrasing over direct quotes. Practice both.

Original source (Smith, 2024): "Machine learning algorithms require careful tuning of hyperparameters to achieve optimal performance."

1. **Direct quote (when to use):**
☐
2. **Paraphrase with reporting verb:**
☐
3. **Indirect speech:**
☐

When should you use direct quotes vs. paraphrasing?

- Use direct quotes when: _____
- Use paraphrasing when: _____

EXERCISE 9.32: REPORTING VERBS WITH MODAL VERBS

Combine reporting verbs with modal verbs appropriately.

Examples:

- "Smith argues that developers should prioritize security."
- "The study suggests that the algorithm could be improved."

Write sentences combining:

1. **argue + must:**
2. **suggest + might:**
3. **recommend + should:**
4. **propose + could:**
5. **claim + will:**

EXERCISE 9.33: REPORTING TRENDS AND DEVELOPMENTS

Use appropriate verbs to report trends over time.

Useful verbs: observe, note, track, document, record, report

Write sentences about trends:

1. **Increasing trend:** Recent studies _____
2. **Emerging pattern:** Researchers _____
3. **Declining phenomenon:** The data _____
4. **Stable situation:** Multiple sources _____

EXERCISE 9.34: REPORTING RECOMMENDATIONS AND IMPLICATIONS

Use appropriate verbs for recommendations and implications sections.

For recommendations: recommend, suggest, propose, advocate, urge, call for, advise

For implications: imply, suggest, indicate, mean, signify

Write sentences:

1. **Practical recommendation:** The authors _____ that organizations _____
2. **Theoretical implication:** The findings _____ that _____
3. **Policy recommendation:** The report _____
4. **Future research suggestion:** The study _____ that further investigation _____

EXERCISE 9.35: MULTIPLE REPORTING VERBS IN COMPLEX SENTENCES

Combine multiple reporting verbs in sophisticated academic sentences.

Example: "While Smith (2024) argues that security should be prioritized, he acknowledges that performance cannot be ignored and suggests that developers must balance both concerns."

Write complex sentences:

1. **Combining agreement and disagreement:**
2. **Presenting a claim and supporting evidence:**
3. **Showing evolution of ideas:**

EXERCISE 9.36: REPORTING VERBS IN TECHNICAL DOCUMENTATION

Technical documentation uses reporting verbs differently than academic papers. Adapt your style.

Academic style: "Smith (2024) demonstrates that the algorithm reduces complexity."

Technical documentation style: "The algorithm reduces complexity, as demonstrated by Smith (2024)." OR "This approach reduces complexity (Smith, 2024)."

Convert academic to technical style:

1. **Academic:** "Johnson argues that microservices improve scalability."
 - **Technical:** _____
2. **Academic:** "The study shows that caching improves performance."
 - **Technical:** _____
3. **Academic:** "Research suggests that encryption is essential."
 - **Technical:** _____

EXERCISE 9.37: REPORTING METHODOLOGY FROM MULTIPLE STUDIES

Synthesize methodological approaches from multiple studies.

Given these methodologies:

- Study A: Used surveys with 500 participants
- Study B: Conducted laboratory experiments
- Study C: Analyzed existing datasets

- Study D: Employed mixed methods approach

Write a synthesis:

EXERCISE 9.38: CRITICAL ANALYSIS - VERB CHOICE EFFECTIVENESS

Analyze these pairs and explain which reporting verb choice is more effective and why.

Pair 1:

- A: "The author says that security is important."
- B: "The author emphasizes that security is critical."

Analysis: _____

Pair 2:

- A: "The research proves that AI is effective."
- B: "The research suggests that AI may be effective."

Analysis: _____

Pair 3:

- A: "Smith talks about the benefits of cloud computing."
- B: "Smith discusses the benefits of cloud computing."

Analysis: _____

EXERCISE 9.39: PRODUCTION EXERCISE - LITERATURE REVIEW SECTION

Write a complete literature review section (250-300 words) on a technical topic of your choice. Your literature review must demonstrate:

- At least 8 different reporting verbs from different strength categories
- Appropriate tense usage throughout
- Both integral and non-integral citations
- At least one instance of synthesizing multiple sources
- At least one instance of reporting conflicting views
- Proper use of citation patterns (that-clauses, noun phrases, etc.)
- Academic tone and style

Your literature review:

Self-assessment:

- Reporting verbs used (list with categories): _____
- Tenses used and justification: _____
- Integration of sources (effective synthesis?): _____
- Any areas for improvement: _____

EXERCISE 9.40: FINAL MASTERY CHALLENGE

Edit this problematic literature review paragraph. It contains multiple issues with reporting verbs, tenses, citation patterns, and academic style.

Original Paragraph:

"Machine learning has become very important in cybersecurity. According to Smith, he says that AI can detect threats better than traditional methods. The study by Johnson shows about how machine learning algorithms works. Martinez (2023) talks about the benefits of using neural networks for intrusion detection, he argues the accuracy is improved significantly. According to the research suggests that deep learning is effective. Several authors has demonstrated about the potential of AI in this field. Thompson says in his paper of 2022 that more research is needed, he questions if current approaches are scalable. The data shows about significant improvements. Rodriguez argues machine learning will transform cybersecurity. According to Kumar, he claims that organizations should adopting these technologies immediately. The findings indicates that AI-based systems detects threats faster than conventional systems."

Your corrected and improved version:

Summary of main corrections:

1. Reporting verb errors: _____
2. Tense errors: _____
3. Citation pattern errors: _____
4. Style improvements: _____
5. Other issues: _____

UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES

10.1 IRREGULAR VERBS

Many common verbs have irregular past and past participle forms.

Common Irregular Verbs in Technical Writing:

Base Form	Past Simple	Past Participle
write	wrote	written
make	made	made
find	found	found
run	ran	run
build	built	built
send	sent	sent
give	gave	given
take	took	taken
get	got	gotten/got

do	did	done
go	went	gone
become	became	become
begin	began	begun
choose	chose	chosen
know	knew	known

10.2 CONFUSING WORD PAIRS

AFFECT VS. EFFECT

- **Affect** (verb): to influence
The bug affects performance.
- **Effect** (noun): a result
The effect of optimization was significant.

ASSURE VS. ENSURE VS. INSURE

- **Assure**: to promise or convince (person)
I assure you the system is secure.
- **Ensure**: to make certain (thing)
We ensure data integrity.

- **Insure:** to protect financially
Insure your equipment against damage.

ITS VS. IT'S

- **Its:** possessive
The system has its limitations.
- **It's:** it is/it has
It's important to test thoroughly.

THAN VS. THEN

- **Than:** comparison
Python is easier than C++.
- **Then:** time sequence
First compile, then run the program.

WHICH VS. THAT

- **That:** restrictive clause (essential information, no commas)
The algorithm that we developed is efficient.
- **Which:** non-restrictive clause (additional information, use commas)
The algorithm, which took three months to develop, is efficient.

10.3 PRONOUN REFERENCE ERRORS

Pronouns (it, this, they, which) must clearly refer to a specific noun.

✗ The system crashed and the data was lost. This is a serious problem.
(What does "this" refer to? The crash or the data loss?)

✓ The system crashed and the data was lost. This data loss is a serious problem.

✗ When you connect the server to the network, make sure it is secure.
(Which one? The server or network?)

✓ When you connect the server to the network, make sure the connection is secure.

10.4 CORRECTION STRATEGIES

STRATEGY 1: READ ALOUD

Reading your writing aloud helps identify:

- Awkward phrasing
- Missing words
- Run-on sentences

STRATEGY 2: SYSTEMATIC PROOFREADING

Read multiple times, checking for one type of error each time:

1. First pass: Sentence fragments and run-ons
2. Second pass: Subject-verb agreement
3. Third pass: Verb tenses
4. Fourth pass: Articles and prepositions
5. Fifth pass: Spelling and punctuation

STRATEGY 3: REVERSE EDITING

Read your text backward (last sentence to first) to focus on individual sentences rather than content flow.

STRATEGY 4: USE TOOLS WISELY

- Grammar checkers can help but aren't always correct
- Have peers review your work

- Maintain a personal error log

10.5 EXERCISES

Exercise 10.1: Irregular verb forms

Fill in the correct form:

1. We ____ (write) the code last week and have ____ (write) documentation this week.
2. The system has ____ (run) smoothly since we ____ (run) the tests.
3. The programmer ____ (make) several changes and has ____ (make) improvements.
4. They ____ (find) the bug yesterday after they had ____ (find) similar issues before.
5. The project ____ (begin) in January and has ____ (begin) to show results.

Exercise 10.2: Confusing word pairs

Choose the correct word:

1. The update will (affect/effect) system performance.
2. The (affect/effect) of the optimization was significant.
3. (Its/It's) important to backup data regularly.
4. The database has (its/it's) own encryption system.
5. Python is more versatile (than/then) Java for data science.
6. First install the software, (than/then) configure the settings.
7. We use encryption to (ensure/assure/insure) data security.
8. The manager (ensured/assured/insured) the team that the deadline was achievable.

Exercise 10.3: Which vs. That

1. The algorithm ____ we implemented is very efficient.
2. The server, ____ cost \$50,000, handles all requests.
3. The code ____ contains errors needs to be reviewed.
4. Python, ____ was created in 1991, is popular today.
5. The function ____ returns the result is optimized.

Exercise 10.4: Fix pronoun reference errors

Rewrite these sentences to eliminate ambiguity:

1. When you connect the device to the computer, make sure it is turned on.
2. The program reads the file and processes the data. This takes several minutes.
3. The developers met with the clients, and they discussed the requirements.
4. The system generates reports and sends them to users. This is automatic.
5. The algorithm compares values and sorts them. Which improves performance.

Exercise 10.5: Comprehensive error correction

Correct all errors in these sentences:

1. The algorithm what we developed are very efficient and run quick.
2. According to the research, it shows that machine learning are transforming industries.
3. The system was design to handle large data, but it's performance is limiting.
4. We have wrote the code in python and have ran extensive tests.

5. The effect of optimization was significant, it improve performance by 40%.
6. Each of the programs have its own advantages and disadvantages.
7. The data was collect during three months and then was analyzed.
8. Because the server crashed and data was lost.

EXERCISE 10.6: ADVANCED IRREGULAR VERB PRACTICE

Complete these technical sentences with the correct form of the irregular verb in parentheses.

1. The developers _____ (build) the application last year and have _____ (build) several updates since then.
2. After the system had _____ (run) for 24 hours, we _____ (find) a memory leak.
3. The team _____ (choose) Python for the project after they had _____ (choose) Java for the previous one.
4. We _____ (send) the report yesterday, just as we had _____ (send) the preliminary data last week.
5. The error _____ (become) apparent during testing after the code had _____ (become) more complex.
6. She _____ (write) the documentation after she had _____ (write) the unit tests.
7. They _____ (make) significant improvements since they _____ (make) the initial release.
8. The server has _____ (run) continuously since we _____ (run) the deployment script.
9. We _____ (get) approval for the project after we had _____ (get) budget estimates.

10. The algorithm _____ (begin) processing data at midnight and has _____ (begin) producing results.

EXERCISE 10.7: EXTENDED CONFUSING WORD PAIRS

Choose the correct word from each pair.

Complement vs. Compliment

1. The new feature _____ (complements/compliments) the existing functionality perfectly.
2. The client _____ (complemented/complimented) the team on their excellent work.

Principal vs. Principle 3. Security is the _____ (principal/principle) concern for this project. 4. The system operates on the _____ (principal/principle) of least privilege. 5. The _____ (principal/principle) developer designed the architecture.

Lose vs. Loose 6. Without proper backup, we might _____ (lose/loose) critical data. 7. The network cable connection is too _____ (lose/loose) and needs tightening.

Accept vs. Except 8. The system will _____ (accept/except) all valid input formats. 9. All tests passed _____ (accept/except) the performance benchmark.

Advice vs. Advise 10. The consultant's _____ (advice/advise) was helpful. 11. We _____ (advice/advise) users to change passwords regularly.

Cite vs. Site vs. Sight 12. Remember to _____ (cite/site/sight) all sources in your research paper. 13. The server is hosted at a data center _____ (cite/site/sight) in Virginia. 14. The error message appeared in plain _____ (cite/site/sight).

Stationary vs. Stationery 15. The mobile device must remain _____ (stationary/stationery) during calibration.

Discreet vs. Discrete 16. The algorithm processes _____ (discreet/discrete) data points separately. 17. We need to be _____ (discreet/discrete) about the security vulnerability until it's patched.

EXERCISE 10.8: MORE CONFUSING PAIRS IN TECHNICAL CONTEXT

Further vs. Farther

1. The server is located _____ (further/farther) from the main office than expected.
2. _____ (Further/Farther) investigation revealed additional bugs.

Continuous vs. Continual 3. The system provides _____ (continuous/continual) monitoring 24/7. 4. We made _____ (continuous/continual) improvements throughout the development process.

Imply vs. Infer 5. The error message _____ (implies/infers) that the connection failed. 6. From the logs, we can _____ (imply/infer) that the crash occurred at midnight.

Fewer vs. Less 7. The optimized algorithm uses _____ (fewer/less) memory. 8. The new version has _____ (fewer/less) bugs than the previous one.

Amount vs. Number 9. A large _____ (amount/number) of data needs to be processed. 10. The _____ (amount/number) of active users has increased.

EXERCISE 10.9: THAT VS. WHICH - ADVANCED

Choose "that" or "which" and add commas where necessary.

1. The algorithm _____ we developed last year is now obsolete.
2. Python _____ is known for its simplicity has become very popular.
3. The servers _____ handle the most traffic are located in the US.
4. Machine learning _____ requires large datasets is computationally expensive.

5. The code _____ passes all tests will be deployed to production.
6. The React framework _____ was developed by Facebook is widely used.
7. Any function _____ returns null should be refactored.
8. The database _____ we migrated to last month has better performance.

Now explain: When should you use "that" vs. "which"?

- Use "that" when: _____
- Use "which" when: _____

EXERCISE 10.10: PRONOUN REFERENCE - AMBIGUITY RESOLUTION

These sentences have ambiguous pronoun references. Rewrite them for clarity.

1. The system communicates with the database, and it occasionally crashes.
 - **Problem:** _____
 - **Rewrite:** _____
2. When developers write code without proper testing, this causes problems.
 - **Problem:** _____
 - **Rewrite:** _____
3. The algorithm processes the input and validates the output, which takes time.
 - **Problem:** _____
 - **Rewrite:** _____

4. The manager told the developer that he needed to improve his communication skills.
 - **Problem:** _____
 - **Rewrite:** _____
5. We updated the documentation and revised the code. This was necessary.
 - **Problem:** _____
 - **Rewrite:** _____
6. The API sends requests to the server, and it responds with JSON.
 - **Problem:** _____
 - **Rewrite:** _____
7. Remove the corrupted file from the directory before you delete it.
 - **Problem:** _____
 - **Rewrite:** _____
8. The system generates reports for users, which are stored in the database.
 - **Problem:** _____
 - **Rewrite:** _____

EXERCISE 10.11: VAGUE "THIS/THESE/THAT/THOSE"

Strengthen these sentences by making vague pronouns more specific.

Example:

- Weak: "The algorithm is inefficient. This is a problem."
- Strong: "The algorithm is inefficient. This inefficiency is a problem."

Improve these:

1. The system crashed during peak hours. This frustrated users.
 - **Improved:** _____
2. We implemented caching and optimized queries. These improved performance.
 - **Improved:** _____
3. The data was corrupted. That caused the analysis to fail.
 - **Improved:** _____
4. Developers often skip documentation. This leads to maintenance issues.
 - **Improved:** _____
5. The API has rate limits. Those prevent abuse.
 - **Improved:** _____

EXERCISE 10.12: COMMONLY MISPELLED TECHNICAL TERMS

Identify and correct the spelling errors in these technical terms.

1. ✗ algorithm → ✓ _____
2. ✗ occured → ✓ _____
3. ✗ recieve → ✓ _____
4. ✗ seperately → ✓ _____
5. ✗ definately → ✓ _____

6. ✗ accomodate → ✓ _____
7. ✗ priviledge → ✓ _____
8. ✗ persistant → ✓ _____
9. ✗ maintainance → ✓ _____
10. ✗ sucessful → ✓ _____
11. ✗ occassionally → ✓ _____
12. ✗ necesary → ✓ _____
13. ✗ existance → ✓ _____
14. ✗ enviroment → ✓ _____
15. ✗ arguement → ✓ _____

EXERCISE 10.13: SUBJECT-VERB AGREEMENT - TRICKY CASES REVIEW

These sentences contain subject-verb agreement errors. Correct them.

1. The data from the sensors are showing unusual patterns.
 - **Correction:** _____ (Note: "data" can be singular or plural)
2. Each of the developers have their own coding style.
 - **Correction:** _____
3. The number of security incidents have increased dramatically.
 - **Correction:** _____

4. Neither the algorithm nor the implementation were optimal.

○ **Correction:** _____

5. Mathematics are essential for understanding algorithms.

○ **Correction:** _____

6. The team of engineers are working on the problem.

○ **Correction:** _____ (*US English*)

7. A series of tests were conducted to verify functionality.

○ **Correction:** _____

EXERCISE 10.14: ARTICLE ERRORS - REVIEW

Correct the article errors in these sentences.

1. The Python is popular language for the data science.

○ **Correction:** _____

2. We need develop a software for managing the databases.

○ **Correction:** _____

3. According to a research, machine learning is transforming the industries.

○ **Correction:** _____

4. The algorithm runs in a linear time and uses the constant space.

○ **Correction:** _____

5. A cybersecurity is critical concern in the modern world.

○ **Correction:** _____

EXERCISE 10.15: PREPOSITION ERRORS - REVIEW

Correct the preposition errors.

1. The application runs in Windows and MacOS.
 - **Correction:** _____
2. We wrote the code with Python.
 - **Correction:** _____
3. The meeting is scheduled on 3:00 PM at Monday.
 - **Correction:** _____
4. The system was deployed at the cloud in AWS.
 - **Correction:** _____
5. In terms in performance, our solution is superior.
 - **Correction:** _____

EXERCISE 10.16: WORD ORDER ERRORS - REVIEW

Correct the word order in these sentences.

1. Efficiently processes the system large amounts of data.
 - **Correction:** _____
2. Was developed the algorithm by researchers at MIT.
 - **Correction:** _____
3. The robust very system prevents attacks effectively.
 - **Correction:** _____
4. Can handle how many requests the server per second?

- **Correction:** _____
- 5. Must be tested all code before deployment thoroughly.
 - **Correction:** _____

EXERCISE 10.17: FRAGMENT AND RUN-ON REVIEW

Identify and correct fragments and run-ons.

1. Although the algorithm is efficient and scalable.
 - **Type:** _____
 - **Correction:** _____
2. The system crashed, the data was lost.
 - **Type:** _____
 - **Correction:** _____
3. Because we didn't test thoroughly before deployment.
 - **Type:** _____
 - **Correction:** _____
4. The code compiled it had errors we fixed them.
 - **Type:** _____
 - **Correction:** _____
5. Which significantly improved performance and reduced memory usage.
 - **Type:** _____
 - **Correction:** _____

EXERCISE 10.18: MIXED ERROR TYPES - SENTENCE LEVEL

Each sentence contains 2-3 errors of different types. Identify and correct all errors.

1. The algorithm what we developed are running efficient on multiple platforms.
 - **Errors:** _____
 - **Correction:** _____
2. Each of the systems have its own database, which stores data secure.
 - **Errors:** _____
 - **Correction:** _____
3. According to the research, it shows that AI are transforming the industry.
 - **Errors:** _____
 - **Correction:** _____
4. The data was collected during six months and then were analyzed careful.
 - **Errors:** _____
 - **Correction:** _____
5. We have wrote the code in python and have ran tests successful.
 - **Errors:** _____
 - **Correction:** _____
6. The effect of optimization was significant, it improve performance by 40%.

- **Errors:** _____
 - **Correction:** _____
7. The system which we deployed last month have better performance than the old one.
- **Errors:** _____
 - **Correction:** _____
8. Its important to ensure data security and to backup files regular.
- **Errors:** _____
 - **Correction:** _____

EXERCISE 10.19: PERSONAL ERROR LOG

Create a personal error log to track your most common mistakes.

Instructions: Fill in this template with your actual errors from your writing.

Error Type	Example (Wrong)	Correction	Why I Made This Error	Strategy to Avoid
Example: Article	"The Python is popular"	"Python is popular"	Overgeneralized article use	Review zero article rules
1.				
2.				

3.

4.

5.

EXERCISE 10.20: SYSTEMATIC PROOFREADING PRACTICE

Proofread this paragraph using the systematic approach (multiple passes).

Paragraph: "The machine learning algorithm what we have developed are very efficient and runs quick on modern hardware. According to the research, it shows that deep learning are transforming industries. The system was design to handle large amount of data, but it's performance is limiting by memory. We have wrote the code in python and have ran extensive tests during three months. Each of the models have its own advantages. The effect of optimization was significant, it improve accuracy with 40%. The data was collected careful and then were analyzed. Because the algorithm is complex. The results suggests that further research is needed, this is important for improving the system."

Pass 1 - Fragments and run-ons: Errors found: _____ Corrections: _____

Pass 2 - Subject-verb agreement: Errors found: _____ Corrections: _____

Pass 3 - Verb tenses and forms: Errors found: _____ Corrections: _____

Pass 4 - Articles and prepositions: Errors found: _____ Corrections: _____

Pass 5 - Word choice and spelling: Errors found: _____ Corrections: _____

Final corrected version:

EXERCISE 10.21: COMPREHENSIVE ERROR CORRECTION - PARAGRAPH 1

This paragraph contains **15 errors** of various types. Find and correct them all.

Paragraph: "The cloud computing have revolutionized how businesses operates. According to the research, it shows that organizations can reduce costs significant by migrating to cloud. The system which we deployed last year are running smooth and handles thousands of requests daily. Each of the servers have its own backup system, this ensures data security. We have chose AWS because its more reliable than other platforms. The migration process was took three months and then were completed successful. The effect of cloud adoption was remarkable, it improve efficiency with 45%. The team of engineers who was responsible for the project have did excellent work. In terms in scalability, cloud solutions is superior than traditional infrastructure. Data is stored secure in multiple locations, which ensures redundancy. Its important to ensure security and to backup data regular."

Error Analysis:

- Total errors: _____
- Error types found: _____

Corrected version:

EXERCISE 10.22: COMPREHENSIVE ERROR CORRECTION - PARAGRAPH 2

This technical report excerpt contains **20 errors**. Identify and correct all of them.

Report Excerpt: "In this project, we have developed a machine learning model what classifies images with high accuracy. The model was build using convolutional neural networks, which is very effective for image processing. We have chose Python because its simplicity and extensive libraries. The dataset what we used contains over 50,000 images, which was collected during six months. Each of the images have been preprocessed careful before training. The

training process was took 48 hours on our GPU cluster. Although the model was complex. The results shows that our approach are superior than existing methods. The accuracy of the model have improved significant after we added more layers. According to our analysis, it suggests that deep learning is transforming computer vision. The model can process images quick and identify patterns accurate. In terms in performance, our system is faster than the baseline model with 30%. We have ran extensive tests and have found that the model generalizes well. Its important to note that the model requires large amount of data. The effect of data augmentation was significant, it improve robustness. Each of the test cases have passed successful. Because we have optimized the algorithm careful, the system runs efficient."

Error tracking:

- 1. Error type: _____ | Correction: _____
- 2. Error type: _____ | Correction: _____ (Continue for all 20 errors)

Fully corrected version:

EXERCISE 10.23: PEER REVIEW CHECKLIST

Use this checklist when reviewing a peer's technical writing (or your own).

Document being reviewed: _____

Category	Specific Check	✓/X	Notes/Exam ples
Grammar	Subject-verb agreement correct?		

Verb tenses consistent and appropriate?

All verbs in correct form (irregular verbs)?

Articles

Articles used correctly (a/an/the/zero)?

No missing or extra articles?

Prepositions

Prepositions correct (in/on/at, etc.)?

Dependent prepositions correct?

**Sentence
Structure**

No fragments or run-ons?

Word order correct throughout?

Varied sentence structures?

Pronouns All pronoun references clear?

No ambiguous "this/that/it"?

Word Choice Confusing pairs used correctly?

Technical terms spelled correctly?

Parallel Structure Lists and series parallel?

Citations Reporting verbs used appropriately?

Citation format consistent?

Overall assessment: _____ **Main strengths:** _____

Priority improvements: _____

EXERCISE 10.24: ERROR PATTERN ANALYSIS

Analyze these sentences written by the same student. Identify recurring error patterns.

Student's sentences:

1. "The algorithm what we developed are very efficient."
2. "The system which handles requests are running smooth."
3. "The data what was collected shows interesting patterns."
4. "Each of the servers which we deployed have backups."
5. "The code what passes tests are ready for deployment."

Pattern analysis:

- **Recurring error #1:** _____
- **Explanation:** _____
- **How to correct:** _____
- **Recurring error #2:** _____
- **Explanation:** _____
- **How to correct:** _____

EXERCISE 10.25: BEFORE AND AFTER - SELF-EDITING

Edit your own writing using this structured approach.

Step 1: Write a first draft (100 words about a technical topic - don't focus on errors yet) Your draft: _____

Step 2: Identify potential errors Possible errors I notice: _____

Step 3: Apply systematic proofreading After Pass 1 (structure): _____ After Pass 2 (agreement): _____ After Pass 3 (tenses): _____ After Pass 4 (articles/prepositions): _____ After Pass 5 (spelling/word choice): _____

Step 4: Final polished version

Step 5: Reflection

- Most common error type: _____
- Hardest error to spot: _____
- Improvement strategy: _____

EXERCISE 10.26: COMMON ERROR PATTERNS IN TECHNICAL WRITING

Match each error pattern with its correction strategy.

Error Patterns: A. Consistently using "which" instead of "that" B. Forgetting to use past participle with "have/has" C. Using "this" without a clear referent D. Mixing singular/plural with "data" E. Using "in" instead of "on" for platforms

Correction Strategies:

1. Make a list of irregular past participles to memorize
2. Remember: that=restrictive (no commas), which=non-restrictive (commas)
3. Always follow "this" with a specific noun
4. Decide on formal (data are) vs. informal (data is) and be consistent
5. Remember: "on" for operating systems and platforms

Your matches: A → _____ B → _____ C → _____ D → _____ E → _____

EXERCISE 10.27: TECHNOLOGY-ASSISTED EDITING

Compare grammar checker suggestions with your own judgment.

Sentence: "The system which we deployed have been running for three months and processes data efficient."

Grammar checker might flag:

- 1.
- 2.
- 3.

Your analysis:

- Errors the tool found correctly: _____
- Errors the tool missed: _____
- False positives (tool wrong): _____
- Your corrected version: _____

Lesson learned: _____

EXERCISE 10.28: ERROR HIERARCHY - PRIORITIZING CORRECTIONS

Not all errors are equally serious. Rank these errors from most to least serious in professional technical writing.

Errors to rank:

- A. Spelling error in a technical term
- B. Missing comma in a non-restrictive clause
- C. Subject-verb agreement error
- D. Inconsistent verb tense
- E. Ambiguous pronoun reference
- F. Missing article before a noun
- G. Run-on sentence

- H. Using "that" instead of "which"

Your ranking (most serious to least):

1. _____ because _____
2. _____ because _____
3. _____ because _____
4. _____ because _____
5. _____ because _____
6. _____ because _____
7. _____ because _____
8. _____ because _____

EXERCISE 10.29: CONTEXT-SPECIFIC ERROR SEVERITY

The same error may be more or less serious depending on context. Evaluate error severity in different documents.

Error: "The system have multiple components."

Severity in:

- Internal team email: _____ (1=not serious, 5=very serious)
- Client-facing proposal: _____
- Published research paper: _____
- Code comments: _____
- Technical documentation: _____
- Job application: _____

Explain your reasoning: _____

EXERCISE 10.30: REAL-WORLD EDITING - EMAIL

Edit this technical email for all errors.

Original Email:

"Subject: Update on Project Status

Hi Team,

I wanted to give you an update on the project what we have been working on. The system which we deployed last week are running smooth. We have ran tests and have found that performance have improved significant.

Each of the modules have its own database, this ensures data isolation. According to our analysis, it shows that the new architecture are more scalable than the old one. The effect of optimization was remarkable, it reduce latency with 40%.

However, there is some issues what needs attention. The authentication system occasionally fails, which causes problems for users. We need ensure data security and to backup files regular.

I have wrote a detailed report what outlines next steps. The team of developers who is working on this have did excellent work. In terms in timeline, we should be able to complete remaining tasks during two weeks.

Please let me know if you have any questions.

Best regards"

Your edited version:

EXERCISE 10.31: REAL-WORLD EDITING - TECHNICAL DOCUMENTATION

Edit this documentation excerpt for all errors.

Original:

"# Installation Guide

This guide explains how to install and configure the application on your system.

REQUIREMENTS

The system requires following components:

- The Python 3.8 or higher
- A database server (MySQL or PostgreSQL)
- The Node.js for running the frontend

INSTALLATION STEPS

1. First, download the installer from website.
2. Then, run the setup script what is located in bin directory.
3. The installation process will takes approximately 10 minutes.
4. Each of the components are installed separately.
5. When you install the database, make sure it is configured correctly.

CONFIGURATION

After installation is completed, you need configure the system:

1. Edit the configuration file what is located at `/etc/config`.
2. The settings which you need to modify is in the database section.
3. Ensure the connection string are correct.
4. Then restart the service.

TROUBLESHOOTING

If the system crashes or does not start:

- Check that all dependencies has been installed correct.
- Verify the configuration file don't contain errors.
- Review logs, which is located in `/var/log` directory.
- If problem persists, contact support team.

Its important to backup configuration files before making changes."

Your edited version:

EXERCISE 10.32: REAL-WORLD EDITING - RESEARCH ABSTRACT

Edit this abstract for all errors.

Original Abstract:

"Machine learning have revolutionized many fields in recent years. In this study, we have developed a new algorithm what improves classification accuracy. The algorithm was build using deep neural networks, which is very effective for pattern recognition. We have chose to use convolutional layers because its ability to extract features automatically. The dataset what we used contains 100,000 images, which was collected during one year. Each of the images have

been labeled carefully by experts. The training process was took 72 hours on GPU cluster. The results shows that our approach are superior than existing methods. The accuracy of our model have improved significant compared to baseline. According to our analysis, it suggests that deeper networks performs better. In terms in computational efficiency, our system is faster than traditional approaches with 35%. The effect of data augmentation was significant, it improve model robustness. Because we have optimized the architecture careful. This research demonstrates that deep learning can achieves high accuracy in image classification tasks."

Your edited version:

EXERCISE 10.33: SPEED EDITING CHALLENGE

Set a timer for 5 minutes. How many errors can you find and correct?

Paragraph:

"The cloud-based system what we have developed are designed to handle large volumes of data efficient. Each of the servers have its own backup mechanism, this ensures reliability. According to our tests, it shows that the system can processes over 10,000 requests per second. We have chose to use microservices architecture because its flexibility and scalability. The API which handles authentication are secure and uses encryption. In terms in performance, our solution is superior than traditional monolithic architectures. The effect of caching was significant, it reduce response time with 50%. Data is stored in distributed database, which ensures high availability. Its important to monitor system performance and to update components regular. The team of engineers who has been working on this have did excellent job. Because the architecture is well-designed. The system have been stable for six months and have processed millions of requests successful."

Timer start time: _____ **Errors found in 5 minutes:** _____ **Corrections made:** _____
Timer end time: _____

After the timer, identify any remaining errors: _____

EXERCISE 10.34: ERROR PREVENTION - WRITING CHECKLIST

Create a personalized writing checklist based on your common errors.

My Pre-Submission Checklist:

Before I submit any technical writing, I will check:

1. ☐ _____

2. ☐ _____

3. ☐ _____

4. ☐ _____

5. ☐ _____

6. ☐ _____

7. ☐ _____

8. ☐ _____

9. ☐ _____

10. ☐ _____

My top 3 error patterns to watch for:

1.

2.

3.

EXERCISE 10.35: FINAL MASTERY EXERCISE - COMPREHENSIVE EDITING

Edit this complete technical report section (500 words). It contains approximately 40 errors of all types covered in Units 1-10.

Original Report:

"# Performance Analysis of Distributed Database Systems

INTRODUCTION

Distributed databases has become increasingly important in modern applications what require high availability and scalability. In this study, we analyzes the performance of three popular distributed database systems: MongoDB, Cassandra, and PostgreSQL. The objective of this research are to determine which system performs best under different workloads and to identify optimization strategies what can improve performance.

LITERATURE REVIEW

According to recent research, it shows that distributed databases is essential for handling big data. Smith (2023) argues about distributed systems requires careful design to ensure consistency. The study by Johnson et al. (2022) demonstrates about how different consistency models affects performance. Martinez suggests further research are needed to understand trade-offs between consistency and availability. Several researchers has investigated performance optimization techniques, however, there is still challenges what needs to be addressed.

METHODOLOGY

We have conducted experiments using three database systems in controlled environment. Each of the systems was installed on separate cluster with identical hardware. The test dataset contains 10 million records, which was generated

using synthetic data. We have chose to test three types of workloads: read-heavy, write-heavy, and mixed.

The experiments was ran during two months period. Each test was repeated 100 times to ensure statistical significance. The data was collected careful and then were analyzed using standard statistical methods. We have measured several performance metrics, including throughput, latency, and resource utilization.

RESULTS

The results shows that each system have its own strengths and weaknesses. MongoDB performs best for read-heavy workloads, processing over 50,000 queries per second. Cassandra was the most efficient for write-heavy operations. PostgreSQL provides good balance between reads and writes, however, its performance is limiting by single-node architecture.

According to our analysis, it indicates that the choice of database depends in specific requirements. The effect of caching was significant, it improve performance with 40% for all systems. Each of the optimization techniques what we applied has contributed to performance improvements.

In terms in scalability, Cassandra demonstrates superior horizontal scaling capabilities. The system can handles millions of operations per second when deployed on large cluster. MongoDB shows good scalability for read operations but faces challenges with write scaling. PostgreSQL, which traditionally is a single-node system, have improved scalability with recent versions.

DISCUSSION

Our findings suggests that distributed databases offers significant advantages for large-scale applications. However, there is trade-offs what must be considered. According to our experiments, it shows that consistency models has significant impact on performance. Systems what prioritize availability often sacrifices consistency, which may be acceptable for certain applications.

The team of researchers who has been working on this project have observed that configuration is crucial. Each of the systems requires careful tuning to achieves optimal performance. Its important to understand the specific

characteristics of your workload and to choose the appropriate database according.

CONCLUSION

In conclusion, distributed databases has revolutionized how we store and process data. This study demonstrates that the performance of these systems depends in many factors, including workload characteristics, configuration, and hardware resources. We have showed that careful optimization can improves performance significant. Future research should investigates automated tuning strategies and to explore emerging technologies. Because the field is evolving rapid, continuous evaluation is necessary."

Your fully corrected version:

Error summary:

- Total errors found: _____
- Most common error types: _____
- Most challenging corrections: _____
- Key lessons learned: _____

EXERCISE 10.36: REFLECTION AND GOAL SETTING

Reflect on your progress through all 10 units.

Self-Assessment:

1. **What error types have I improved most on?**
2. **What error types still challenge me?**
3. **What correction strategies work best for me?**
4. **My specific goals for continued improvement:**

- Goal 1: _____
- Goal 2: _____
- Goal 3: _____

5. Action plan:

- Strategy 1: _____
- Strategy 2: _____
- Strategy 3: _____

6. How will I track my progress?

UNIT 11: COMPREHENSIVE REVIEW EXERCISES

EXERCISE 11.1: MIXED GRAMMAR TOPICS

Correct all grammatical errors in this paragraph:

The artificial intelligence have transformed many industries in recent years. According to recent studies, it shows that machine learning algorithms can process data more faster than traditional methods. The system what we developed are designed to handle large datasets, but it's performance depend on many factors. Each of the algorithms have different complexity, some runs in linear time while others requiring exponential time. We have wrote extensive documentation and have ran numerous tests. The results suggests that our approach is more efficient than to use conventional methods. This are particularly important for real-time applications. When the system process data, make sure that it is backup regularly. The optimization what we implemented was improved performance by 40%, this is significant achievement.

EXERCISE 11.2: TECHNICAL WRITING SAMPLE

Rewrite this informal text as formal academic/technical writing, correcting all errors:

So basically, me and my team worked on this really cool project last semester. We was trying to make an app that can detect faces in images super fast. The thing is, existing algorithms are pretty slow, so we thought maybe we can do better. We developed this new algorithm that's way more efficient. It don't use as much memory and can process like 100 images per second, which is pretty awesome compared to the old methods. The results shows that our method is better than other approaches. Hopefully, this will help a lot of applications that needs fast face detection, like security systems and stuff. Also, it could be used for organizing photos and things like that. We tested it on bunch of datasets and it worked great. This is important because face detection is becoming more and more common in various applications. In the future, we plan on making it even faster and more accurate.

EXERCISE 11.3: ARTICLE AND PREPOSITION CHALLENGE

Fill in all articles (a, an, the, or Ø) and prepositions:

___ cloud computing has revolutionized how organizations store and process ___ data. ___ systems that operate ___ cloud offer numerous advantages ___ terms ___ scalability and cost. ___ Microsoft Azure, ___ example, provides ___ infrastructure that can scale automatically based ___ demand. ___ applications run ___ virtual machines ___ cloud rather than ___ physical servers ___ organization's premises. This approach is particularly useful ___ companies that experience variable workload. ___ data is transmitted ___ encrypted connections and stored ___ multiple locations ___ ensure reliability. ___ future ___ cloud computing looks promising, with ___ new services being introduced regularly.

EXERCISE 11.4: VERB TENSE CONSISTENCY

Choose the correct verb tense throughout this research abstract:

This paper (presents/presented/has presented) a novel approach to network security. Cyber attacks (become/became/have become) increasingly sophisticated in recent years. Traditional firewall systems (were/are/have been) often inadequate for detecting modern threats. In 2020, researchers (develop/developed/have developed) machine learning methods for threat detection. Building on this work, we (propose/proposed/have proposed) an enhanced algorithm that (combines/combined/has combined) deep learning with rule-based filtering. We (implement/implemented/have implemented) and (test/tested/have tested) our system over a six-month period. The results (show/showed/have shown) that our approach (detects/detected/has detected) 95% of threats, which (is/was/has been) a significant improvement over existing methods. Our findings (suggest/suggested/have suggested) that hybrid approaches (offer/offered/have offered) the best protection. Future work (explores/will explore/explored) real-time implementation in enterprise environments.

EXERCISE 11.5: CREATING PROFESSIONAL DOCUMENTATION

Write a paragraph (150-200 words) for each scenario, demonstrating proper grammar:

1. **Installation Instructions:** Write instructions for installing and configuring software (use active voice, imperative mood, simple sentences).
2. **Algorithm Description:** Describe how a sorting algorithm works (use present simple, passive voice where appropriate, technical vocabulary).
3. **Research Abstract:** Write an abstract summarizing a hypothetical research project (use appropriate tenses, reporting verbs, formal language).
4. **Problem Report:** Describe a technical problem and its solution (use past simple for what happened, present perfect for results, clear paragraph structure).

EXERCISE 11.6: MULTI-ERROR PARAGRAPH CORRECTION

This paragraph contains errors from multiple grammar categories. Identify the error type for each and correct.

Paragraph:

"The blockchain technology are revolutionizing financial services. According to recent research, it shows that distributed ledgers can process transactions more secure than traditional databases. The system what we have developed uses consensus algorithms, which ensures data integrity. Each of the nodes in network have their own copy of ledger. We have chose this approach because its decentralization and transparency. The transactions are validate by multiple nodes, this prevents fraud. In terms in performance, our system can handles thousands of transactions per second. The testing what we conducted shows that the algorithm are reliable. When you deploy the system, make sure it is

configured correct. The results suggests that blockchain will transforms many industries in future."

Error Analysis Table:

Sentence/Phrase	Error Type(s)	Correction	Grammar Unit
"blockchain technology are"			
"it shows that"			
"more secure"			
"what we have developed"			
(continue...)			

Corrected version:

EXERCISE 11.7: GRAMMAR CATEGORY IDENTIFICATION

Read this corrected technical paragraph. Identify and label examples of concepts from each unit.

Paragraph:

"Cloud computing has transformed how organizations manage their IT infrastructure. The system that we developed enables automatic scaling based on demand. Each component is designed to be fault-tolerant, ensuring high availability. According to recent studies, organizations have reduced costs by 40% through cloud adoption. The migration process requires careful planning and must be executed systematically. Not only does cloud computing provide scalability, but it also offers enhanced security features. The data is encrypted both in transit and at rest, which protects against unauthorized access."

Identify:

1. **Article usage examples:** _____
2. **Subject-verb agreement examples:** _____
3. **Verb tenses used and why:** _____
4. **Active vs. passive voice examples:** _____
5. **Modal verbs used:** _____
6. **Prepositions (at least 5):** _____
7. **Sentence patterns (identify 2):** _____
8. **Parallel structure example:** _____
9. **Reporting verb example:** _____
10. **That vs. which usage:** _____

EXERCISE 11.8: COMPLETE DOCUMENT EDITING - TECHNICAL PROPOSAL

Edit this complete technical proposal (400 words). It contains approximately 35 errors across all grammar categories.

Original Proposal:

"# Proposal for Implementing AI-Powered Customer Service System

EXECUTIVE SUMMARY

This proposal outlines a plan for implementing the artificial intelligence-powered customer service system what will revolutionizes how our company interacts with customers. According to recent research, it shows that AI chatbots can handle over 80% of routine inquiries, this allows human agents to focus on complex issues.

BACKGROUND

Currently, our customer service team are handling approximately 10,000 inquiries per month. Each of the agents have different response times, and the quality of service vary significant. The data what we collected shows that customers often waits over 30 minutes for responses. This have negative impact on customer satisfaction. We believe that implementing AI-powered system will improves response times and to enhance service quality.

PROPOSED SOLUTION

We propose to implement a machine learning-based chatbot what can handles routine inquiries 24/7. The system will be build using natural language processing, which allows it to understand customer questions and to provide accurate responses. Each of the customer interactions will be logged and analyzed, this helps improve the system over time.

The chatbot will integrates with our existing CRM system and can accesses customer data secure. When the bot cannot handle inquiry, it will transfers the conversation to human agent seamless. The system which we plan to deploy are more advanced than traditional rule-based chatbots.

TECHNICAL REQUIREMENTS

The implementation requires following components:

- The cloud-based infrastructure for hosting the AI model
- A natural language processing engine
- Integration with existing systems
- Security measures for protecting the customer data

Each of the components needs to be carefully configured. The system must processes requests quick and must maintains high accuracy. In terms in security, all data will be encrypted and will complies with industry standards.

TIMELINE AND BUDGET

The project will takes approximately six months to complete. We have identified three phases:

Phase 1: System design and planning (2 months) Phase 2: Development and testing (3 months)

Phase 3: Deployment and training (1 month)

The total budget are estimated at \$250,000, which includes software licenses, the development costs, and training.

EXPECTED BENEFITS

According to our analysis, the system will reduces response time with 70% and will handles up to 80% of routine inquiries automatic. This will allows our human agents to focuses on complex customer issues. The effect of improved service quality will be significant, it will increases customer satisfaction and loyalty.

CONCLUSION

The implementation of AI-powered customer service system is critical investment what will transforms how we serve customers. We have demonstrated that the benefits outweighs the costs. The system are more efficient than traditional approaches and will provides better customer experience. We recommends proceeding with this project and beginning implementation at next quarter."

Your fully corrected version:

Error summary:

- Articles: _____
- SVA: _____
- Verb tenses: _____
- Prepositions: _____
- Word order: _____
- That/which: _____
- Other: _____

EXERCISE 11.9: WRITING FROM SCRATCH - SYSTEM ARCHITECTURE DESCRIPTION

Write a technical description of a software system architecture (200-250 words). Your description must demonstrate:

Required elements:

- ✓ Correct article usage (at least 5 instances)
- ✓ Perfect subject-verb agreement throughout

- ✓ Appropriate verb tenses (primarily present simple)
- ✓ At least 2 passive voice constructions (where appropriate)
- ✓ At least 1 modal verb
- ✓ Correct prepositions (at least 8)
- ✓ Varied sentence structures (simple, compound, complex)
- ✓ At least 1 parallel structure
- ✓ Professional technical vocabulary
- ✓ No errors in any category

System to describe: Choose one:

- Microservices architecture
- Database replication system
- Authentication and authorization system
- Content delivery network
- Real-time messaging system

Your description:

Self-check checklist:

- ☐ All required elements included
- ☐ No article errors
- ☐ No SVA errors
- ☐ Appropriate tenses

- ☐ Effective use of passive voice
- ☐ Correct prepositions
- ☐ Sentence variety
- ☐ Professional tone

EXERCISE 11.10: COMPARATIVE ANALYSIS - BEFORE AND AFTER

Compare these two versions of the same technical content. Identify all improvements.

Version A (Student draft):

"Machine learning is very important technology. It can do lots of things like recognizing images and translating languages. The algorithms what we use needs lots of data for training. Each of the models have different accuracy. We have implemented several algorithms and have tested them. The results shows that deep learning is better than traditional methods. This is because it can learns complex patterns. In the future, machine learning will probably change many industries."

Version B (Improved):

"Machine learning has become a critical technology in modern computing. It enables various applications, including image recognition and natural language translation. The algorithms used in machine learning require substantial training data to achieve optimal performance. Each model demonstrates different accuracy levels depending on the task and dataset characteristics. We implemented several algorithms and conducted extensive testing. The results indicate that deep learning approaches outperform traditional methods due to their ability to learn complex, hierarchical patterns. Future developments in machine learning will likely transform numerous industries."

Improvement analysis:

Category	Issues in Version A	Improvements in Version B
Articles		
SVA		
Verb tenses		
Word choice		
Sentence structure		
Formality		
Clarity		

**EXERCISE 11.11: INTEGRATION EXERCISE -
RESEARCH PAPER SECTION**

Write a complete "Related Work" section for a research paper (300-350 words) on a technical topic. Integrate all grammar concepts appropriately.

Requirements:

- Use at least 5 different reporting verbs appropriately
- Include at least 3 citations (make up author names and years)
- Use appropriate tenses for literature review
- Include both integral and non-integral citations
- Demonstrate parallel structure in at least one sentence
- Use "that" and "which" correctly
- Show synthesis of multiple sources
- Maintain academic tone throughout

Topic: Choose one:

- Deep learning in medical imaging
- Blockchain for supply chain management
- Edge computing for IoT applications
- Quantum algorithms for optimization
- Natural language processing for sentiment analysis

Your "Related Work" section:

EXERCISE 11.12: TECHNICAL WRITING STYLES - MULTIPLE FORMATS

Write about the same technical concept in three different formats, adapting grammar and style appropriately.

Concept: How a load balancer distributes traffic across multiple servers

Format 1: User Documentation (100 words)

- Use: Active voice, imperative mood, simple sentences, present simple
- Your text: _____

Format 2: Technical Specification (100 words)

- Use: Mix of active/passive, modal verbs, detailed descriptions, present simple
- Your text: _____

Format 3: Research Paper (100 words)

- Use: Academic style, passive where appropriate, reporting verbs, formal language
- Your text: _____

Reflection: How did grammar usage differ across formats? _____

EXERCISE 11.13: TIMED WRITING CHALLENGE

Set a timer for 15 minutes. Write a technical blog post (250-300 words) about a technology trend. Focus on accuracy across all grammar categories.

Topic: Choose one:

- The rise of artificial intelligence in software development
- Cloud-native application architecture
- Cybersecurity challenges in remote work

- The impact of 5G on mobile applications
- Sustainable computing and green data centers

Your blog post:

Post-writing review (5 minutes):

- Errors found: _____
- Corrections made: _____
- Grammar areas that need more practice: _____

EXERCISE 11.14: ERROR PATTERN RECOGNITION

Analyze this collection of sentences from the same writer. Identify systematic error patterns.

Writer's sentences:

1. "The system what handles requests are very efficient."
2. "Each of the algorithms have different complexity."
3. "According to the research, it shows that AI is important."
4. "We have wrote the code and have ran tests."
5. "The data was collected careful during three months."
6. "In terms in performance, our approach is better."
7. "The results suggests that further research are needed."
8. "Its important to ensure data security."

Pattern Analysis:

Error Pattern #1: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Error Pattern #2: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Error Pattern #3: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Recommendations for this writer: _____

EXERCISE 11.15: COMPREHENSIVE EDITING - ACADEMIC PAPER ABSTRACT

Edit this abstract containing approximately 25 errors.

Original:

"The Internet of Things have transformed how devices communicates. In this paper, we presents a novel architecture for managing the IoT networks. The system what we developed uses machine learning algorithms, which predicts network failures before they occurs. According to recent studies, it shows that proactive maintenance can reduces downtime significant. We have implemented and have tested our approach in large-scale IoT deployment. Each of the sensors in network generates data, which is analyzed in real-time. The results demonstrates that our system detects anomalies accurate and can predicts failures with 90% accuracy. In terms in scalability, the architecture handles millions of devices without performance degradation. The effect of predictive maintenance was remarkable, it reduced downtime with 60%. This research contributes to field by providing practical solution what can be deployed in production environments. We have showed that combining machine learning with traditional monitoring approaches improves reliability significant. Because the system is designed modular. Future work will explores integration with edge computing and to investigate additional machine learning models."

Your corrected version:

EXERCISE 11.16: CROSS-DOCUMENT CONSISTENCY

Edit these three related documents to ensure grammatical consistency and appropriate style for each format.

Document 1: Email to Team (Informal) "Hey team, just wanted to give you update on the API project. We've been making good progress and the system are working pretty well. Each of the endpoints have been tested and they seems reliable. The performance testing what we did shows that we can handles about 5000 requests per second, this is better than we expected. Let me know if you have any questions!"

Document 2: Client Status Report (Formal) "The API development project are progressing according to schedule. All endpoints has been implemented and tested thorough. Performance testing demonstrates that the system can process

approximately 5,000 requests per second, which exceeds the specified requirements. Each of the components have been optimized for reliability and efficiency. We remains on track for the planned deployment date."

Document 3: Technical Documentation (Very Formal) "The RESTful API consists of multiple endpoints what provides access to system resources. Each endpoint have been designed to handle specific operations and returns data in JSON format. The system which we developed uses caching mechanisms to optimizes performance. Load testing indicates that the API can sustains 5,000 requests per second under peak load. All endpoints requires authentication and implements rate limiting to prevents abuse."

Your corrected versions:

Document 1 (maintain informal tone but fix errors):

Document 2 (maintain formal business tone):

Document 3 (maintain technical documentation style):

EXERCISE 11.17: GRAMMAR IN CONTEXT - TECHNICAL TUTORIAL

Write a technical tutorial (300-350 words) explaining how to implement a specific technology or solve a technical problem. Demonstrate mastery of all grammar concepts.

Requirements:

- Mix of imperative sentences (instructions) and declarative sentences (explanations)
- Correct article usage throughout

- Appropriate verb tenses (imperative for steps, present simple for explanations)
- At least 3 modal verbs (for advice/recommendations)
- Correct prepositions (at least 10)
- At least 2 parallel structures
- Varied sentence types
- Professional but accessible tone

Tutorial topic: Choose one:

- How to implement OAuth 2.0 authentication
- How to optimize database queries
- How to set up a CI/CD pipeline
- How to implement caching in web applications
- How to secure a REST API

Your tutorial:

EXERCISE 11.18: PEER REVIEW EXERCISE - COMPLETE WORKFLOW

Exchange documents with a peer (or use the sample provided) and complete a full review cycle.

Sample Document for Review:

"# Code Review Guidelines

Effective code review are essential for maintaining the code quality. This document outlines best practices what every developer should follows.

PURPOSE OF CODE REVIEW

Code reviews serves several purposes. They helps catch bugs before they reaches production, ensures consistency across codebase, and provides learning opportunities for team members. Each of the review should be thorough but also respectful of the developers time.

REVIEW PROCESS

When you review code, follow these steps:

1. Read the entire code what needs review
2. Check that all tests has been passed
3. Verify the code follows our standards
4. Look for potential bugs or security issues
5. Provides constructive feedback

Each reviewer are responsible for checking specific aspects. The senior developers reviews architectural decisions while junior developers checks code style.

BEST PRACTICES

According to our experience, the best reviews is thorough but quick. Reviewers should focuses on important issues rather than minor style preferences. Its important to be respectful and to explain your suggestions clearly. When you finds an issue, explain why its problematic and suggest how to fix it.

The feedback should be specific and actionable. Instead of saying 'this is bad', explains what is wrong and provides better alternative. Remember that code review is about improving the code, not criticizing the developer.

COMMON ISSUES TO CHECK

- Code are following our style guide
- Tests covers all functionality
- Error handling are implemented correct
- Documentation is complete and accurate
- Performance implications has been considered

Each of these areas needs careful attention. The reviewer who spots issue should creates a comment what clearly explains the problem."

Your review:

Part 1: Error identification

- Total errors found: _____
- Errors by category: _____

Part 2: Corrected version

Part 3: Constructive feedback What this writer does well: _____ Priority areas for improvement: _____ Specific recommendations: _____

EXERCISE 11.19: WRITING PORTFOLIO PIECE

Create a complete, polished technical document (500-600 words) suitable for a professional portfolio. This should demonstrate mastery of all grammar concepts and professional writing skills.

Document type: Choose one:

- Technical white paper on a technology trend
- Detailed API documentation
- Research paper methodology section
- Technical blog post for a professional audience
- Software architecture design document

Requirements:

- No grammatical errors of any kind
- Varied, sophisticated sentence structures
- Appropriate technical vocabulary
- Professional formatting and organization
- Clear, logical flow
- Appropriate tone for the document type

Your portfolio piece:

Self-assessment:

- Grammar accuracy: ____ /10
- Clarity: ____ /10
- Professional tone: ____ /10

- Organization: _____ /10
- Technical accuracy: _____ /10
- Overall quality: _____ /50

EXERCISE 11.20: RAPID ERROR DETECTION

You're proofreading under time pressure. How quickly can you spot errors?

Set 1 (30 seconds per sentence):

1. "The algorithm what processes data are highly efficient and runs quick."
2. "According to the research, it shows that machine learning is transforming industries."
3. "Each of the systems have their own database, this ensures data isolation."
4. "We have wrote the documentation and have ran comprehensive tests."
5. "The system which handles authentication are secure and uses encryption."

Your corrections:

- 1.
- 2.
- 3.
- 4.
- 5.

Set 2 (1 minute per sentence - more complex): 6. "The distributed system what we have developed uses consensus algorithms, which ensures data consistency across multiple nodes and prevents the conflicts." 7. "In terms in performance, our approach is more efficient than traditional methods, it reduces processing time

with 40% and uses less memory significant." 8. "Each of the components are designed modular and can be deployed independent, this provides flexibility and allows updates without system downtime."

Your corrections: 6. ____ 7. ____ 8. ____

EXERCISE 11.21: GRAMMAR IN DIFFERENT TECHNICAL DOMAINS

Write a paragraph (100-150 words) for each technical domain, demonstrating domain-appropriate language and perfect grammar.

A. Cybersecurity:

B. Data Science:

C. Cloud Computing:

D. Software Engineering:

Compare: How does technical vocabulary differ while grammar rules remain the same?

EXERCISE 11.22: COMPREHENSIVE ERROR CORRECTION - FULL ARTICLE

Edit this complete technical article (600 words, ~45 errors).

Original Article:

"# The Future of Quantum Computing

INTRODUCTION

Quantum computing have emerged as one of the most promising technologies what could revolutionizes how we process information. Unlike classical computers what use bits, quantum computers uses qubits, which can exists in multiple states simultaneously. This property, known as superposition, allows quantum computers to performs certain calculations exponential faster than classical computers.

HOW QUANTUM COMPUTING WORKS

Classical computers processes information using bits what can be either 0 or 1. Quantum computers, however, uses qubits what can be both 0 and 1 at same time. This are achieved through quantum superposition. When multiple qubits are combined, the computing power increases exponential.

Another key principle is quantum entanglement, which allows qubits to be correlated in ways what has no classical equivalent. When qubits are entangled, the state of one qubit instantly affects the others, regardless of distance. This property can be used for creating powerful quantum algorithms.

The process of quantum computation involves three main steps. First, qubits are initialized in specific state. Then, quantum gates are applied to manipulate the qubits. Finally, the qubits are measured to obtain results. Each of these steps requires extreme precision, and even small errors can affects the computation significant.

CURRENT STATE OF TECHNOLOGY

According to recent reports, it shows that several companies has made significant progress in quantum computing. IBM, Google, and other tech giants has built quantum computers what can perform specific tasks. In 2019, Google announced that they have achieved "quantum supremacy," meaning their quantum computer has solved a problem what would take classical computer thousands of years.

However, current quantum computers are still in early stages. Each of the existing systems have limitations. The main challenge is maintaining quantum coherence, which is necessary for computations. Qubits are extremely sensitive to environmental noise, which causes errors. The systems must be kept at temperature near absolute zero, this requires sophisticated cooling systems.

POTENTIAL APPLICATIONS

Quantum computing have potential to transform many fields. In cryptography, quantum computers could breaks many of encryption methods what are currently used, this raises both opportunities and concerns. New quantum-resistant encryption methods is being developed to address this threat.

In drug discovery, quantum computers could simulates molecular interactions accurate, which would accelerates the development of new medicines. The pharmaceutical industry are particularly interested in this application.

Financial modeling is another promising area. Quantum algorithms could optimizes investment portfolios and analyzes market risks more effective than classical methods. Several financial institutions has started exploring quantum computing for their operations.

CHALLENGES AND LIMITATIONS

Despite the promise, there is significant challenges what needs to be addressed. Building stable quantum computers are extremely difficult and expensive. Each of the qubits needs to be isolated from environment while still being accessible for manipulation.

Error correction in quantum systems is more complex than in classical computers. The quantum error correction requires many physical qubits to create single logical qubit, this significantly increases the resources needed.

Scalability is another major challenge. Current quantum computers has only dozens of qubits, but practical applications will requires thousands or even millions of qubits. The engineering challenges of scaling up quantum systems is immense.

FUTURE OUTLOOK

The future of quantum computing remains uncertain but promising. According to experts predictions, practical quantum computers what can outperforms classical computers in useful tasks may still be decade or more away. However, the progress in recent years has been remarkable.

We expects that quantum computing will not replaces classical computing but will complements it. Certain types of problems will be solved better with quantum computers, while classical computers will continues to be more suitable for other tasks. The effect of quantum computing on technology and society could be profound, it may enables breakthroughs in science, medicine, and cryptography.

Research in quantum computing continues to accelerate. Governments and private companies invests billions of dollars in this technology. As the field matures, we will likely sees new applications what we cannot yet imagine. Because quantum computing has such transformative potential."

Your fully corrected version:

Detailed error analysis:

- Articles: _____ errors
- Subject-verb agreement: _____ errors
- Verb forms/tenses: _____ errors
- Relative pronouns (that/which/what): _____ errors
- Prepositions: _____ errors

- Pronoun reference: _____ errors
- Fragments/run-ons: _____ errors
- Other: _____ errors
- Total: _____ errors

EXERCISE 11.23: STYLE TRANSFORMATION

Take this overly casual text and transform it into professional technical writing while correcting all errors.

Original (Casual):

"So yeah, cloud computing is basically super important nowadays. Like, pretty much every company is using it or thinking about using it. The cool thing about cloud is that you don't gotta worry about buying servers and stuff. You just pay for what you use, which is way better than the old way. Plus, if you need more resources, you can just scale up really fast. There's different types of clouds - public, private, hybrid, whatever. Each one has its pros and cons, you know? The main providers are AWS, Azure, and Google Cloud. They're all pretty good but have different features. Security used to be a big worry, but it's gotten way better. Most cloud providers has really good security now. Overall, cloud computing is awesome and it's definitely gonna keep growing."

Your professional version (150-200 words):

EXERCISE 11.24: TECHNICAL COMMUNICATION SCENARIOS

Write appropriately for each scenario, demonstrating situational grammar awareness.

Scenario A: Executive Summary (100 words) Explain a technical project to non-technical executives.

- Requirements: Clear, concise, business-focused language; no jargon; perfect grammar
- Your text: _____

Scenario B: Technical Specification (100 words) Specify system requirements for developers.

- Requirements: Precise, detailed, technical; modal verbs for requirements; perfect grammar
- Your text: _____

Scenario C: User Guide Section (100 words) Explain a feature to end users.

- Requirements: Clear, accessible, step-by-step; imperative mood; perfect grammar
- Your text: _____

Scenario D: Academic Conference Abstract (100 words) Summarize research for academic audience.

- Requirements: Formal, academic style; reporting verbs; appropriate tenses; perfect grammar
- Your text: _____

EXERCISE 11.25: FINAL MASTERY ASSESSMENT

This is your final comprehensive assessment. Edit this complete document (800 words, ~60 errors) representing a realistic technical writing task.

Original: Software Development Best Practices Guide

INTRODUCTION

Software development have become increasingly complex in recent years. The applications what we build today requires sophisticated architectures, multiple technologies, and large teams. According to industry research, it shows that following best practices can improves productivity significant and reduces bugs.

This guide outlines essential practices what every development team should adopts. Each of the sections covers different aspect of development process. We have compiled these practices based on our experience and have incorporated feedback from industry experts.

CODE QUALITY

Writing high-quality code are fundamental to successful software development. Each line of code what you write should be clean, readable, and maintainable. The code which is difficult to understand creates problems for entire team.

NAMING CONVENTIONS

Variable and function names should be descriptive and follows consistent conventions. Each of the names should clearly indicates its purpose. For example, instead of using 'x' or 'temp', use meaningful names like 'userCount' or 'temporaryUserData'. The names what you choose affects code readability significant.

CODE COMMENTS

According to best practices, it suggests that code should be self-documenting. However, complex logic needs explanation through comments. Each comment should explains why something is done, not what is done. The code itself should makes the 'what' obvious.

Comments should be wrote in clear English and should be updated when code changes. Outdated comments is worse than no comments, they misleads developers.

TESTING

Testing are crucial for ensuring code quality. Without thorough testing, bugs reaches production and affects users. Each of the features should have automated tests.

UNIT TESTING

Unit tests verifies that individual functions works correct. Each test should focuses on single functionality. The tests should be independent and should runs quick. When you write unit tests, make sure they covers edge cases and error conditions.

According to our analysis, teams what writes unit tests catches bugs earlier and spends less time debugging. The effect of comprehensive testing is significant, it reduces production bugs with 70%.

INTEGRATION TESTING

Integration tests verifies that different components works together correct. This tests are more complex than unit tests but is essential for complex systems. Each of the integration test should covers realistic user scenario.

VERSION CONTROL

Using version control systems like Git is mandatory for modern development. Each of the developers should commits code regularly with clear messages. The commit messages what you write should describes what was changed and why.

BRANCHING STRATEGY

Teams should adopt a clear branching strategy. The main branch should always contain stable, deployable code. Feature development should happen on separate branches. When a feature is complete, it should be merged through a pull request.

Each pull request needs to be reviewed by at least one other developer. The reviewer checks code quality, tests coverage, and potential issues. This process ensures that only high-quality code enters the main branch.

CODE REVIEW

Code review is one of the most valuable practices for improving code quality. According to research, teams that do regular code reviews have fewer bugs and better code quality.

REVIEW PROCESS

When you review code, focus on important issues rather than style preferences. Check for logic errors, security vulnerabilities, and performance problems. Each review should be constructive and help the developer improve.

The feedback should be specific and actionable. Instead of saying 'this is bad', explain exactly what the issue is and suggest how to fix it. Remember that the goal is to improve the code, not to criticize the developer.

REVIEW CHECKLIST

Each review should cover these aspects:

- Code follows project standards
- Tests are comprehensive
- Error handling is implemented correctly
- Documentation is complete
- No security vulnerabilities exist

- Performance implications has been considered

DOCUMENTATION

Good documentation is essential for maintainable software. Each of the modules should have clear documentation what explains its purpose and usage. The documentation should be kept up-to-date with code.

API DOCUMENTATION

For APIs, documentation should describes each endpoint, its parameters, and response format. Each parameter should be documented with its type, whether its required, and what values are valid. Examples should be provided for common use cases.

ARCHITECTURE DOCUMENTATION

High-level architecture documentation explains how system components fits together. This documentation helps new team members understands the system and guides design decisions. Each of the major components should be documented with its responsibilities and interactions.

CONTINUOUS INTEGRATION

Continuous integration practices ensures that code integrates smoothly and all tests passes regularly. Each commit triggers automated build and test process. If build fails, the team is notified immediate.

The CI system should runs all tests, checks code quality, and generates reports. This provides quick feedback and catches issues early. According to studies, teams what uses CI deploys more frequent and has fewer production issues.

CONCLUSION

Following these best practices requires discipline and commitment from entire team. However, the benefits is substantial. Code quality improves, bugs

decreases, and development becomes more efficient. Each of the practices contributes to overall software quality.

We recommends implementing these practices gradually. Start with most critical practices like version control and testing, then adds others over time. The effect of good practices becomes apparent quickly, it transforms how team works and improves software quality significant.

Remember that best practices evolves as technology and methodologies changes. Stay informed about new practices and be willing to adapts your approach. Because software development is constantly evolving."

Your complete corrected version:

Comprehensive analysis:

1. Error summary by category:

- Articles: _____
- SVA: _____
- Verb tenses/forms: _____
- That/which/what: _____
- Prepositions: _____
- Word choice: _____
- Sentence structure: _____
- Other: _____
- **Total errors found:** _____

2. Most challenging aspects: _____

3. Strategies used: _____

4. Time taken: _____

5. Confidence level (1-10): _____

EXERCISE 11.26: SELF-ASSESSMENT AND GOAL SETTING

Part A: Grammar Skills Inventory

Rate your current confidence level (1-10) for each grammar area:

Grammar Area	Confidence (1-10)	Evidence	Goals
Articles			
Subject-Verb Agreement			
Verb Tenses			
Active/Passive Voice			
Modal Verbs			
Prepositions			

Sentence Structure

Parallel Structure

Reporting Verbs

Common Errors

Part B: Writing Portfolio Review

Select your best piece of technical writing from these exercises.

1. **Selected piece:** _____
2. **Why this piece:** _____
3. **Strengths demonstrated:** _____
4. **Areas for continued improvement:** _____

Part C: Action Plan

Immediate goals (next month):

- 1.
- 2.
- 3.

Longer-term goals (3-6 months):

- 1.

- 2.
- 3.

Strategies for continued improvement:

- 1.
- 2.
- 3.

How will you track progress?

EXERCISE 11.27: FINAL REFLECTION ESSAY

Write a reflection (300-400 words) on your grammar learning journey. Use this as a final demonstration of your writing skills.

Prompts to consider:

- What grammar concepts were most challenging?
- What strategies helped you improve?
- How has your technical writing improved?
- What are your ongoing goals?
- How will you apply these skills professionally?

Your reflection (demonstrating perfect grammar):

ANSWER KEY AND ASSESSMENT NOTES

SCORING RUBRICS

For editing exercises:

- 90-100% errors found: Excellent mastery
- 75-89% errors found: Good competence
- 60-74% errors found: Satisfactory progress
- Below 60%: Needs continued practice

For original writing:

- Grammar accuracy (40%)
- Clarity and organization (30%)
- Appropriate style and tone (20%)
- Technical content (10%)

RECOMMENDED NEXT STEPS

If you scored 90%+:

- Focus on advanced stylistic refinement
- Practice writing for diverse audiences
- Consider mentoring others
- Continue with authentic professional writing

If you scored 75-89%:

- Review specific error categories
- Practice systematic proofreading

- Get peer feedback regularly
- Focus on persistent error patterns

If you scored 60-74%:

- Revisit relevant units
- Work through additional exercises
- Use grammar checkers as learning tools
- Practice daily with focused exercises

If you scored below 60%:

- Consider working with a tutor
- Go back to foundational units
- Practice one grammar concept at a time
- Build confidence gradually

RESOURCES FOR CONTINUED LEARNING

1. **Regular practice:** Write daily, even briefly
2. **Read technical writing:** Observe how professionals write
3. **Peer review:** Exchange feedback with colleagues
4. **Professional editing:** Consider professional feedback on important documents
5. **Grammar tools:** Use Grammarly, ProWritingAid, etc. as learning aids
6. **Keep a personal error log:** Track and learn from your mistakes

Congratulations on completing this comprehensive technical grammar course!

Remember:

- Good grammar is a professional asset
- Improvement comes with consistent practice
- Errors are learning opportunities
- Clear communication requires continuous effort
- Your technical expertise deserves clear expression

CONCLUSION

Mastering English grammar is essential for success in Computer Science academic and professional contexts. This handbook has provided you with:

- Core grammar concepts with CS-relevant examples
- Common error patterns to avoid
- Extensive practice exercises
- Correction strategies

Remember:

1. Read extensively in your field to internalize grammatical patterns
2. Write regularly and seek feedback
3. Proofread systematically, focusing on one error type at a time
4. Keep a personal error log to track your most common mistakes
5. Use this handbook as an ongoing reference resource

Next Steps:

- Complete all exercises and check your answers
- Apply these concepts in your academic writing
- Review sections where you made errors
- Practice writing technical documentation and research papers
- Share your work with peers for feedback

Good luck with your English language development!

REFERENCES AND RECOMMENDED RESOURCES

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ADDITIONAL RESOURCES

PODCASTS AND MULTIMEDIA

Grammar Girl Quick and Dirty Tips.

<https://www.quickanddirtytips.com/grammar-girl>

Culips ESL Podcast. <https://esl.culips.com>

The Academic Writing Podcast. <https://academicwritingpodcast.com>

YOUTUBE CHANNELS

English Lessons with Adam - engVid.

<https://www.youtube.com/user/MinooEngVid>

Oxford Online English. <https://www.youtube.com/user/oxfordonlineenglish>

Write Right. <https://www.youtube.com/c/WriteRightIndia>

Електронне навчальне видання

English for Technical Communication: Grammar Guide for CS Students

Уклали Володимир Кшевецький, Олена Дідич

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TABLE OF CONTENTS

INTRODUCTION	4
UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS.....	13
UNIT 2: SUBJECT-VERB AGREEMENT (SVA)	22
UNIT 3: VERB TENSES IN TECHNICAL WRITING.....	35
UNIT 4: ACTIVE VS. PASSIVE VOICE.....	53
UNIT 5: MODAL VERBS IN ACADEMIC WRITING	76
UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS	99
UNIT 7: SENTENCE STRUCTURE AND WORD ORDER	123
UNIT 8: PARALLEL STRUCTURE	152
UNIT 9: REPORTING VERBS AND CITATIONS	180
UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES.....	209
UNIT 11: COMPREHENSIVE REVIEW EXERCISES	245
CONCLUSION	283
REFERENCES AND RECOMMENDED RESOURCES.....	285

INTRODUCTION

Welcome to *English for Technical Communication*, a comprehensive grammar course designed specifically for ESL students pursuing careers in technology, software development, data science, and related technical fields. This course recognizes that technical professionals need more than just coding skills – clear, accurate written communication is essential for documentation, research papers, proposals, reports, and collaboration with international teams.

Whether you're writing code documentation, preparing a research paper, drafting a technical proposal, or communicating with colleagues and clients, the grammar skills you develop here will serve as a foundation for professional success.

WHY THIS COURSE?

Technical writing demands precision. A misplaced article, incorrect verb tense, or ambiguous pronoun reference can confuse readers, undermine your credibility, or even change the meaning of critical technical information. While grammar checkers and AI tools can help, they cannot replace a solid understanding of English grammar fundamentals.

This course is different from general ESL grammar courses because it:

- **Focuses on technical contexts:** All examples, exercises, and practice materials use authentic technical vocabulary and scenarios from computer science, software engineering, and IT
- **Addresses common ESL challenges:** Targets the specific errors that non-native speakers commonly make in technical writing
- **Builds systematically:** Progresses from foundational concepts to complex applications
- **Emphasizes practical application:** Every unit includes real-world writing tasks
- **Develops self-correction skills:** Teaches you strategies to identify and fix your own errors

COURSE STRUCTURE

This course consists of **11 comprehensive units**, each focusing on a critical aspect of English grammar for technical writing:

UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS

Master the use of *a*, *an*, *the*, and zero article in technical contexts. Learn when to use articles with technology names, programming languages, and abstract concepts.

UNIT 2: SUBJECT-VERB AGREEMENT (SVA)

Ensure verbs always agree with their subjects, even in complex sentences with intervening phrases, compound subjects, and collective nouns.

UNIT 3: VERB TENSES IN TECHNICAL WRITING

Use appropriate tenses for different sections of technical documents, research papers, and documentation. Understand when to use present simple, past simple, present perfect, and other tenses.

UNIT 4: ACTIVE VS. PASSIVE VOICE

Choose between active and passive voice appropriately based on context, audience, and emphasis. Learn when each voice is more effective in technical communication.

UNIT 5: MODAL VERBS IN ACADEMIC WRITING

Use modal verbs (*can*, *should*, *must*, *may*, etc.) to express ability, necessity, possibility, and recommendations with appropriate levels of certainty.

UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS

Master challenging prepositions used with time, place, technology platforms, and technical phrases. Learn dependent prepositions with common verbs, adjectives, and nouns.

UNIT 7: SENTENCE STRUCTURE AND WORD ORDER

Construct clear, well-organized sentences following English word order rules. Avoid fragments, run-ons, and word order errors common among ESL writers.

UNIT 8: PARALLEL STRUCTURE

Create balanced, professional sentences by maintaining consistent grammatical forms in lists, comparisons, and series.

UNIT 9: REPORTING VERBS AND CITATIONS

Cite sources effectively using appropriate reporting verbs. Learn to integrate research findings, quote other authors, and synthesize multiple sources.

UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES

Identify and correct frequent errors including irregular verbs, confusing word pairs (*affect/effect*, *its/it's*, *that/which*), and pronoun reference issues. Develop systematic proofreading strategies.

UNIT 11: COMPREHENSIVE REVIEW EXERCISES

Apply all concepts in integrated, real-world writing tasks. Edit complete documents, write in various technical formats, and demonstrate mastery across all grammar categories.

PEDAGOGICAL APPROACH

This course uses a **scaffolded learning methodology** where exercises systematically build your skills through five progressive stages:

1. ISOLATED ERROR CORRECTION

Begin with focused exercises targeting one specific grammar point. For example:

- Fill-in-the-blank exercises for articles

- Multiple choice questions for verb tenses
- Simple sentence correction for subject-verb agreement

2. MIXED ERROR TYPES

Progress to exercises combining multiple grammar concepts within single sentences or short paragraphs. This develops your ability to identify various error types simultaneously—a crucial real-world skill.

3. PARAGRAPH EDITING

Edit complete paragraphs (100-200 words) containing 8-15 errors of various types. This mirrors the complexity of actual technical writing and requires sustained attention to multiple grammar rules.

4. FULL DOCUMENT EDITING

Work with complete technical documents (400-800 words) such as:

- Research abstracts
- Technical proposals
- System documentation
- User guides
- Academic papers

These exercises simulate professional editing tasks and build stamina for reviewing longer texts.

5. REFLECTIVE PRACTICE

Analyze your own error patterns, create personal error logs, set improvement goals, and develop individualized correction strategies. This metacognitive approach ensures continued growth beyond the course.

Why this progression? Research shows that learners master grammar most effectively when they:

- Practice concepts in isolation first (to understand the rule)

- Apply concepts in combination (to develop flexibility)
- Work with authentic, extended texts (to build real-world competence)
- Reflect on their learning (to develop autonomy)

HOW TO USE THIS COURSE

FOR SELF-STUDY STUDENTS:

8. **Work sequentially through units** – Each unit builds on previous knowledge
9. **Complete ALL exercises** – Don't skip the basic exercises; they build your foundation
10. **Check your answers** – Review answer keys carefully to understand not just what's correct, but *why*
11. **Keep an error log** – Track your most common mistakes (template provided in Unit 10)
12. **Review regularly** – Revisit challenging units; grammar mastery requires repetition
13. **Write frequently** – Apply concepts immediately in your own technical writing
14. **Set a schedule** – Consistent practice (e.g., 3-4 hours per week) is more effective than cramming

Estimated completion time: 60-80 hours over 12-16 weeks

WHAT YOU'LL ACHIEVE

By completing this course, you will:

- **Write with confidence** in professional technical contexts
- **Identify and correct** your most common grammar errors
- **Understand grammar rules** rather than just memorizing examples
- **Edit your own writing** systematically and effectively
- **Adapt your writing style** for different technical audiences and document types

- **Recognize error patterns** in others' writing (useful for code reviews, team collaboration)
- **Develop lifelong learning strategies** for continued grammar improvement
- **Communicate technical concepts clearly** in writing
- **Produce professional documents** suitable for academic, business, and technical contexts

PREREQUISITES

This course assumes:

- **Intermediate English proficiency** (CEFR B1-B2 or equivalent)
- **Basic technical knowledge** (you should be comfortable with computer science concepts and terminology)
- **Motivation to improve** your written English for professional purposes

You do NOT need:

- Perfect English – this course will help you improve
- Advanced grammar terminology knowledge – concepts are explained clearly
- Prior technical writing experience – we'll develop this together

COURSE MATERIALS

Each unit includes:

- **Grammar Explanations:** Clear, concise rules with technical examples
- **Extensive Exercises:** 25-40 exercises per unit, progressing in difficulty
- **Common Error Alerts:** Warnings about frequent mistakes
- **Practical Applications:** Real-world writing tasks
- **Self-Assessment Tools:** Track your progress throughout the course

TIPS FOR SUCCESS

9. **Be patient with yourself** – Grammar mastery takes time; progress is incremental
10. **Learn from errors** – Mistakes are valuable learning opportunities
11. **Practice consistently** – Regular short sessions beat occasional long ones
12. **Apply immediately** – Use new concepts in your actual writing projects
13. **Seek feedback** – Share your writing with peers, tutors, or online communities
14. **Read technical writing** – Observe how professionals use grammar in your field
15. **Use tools wisely** – AI and grammar checkers supplement but don't replace learning
16. **Stay motivated** – Remember that strong writing skills enhance your technical expertise

SPECIAL FEATURES

TECHNICAL CONTEXTS THROUGHOUT

Every example and exercise uses authentic technical scenarios:

- Software development and debugging
- Database management and queries
- Algorithm analysis and complexity
- System architecture and design
- Cybersecurity and encryption
- Machine learning and AI
- Cloud computing and DevOps
- Research methodology and findings

MULTIPLE DOCUMENT TYPES

Practice writing across formats you'll encounter professionally:

- Research papers and abstracts
- Technical documentation
- API documentation
- User guides and tutorials
- Bug reports and issue tracking
- Technical proposals
- Code comments and README files
- Email and team communication
- Blog posts and technical articles

ERROR ANALYSIS AND PREVENTION

Beyond correction, learn to:

- Recognize your personal error patterns
- Understand *why* errors occur
- Develop prevention strategies
- Build systematic proofreading habits
- Create personal reference materials

ASSESSMENT AND PROGRESS TRACKING

Throughout the course, you'll have opportunities to assess your progress:

- **Unit exercises:** Immediate practice and feedback
- **End-of-unit self-checks:** Verify mastery before moving forward
- **Comprehensive reviews:** Units 10 and 11 integrate all concepts
- **Portfolio pieces:** Create polished writing samples
- **Error logs:** Track improvement over time
- **Reflection exercises:** Develop metacognitive awareness

BEYOND THIS COURSE

Grammar mastery is a journey, not a destination. After completing this course, continue developing your skills by:

- **Writing regularly** in professional contexts
- **Reading technical publications** in your field
- **Seeking feedback** from native speakers and editors
- **Teaching others** – explaining grammar solidifies your understanding
- **Staying updated** on evolving language conventions
- **Building your personal style** while maintaining grammatical accuracy

A NOTE ON GRAMMAR AND CODING

As a technical student, you might wonder: *"Why spend so much time on grammar when I should be coding?"*

Consider this: **Grammar is to writing what syntax is to programming.**

Just as incorrect syntax prevents code from compiling, grammar errors prevent clear communication. Just as clean code is maintainable and professional, clean writing is credible and effective. The debugging skills you use in programming – identifying errors, understanding why they occur, and systematically fixing them – apply directly to grammar improvement.

Your technical skills deserve clear expression. This course ensures your writing matches your expertise.

Let's begin your journey to grammar mastery in technical English!

UNIT 1: ARTICLES, DETERMINERS, AND QUANTIFIERS

1.1 GRAMMAR EXPLANATION

DEFINITE ARTICLE: THE

Use **the** when:

- The noun is specific or previously mentioned
- There is only one of something
- You're referring to a specific system, algorithm, or concept

Examples:

- *The algorithm we developed runs in $O(n \log n)$ time.*
- *The Internet has transformed communication.*
- *Close the application before updating.*

INDEFINITE ARTICLES: A/AN

Use **a/an** when:

- The noun is non-specific or mentioned for the first time
- You're introducing a concept
- **A** before consonant sounds; **AN** before vowel sounds

Examples:

- *A database stores structured information.*
- *An API allows programs to communicate.*
- *We need a more efficient solution.*

ZERO ARTICLE (NO ARTICLE)

Use no article with:

- Uncountable/abstract nouns in general statements
- Plural nouns in general statements
- Programming languages, most technologies

Examples:

- *Software development requires careful planning.* (general)
- *Python is widely used in data science.* (language name)
- *Computers have changed society.* (general plural)

BUT: Use article when specifying:

- *The software we developed* (specific)
- *The Python version installed on your system* (specific)

1.2 COMMON ERRORS

 **The Java is object-oriented language.**

 **Java is an object-oriented language.**

 **Algorithm finds shortest path.**

 **The algorithm finds the shortest path.**

 **We need develop a software.**

 **We need to develop software.** (uncountable)

 **We need to develop a software application.** (countable with qualifier)

1.3 EXERCISES

Exercise 1.1: Fill in the blanks with a, an, the, or Ø (zero article)

11. ___ computer science is ___ rapidly evolving field.
12. We implemented ___ algorithm that reduces ___ processing time by 40%.
13. ___ Python is ___ popular language for ___ machine learning.
14. ___ database management system stores ___ data efficiently.
15. ___ Internet of Things connects ___ devices through ___ networks.
16. She wrote ___ excellent code for ___ project.
17. ___ software engineer needs ___ strong foundation in ___ mathematics.
18. ___ API we created allows ___ seamless integration.
19. ___ artificial intelligence will transform ___ industry.
20. We encountered ___ error in ___ third iteration.

Exercise 1.2: Correct the article errors

9. The HTML is markup language for creating the web pages.
10. We need develop the new algorithm for a problem.
11. A cybersecurity is critical concern in the modern world.
12. Algorithm runs in a linear time.
13. The students must learn the programming fundamentals.
14. JavaScript is language for the web development.
15. We stored data in cloud.
16. The compiler converts source code into the machine code.

Exercise 1.3: Choose the correct option

6. (The/Ø) Cloud computing has revolutionized (the/Ø) data storage.
7. We developed (a/an/the) application using (a/an/the) React framework.
8. (A/An/The) encryption protects (Ø/the) sensitive information.
9. (The/Ø) SQL is (a/an/the) standard language for database queries.
10. (A/An/The) software we tested showed (Ø/a/the) significant improvement.

EXERCISE 1.4: PARAGRAPH COMPLETION

Fill in ALL the blanks with **a, an, the, or Ø** (zero article). Pay attention to context and whether items are specific or general.

Paragraph 1: ___ blockchain technology is ___ distributed ledger system that enables ___ secure transactions without ___ central authority. ___ concept was first introduced in 2008 when ___ anonymous developer published ___ whitepaper describing ___ cryptocurrency called Bitcoin. Today, ___ blockchain has applications beyond ___ cryptocurrency, including ___ supply chain management and ___ smart contracts. ___ companies worldwide are exploring how ___ technology can improve ___ transparency and ___ efficiency in their operations.

Paragraph 2: When developing ___ web application, ___ developer must consider ___ scalability from ___ beginning. ___ application that works well with ___ hundred users may fail when ___ user base grows to ___ thousands. ___ load balancing is ___ technique that distributes ___ traffic across ___ multiple servers. ___ system we implemented uses ___ Redis cache to reduce ___ database queries and improve ___ response times.

EXERCISE 1.5: ERROR IDENTIFICATION AND CORRECTION

Each sentence contains 0-3 article errors. Identify the errors and provide corrections.

9. The machine learning has become the essential tool for data scientists working with the large datasets.
10. When writing the code, developers should follow a coding standards to ensure the consistency across project.
11. A quantum computing promises to solve the problems that are impossible for classical computers.
12. The GitHub is platform where developers can collaborate on the open-source projects.
13. We deployed application to cloud using the Docker containers and Kubernetes for the orchestration.
14. A neural network learns patterns by adjusting weights during training process.
15. The JavaScript frameworks like React and Vue have simplified a frontend development significantly.
16. Researcher published paper describing novel approach to the natural language processing.

EXERCISE 1.6: SPECIFIC VS. GENERAL REFERENCE

Choose the correct article based on whether the reference is **specific** or **general**.

6. (The/Ø) Artificial intelligence can recognize patterns in data. BUT:
(The/Ø) Artificial intelligence we developed can diagnose diseases.
7. (A/The) Software development requires collaboration. BUT: (A/The)
Software development process we use follows Agile methodology.
8. (Ø/The) APIs enable communication between applications. BUT:
(Ø/The) API documented in this manual uses REST architecture.
9. (A/An/The) Programmer must understand data structures. BUT:
(A/An/The) Programmer who wrote this code left detailed comments.
10. (Ø/The) Cybersecurity threats are constantly evolving. BUT: (Ø/The)
Cybersecurity threats identified in the report require immediate action.

EXERCISE 1.7: CONTEXT-DEPENDENT CHOICE

Select the appropriate article(s) based on the full context of the sentence.

6. After analyzing (Ø/the) code, we discovered (a/an/the) memory leak in (a/the) authentication module.
7. (The/Ø) Python's simplicity makes it (a/an/the) ideal language for (Ø/the) beginners, but (the/Ø) same simplicity can lead to (Ø/the) performance issues in (Ø/the) large-scale applications.
8. (A/An/The) microservices architecture divides (a/an/the) application into (Ø/the) smaller, independent services that communicate through (Ø/the/an) well-defined APIs.
9. We conducted (a/an/the) series of (Ø/the) tests to evaluate (a/the/Ø) performance of (a/an/the) new algorithm under (Ø/the) different conditions.
10. (The/Ø) Agile methodology emphasizes (a/an/the) iterative development, where (Ø/the) teams deliver (Ø/the) working software in (Ø/the) short cycles called (Ø/the) sprints.

EXERCISE 1.8: TECHNICAL DOCUMENTATION STYLE

Complete these sentences as they might appear in technical documentation. Consider formal/informal context.

6. To install ____ application, download ____ installer from ____ official website and run ____ setup wizard.
7. ____ function takes ____ array as ____ input and returns ____ sorted version using ____ quicksort algorithm.
8. ____ SQL injection is ____ type of ____ security vulnerability where ____ attacker can execute ____ malicious SQL code through ____ application's input fields.
9. For ____ optimal performance, configure ____ server with at least ____ 8GB of ____ RAM and ____ multi-core processor.

10. ____ unit testing is ____ practice of testing ____ individual components of ____ software to ensure they work correctly before ____ integration.

EXERCISE 1.9: TRANSLATION-STYLE EXERCISE

These sentences describe technical concepts. Add articles where necessary and explain why.

5. **Given:** "Version control system tracks changes in source code." **Rewrite with correct articles:** _____
6. **Given:** "DNS translates domain names into IP addresses that computers use to identify each other on network." **Rewrite with correct articles:** _____
7. **Given:** "Compiler optimization can significantly improve execution speed of program without changing its functionality." **Rewrite with correct articles:** _____
8. **Given:** "Responsive design ensures that website displays correctly on devices of different screen sizes." **Rewrite with correct articles:** _____

EXERCISE 1.10: ADVANCED PRODUCTION EXERCISE

Write 5 sentences about a technical topic of your choice (e.g., cloud computing, mobile development, AI). Each sentence must demonstrate correct article usage in at least TWO of these scenarios:

- **Scenario A:** General reference to a technology/concept
- **Scenario B:** Specific reference to something previously mentioned or unique
- **Scenario C:** First mention of a countable noun
- **Scenario D:** Plural or uncountable noun used generally

Example: "Ø Cloud computing (A) provides Ø scalability (D) for businesses, but the security concerns (B-specific concerns in this context) remain significant."

Your sentences:

- 6.
- 7.
- 8.
- 9.
- 10.

EXERCISE 1.11: CHALLENGING MIXED REVIEW

These sentences contain complex article situations. Choose ALL correct options (there may be more than one correct answer for some blanks).

6. (Ø/The/A) Research in (Ø/the) quantum computing has made (Ø/the) significant progress in recent years.
 - Which options are acceptable? Why might one be preferred over another?
7. She is (a/an/the/Ø) expert in (Ø/the) cybersecurity with (a/an/the/Ø) decade of (Ø/the) experience.
8. (The/Ø) Data shows that (the/Ø) users prefer (the/a/Ø) simple interface to (a/the/Ø) complex one.
9. We're developing (a/an/the) system that uses (Ø/the) machine learning to predict (Ø/the) server failures before they occur.
10. (A/An/The/Ø) Successful deployment requires (a/an/the/Ø) careful planning, (a/an/the/Ø) thorough testing, and (a/an/the/Ø) effective communication with (the/Ø) stakeholders.

EXERCISE 1.12: CRITICAL ANALYSIS

For each pair, explain why the article usage differs:

5. a) "Java is widely used in enterprise applications." b) "The Java Virtual Machine executes bytecode." **Explanation:** _____
6. a) "We need to implement encryption." b) "We need to implement an encryption algorithm." **Explanation:** _____
7. a) "The system crashed during testing." b) "Systems crash when memory is insufficient." **Explanation:** _____
8. a) "She's studying computer science at university." b) "She's studying at the university in Boston." **Explanation:** _____

UNIT 2: SUBJECT-VERB AGREEMENT (SVA)

2.1 GRAMMAR EXPLANATION

The verb must agree with the subject in number (singular/plural) and person.

BASIC RULES:

Singular subjects → Singular verbs

- The program **runs** successfully.
- The server **crashes** frequently.

Plural subjects → Plural verbs

- The programs **run** simultaneously.
- Multiple servers **crash** under heavy load.

TRICKY SITUATIONS:

1. Phrases between subject and verb:

- The algorithm for sorting arrays **is** efficient. (algorithm is)
- The results of the experiment **show** improvement. (results show)

2. Compound subjects with AND:

- Python and Java **are** popular languages.

3. Subjects with OR/NOR: Match the verb to the nearest subject:

- Neither the developer nor the testers **were** available.
- Neither the testers nor the developer **was** available.

4. Uncountable nouns (always singular):

- The *data* **is** stored in the cloud. (Note: "data" is technically plural, but often treated as singular in modern usage)
- Information **travels** quickly online.

5. Collective nouns:

- The *team* **develops** the software. (one unit)
- The *committee* **meets** weekly.

2.2 COMMON ERRORS

✗ The system for processing requests are slow.

✓ The system for processing requests is slow.

✗ Each of the algorithms have different complexity.

✓ Each of the algorithms has different complexity.

✗ The list of errors are displayed on screen.

✓ The list of errors is displayed on screen.

2.3 EXERCISES

Exercise 2.1: Choose the correct verb form

11. The application (run/runs) on multiple platforms.
12. Several methods for encryption (exist/exists).
13. Each of the functions (return/returns) a Boolean value.
14. The data from the sensors (is/are) transmitted wirelessly.
15. Neither the input nor the output values (match/matches) expectations.
16. The complexity of these algorithms (vary/varies) significantly.
17. Every programmer (need/needs) to understand data structures.

18. The collection of user preferences (is/are) stored locally.
19. Both Python and JavaScript (support/supports) asynchronous programming.
20. The number of active users (increase/increases) daily.

Exercise 2.2: Correct the SVA errors

9. The software for managing databases are expensive.
10. Each of the test cases have passed successfully.
11. The list of requirements are available in the documentation.
12. Neither the algorithm nor the data structures was optimized.
13. The team of developers are working remotely.
14. One of the servers were down yesterday.
15. The information about security vulnerabilities are classified.
16. Every student in the class have completed the assignment.

Exercise 2.3: Advanced - Write complete sentences

Create sentences using these subjects and ensuring proper SVA:

6. The collection of programming languages...
7. Neither the hardware nor the software...
8. Each of the network protocols...
9. The data received from multiple sources...
10. A group of researchers...

EXERCISE 2.4: PARAGRAPH COMPLETION

Choose the correct verb form for each blank. Pay careful attention to the actual subject of each verb.

Paragraph 1: The development of artificial intelligence systems (require/requires) _____ significant computational resources. Each of the neural networks we tested (was/were) _____ trained on datasets containing millions of examples. The accuracy of predictions (depend/depends) _____ on the quality and quantity of training data. Neither overfitting nor underfitting (is/are) _____ desirable outcomes in machine learning. The team of researchers (has/have) _____ published their findings in several journals. A combination of supervised and unsupervised learning techniques (provide/provides) _____ the best results for this problem.

Paragraph 2: The number of cybersecurity threats (continue/continues) _____ to grow exponentially. Everyone working in IT security (need/needs) _____ to stay updated on emerging vulnerabilities. The data collected from various sources (show/shows) _____ patterns that help identify potential attacks. Either the firewall or the intrusion detection systems (need/needs) _____ immediate updating. The committee responsible for security protocols (meet/meets) _____ monthly to review incidents. Each of the security measures implemented last year (has/have) _____ proven effective.

EXERCISE 2.5: IDENTIFY AND CORRECT SVA ERRORS

Each sentence contains **one** SVA error. Identify the subject, the verb, and correct the error.

11. The framework for building web applications have gained popularity among developers.

- ☐ **Subject:** _____
- ☐ **Incorrect verb:** _____
- ☐ **Correction:** _____

12. A significant portion of the code were rewritten for better performance.
13. The series of lectures on database design are scheduled for next month.
14. One of the most challenging aspects of programming are debugging complex systems.
15. The documentation, along with the source code and examples, are available on GitHub.
16. Each of the students who completed the course have received a certificate.
17. The set of instructions for installing the software were unclear.
18. Neither the project manager nor the team members was satisfied with the timeline.
19. The statistics from our user testing shows that mobile users prefer simpler interfaces.
20. Every one of the API endpoints need authentication tokens.

EXERCISE 2.6: QUANTIFIERS AND DETERMINERS WITH SVA

Choose the correct verb form based on the quantifier/determiner used.

13. **Each** of the microservices (communicate/communicates) _____ through REST APIs.
14. **Every** developer on the team (has/have) _____ access to the production environment.
15. **Some** of the code (need/needs) _____ refactoring.
16. **Some** of the functions (return/returns) _____ null values.
17. **All** of the data (is/are) _____ encrypted before transmission.

18. **All** of the test cases (pass/passes) _____ successfully.
19. **None** of the security vulnerabilities (was/were) _____ critical.
20. **None** of the software (was/were) _____ compatible with older systems.
21. **Half** of the repository (consist/consists) _____ of third-party libraries.
22. **Half** of the developers (prefer/prefers) _____ working remotely.
23. **Most** of the processing time (is/are) _____ spent on database queries.
24. **Most** of the users (access/accesses) _____ the platform via mobile devices.

EXERCISE 2.7: COMPLEX SUBJECT STRUCTURES

These sentences have complex subjects with multiple modifiers. Identify the **head noun** of the subject and choose the correct verb.

7. The implementation of new security features across all our applications (is/are) _____ scheduled for Q3.
 - **Head noun:** _____
8. The challenges associated with scaling distributed systems (require/requires) _____ careful architectural planning.
 - **Head noun:** _____
9. The percentage of users who abandon their shopping carts (has/have) _____ decreased significantly.
 - **Head noun:** _____
10. The way modern frameworks handle state management (differ/differs) _____ from traditional approaches.
 - **Head noun:** _____

11. The company's approach to continuous integration and deployment (involve/involves) _____ automated testing at every stage.
- **Head noun:** _____
12. The consequences of not following coding standards (become/becomes) _____ evident in large projects.
- **Head noun:** _____

EXERCISE 2.8: TRICKY CASES - DATA, INFORMATION, AND TECHNICAL TERMS

Choose the correct verb. Note: "Data" can be singular or plural depending on context and formality.

9. The data from the experiment (is/are) _____ inconclusive. (*In modern technical writing, "data" is often treated as singular*)
10. These data (show/shows) _____ a clear correlation between variables. (*Formal scientific usage treating "data" as plural*)
11. Big data (has/have) _____ transformed business intelligence.
12. The criteria for selection (is/are) _____ clearly documented.
13. This criterion (is/are) _____ the most important factor.
14. The media coverage of the technology conference (was/were) _____ extensive.
15. Social media (has/have) _____ changed how companies interact with customers.
16. The metadata (is/are) _____ stored separately from the content.

EXERCISE 2.9: RELATIVE CLAUSES AND SVA

The verb in the relative clause must agree with the noun it modifies. Choose the correct verb.

7. The developer **who** (write/writes) _____ clean code (is/are) _____ valued by employers.
8. The functions **that** (handle/handles) _____ user input (need/needs) _____ validation.
9. Python, **which** (is/are) _____ an interpreted language, (offer/offers) _____ rapid development.
10. The engineers **who** (was/were) _____ hired last month (has/have) _____ already contributed significantly.
11. The algorithm **that** (work/works) _____ best for this problem (is/are) _____ not the most intuitive one.
12. One of the libraries **that** (is/are) _____ most widely used (provide/provides) _____ excellent documentation.

EXERCISE 2.10: "THERE IS" VS. "THERE ARE"

Choose the correct form based on what follows.

9. There (is/are) _____ several approaches to solving this problem.
10. There (is/are) _____ a bug in the authentication module.
11. There (has/have) _____ been significant improvements in performance.
12. There (was/were) _____ three critical errors in the logs.
13. There (appear/appears) _____ to be a memory leak in the application.
14. There (exist/exists) _____ multiple frameworks for building mobile apps.
15. There (is/are) _____ no easy solution to this security vulnerability.
16. There (has/have) _____ been complaints about the new interface.

EXERCISE 2.11: COLLECTIVE NOUNS AND TEAM/COMPANY NAMES

Decide whether to treat these as singular or plural based on context (US vs. UK usage may differ).

8. The team (is/are) _____ divided on which technology stack to use.
(*Emphasis on members disagreeing*)
9. The team (is/are) _____ launching the product next month. (*Emphasis on team as single unit*)
10. Microsoft (has/have) _____ released a new version of their operating system.
11. The staff (was/were) _____ all given training on the new procedures.
12. The government (is/are) _____ implementing new data protection regulations.
13. The committee (has/have) _____ not yet reached consensus on the proposal.
14. Google (announce/announces) _____ new AI features regularly.

EXERCISE 2.12: GERUNDS AND INFINITIVES AS SUBJECTS

Gerund and infinitive subjects are always singular. Choose the correct verb.

7. **Testing** code thoroughly (is/are) _____ essential for quality assurance.
8. **To learn** multiple programming languages (take/takes) _____ years of practice.
9. **Deploying** applications to the cloud (require/requires) _____ specific expertise.
10. **Writing** and **maintaining** documentation (is/are) _____ often overlooked. (*Two gerunds joined by "and" = plural*)

11. **To understand** how neural networks work (help/helps) _____ in debugging them.
12. **Refactoring** legacy code (present/presents) _____ unique challenges.

EXERCISE 2.13: PARAGRAPH ERROR CORRECTION

This paragraph contains **8 SVA errors**. Find and correct them all.

The process of developing software have become increasingly complex. Each of the stages in the development cycle require careful attention. The team of developers, along with the project manager, are responsible for meeting deadlines. Neither the budget constraints nor the timeline were realistic given the project scope. The data collected during user testing show that most users prefers the original interface. One of the biggest challenges are integrating the new features with existing code. The number of bugs reported have decreased since we implemented automated testing. Every one of the team members feel confident about the upcoming release.

Corrections:

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

EXERCISE 2.14: ADVANCED PRODUCTION EXERCISE

Write 6 sentences about a technical project or system. Each sentence must correctly demonstrate SVA in one of these challenging situations:

- **Sentence 1:** Subject with a long modifying phrase
- **Sentence 2:** Compound subject with "and"
- **Sentence 3:** Compound subject with "or" or "neither...nor"
- **Sentence 4:** Collective noun as subject
- **Sentence 5:** Quantifier (each, every, some, etc.) with subject
- **Sentence 6:** "There is/are" structure

Example: "The integration of machine learning algorithms into our existing platform requires significant computational resources."

Your sentences:

- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

EXERCISE 2.15: CRITICAL ANALYSIS

Explain why the verb form is correct in each sentence. Identify the subject and any distractors.

5. "The use of cloud services has increased dramatically."
 - **Subject:** _____
 - **Distractors:** _____
 - **Why 'has' is correct:** _____

6. "Neither the initial tests nor the final evaluation shows any problems."
- **Subject:** _____
 - **Rule applied:** _____
7. "Each of the algorithms we compared performs differently under load."
- **Subject:** _____
 - **Why 'performs' is correct:** _____
8. "The committee reviewing the proposals meets every Thursday."
- **Subject:** _____
 - **Why 'meets' is correct:** _____

EXERCISE 2.16: REAL-WORLD TECHNICAL WRITING

These sentences are from technical documentation. Choose the correct verb and explain your choice.

9. The following steps (describe/describes) _____ how to configure the server.
10. A list of supported browsers (is/are) _____ available in Appendix B.
11. The number of concurrent connections (affect/affects) _____ overall performance.
12. Either updating the drivers or reinstalling the software (fix/fixes) _____ most issues.
13. The class of algorithms known as greedy algorithms (provide/provides) _____ approximate solutions.
14. Physics (is/are) _____ not required for this computer science course.
15. Ten milliseconds (is/are) _____ the maximum acceptable latency.
16. The headquarters (is/are) _____ located in Silicon Valley.

CHALLENGE EXERCISE 2.17: MIXED COMPLEXITY

These sentences combine multiple SVA challenges. Choose all correct verbs and be prepared to explain your choices.

6. The team of developers who (work/works) _____ on the backend (has/have) _____ implemented several optimizations that (improve/improves) _____ response time.
7. Each of the microservices that (handle/handles) _____ payment processing (need/needs) _____ to be PCI compliant.
8. The data that (is/are) _____ collected from IoT sensors (is/are) _____ analyzed in real-time, and the insights (is/are) _____ displayed on the dashboard.
9. Neither the complexity of the algorithm nor the limitations of the hardware (prevent/prevents) _____ us from achieving our performance goals.
10. There (is/are) _____ several factors that (contribute/contributes) _____ to the success of a software project, but the most important (is/are) _____ clear communication.

UNIT 3: VERB TENSES IN TECHNICAL WRITING

3.1 GRAMMAR EXPLANATION

PRESENT SIMPLE

Use for:

- General truths and facts
- Current states
- Regular occurrences
- Describing how systems work

Examples:

- *Neural networks **learn** from training data.*
- *The algorithm **sorts** elements in ascending order.*
- *This function **returns** an integer value.*

PRESENT PERFECT

Use for:

- Actions completed at an unspecified time
- Past actions with present relevance
- Recent developments

Examples:

- *Researchers **have developed** a new encryption method.*
- *The system **has processed** over 1 million requests.*
- *We **have tested** the application extensively.*

PAST SIMPLE

Use for:

- Completed actions at specific times
- Describing methodology
- Literature review

Examples:

- *Smith (2020) **developed** a novel approach.*
- *We **implemented** the algorithm last month.*
- *The experiment **took** three weeks.*

FUTURE SIMPLE

Use for:

- Predictions
- Plans
- Future work sections

Examples:

- *The system **will support** additional features.*
- *We **will investigate** alternative approaches.*

3.2 TENSES IN DIFFERENT SECTIONS

Abstract: Present simple for general statements, past simple for what you did

Introduction: Present simple for facts, present perfect for recent work

Methodology: Past simple for what you did

Results: Past simple for findings

Discussion: Present simple for interpretation, modal verbs for speculation

3.3 COMMON ERRORS

 Python was created in 1991 and still is popular today.

 Python was created in 1991 and is still popular today.

 We develop the system and test it thoroughly.

 We developed the system and tested it thoroughly. (completed research)

 The algorithm will work efficiently in all test cases.

 The algorithm works efficiently in all test cases. (demonstrated fact)

3.4 EXERCISES

Exercise 3.1: Choose the correct tense

9. Machine learning (transforms/transformed/has transformed) many industries in recent years.
10. In 1983, the Internet (adopted/adopts/has adopted) TCP/IP protocols.
11. Currently, cloud computing (provides/provided/will provide) scalable infrastructure.
12. We (implement/implemented/have implemented) the solution last semester.
13. The next version (includes/included/will include) enhanced security features.
14. Quantum computers (solve/solved/will solve) certain problems exponentially faster.
15. The researchers (test/tested/have tested) their hypothesis multiple times before publication.
16. Blockchain technology (gains/gained/has gained) significant attention since 2017.

Exercise 3.2: Correct the tense errors

7. We develop a new algorithm that improves performance by 30% last year.
8. The Internet of Things is connecting billions of devices since 2010.
9. Currently, the system will process 10,000 transactions per second.
10. In our previous study, we are finding significant correlation between variables.
11. Machine learning has revolutionized data analysis in 2012.
12. The application currently supports multiple languages and will add more soon.

Exercise 3.3: Write sentences with specific tenses

Write one sentence for each tense in a CS context:

6. Present Simple: (describing how an algorithm works)
7. Past Simple: (describing what you did in your project)
8. Present Perfect: (discussing recent advances in AI)
9. Future Simple: (discussing future improvements)
10. Present Continuous: (describing ongoing research)

EXERCISE 3.4: MULTI-PARAGRAPH TENSE SELECTION

Choose the correct tense for each blank. Pay attention to which section of a research paper/technical document each paragraph represents.

Abstract: This paper (present/presents/presented) _____ a novel approach to image recognition using convolutional neural networks. We (develop/developed/have developed) _____ a system that (achieve/achieved/achieves) _____ 95% accuracy on standard benchmarks.

Our results (show/showed/have shown) _____ that deep learning architectures (can/could) _____ outperform traditional methods when trained on large datasets. The proposed model (is/was/will be) _____ significantly more efficient than existing solutions.

Introduction: Computer vision (is/was/has been) _____ a rapidly evolving field for several decades. Traditional approaches (rely/relied/have relied) _____ on hand-crafted features, which (require/required/have required) _____ extensive domain expertise. In recent years, deep learning methods (revolutionize/revolutionized/have revolutionized) _____ image processing tasks. LeCun et al. (1998) (introduce/introduced/have introduced) _____ convolutional neural networks that (become/became/have become) _____ the foundation for modern computer vision. Despite these advances, current systems still (face/faced/will face) _____ challenges with limited training data.

Methodology: We (conduct/conducted/have conducted) _____ experiments using the ImageNet dataset, which (contains/contained/has contained) _____ over 14 million images. First, we (preprocess/preprocessed/have preprocessed) _____ the images by resizing them to 224×224 pixels. We then (split/have split/had split) _____ the data into training (80%) and testing (20%) sets. The model (train/trained/was trained) _____ for 50 epochs using stochastic gradient descent. Each training session (take/took/has taken) _____ approximately 12 hours on our GPU cluster.

Results: Our model (achieve/achieved/has achieved) _____ an accuracy of 95.3% on the test set. This result (is/was/has been) _____ significantly better than the baseline model, which only (reach/reached/has reached) _____ 87.2% accuracy. Figure 1 (show/shows/showed) _____ the learning curves for both models. We (observe/observed/have observed) _____ that increasing the depth of the network (improve/improved/improves) _____ performance up to a certain point.

Discussion: Our findings (demonstrate/demonstrated/have demonstrated) _____ that deeper architectures (are/were/have been) _____ more effective for this task. The improved accuracy (suggest/suggests/suggested) _____ that the additional layers (help/helped/have helped) _____ capture more complex patterns. However, we (note/noted/have noted) _____ that very deep networks (can/could) _____ suffer from overfitting without proper regularization. This observation (is/was/will be) _____ consistent with prior research in the field.

Conclusion and Future Work: We (present/presented/have presented) _____ a deep learning approach that (outperform/outperformed/outperforms) _____ previous methods on image recognition tasks. In future work, we (plan/planned/will plan) _____ to extend this approach to video analysis. We also (intend/intended/will intend) _____ to investigate transfer learning techniques that (may/might) _____ reduce training time.

EXERCISE 3.5: IDENTIFY AND CORRECT TENSE ERRORS

Each sentence contains **one or more** tense errors. Correct them and explain why.

9. The researchers are developing a new framework in 2019 that transforms data processing.
 - **Correction:** _____
 - **Explanation:** _____
10. We have implemented the algorithm last week and it performs well in all tests.
 - **Correction:** _____
 - **Explanation:** _____
11. Currently, artificial intelligence is used in healthcare, and it will improve diagnosis accuracy significantly.
 - **Correction:** _____
 - **Explanation:** _____
12. The system was processing over 10,000 requests per second and will be very reliable.
 - **Correction:** _____
 - **Explanation:** _____

13. Since 2015, blockchain technology gained widespread adoption in financial services.

○ **Correction:** _____

○ **Explanation:** _____

14. The study showed that users will prefer simpler interfaces and are completing tasks faster.

○ **Correction:** _____

○ **Explanation:** _____

15. We conduct extensive testing before we deploy the application to production next month.

○ **Correction:** _____

○ **Explanation:** _____

16. Python is created by Guido van Rossum and has become one of the most popular programming languages.

○ **Correction:** _____

○ **Explanation:** _____

EXERCISE 3.6: PRESENT PERFECT VS. PAST SIMPLE

Choose between present perfect and past simple. Remember: present perfect connects past to present; past simple is for completed actions at specific times.

11. Over the past decade, cloud computing (has transformed/transformed) _____ how businesses store data.

12. In 2007, Apple (has released/released) _____ the first iPhone.

13. Researchers (have made/made) _____ significant progress in natural language processing in recent years.

14. Last month, we (have conducted/conducted) _____ a survey of 500 users.
15. Since its introduction, the framework (has been/was) _____ adopted by thousands of developers.
16. The team (has completed/completed) _____ the project last Friday.
17. Machine learning models (have become/became) _____ increasingly sophisticated over time.
18. During the testing phase, we (have identified/identified) _____ several critical bugs.
19. The company (has invested/invested) _____ heavily in AI research, spending \$50 million in 2023 alone.
20. We (have never encountered/never encountered) _____ this type of error before.

EXERCISE 3.7: TENSE CONSISTENCY IN PARAGRAPHS

The following paragraphs have tense consistency issues. Rewrite them with appropriate tense usage.

Paragraph 1 (Methodology section): We are using a dataset of 10,000 images for our experiments. First, we preprocess the images by removing noise and adjusting brightness. Then we have split the data into training and validation sets. The model trains for 100 epochs, and we are evaluating its performance using standard metrics. Each experiment will take approximately 6 hours to complete.

Your rewrite: _____

Paragraph 2 (Literature review): Johnson (2020) has developed a new algorithm for graph traversal. His approach is based on breadth-first search but includes optimizations that reduced memory usage. Several researchers are testing this algorithm and found it to be effective. Smith and Lee (2021) were

building on this work and propose further improvements. Their method is showing promising results in initial tests.

Your rewrite: _____

Paragraph 3 (Results and Discussion): Figure 2 showed the performance comparison between our model and baseline methods. Our approach will achieve 92% accuracy, while the baseline only reaches 85%. This difference was statistically significant ($p < 0.05$). The results are suggesting that our modifications have improved the model's ability to generalize. We have observed similar patterns across all test scenarios.

Your rewrite: _____

EXERCISE 3.8: TECHNICAL WRITING - SECTION-SPECIFIC TENSE USAGE

Write two sentences for each section of a technical paper, using appropriate tenses.

Abstract:

3.

4.

Introduction (stating current facts/recent developments):

3.

4.

Literature Review (discussing past research):

3.

4.

Methodology (describing what you did):

3.

4.

Results (presenting findings):

3.

4.

Discussion (interpreting results):

3.

4.

Future Work:

3.

4.

EXERCISE 3.9: PRESENT SIMPLE VS. PRESENT CONTINUOUS

Choose the correct form. Remember: present simple for general truths/regular actions; present continuous for actions happening now or temporary situations.

9. Currently, our team (develops/is developing) _____ a mobile application for Android.
10. The algorithm (sorts/is sorting) _____ data using a divide-and-conquer approach.
11. Researchers worldwide (work/are working) _____ on quantum computing applications this year.
12. The system (uses/is using) _____ machine learning to detect anomalies.
13. This week, we (test/are testing) _____ the new features with a focus group.

14. Neural networks (learn/are learning) _____ patterns through backpropagation.
15. The company (invests/is investing) _____ heavily in AI research these days.
16. HTTP (transfers/is transferring) _____ data between web servers and clients.

EXERCISE 3.10: MODAL VERBS WITH DIFFERENT TENSES

Complete the sentences with appropriate modal verbs (can, could, may, might, will, would, should) and correct tense forms.

6. Our experiments (show/showed/have shown) _____ that the algorithm _____ (can/could) process data 50% faster than existing methods.
7. Future research _____ (may/might/will) explore hybrid approaches that combine deep learning with traditional algorithms.
8. The results (suggest/suggested/have suggested) _____ that increasing training data _____ (could/can/may) improve accuracy.
9. We (believe/believed/have believed) _____ that this technique _____ (should/would/will) be applicable to other domains.
10. The system _____ (can/could) theoretically handle millions of concurrent users, although we (test/tested/have tested) _____ it with only 100,000.

EXERCISE 3.11: TIME MARKERS AND TENSE SELECTION

Choose the correct tense based on the time marker in each sentence.

11. **Recently**, deep learning (has made/made/makes) _____ remarkable progress in speech recognition.

12. **In 2012**, Google (has developed/developed/develops) _____ the Knowledge Graph.
13. **Currently**, the system (processed/processes/is processing) _____ requests in real-time.
14. **Over the past five years**, cybersecurity threats (have increased/increased/increase) _____ dramatically.
15. **Last semester**, we (have implemented/implemented/implement) _____ a chatbot for customer service.
16. **Next quarter**, the company (has released/released/will release) _____ version 2.0 of the software.
17. **Since 2015**, the framework (has been/was/is) _____ the industry standard.
18. **At this moment**, engineers (are testing/test/tested) _____ the prototype in the lab.
19. **By the end of this year**, we (will complete/completed/complete) _____ the migration to cloud infrastructure.
20. **So far**, the results (have been/were/are) _____ encouraging.

EXERCISE 3.12: PAST PERFECT FOR SEQUENCING

Use past perfect to show that one past action occurred before another past action.

Example: We deployed the system after we (*had tested*) it thoroughly.

Complete these sentences:

6. Before we launched the application, we _____ (conduct) extensive user testing.
7. The error occurred because the developer _____ (not validate) the input data.

8. We discovered that someone _____ (already report) the bug two weeks earlier.
9. After the team _____ (complete) the code review, they merged the changes into the main branch.
10. The system crashed because it _____ (run) out of memory.

EXERCISE 3.13: FUTURE FORMS - WILL VS. GOING TO VS. PRESENT CONTINUOUS

Choose the most appropriate future form.

7. Based on current trends, AI (will transform/is going to transform/is transforming) _____ healthcare over the next decade.
8. We (will meet/are going to meet/are meeting) _____ with the client tomorrow at 2 PM. (*scheduled*)
9. Look at those server logs – the system (will crash/is going to crash/is crashing) _____ soon!
10. In the next section, we (will discuss/are going to discuss/are discussing) _____ the methodology.
11. The conference (will start/is going to start/is starting) _____ next Monday.
12. Quantum computers (will probably revolutionize/are probably going to revolutionize) _____ cryptography.

EXERCISE 3.14: MIXED TENSE ERROR CORRECTION

This technical report excerpt contains **10 tense errors**. Find and correct them.

Report Excerpt:

Cloud computing has emerged as a dominant paradigm in recent years. Companies are adopting cloud infrastructure since the early 2000s to reduce

costs and improve scalability. In our study, we are analyzing data from 50 organizations that have migrated to the cloud between 2020 and 2023.

We have conducted surveys last month and interviewed IT managers to understand their experiences. The results showed that 80% of organizations reported cost savings, though initial migration has been challenging. Most companies are facing difficulties with data security during the transition, but these issues have been resolved over time.

Currently, cloud adoption continues to grow, and analysts are predicting that 90% of enterprises used cloud services by 2025. Our findings are suggesting that proper planning is essential for successful migration. Organizations that invested in training their staff have better outcomes than those that didn't.

Corrections:

10.

11.

12.

13.

14.

15.

16.

17.

18.

EXERCISE 3.15: TENSE IN CITATIONS AND LITERATURE REVIEW

Complete these sentences with appropriate tenses for literature reviews.

7. Smith (2019) _____ (argue) that machine learning models require large datasets.

8. Recent studies _____ (show) that transfer learning can reduce training time significantly.
9. According to Johnson et al. (2020), neural networks _____ (be) effective for image classification tasks.
10. Previous research _____ (demonstrate) that deep learning approaches outperform traditional methods.
11. Lee (2021) _____ (develop) a framework that _____ (address) scalability issues.
12. Several researchers _____ (investigate) this problem, but no consensus _____ (emerge) yet.

EXERCISE 3.16: REAL-WORLD TECHNICAL DOCUMENTATION

These sentences are from different types of technical documents. Choose the correct tense and identify the document type.

6. The function (accepts/accepted/has accepted) _____ two parameters and (returns/returned/has returned) _____ a Boolean value.
 - **Document type:** _____
7. Version 3.0 (will include/includes/included) _____ support for dark mode and (improves/will improve/improved) _____ performance by 30%.
 - **Document type:** _____
8. To install the package, first (download/downloaded/have downloaded) _____ the installer from our website.
 - **Document type:** _____
9. The bug (occurs/occurred/has occurred) _____ when users (try/tried/have tried) _____ to upload files larger than 10MB.
 - **Document type:** _____

10. Our analysis (shows/showed/will show) _____ that the new algorithm (is/was/has been) _____ 40% faster than the previous version.

○ **Document type:** _____

EXERCISE 3.17: ADVANCED PRODUCTION EXERCISE

Write a 150-200 word technical abstract about a project or research topic you're familiar with. Your abstract must:

- Use **present simple** to state general truths or describe what the system does
- Use **past simple** to describe what you did in your research/project
- Use **present perfect** at least once to connect past work to present relevance
- Use **modal verbs** (can, may, will, should) appropriately for claims and future work
- Maintain consistent and appropriate tense usage throughout

Your abstract:

EXERCISE 3.18: CRITICAL ANALYSIS - TENSE JUSTIFICATION

For each sentence, explain **why** that particular tense is used.

7. "The Internet has fundamentally changed how people communicate."
- **Tense:** _____
 - **Why this tense:** _____
8. "TCP/IP was developed by Vint Cerf and Bob Kahn in the 1970s."
- **Tense:** _____

- **Why this tense:** _____
9. "Neural networks learn by adjusting weights during training."
- **Tense:** _____
 - **Why this tense:** _____
10. "We implemented the algorithm and tested it on various datasets."
- **Tense:** _____
 - **Why this tense:** _____
11. "The results suggest that our approach is more efficient."
- **Tense:** _____
 - **Why this tense:** _____
12. "Future versions will include support for additional file formats."
- **Tense:** _____
 - **Why this tense:** _____

EXERCISE 3.19: TENSE SEQUENCING IN COMPLEX SENTENCES

Complete these complex sentences with appropriate tenses in both clauses.

6. The algorithm _____ (fail) because we _____ (not consider) edge cases during development.
7. Although previous methods _____ (achieve) good results, our approach _____ (be) more efficient.
8. We _____ (discover) that the system _____ (perform) better when we _____ (increase) the batch size.
9. The framework _____ (become) popular after developers _____ (realize) how easy it _____ (be) to use.

10. If the trend _____ (continue), quantum computers _____ (be) commercially available within a decade.

EXERCISE 3.20: PEER REVIEW EXERCISE

Read this paragraph from a student's technical report. Identify **all tense errors** and suggest improvements for clarity and consistency.

Student's paragraph:

"In this project, we are developing a recommendation system using collaborative filtering. First, we have collected data from 1,000 users over a three-month period last year. The data contains user ratings for various products. We then process this data and build a matrix factorization model. The model is trained using stochastic gradient descent, which was taking approximately 2 hours. Our results showed that the system will achieve 85% accuracy on the test set. Currently, collaborative filtering is one of the most effective techniques for building recommendation systems. We believed that our approach was better than content-based methods because it is capturing implicit user preferences."

Your analysis:

- **Number of tense errors:** _____
- **Corrected version:** _____
- **Explanation of main issues:** _____

UNIT 4: ACTIVE VS. PASSIVE VOICE

4.1 GRAMMAR EXPLANATION

ACTIVE VOICE STRUCTURE

Subject + Verb + Object

The developer writes the code.
(Actor performs action)

PASSIVE VOICE STRUCTURE

Object + be + Past Participle + (by + Actor)

The code is written by the developer.
(Action happens to object)

4.2 WHEN TO USE EACH

USE ACTIVE VOICE WHEN:

- Writing instructions or procedures (required in STE)
- Clarity and directness are priorities
- The actor is important
- Writing technical documentation

Examples:

- *Click the Submit button.*
- *The algorithm processes the input data.*
- *We implemented three security measures.*

USE PASSIVE VOICE WHEN:

- The actor is unknown or unimportant

- Focusing on the action or result
- Writing descriptive sections in academic papers
- Describing what was done to something

Examples:

- *The data was collected over six months.* (who collected it is less important)
- *The system is designed to handle 1000 concurrent users.*
- *Errors were detected during testing.*

4.3 CONVERTING BETWEEN VOICES

Active → Passive:

5. Object becomes subject
6. Add appropriate form of "be"
7. Change main verb to past participle
8. Original subject becomes "by" phrase (optional)

The team developed the application.

→ *The application was developed by the team.*

Passive → Active:

5. Identify the actor (or add one)
6. Make actor the subject
7. Remove "be" + use active verb
8. Former subject becomes object

The bug was fixed.

→ *The developer fixed the bug.*

4.4 COMMON ERRORS

✗ The code was wrote by the programmer. (incorrect past participle)

✓ The code was written by the programmer.

✗ The system was design to be scalable. (missing past participle)

✓ The system was designed to be scalable.

✗ Data is being store in the database. (incorrect form)

✓ Data is being stored in the database.

4.5 EXERCISES

Exercise 4.1: Identify active or passive voice

9. The algorithm sorts the array in ascending order.
10. The database was updated at midnight.
11. Programmers use version control systems.
12. The error was caused by incorrect input.
13. The application encrypts user data.
14. Several vulnerabilities were discovered during testing.
15. Machine learning models require large datasets.
16. The server is monitored 24/7.

Exercise 4.2: Convert from active to passive

6. The developers released the new version yesterday.
7. The system processes thousands of transactions daily.
8. Hackers attacked the network last week.

9. The team will complete the project by Friday.
10. The algorithm analyzes the data in real-time.

Exercise 4.3: Convert from passive to active

6. The software is maintained by our IT department.
7. The vulnerability was exploited by cybercriminals.
8. The code has been reviewed by senior developers.
9. The system will be upgraded next month.
10. Passwords are encrypted before storage.

Exercise 4.4: Choose the better voice (active or passive)

Rewrite these sentences using the more appropriate voice:

6. The button should be clicked by you to save the file. (instruction)
7. The programmer fixed the bug. (focus on result, not actor)
8. Great improvements in AI have been made by researchers. (focus on progress)
9. You should enter your password in the login field. (instruction)
10. The report was generated by the system automatically. (obvious actor)

EXERCISE 4.5: IDENTIFY VOICE AND JUSTIFY USAGE

Identify whether each sentence is active or passive, then explain why that voice is appropriate in the given context.

6. "The encryption algorithm was developed in the 1970s and is still widely used today."
 - **Voice:** _____
 - **Why appropriate:** _____

7. "Click the 'Download' button to install the software."
- **Voice:** _____
 - **Why appropriate:** _____
8. "We conducted experiments using three different datasets."
- **Voice:** _____
 - **Why appropriate:** _____
9. "Significant improvements in processing speed were observed."
- **Voice:** _____
 - **Why appropriate:** _____
10. "The database administrator monitors server performance daily."
- **Voice:** _____
 - **Why appropriate:** _____

EXERCISE 4.6: MIXED VOICE CORRECTION

These sentences use inappropriate voice for their context. Rewrite them using the more suitable voice and explain your choice.

6. **Context: User manual instruction** "The 'Save' button should be clicked by users after completing the form."
- **Rewrite:** _____
 - **Why:** _____
7. **Context: Research methodology** "We collected the data, we analyzed the results, and we validated the findings."
- **Rewrite:** _____
 - **Why:** _____

8. **Context: System description (focus on system capability)**
"Administrators can configure the firewall rules through the control panel."
- **Rewrite:** _____
 - **Why:** _____
9. **Context: Academic paper results section** "We found that the algorithm reduced processing time by 40%."
- **Rewrite:** _____
 - **Why:** _____
10. **Context: Error message (focus on action needed)** "The connection to the server could not be established by the system."
- **Rewrite:** _____
 - **Why:** _____

EXERCISE 4.7: PASSIVE VOICE FORMS - ALL TENSES

Complete these sentences with the correct passive voice form of the verb in parentheses.

Present Simple Passive:

- 3. User data _____ (encrypt) before transmission.
- 4. Backups _____ (perform) daily at midnight.

Present Continuous Passive: 3. The system _____ (upgrade) right now. 4. New features _____ (add) to the platform.

Present Perfect Passive: 5. The bug _____ (fix) in the latest patch. 6. Several vulnerabilities _____ (identify) during the audit.

Past Simple Passive: 7. The database _____ (compromise) last week. 8. The application _____ (design) to handle high traffic.

Past Continuous Passive: 9. The servers _____ (monitor) when the outage occurred. 10. Data _____ (transfer) to the new system during migration.

Past Perfect Passive: 11. The code _____ (review) before it was merged. 12. All tests _____ (complete) by the time we deployed.

Future Simple Passive: 13. The update _____ (release) next month. 14. Additional servers _____ (deploy) to handle increased load.

Modal Passive: 15. Passwords _____ (should/change) every 90 days. 16. The file _____ (can/access) by authorized users only.

EXERCISE 4.8: CONTEXT-SPECIFIC VOICE SELECTION

For each scenario, write two sentences: one using active voice and one using passive voice. Then indicate which is more appropriate for that context.

Scenario 1: Technical documentation describing a system's security features

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 2: User manual - step-by-step installation instructions

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 3: Research paper methodology - describing data collection

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

Scenario 4: Bug report - describing what caused an error

- **Active version:** _____
- **Passive version:** _____
- **More appropriate:** _____ **Why:** _____

EXERCISE 4.9: PASSIVE VOICE ERROR CORRECTION

Each sentence contains an error in passive voice formation. Correct the error and explain what was wrong.

9. The application was develop by our team last year.

- **Correction:** _____
- **Error type:** _____

10. Data is being store in the cloud for backup purposes.

- **Correction:** _____
- **Error type:** _____

11. The system has been optimize for mobile devices.

- **Correction:** _____
- **Error type:** _____

12. New features will be add in the next release.

- **Correction:** _____
- **Error type:** _____

13. The code was wrote by inexperienced developers.

- **Correction:** _____
- **Error type:** _____

14. Security protocols must be follow at all times.

○ **Correction:** _____

○ **Error type:** _____

15. The database is maintain by the IT department.

○ **Correction:** _____

○ **Error type:** _____

16. Several bugs has been fix in this version.

○ **Correction:** _____

○ **Error type:** _____

EXERCISE 4.10: "BY" PHRASE - WHEN TO INCLUDE OR OMIT

Decide whether the "by" phrase should be included, omitted, or is optional.
Rewrite if necessary.

6. The software was developed by developers.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

7. The vulnerability was discovered by our security team.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

8. Python was created by Guido van Rossum in 1991.

○ **Decision:** _____

○ **Rewrite (if needed):** _____

9. The error was caused by insufficient memory.

- **Decision:** _____
- **Rewrite (if needed):** _____

10. The system is monitored by monitoring tools 24/7.

- **Decision:** _____
- **Rewrite (if needed):** _____

EXERCISE 4.11: PARAGRAPH VOICE CONSISTENCY

These paragraphs have inconsistent voice usage. Rewrite them to maintain appropriate voice throughout.

Paragraph 1 (Technical documentation - system description): The authentication system was designed to provide secure access. Users enter their credentials, and the system validates them against the database. Two-factor authentication is supported. The system generates a temporary code, and it is sent to the user's mobile device by the system. Access is granted after the code has been verified.

Your rewrite: _____

Paragraph 2 (User manual - installation instructions): First, the installer should be downloaded from our website. Then, you should run the setup file. Installation options will be presented to you by the installer. The default settings can be selected, or custom options should be chosen by you if preferred. After the installation is completed by you, you need to restart your computer.

Your rewrite: _____

Paragraph 3 (Research methodology): We collected data from 500 participants over six months. Surveys were distributed online, and participants completed them anonymously. The data was then analyzed using statistical software. We performed correlation analysis to identify relationships between variables. Outliers were removed by us before the final analysis. The results showed significant patterns.

Your rewrite: _____

EXERCISE 4.12: ACTIVE VS. PASSIVE IN DIFFERENT DOCUMENT TYPES

Write three sentences for each document type, using the appropriate voice.

A) Technical Specifications (mix of both voices as appropriate):

4.

5.

6.

B) API Documentation (primarily active for clarity):

4.

5.

6.

C) Research Paper Abstract (mix, with passive for methodology):

4.

5.

6.

D) Quick Start Guide (active imperative for instructions):

4.

5.

6.

E) System Architecture Description (passive for describing components):

- 4.
- 5.
- 6.

EXERCISE 4.13: COMPLEX PASSIVE CONSTRUCTIONS

Transform these complex active sentences into passive voice, maintaining all information.

6. The development team has been implementing new security features throughout the entire application.
 - **Passive:** _____
7. Artificial intelligence algorithms are continuously analyzing user behavior patterns to improve recommendations.
 - **Passive:** _____
8. The company will have completed the cloud migration by the end of Q3.
 - **Passive:** _____
9. Cybersecurity experts recommend that organizations should update their systems regularly.
 - **Passive:** _____
10. The research team had been testing the prototype for three months before they discovered the flaw.
 - **Passive:** _____

EXERCISE 4.14: GET-PASSIVE (INFORMAL PASSIVE)

The "get-passive" (get + past participle) is more informal than "be-passive." Identify which sentences use get-passive and rewrite them in formal be-passive for technical writing.

6. The system got infected by malware yesterday.
 - **Type:** _____
 - **Formal version:** _____
7. Our proposal got rejected by the review committee.
 - **Type:** _____
 - **Formal version:** _____
8. The application was downloaded over a million times.
 - **Type:** _____
 - **Formal version:** _____
9. Several files got corrupted during the transfer.
 - **Type:** _____
 - **Formal version:** _____
10. The issue was resolved by the support team within hours.
 - **Type:** _____
 - **Formal version:** _____

EXERCISE 4.15: DOUBLE PASSIVE (ADVANCED)

Some sentences incorrectly use double passives. Identify the error and correct it.

5.  The report is being attempted to be generated by the system.
- **Problem:** _____
 - **Correction:** _____
6.  The code needs to be tried to be optimized further.
- **Problem:** _____
 - **Correction:** _____
7.  The data needs to be analyzed before conclusions can be drawn.
- **Status:** _____
8.  The password should be tried to be reset by users if they forget it.
- **Problem:** _____
 - **Correction:** _____

EXERCISE 4.16: AGENT VS. INSTRUMENT IN PASSIVE VOICE

Identify whether the "by" phrase introduces an agent (doer) or an instrument (tool), and determine if it should be included.

6. The file was deleted by the system administrator. (Agent/Instrument?)

- **Should it be included?** _____

7. The file was deleted by an automated script. (Agent/Instrument?) _____
- **Should it be included?** _____
8. The vulnerability was exploited by hackers using malware. (Agent/Instrument?) _____
- **Should it be included?** _____
9. The calculation was performed by a quantum computer. (Agent/Instrument?) _____
- **Should it be included?** _____
10. The image was processed by an AI algorithm. (Agent/Instrument?) _____
- **Should it be included?** _____

EXERCISE 4.17: MIXED PARAGRAPH REVISION

This technical report excerpt contains 15 voice-related issues (unnecessary passive, unclear active, missing agents, etc.). Identify and correct them.

Original paragraph:

"In this study, cloud computing security was investigated by us. Data was collected from 100 companies, and interviews were conducted by researchers with IT managers. Several common vulnerabilities were identified, including weak authentication and insufficient encryption. It was found by us that many organizations don't implement basic security measures. Recommendations are being made for improving cloud security. A framework was developed that can be used by companies to assess their security posture. The framework was tested in pilot studies, and positive results were received. It is believed by many experts that cloud security will remain a critical concern. More research needs to be done by the academic community to address emerging threats."

Your revised version:

List of changes made:

- 4.
- 5.
- 6.

(continue as needed)

EXERCISE 4.18: STATIVE PASSIVES VS. DYNAMIC PASSIVES

Distinguish between stative passive (describing a state) and dynamic passive (describing an action). Then convert as requested.

Examples:

- **Stative:** "The office is located in Silicon Valley." (describes state)
- **Dynamic:** "The office was relocated last year." (describes action)

Identify and explain:

5. The database is stored on secure servers.
 - **Type:** _____
 - **Explanation:** _____
6. The database was backed up at midnight.
 - **Type:** _____
 - **Explanation:** _____
7. The code is written in Python.
 - **Type:** _____
 - **Explanation:** _____
8. The code was written by junior developers.

- **Type:** _____
- **Explanation:** _____

Now write two sentences (one stative passive, one dynamic passive) for these verbs:

7. design

- Stative: _____
- Dynamic: _____

8. connect

- Stative: _____
- Dynamic: _____

EXERCISE 4.19: VOICE IN DIFFERENT SECTIONS OF ACADEMIC PAPERS

For each section of a research paper, determine whether active or passive voice is more common/appropriate. Then write an example sentence.

Section	Preferred Voice	Example Sentence
Abstract (describing what was done)	_____	_____
Introduction (stating facts/context)	_____	_____

Literature Review (discussing others' work) _____

Methodology (describing procedures) _____

Results (presenting findings) _____

Discussion (interpreting results) _____

Conclusion (summarizing contributions) _____

EXERCISE 4.20: REAL-WORLD DOCUMENT ANALYSIS

Read these authentic technical writing samples and analyze voice usage.

Sample A (Error message): "An error has been encountered by the system while processing your request. The operation could not be completed. Please try again later."

- **Problems with voice usage:** _____
- **Improved version:** _____

Sample B (API documentation): "The authenticate() method should be called first. Then, the getData() method can be used to retrieve information. Results are returned in JSON format."

- **Voice consistency:** _____
- **Any improvements needed?** _____

Sample C (Research abstract): "Machine learning techniques have been applied by researchers to predict system failures. In this study, three different algorithms are compared. The results show that neural networks achieve the highest accuracy."

- **Voice usage assessment:** _____
- **Suggested revisions:** _____

EXERCISE 4.21: PRODUCTION EXERCISE - WRITING WITH PURPOSE

Write a 150-word paragraph for **each** scenario below, using appropriate voice choices:

Scenario A: User Manual Section Write instructions for resetting a password in a mobile app. Use primarily active voice with imperative mood.

Your paragraph: _____

Scenario B: Research Methodology Describe how you collected and analyzed data for a software testing project. Use appropriate mix of active and passive voice.

Your paragraph: _____

Scenario C: System Description Describe the architecture and capabilities of a web application. Use passive voice where appropriate to focus on the system rather than developers.

Your paragraph: _____

EXERCISE 4.22: CRITICAL ANALYSIS - VOICE EFFECTIVENESS

For each pair of sentences, explain which is more effective and why, considering clarity, formality, and focus.

Pair 1:

- A: "We developed the algorithm to minimize computational complexity."
- B: "The algorithm was developed to minimize computational complexity."

Analysis: _____

Pair 2:

- A: "Click the Submit button."
- B: "The Submit button should be clicked."

Analysis: _____

Pair 3:

- A: "The system encrypts all user data automatically."
- B: "All user data is encrypted automatically by the system."

Analysis: _____

Pair 4:

- A: "Researchers have made significant advances in AI."
- B: "Significant advances have been made in AI."

Analysis: _____

EXERCISE 4.23: TRANSFORMATION CHALLENGE

Rewrite this entire paragraph THREE times:

4. **Version A:** Maximize active voice
5. **Version B:** Maximize passive voice
6. **Version C:** Optimal mix based on context and clarity

Original paragraph: "Our team developed a new algorithm for image recognition. The algorithm uses deep learning techniques. We trained the model on 10,000 images. The training process took 48 hours. We tested the system on various datasets. The results showed 95% accuracy. This performance exceeds previous benchmarks. We plan to implement the algorithm in production systems next quarter."

Version A (Maximized Active): _____

Version B (Maximized Passive): _____

Version C (Optimal Mix): _____

Reflection: Which version is most effective? Why? _____

EXERCISE 4.24: COMMON PASSIVE PITFALLS

Identify and correct the problem in each sentence.

6. **Dangling modifier:** "While being tested, several bugs were discovered."
 - **Problem:** _____
 - **Correction:** _____
7. **Unclear agent:** "The project was delayed."
 - **Problem:** _____
 - **Better alternatives:** _____
8. **Wordy passive:** "The decision was made by the committee to postpone the launch."
 - **Problem:** _____
 - **Correction:** _____
9. **Passive + weak verb:** "An investigation of the issue was conducted."

- **Problem:** _____
- **Correction:** _____

10. **Unnecessary formality:** "The file can be opened by clicking on the icon."

- **Problem:** _____
- **Correction:** _____

EXERCISE 4.25: FINAL MASTERY EXERCISE

You're editing a technical document. For each sentence:

- Identify if it uses active or passive voice
- Evaluate if the voice choice is appropriate
- If not, rewrite it with justification
- If appropriate, explain why

9. "The application was designed by our team to meet industry standards."

10. "Enter your username and password to log in."

11. "Significant improvements were observed in system performance."

12. "We recommend that users should change their passwords regularly."

13. "The algorithm processes data in real-time to detect anomalies."

14. "A comprehensive analysis of the results was performed by us."

15. "The database stores customer information securely."

16. "New features will be added in future updates."

Your analysis:

9.

10.

11.

12.

13.

14.

15.

16.

UNIT 5: MODAL VERBS IN ACADEMIC WRITING

5.1 GRAMMAR EXPLANATION

Modal verbs (can, could, may, might, must, should, will, would) express:

- Ability
- Permission
- Possibility/Probability
- Necessity/Obligation
- Advice/Recommendation

STRUCTURE

Subject + Modal + Base Verb (no "to")

The system **can process** 1000 requests per second.

5.2 COMMON MODALS IN TECHNICAL WRITING

CAN/COULD (ABILITY, POSSIBILITY)

- The algorithm **can** solve the problem in linear time.
- This approach **could** improve efficiency. (less certain)

MAY/MIGHT (POSSIBILITY, PERMISSION)

- This **may** lead to security vulnerabilities. (possible)
- The results **might** vary depending on input. (less certain)

MUST/SHOULD (NECESSITY, RECOMMENDATION)

- Users **must** change their passwords regularly. (strong obligation)
- Developers **should** follow coding standards. (recommendation)

WILL/WOULD (PREDICTION, HYPOTHESIS)

- The system **will** scale to meet demand. (confident prediction)
- The algorithm **would** fail with negative input. (hypothetical)

5.3 STRENGTH OF CERTAINTY

Strongest → Weakest:

5. Will, must (certain)
6. Should (expected)
7. Can, may (possible)
8. Could, might (less certain)

In academic writing:

- Use weaker modals when discussing limitations or speculating
- Use stronger modals for established findings or requirements

5.4 COMMON ERRORS

✗ The program can runs on Windows.

✓ The program can run on Windows.

✗ Users must to update their software.

✓ Users must update their software.

✗ This could to cause errors.

✓ This could cause errors.

5.5 EXERCISES

Exercise 5.1: Choose the correct modal

9. The algorithm (can/must) sort arrays efficiently.
10. This vulnerability (should/will) be fixed immediately.

11. The results (may/must) vary depending on configuration.
12. Developers (could/must) follow security best practices.
13. The system (might/will) crash under heavy load if not optimized.
14. This approach (should/might) reduce processing time.
15. Users (can/must) authenticate before accessing the system.
16. Future research (could/will) explore alternative methods.

Exercise 5.2: Correct the modal verb errors

7. The software can runs on multiple operating systems.
8. You must to install the latest version.
9. This might to improve performance significantly.
10. Developers should tests their code thoroughly.
11. The system will can handle increased traffic.
12. Users may to encounter compatibility issues.

Exercise 5.3: Choose the appropriate strength

Rewrite using a modal verb with appropriate certainty:

6. It is certain that quantum computers ____ revolutionize cryptography.
(will/might)
7. It is possible that the algorithm ____ perform better with optimization.
(must/could)
8. It is strongly recommended that users ____ enable two-factor authentication. (should/might)
9. There is a slight possibility that errors ____ occur. (may/will)
10. It is necessary that the data ____ be encrypted. (could/must)

Exercise 5.4: Formal academic writing

Replace informal expressions with appropriate modal verbs:

6. Maybe this will cause problems.
7. It's possible to optimize the code.
8. You need to back up your data regularly.
9. Perhaps future research will find better solutions.
10. It's likely that AI will transform the industry.

EXERCISE 5.5: MODAL MEANINGS IN CONTEXT

Choose the correct modal based on the intended meaning in each technical context.

Meaning: Ability/Capability

3. Modern smartphones (can/must/should) _____ run complex AI algorithms locally.
4. Quantum computers (could/must/would) _____ theoretically solve problems that classical computers cannot.

Meaning: Permission 3. Authenticated users (may/should/will) _____ access the admin panel. 4. With proper credentials, developers (can/must/might) _____ modify the source code.

Meaning: Necessity/Strong Obligation 5. All passwords (must/should/may) _____ contain at least 12 characters. 6. The system (must/could/might) _____ validate input before processing.

Meaning: Recommendation/Advice 7. Organizations (should/must/can) _____ implement regular security audits. 8. Developers (ought to/must/will) _____ comment their code for maintainability.

Meaning: Possibility/Uncertainty 9. The algorithm (might/must/will) _____ fail with extremely large datasets. 10. This approach (may/must/shall) _____ produce different results on different platforms.

Meaning: Future Prediction 11. Artificial intelligence (will/might/should) _____ become more sophisticated over time. 12. The update (will/could/may) _____ be released next Tuesday.

Meaning: Hypothetical Situation 13. If we increased the buffer size, the system (would/will/could) _____ handle more requests. 14. Without encryption, data (would/will/might) _____ be vulnerable to attacks.

EXERCISE 5.6: CERTAINTY SCALE

Arrange these modal expressions from **most certain** to **least certain**, then write a technical sentence for each.

Modals to arrange: must, will, should, can, may, could, might

Your ranking:

8. _____ (most certain) - Example: _____

9. _____ - Example: _____

10. _____ - Example: _____

11. _____ - Example: _____

12. _____ - Example: _____

13. _____ - Example: _____

14. _____ (least certain) - Example: _____

EXERCISE 5.7: PAST MODALS

Complete these sentences with appropriate past modal constructions (modal + have + past participle).

9. The system crashed. The developers _____ (should/test) it more thoroughly before deployment.
10. The data is corrupted. Someone _____ (must/modify) the database without authorization.
11. The project succeeded. The team _____ (may/work) overtime to meet the deadline.
12. We found a bug. This error _____ (could/cause) serious security vulnerabilities.
13. The algorithm performs well. The researchers _____ (must/optimize) it carefully.
14. The application is slow. We _____ (should/use) caching to improve performance.
15. The test results are surprising. There _____ (might/be) an error in our methodology.
16. The system is down. The servers _____ (could/crash) due to high traffic.

EXERCISE 5.8: MODAL + PASSIVE VOICE

Combine modals with passive voice (modal + be + past participle). Complete these technical writing examples.

11. User data _____ (must/encrypt) before transmission.
12. The code _____ (should/review) by senior developers before merging.
13. Security updates _____ (should/install) as soon as they are released.
14. This vulnerability _____ (could/exploit) by malicious actors.
15. The algorithm _____ (can/optimize) further to reduce complexity.
16. All API endpoints _____ (must/authenticate) to prevent unauthorized access.
17. The results _____ (may/affect) by environmental factors.

18. Legacy code _____ (might/need/refactor) for better maintainability.
19. The system _____ (will/upgrade) during the maintenance window.
20. These findings _____ (should/interpret) with caution due to sample size limitations.

EXERCISE 5.9: HEDGING IN ACADEMIC WRITING

Academic writing often uses "hedging" (cautious language) to avoid overstating claims. Rewrite these overly strong statements using appropriate modals.

7. **Too strong:** "This approach solves all security problems."
 - **Hedged version:** _____
8. **Too strong:** "The algorithm always produces optimal results."
 - **Hedged version:** _____
9. **Too strong:** "Machine learning transforms every industry."
 - **Hedged version:** _____
10. **Too strong:** "Our method is the best solution for this problem."
 - **Hedged version:** _____
11. **Too strong:** "The results prove that cloud computing is superior."
 - **Hedged version:** _____
12. **Too strong:** "This finding applies to all programming languages."
 - **Hedged version:** _____

EXERCISE 5.10: CONTEXT-SPECIFIC MODAL SELECTION

Choose the appropriate modal based on the document type and purpose.

Context A: Technical Requirements Document (strong obligations)

4. The system _____ (must/should/may) support at least 10,000 concurrent users.
5. All transactions _____ (must/could/might) be logged for audit purposes.
6. Data _____ (should/must/can) be backed up daily.

Context B: Research Discussion Section (tentative conclusions) 4. These findings _____ (suggest/will/might) that deep learning approaches are more effective. 5. The discrepancy _____ (could/must/will) be due to differences in dataset composition. 6. Future improvements _____ (may/must/should) be achieved through hyperparameter tuning.

Context C: User Documentation (instructions and recommendations) 7. You _____ (can/must/might) reset your password by clicking "Forgot Password." 8. Users _____ (should/must/will) save their work frequently to avoid data loss. 9. For best performance, you _____ (should/must/will) close unnecessary applications.

Context D: Technical Proposal (capabilities and predictions) 10. Our solution _____ (can/must/might) reduce processing time by up to 50%. 11. The implementation _____ (will/could/should) be completed within six months. 12. This approach _____ (may/must/will) provide better scalability than current methods.

EXERCISE 5.11: MODAL VERB ERRORS - IDENTIFICATION AND CORRECTION

Each sentence contains one or more errors with modal verb usage. Identify and correct them.

9. The software can runs on both Windows and macOS platforms.
 - **Error:** _____
 - **Correction:** _____

10. Developers must to follow the coding guidelines outlined in the documentation.

- **Error:** _____
- **Correction:** _____

11. This approach might to reduce the computational complexity significantly.

- **Error:** _____
- **Correction:** _____

12. Users should tests the application before deploying to production.

- **Error:** _____
- **Correction:** _____

13. The algorithm will can process large datasets efficiently.

- **Error:** _____
- **Correction:** _____

14. We could have to optimize the code for better performance.

- **Error:** _____
- **Correction:** _____

15. The system may not to support older browsers.

- **Error:** _____
- **Correction:** _____

16. Researchers must tests their hypotheses through experimentation.

- **Error:** _____
- **Correction:** _____

EXERCISE 5.12: MODAL COMBINATIONS AND VARIATIONS

Some situations require modal combinations or alternatives. Complete these sentences appropriately.

7. The system _____ (be able to) handle increased traffic after the upgrade. (Use "be able to" instead of "can" for future ability)
8. Developers _____ (have to) meet the project deadline despite technical challenges. (Use "have to" for external obligation)
9. You _____ (be supposed to) back up your data before updating the system. (Use "be supposed to" for expectations)
10. The team _____ (ought to) have conducted more thorough testing. (Use "ought to" for past advice)
11. We _____ (be going to) implement new security features next quarter. (Use "be going to" for planned future action)
12. The algorithm _____ (be likely to) perform well on large datasets. (Use "be likely to" for probability)

EXERCISE 5.13: MODALS IN DIFFERENT PAPER SECTIONS

Write appropriate sentences using modals for each section of a research paper.

Abstract (stating capabilities and findings): Example: "The proposed algorithm can reduce processing time by 40%."

- 3.
- 4.

Introduction (identifying needs and gaps): Example: "Current approaches cannot handle real-time processing efficiently." 3. _____ 4. _____

Literature Review (discussing others' claims cautiously): Example: "Smith (2020) suggests that machine learning may improve accuracy." 5. _____ 6. _____

Methodology (describing procedures and requirements): Example: "Participants must be at least 18 years old." 7. _____ 8. _____

Results (presenting findings with appropriate certainty): Example: "The results indicate that the treatment might be effective." 9. _____ 10. _____

Discussion (interpreting with hedging): Example: "This finding could suggest that..." 11. _____ 12. _____

Limitations (acknowledging constraints): Example: "The sample size may limit the generalizability of our findings." 13. _____ 14. _____

Future Work (suggesting possibilities): Example: "Future research should investigate alternative approaches." 15. _____ 16. _____

EXERCISE 5.14: REFORMULATION EXERCISE

Rewrite each sentence using the modal verb in parentheses while maintaining the original meaning.

9. It is possible that the algorithm will fail with negative inputs. (**might**)
☐
10. It is necessary for users to authenticate before accessing data. (**must**)
☐
11. There is a possibility that caching will improve performance. (**could**)
☐
12. It is advisable for developers to write unit tests. (**should**)
☐
13. The system has the ability to process 1000 requests per second. (**can**)

-
- 14. In the hypothetical case of a power failure, data would be at risk. **(would)**
-
- 15. It is likely that AI will transform healthcare. **(will)**
-
- 16. It was probably a configuration error that caused the crash. **(must have)**
-

EXERCISE 5.15: NEGATIVE MODAL FORMS

Complete these sentences with appropriate negative modal forms.

- 9. The system _____ (must not/doesn't have to) store passwords in plain text. *(Which expresses prohibition vs. lack of obligation?)*
- 10. Users _____ (cannot/may not) access admin features without authorization.
- 11. The algorithm _____ (might not/will not) work correctly with malformed input.
- 12. Developers _____ (shouldn't/mustn't) skip code reviews.
- 13. We _____ (could not/might not) replicate the results in our environment.
- 14. The application _____ (won't/can't) run on devices with less than 2GB RAM.
- 15. Organizations _____ (don't have to/must not) use outdated encryption methods.
- 16. The findings _____ (may not/cannot) be applicable to all scenarios.

EXERCISE 5.16: MODAL NUANCES - CHOOSE AND JUSTIFY

For each situation, choose between the two modals and explain why your choice is better.

6. **Situation:** Writing a security policy document "Users (should/must) _____ change their passwords every 90 days."
 - **Choice:** _____
 - **Justification:** _____
7. **Situation:** Discussing preliminary research findings "Our results (suggest/might suggest) _____ that the new algorithm is more efficient."
 - **Choice:** _____
 - **Justification:** _____
8. **Situation:** Describing a system's theoretical capability "The architecture (can/could) _____ theoretically support millions of users."
 - **Choice:** _____
 - **Justification:** _____
9. **Situation:** Making a prediction in a technical proposal "Implementation (will/should) _____ be completed by Q3."
 - **Choice:** _____
 - **Justification:** _____
10. **Situation:** Offering advice in documentation "For optimal performance, you (should/must) _____ close background applications."
 - **Choice:** _____
 - **Justification:** _____

EXERCISE 5.17: PARAGRAPH COMPLETION

Fill in ALL blanks with appropriate modal verbs. Consider the context and desired level of certainty.

Paragraph 1: Research Discussion Our findings suggest that machine learning approaches _____ be more effective than traditional methods for this task. However, the results _____ vary depending on dataset characteristics. The observed performance improvements _____ be attributed to the model's ability to learn complex patterns. Future research _____ investigate whether these benefits extend to other domains. It _____ also be noted that our study has certain limitations that _____ affect the generalizability of the conclusions.

Paragraph 2: Technical Requirements The system _____ support at least 5,000 concurrent users during peak hours. All user data _____ be encrypted both in transit and at rest. The application _____ maintain 99.9% uptime, excluding scheduled maintenance. Users _____ be able to recover their accounts through multi-factor authentication. The interface _____ be intuitive enough that users _____ complete common tasks without training. Error messages _____ provide clear guidance on how to resolve issues.

Paragraph 3: System Capabilities The proposed architecture _____ scale horizontally to accommodate increased load. Under optimal conditions, the system _____ process up to 10,000 transactions per second. However, performance _____ degrade if multiple components fail simultaneously. The caching layer _____ reduce database queries by up to 70%. With proper configuration, response times _____ be kept under 100 milliseconds. The system _____ also handle graceful degradation when backend services are unavailable.

EXERCISE 5.18: MODAL VERBS IN CONDITIONAL SENTENCES

Complete these conditional sentences with appropriate modals.

First Conditional (real possibility in the future):

3. If we optimize the algorithm, it _____ run 30% faster.

4. If users don't update their software, they _____ experience compatibility issues.

Second Conditional (hypothetical present/future): 3. If the system had more memory, it _____ handle larger datasets. 4. If we used a different framework, development _____ be easier.

Third Conditional (hypothetical past): 5. If we had tested more thoroughly, we _____ (avoid) this bug. 6. If the team had more time, they _____ (implement) additional features.

Mixed Conditional: 7. If we had chosen a better architecture initially, we _____ (not have) these scalability issues now.

EXERCISE 5.19: FORMALITY LEVELS WITH MODALS

Rewrite each sentence at three different formality levels using different modal expressions.

Situation: Advising users to back up their data

4. **Informal:** _____
5. **Neutral:** _____
6. **Formal/Academic:** _____

Situation: Expressing possibility of system failure

7. **Informal:** _____
8. **Neutral:** _____
9. **Formal/Academic:** _____

Situation: Stating a requirement for authentication

10. **Informal:** _____
11. **Neutral:** _____

EXERCISE 5.20: ERROR ANALYSIS - STUDENT WRITING

This paragraph is from a student's technical report. Identify all modal-related errors and suggest improvements.

Student's Paragraph:

"In this project, we developed a system that can processes large amounts of data in real-time. Users must to authenticate before accessing the system. The algorithm might to improve performance by up to 50% compared to existing solutions. We could observed that the system will can handle 5,000 concurrent users without issues. Future versions should includes additional security features. The implementation must completes before the end of the semester. This approach may to be useful for other applications as well."

Error Analysis:

8. Error: _____ Correction: _____

9. Error: _____ Correction: _____

10. Error: _____ Correction: _____

11. Error: _____ Correction: _____

12. Error: _____ Correction: _____

13. Error: _____ Correction: _____

14. Error: _____ Correction: _____

Revised Paragraph: _____

EXERCISE 5.21: MUST VS. SHOULD VS. HAVE TO

Explain the difference in meaning and choose the most appropriate option for each context.

Understanding the differences:

- **Must:** Strong obligation/logical necessity (speaker's authority)
- **Have to:** External obligation/requirement (external rules)
- **Should:** Recommendation/expectation (not as strong as must)

Choose and explain:

5. Security protocols _____ (must/should/have to) be followed at all times.
 - **Choice:** _____
 - **Why:** _____
6. Employees _____ (must/should/have to) complete the training course by Friday or they will lose access. (*company policy*)
 - **Choice:** _____
 - **Why:** _____
7. For best results, you _____ (must/should/have to) configure the settings manually.
 - **Choice:** _____
 - **Why:** _____
8. The password _____ (must/should/have to) contain at least one special character. (*system requirement*)
 - **Choice:** _____
 - **Why:** _____

EXERCISE 5.22: COULD VS. WAS/WERE ABLE TO

"Could" and "was/were able to" both express past ability, but they're used differently. Complete these sentences correctly.

Rule: Use "was/were able to" (not "could") for specific achievements in the past.

6. In 1969, NASA _____ (could/was able to) land astronauts on the moon. (*specific achievement*)
7. Before the update, the system _____ (couldn't/wasn't able to) handle concurrent requests efficiently. (*general inability in the past*)
8. After hours of debugging, the team _____ (could/was able to) finally identify the source of the error. (*specific success*)
9. The early algorithms _____ (could/were able to) only process small datasets. (*general ability in the past*)
10. Despite the limitations, researchers _____ (could/were able to) achieve significant improvements. (*specific achievement*)

EXERCISE 5.23: MODALS FOR SPECULATION AND DEDUCTION

Use modals to express different levels of certainty about past events or situations.

Levels of certainty:

- **must have:** very certain (logical deduction)
- **may/might have:** possible
- **could have:** possible alternative
- **can't/couldn't have:** impossible

Complete these deductions:

6. The system is down. The servers _____ crashed during the night shift.
(You're 95% certain based on the logs)
7. The algorithm performed poorly. There _____ been an error in our implementation. (It's one possible explanation)
8. The data is accurate. The error _____ come from the collection process.
(This is impossible based on verification)
9. Performance improved dramatically. The team _____ optimized the code very carefully. (This is the only logical explanation)
10. The project succeeded. The developers _____ worked overtime to meet the deadline. (This is a possibility among several)

EXERCISE 5.24: PRODUCTION EXERCISE - WRITING WITH MODALS

Write a 200-word technical abstract about a software project or research topic. Your abstract must include:

- At least 3 different modal verbs
- At least 1 past modal (modal + have + past participle)
- At least 1 modal + passive construction
- Appropriate hedging for claims
- Varied levels of certainty

Your abstract:

EXERCISE 5.25: CRITICAL ANALYSIS - MODAL EFFECTIVENESS

Analyze these pairs of sentences and explain which is more appropriate for academic/technical writing and why.

Pair 1:

- A: "The system can definitely solve all problems."
- B: "The system may be able to address these challenges."

Analysis: _____

Pair 2:

- A: "We proved that the algorithm is better."
- B: "Our results suggest that the algorithm could be more effective."

Analysis: _____

Pair 3:

- A: "Users have got to update their software immediately."
- B: "Users must update their software immediately."

Analysis: _____

Pair 4:

- A: "This might possibly perhaps improve performance."
- B: "This could improve performance."

Analysis: _____

Pair 5:

- A: "The error must have occurred during data transfer."

- B: "The error probably occurred during data transfer."

Analysis: _____

EXERCISE 5.26: REAL-WORLD TECHNICAL WRITING

For each type of technical document, write 3 sentences using modals appropriately.

A) Software Requirements Specification:

- 4.
- 5.
- 6.

B) Research Paper Limitations Section:

- 4.
- 5.
- 6.

C) API Documentation:

- 4.
- 5.
- 6.

D) Troubleshooting Guide:

- 4.
- 5.
- 6.

E) Project Proposal (predicting outcomes):

- 4.
- 5.
- 6.

EXERCISE 5.27: COMPLEX MODAL CONSTRUCTIONS

Complete these sentences with complex modal structures.

6. The bug _____ (should/report) to the development team as soon as it was discovered. (*past modal passive - should have been reported*)
7. With proper optimization, the algorithm _____ (can/make) to run twice as fast. (*modal passive - can be made*)
8. The security vulnerability _____ (may/exploit) by hackers if left unpatched. (*modal passive - may be exploited*)
9. All code changes _____ (must/review) before being merged into the main branch. (*modal passive - must be reviewed*)
10. The project deadline _____ (could/extend) if additional resources are not allocated. (*modal passive - could be extended*)

EXERCISE 5.28: FINAL MASTERY CHALLENGE

Rewrite this paragraph to improve modal verb usage. The paragraph has issues with:

- Incorrect modal forms
- Inappropriate certainty levels
- Missing hedging where needed
- Overconfident claims
- Informal modal expressions

Original Paragraph:

"Our system can definitely handles all types of data without any problems. Users have got to install version 2.0 or they will probably maybe have issues. The algorithm must improves performance by exactly 50% in all cases. Previous research couldn't never achieve these results. Our findings prove that this is the best solution that exists. The system might to be used by thousands of companies soon. This approach will can solve every problem in the field. Users must to follow our recommendations without question."

Your revised paragraph:**List of changes made:**

- 4.
- 5.
- 6.

(continue as needed)

UNIT 6: PREPOSITIONS IN TECHNICAL CONTEXTS

6.1 GRAMMAR EXPLANATION

Prepositions show relationships between nouns, verbs, and other words. They indicate:

- Time (at, on, in, during)
- Place (at, on, in, above, below)
- Direction (to, from, into)
- Method (by, with, through)

6.2 COMMON PREPOSITION USAGE

TIME PREPOSITIONS

- **AT:** specific times → *at 3:00 PM, at runtime*
- **ON:** days/dates → *on Monday, on March 15th*
- **IN:** months/years/periods → *in 2024, in the morning*
- **DURING:** throughout a period → *during testing, during execution*
- **FOR:** duration → *for three hours, for several years*

PLACE/POSITION

- **AT:** specific points → *at the university, at line 42*
- **ON:** surfaces, devices → *on the server, on the screen*
- **IN:** enclosed spaces, systems → *in the database, in memory*

TECHNICAL CONTEXTS

- **ON:** platforms/systems → *on Linux, on the cloud*
- **IN:** programming languages → *in Python, in C++*
- **WITH:** tools/methods → *with machine learning, with encryption*
- **BY:** methods/agents → *by using algorithms, by the system*
- **THROUGH:** processes → *through iteration, through testing*
- **FROM/TO:** data flow → *from the user to the server*

6.3 COMMON PREPOSITIONAL PHRASES IN CS

- *according to the specifications*
- *in terms of performance*
- *with respect to security*
- *by means of encryption*
- *in contrast to previous methods*
- *in accordance with standards*
- *in addition to features*
- *due to high demand*
- *based on empirical data*

6.4 COMMON ERRORS

✗ The meeting is on 3 PM.

✓ The meeting is at 3 PM.

✗ The program runs in Windows.

✓ The program runs on Windows.

✗ We wrote the code with Python.

✓ We wrote the code in Python.

✗ Send the data from the server.

✓ Send the data to the server. (or from, depending on direction)

6.5 EXERCISES

Exercise 6.1: Fill in the correct preposition

11. The algorithm runs ____ $O(n \log n)$ time.
12. The conference will be held ____ June 15th ____ 2:00 PM.
13. The data is stored ____ the cloud.
14. We implemented the system ____ Python.
15. The application runs ____ multiple platforms.
16. The error occurred ____ runtime ____ testing.
17. ____ accordance ____ best practices, we encrypted all data.
18. The performance improved ____ 40% ____ optimization.
19. Information flows ____ the client ____ the server.
20. ____ contrast ____ previous versions, this release is more secure.

Exercise 6.2: Correct the preposition errors

9. The program was developed in Java language.
10. The server crashed in midnight.
11. We will deploy the application at Monday.
12. The code runs in the operating system.
13. The data is transmitted from the client on the server.
14. In terms in performance, the new algorithm is superior.
15. The meeting is scheduled on 10:00 AM.
16. We worked in the project during three months.

Exercise 6.3: Advanced - Choose the correct preposition

7. The complexity is measured (in/by/with) terms of time and space.
8. (At/On/In) accordance (with/to/for) the requirements, we added validation.
9. The system operates (in/on/at) real-time.
10. (During/For/In) the past decade, cloud computing has grown significantly.
11. The algorithm is based (in/on/at) machine learning techniques.
12. Data flows (from/to/by) multiple sources (to/from/in) the analytics engine.

Exercise 6.4: Complete the sentences

Use appropriate prepositions to complete these technical sentences:

6. The application is compatible ____ Windows, macOS, and Linux.
7. ____ our experiments, the system performed well ____ high load.
8. The data is encrypted ____ transmission and stored ____ rest.
9. ____ comparison ____ traditional methods, our approach is more efficient.
10. The error occurs ____ specific conditions ____ runtime.

EXERCISE 6.5: TIME PREPOSITIONS IN TECHNICAL WRITING

Choose the correct preposition for these time expressions.

13. The system was deployed _____ (at/on/in) March 2024.
14. The backup runs automatically _____ (at/on/in) midnight.
15. We will release the update _____ (at/on/in) Friday.
16. The project was completed _____ (during/for/in) three months.

17. _____ (During/For/In) the testing phase, we identified several bugs.
18. The server has been running _____ (for/since/from) 2020.
19. Development began _____ (at/on/in) the beginning of the year.
20. The application crashed _____ (at/on/in) runtime.
21. We worked on optimization _____ (during/for/in) the entire week.
22. The conference takes place _____ (at/on/in) the morning _____
(at/on/in) 9:00 AM.
23. _____ (In/On/At) the past decade, AI has advanced significantly.
24. The system will be unavailable _____ (during/for/while) maintenance.

EXERCISE 6.6: PLACE AND PLATFORM PREPOSITIONS

Complete these sentences with appropriate prepositions (at, on, in, to, from).

11. The application runs _____ Linux, Windows, and macOS.
12. Data is stored _____ the cloud _____ multiple data centers.
13. The file is located _____ the server _____ the /var/www directory.
14. The error message appears _____ the screen _____ the top right corner.
15. The code is hosted _____ GitHub _____ our organization's repository.
16. Users can access the system _____ any device connected _____ the internet.
17. The function is defined _____ line 247 _____ the main.py file.
18. The application is deployed _____ AWS _____ the us-east-1 region.
19. The database runs _____ a dedicated server _____ the data center.

20. Information is displayed _____ the dashboard _____ real-time.

EXERCISE 6.7: METHOD AND MEANS PREPOSITIONS

Choose the correct preposition to describe methods, tools, and means.

11. We implemented the solution _____ (by/with/through) using machine learning algorithms.
12. The data is encrypted _____ (by/with/in) AES-256 encryption.
13. Security is enhanced _____ (by/through/with) implementing multi-factor authentication.
14. The algorithm sorts the array _____ (by/with/through) comparing adjacent elements.
15. We communicated _____ (by/through/with) the team _____ (by/via/through) Slack.
16. The system operates _____ (in/on/by) following a client-server architecture.
17. Performance was improved _____ (by/with/through) optimization techniques.
18. The application was built _____ (in/with/by) React and Node.js.
19. Data flows _____ (through/by/with) multiple processing stages.
20. Authentication is handled _____ (by/with/through) OAuth 2.0.

EXERCISE 6.8: COMMON TECHNICAL PREPOSITIONAL PHRASES

Complete these sentences with the correct prepositional phrase from the box.

Box: according to | in terms of | with respect to | by means of | in contrast to
| in accordance with | in addition to | due to | based on | in relation to

11. _____ the documentation, the API supports JSON and XML formats.
12. _____ performance, the new algorithm is 50% faster.
13. _____ security, all endpoints must be authenticated.
14. Encryption is achieved _____ cryptographic protocols.
15. _____ previous versions, this release includes dark mode.
16. The system was designed _____ industry standards.
17. _____ the core features, we added several plugins.
18. The server crashed _____ insufficient memory.
19. The model is trained _____ historical data.
20. The complexity is measured _____ the size of the input.

EXERCISE 6.9: DEPENDENT PREPOSITIONS - VERBS

Match verbs with their correct dependent prepositions, then write technical sentences.

Verb + Preposition combinations:

- consist _____ (of)
- depend _____ (on)
- result _____ (in/from)
- contribute _____ (to)
- focus _____ (on)
- rely _____ (on)

- lead _____ (to)
- protect _____ (from/against)
- comply _____ (with)
- suffer _____ (from)

Write sentences:

6. (consist of) _____
7. (depend on) _____
8. (result in) _____
9. (contribute to) _____
10. (focus on) _____

EXERCISE 6.10: DEPENDENT PREPOSITIONS - ADJECTIVES

Complete with the correct preposition after these adjectives.

16. The system is compatible _____ (with) all major browsers.
17. The algorithm is capable _____ processing large datasets.
18. The developers are responsible _____ maintaining the codebase.
19. The error is related _____ memory allocation issues.
20. The framework is suitable _____ enterprise applications.
21. Our approach is different _____ traditional methods.
22. The result is similar _____ what we expected.
23. The team is familiar _____ Agile methodologies.
24. The API is independent _____ specific programming languages.

25. Machine learning is applicable _____ various domains.
26. The solution is superior _____ existing alternatives.
27. This version is identical _____ the previous release.
28. The system is vulnerable _____ SQL injection attacks.
29. The developer is proficient _____ Python and JavaScript.
30. The architecture is based _____ microservices.

EXERCISE 6.11: DEPENDENT PREPOSITIONS - NOUNS

Complete these noun + preposition combinations.

11. The advantage _____ (of) cloud computing is scalability.
12. There is a need _____ better security measures.
13. The impact _____ AI _____ healthcare has been significant.
14. The relationship _____ input size and processing time is linear.
15. The solution _____ the problem was found through debugging.
16. Our approach _____ software development emphasizes testing.
17. The difference _____ these two algorithms is complexity.
18. There is a demand _____ skilled developers in the industry.
19. The effect _____ caching _____ performance is substantial.
20. The increase _____ traffic caused the server overload.

EXERCISE 6.12: PREPOSITION ERROR IDENTIFICATION

Each sentence contains **one or two** preposition errors. Find and correct them.

9. The algorithm was implemented with Java and tested in various scenarios.
- **Error(s):** _____
 - **Correction:** _____
10. The meeting is scheduled at Monday in 2:00 PM at the conference room.
- **Error(s):** _____
 - **Correction:** _____
11. According with the requirements, the system must operate in real-time.
- **Error(s):** _____
 - **Correction:** _____
12. The data flows to the database from the analytics engine.
- **Error(s):** _____
 - **Correction:** _____
13. In terms in performance, our solution is superior from the baseline.
- **Error(s):** _____
 - **Correction:** _____
14. The application runs in multiple operating systems and is available at the cloud.
- **Error(s):** _____
 - **Correction:** _____
15. We worked in this project during three years until we completed it at 2023.
- **Error(s):** _____

○ **Correction:** _____

16. The error occurred in runtime during the deployment of the new version.

○ **Error(s):** _____

○ **Correction:** _____

EXERCISE 6.13: CONTEXT-DEPENDENT PREPOSITION CHOICE

Some prepositions change meaning based on context. Choose the correct one.

11. The program runs ____ (in/on/at) the background. (*continuous operation*)
12. The system operates ____ (in/on/at) high efficiency. (*manner/state*)
13. The function executes ____ (in/on/at) $O(n)$ time. (*complexity measurement*)
14. The code is written ____ (in/with/by) Python. (*programming language*)
15. The application was developed ____ (in/with/by) our team. (*agent*)
16. Security is implemented ____ (in/with/by) encryption. (*method/tool*)
17. Data is sent _____ (**from/to/at**) the client _____ (**from/to/at**) the server. (*direction of flow*)
18. The server is located _____ (**in/on/at**) Silicon Valley. (*general location*)
19. The server is located _____ (**in/on/at**) 123 Main Street. (*specific address*)
20. The bug was discovered _____ (**during/for/in**) testing. (*time period when something happened*)

EXERCISE 6.14: PHRASAL VERBS AND PREPOSITIONS

Complete these technical phrasal verbs with the correct preposition(s).

16. The system shut _____ unexpectedly during peak hours.
17. We need to set _____ a new development environment.
18. The developers are working _____ a critical bug fix.
19. The application crashed and we had to start _____ from scratch.
20. Make sure to back _____ your data before updating.
21. The team is looking _____ the error logs to find the cause.
22. We should break _____ the problem into smaller components.
23. The server can't keep _____ with the increased traffic.
24. Log _____ to your account to access premium features.
25. The update will roll _____ gradually over the next week.
26. We need to figure _____ why the algorithm is failing.
27. The old API will be phased _____ next quarter.
28. Developers rely _____ version control for collaboration.
29. The database filled _____ and stopped accepting new records.
30. We should focus _____ optimizing the critical sections first.

EXERCISE 6.15: PARAGRAPH COMPLETION

Fill in **all** prepositions in these technical paragraphs.

Paragraph 1: System Description Our web application runs _____ AWS _____ multiple availability zones. The frontend is built _____ React and deployed _____ CloudFront _____ global distribution. Data is stored _____ a PostgreSQL database _____ the backend. Communication _____ the client and server occurs _____ REST APIs _____ JSON format. _____ terms _____ security, all traffic is

encrypted ____ TLS 1.3. The system operates ____ accordance ____ GDPR requirements and can handle up ____ 10,000 concurrent users.

Paragraph 2: Research Methodology ____ this study, we conducted experiments ____ three different datasets. Data was collected ____ six months ____ January ____ June 2024. The experiments were performed ____ a GPU cluster ____ 8 NVIDIA A100 GPUs. ____ contrast ____ previous research, we focused ____ real-time processing. The algorithm was implemented ____ Python using TensorFlow. Results were analyzed ____ statistical methods and visualized ____ means ____ matplotlib. ____ accordance ____ ethical guidelines, all participant data was anonymized.

Paragraph 3: Problem and Solution The main challenge ____ distributed systems is maintaining consistency ____ multiple nodes. ____ our previous approach, data synchronization relied ____ a centralized coordinator, which resulted ____ a single point ____ failure. ____ addition ____ this limitation, the system suffered ____ high latency ____ peak hours. Our new solution is based ____ a consensus algorithm that distributes coordination ____ all nodes. This leads ____ improved reliability and performance ____ terms ____ throughput and response time.

EXERCISE 6.16: PREPOSITIONS IN ACADEMIC WRITING PHRASES

Complete these common academic phrases with appropriate prepositions.

16. ____ accordance ____ previous research...
17. ____ contrast ____ traditional approaches...
18. ____ addition ____ the core functionality...
19. ____ terms ____ efficiency...
20. ____ respect ____ security concerns...
21. ____ comparison ____ existing methods...
22. ____ means ____ experimentation...
23. ____ the basis ____ our findings...

24. _____ order _____ improve performance...
25. _____ spite _____ these limitations...
26. _____ account _____ recent developments...
27. _____ particular, _____ regard _____ scalability...
28. _____ the context _____ machine learning...
29. _____ the perspective _____ software engineering...
30. _____ the exception _____ edge cases...

EXERCISE 6.17: PREPOSITIONS WITH NUMBERS AND MEASUREMENTS

Choose the correct preposition for expressing quantities and measurements.

11. The algorithm runs _____ (in/at/on) $O(n^2)$ time complexity.
12. Performance improved _____ (by/with/to) 40%.
13. The system can scale _____ (to/up to/until) millions of users.
14. Response time decreased _____ (from/by/to) 500ms _____
(from/by/to) 100ms.
15. The accuracy increased _____ (by/from/to) 85% _____ (by/from/to)
95%.
16. The server operates _____ (at/on/in) 90% capacity.
17. The dataset consists _____ (of/from/with) over 10,000 samples.
18. Processing time varies _____ (from/between/among) 1 _____
(from/between/to) 5 seconds.
19. The application uses _____ (between/around/approximately) 2GB of
memory.
20. The price ranges _____ (from/between) \$50 _____ (to/and) \$100.

EXERCISE 6.18: FIXED EXPRESSIONS AND COLLOCATIONS

Match the beginning of each technical expression with its correct prepositional ending.

Beginnings:

11. access to
12. solution to
13. approach to
14. alternative to
15. impact on
16. effect on
17. relationship between
18. difference between
19. connection between
20. advantage over

Write complete sentences using 5 of these collocations:

- 6.
- 7.
- 8.
- 9.
- 10.

EXERCISE 6.19: PREPOSITION OMISSION AND ADDITION

Some sentences incorrectly include or omit prepositions. Correct them.

9. We discussed about the implementation details.

○ **Correction:** _____

10. The system lacks of proper error handling.

○ **Correction:** _____

11. The algorithm resembles to the one proposed by Smith (2020).

○ **Correction:** _____

12. We should focus on optimization the critical path.

○ **Correction:** _____

13. The application provides users real-time updates.

○ **Correction:** _____

14. The team consists five developers and two designers.

○ **Correction:** _____

15. This approach differs from traditional methods.

○ **Correction:** _____ (*Is this correct or incorrect?*)

16. We need to comply the security regulations.

○ **Correction:** _____

EXERCISE 6.20: PREPOSITIONS IN DIFFERENT DOCUMENT TYPES

Write appropriate sentences with correct prepositions for each document type.

A) Technical Specification (3 sentences with prepositions):

4.

5.

6.

B) User Manual (3 sentences with prepositions):

4.

5.

6.

C) Research Abstract (3 sentences with prepositions):

4.

5.

6.

D) Bug Report (3 sentences with prepositions):

4.

5.

6.

EXERCISE 6.21: COMPLEX PREPOSITIONAL PHRASES

Complete these complex sentences with multiple prepositions.

6. _____ accordance _____ the requirements specified _____ the documentation, the system must operate _____ real-time _____ latency _____ less than 100ms.

7. _____ contrast _____ our previous approach, which relied _____ centralized processing, the new architecture distributes workload _____ multiple nodes.
8. _____ terms _____ security, data must be encrypted _____ transit _____ TLS and _____ rest _____ AES-256.
9. The relationship _____ input size and execution time varies _____ $O(n)$ _____ best-case scenarios _____ $O(n^2)$ _____ worst-case scenarios.
10. _____ addition _____ the core functionality, the system provides APIs _____ integration _____ third-party services.

EXERCISE 6.22: ERROR ANALYSIS - STUDENT WRITING

This paragraph from a student's technical report contains **12 preposition errors**. Find and correct them all.

Student's Paragraph:

"In this project, we developed a mobile application in React Native that runs in both iOS and Android. The app was deployed at the cloud in AWS. Development started at March and was completed after three months at June. The application communicates to the backend server by REST APIs. Data is stored at a MongoDB database and cached in Redis for better performance. In terms in speed, the app loads at less than 2 seconds. According with user feedback, the interface is intuitive and easy to use. We worked in this project during the entire semester and presented our results at the final presentation in 10:00 AM."

Corrections:

- 13.
- 14.
- 15.
- 16.

- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

Corrected paragraph: _____

EXERCISE 6.23: PREPOSITION CHOICE - SUBTLE DIFFERENCES

Explain the difference in meaning or usage between these pairs.

7. **"The program runs on Windows" vs. "The program runs in Windows"**
 - Explanation: _____
8. **"We worked for three months" vs. "We worked during three months"**
 - Explanation: _____
9. **"Written in Python" vs. "Written with Python"**
 - Explanation: _____
10. **"Based on data" vs. "Based in data"**
 - Explanation: _____
11. **"At the end of the day" vs. "By the end of the day"**

- Explanation: _____

12. **"Communicate with the server" vs. "Communicate to the server"**

- Explanation: _____

EXERCISE 6.24: PREPOSITIONS IN INSTRUCTIONS

Write step-by-step instructions for a technical task (e.g., installing software, configuring a system). Use at least 10 different prepositions correctly.

Task: Installing and configuring a web server

Your instructions (8-10 steps):

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

Prepositions used: _____ (list them)

EXERCISE 6.25: PRODUCTION EXERCISE - TECHNICAL DESCRIPTION

Write a 200-word description of a software system or technology. Your description must include:

- At least 15 different prepositions
- At least 5 dependent preposition combinations (verb+prep, adj+prep, or noun+prep)
- At least 3 common academic prepositional phrases (e.g., "in terms of," "with respect to")
- Correct usage throughout

Your description:

Self-check list:

- Different prepositions used: _____ (list them)
- Dependent preposition combinations: _____
- Academic phrases: _____

EXERCISE 6.26: COMPARATIVE ANALYSIS

Compare these two versions of the same technical sentence. Which uses prepositions more effectively?

Version A: "The algorithm processes data through iteration using multiple stages with optimization techniques for improving performance in terms of speed and efficiency."

Version B: "The algorithm processes data iteratively through multiple optimization stages to improve performance in both speed and efficiency."

Analysis:

- Which is better? _____

- Why? _____
- Any improvements? _____

EXERCISE 6.27: REAL-WORLD TECHNICAL WRITING

These sentences are from actual technical documents. Fill in the missing prepositions.

6. "The API is designed _____ RESTful principles and communicates _____ JSON format."
7. "_____ order _____ ensure compatibility _____ older systems, we maintained backward compatibility _____ version 1.0."
8. "The algorithm operates _____ $O(n \log n)$ time complexity _____ average-case scenarios."
9. "Data flows _____ the ingestion layer _____ the processing pipeline and finally _____ the storage layer."
10. "_____ accordance _____ industry standards, all passwords are hashed _____ bcrypt _____ a cost factor _____ 12."

EXERCISE 6.28: PREPOSITION SUBSTITUTION

For each sentence, suggest alternative prepositions that would also be grammatically correct but might change the meaning slightly.

5. "The system operates **in** real-time."
 - Alternative: _____
 - Meaning change: _____
6. "We implemented the feature **by** using microservices."
 - Alternative: _____
 - Meaning change: _____

7. "The application runs **on** AWS."

- Alternative: _____
- Meaning change: _____

8. "Performance improved **by** 40%."

- Alternative: _____
- Meaning change: _____

EXERCISE 6.29: CRITICAL ANALYSIS - PREPOSITION DENSITY

Analyze this sentence for preposition overuse and rewrite it more concisely.

Original: "In the context of our research on the impact of machine learning algorithms on the performance of systems in the domain of natural language processing, we conducted experiments with the use of various models from the field of deep learning."

Analysis:

- Number of prepositions: _____
- Is it overused? _____
- Improved version: _____

EXERCISE 6.30: FINAL MASTERY EXERCISE

Edit this technical abstract to correct all preposition errors and improve preposition usage. The abstract contains multiple error types: wrong prepositions, missing prepositions, unnecessary prepositions, and awkward phrasing.

Original Abstract:

"In this paper, we present a novel approach of image recognition using deep learning. The system was implemented with Python and trained in a dataset at over 100,000 images. Experiments were conducted during six months period from January until June 2024. According our results, the algorithm achieves 95% accuracy that is superior from existing methods. In terms in computational efficiency, our approach reduces processing time with 40%. The system operates in real-time and can be deployed at edge devices. In accordance of industry standards, we evaluated the model in various benchmark datasets. The results demonstrate the effectiveness from our approach in terms in both accuracy and speed. This work contributes in the field by providing a solution of the challenge with real-time processing in resource-constrained environments."

Your corrected version:

Summary of changes:

4. Errors found: _____ (number)
5. Main error types: _____
6. Key improvements: _____

UNIT 7: SENTENCE STRUCTURE AND WORD ORDER

7.1 GRAMMAR EXPLANATION

English follows a strict Subject-Verb-Object (SVO) word order.

Basic Pattern:

Subject + Verb + Object + (Complement/Modifier)

The programmer (S) wrote (V) the code (O) efficiently (Adv).

7.2 ESSENTIAL ELEMENTS

Every complete sentence must have:

4. **Subject:** Who/what performs the action
5. **Verb:** The action or state
6. **Complete thought**

7.3 COMMON SENTENCE PATTERNS IN TECHNICAL WRITING

Pattern 1: S + V

The system crashed.

Pattern 2: S + V + O

The algorithm processes data.

Pattern 3: S + V + O + O (indirect + direct)

The API sends the client a response.

Pattern 4: S + V + C (complement)

The result is accurate.

Pattern 5: S + V + O + C

The test proved the hypothesis correct.

7.4 WORD ORDER RULES

ADJECTIVES BEFORE NOUNS:

*The **efficient algorithm** processes data.*

ADVERBS:

- Manner: after verb/object → *works **efficiently***
- Frequency: before main verb → ***often** crashes*
- Time: usually at end → *deployed **yesterday***

QUESTIONS:

Auxiliary/Modal + Subject + Main Verb

Does the system support encryption?

Can the algorithm handle large datasets?

7.5 COMMON ERRORS

- ✗ Processes the algorithm data quickly.
✓ The algorithm processes data quickly.
- ✗ Was developed the system last year.
✓ The system was developed last year.
- ✗ What this function does?
✓ What does this function do?
- ✗ The efficient very algorithm.
✓ The very efficient algorithm.

7.6 SENTENCE FRAGMENTS AND RUN-ONS

Fragment: Incomplete sentence lacking subject or verb



Because the server was down.



Because the server was down, users could not access the system.

Run-on/Comma Splice: Two independent clauses incorrectly joined



The code compiled, it had errors.



The code compiled, but it had errors.



The code compiled; however, it had errors.

7.7 EXERCISES

Exercise 7.1: Identify the sentence pattern (S, V, O, C)

6. The database stores user information.
7. The system is robust.
8. Developers write clean code.
9. The algorithm proved the theorem correct.
10. The API returns JSON data.

Exercise 7.2: Correct the word order

9. Efficiently runs the program on modern hardware.
10. Was created Python by Guido van Rossum.
11. The secure very system protects data.
12. Often crashes the application under load.
13. What does mean this error?
14. Installed we the software yesterday.
15. The well-written documentation helps users.

16. Can process the system requests how many?

Exercise 7.3: Fix fragments and run-ons

7. Because the network was slow.
8. The test failed, we fixed the bug.
9. Although the code is complex.
10. The system crashed, the data was lost, users complained.
11. When the server rebooted.
12. The algorithm is efficient, it requires less memory.

Exercise 7.4: Build complete sentences

Arrange these words into correct sentences:

6. quickly / the / data / analyzes / algorithm / the
7. yesterday / deployed / the / was / application
8. users / the / interface / intuitive / find / the
9. encryption / supports / the / system / does / ?
10. efficiently / runs / modern / on / hardware / the / program / very

Exercise 7.5: Advanced - Create complex sentences

Combine these simple sentences using conjunctions, relative clauses, or subordination:

6. The algorithm is efficient. It uses dynamic programming.
7. The system crashed. The database was corrupted. We restored from backup.
8. Python is popular. It has simple syntax. It has extensive libraries.
9. The test failed. We debugged the code. We found the error.

10. The network is slow. Users experience delays. We need to upgrade infrastructure.

EXERCISE 7.6: SENTENCE PATTERN IDENTIFICATION AND ANALYSIS

Identify the sentence pattern (S=Subject, V=Verb, O=Object, C=Complement, A=Adverbial) and label each component.

Pattern Key:

- **Pattern 1:** S + V
- **Pattern 2:** S + V + O
- **Pattern 3:** S + V + O + O (indirect + direct object)
- **Pattern 4:** S + V + C
- **Pattern 5:** S + V + O + C

Identify and label:

9. The neural network learns patterns from data.
- **Pattern:** _____
 - **Components:** S = _____ | V = _____ | O = _____ | Other = _____
10. The system became unstable.
- **Pattern:** _____
 - **Components:** _____
11. The API sends developers error messages.
- **Pattern:** _____
 - **Components:** _____

12. Machine learning algorithms require substantial computational resources.

- **Pattern:** _____
- **Components:** _____

13. The testing process proved our hypothesis incorrect.

- **Pattern:** _____
- **Components:** _____

14. Quantum computers exist.

- **Pattern:** _____
- **Components:** _____

15. The framework provides users extensive documentation.

- **Pattern:** _____
- **Components:** _____

16. The results seem promising.

- **Pattern:** _____
- **Components:** _____

EXERCISE 7.7: WORD ORDER CORRECTION - MULTIPLE ERRORS

Each sentence has multiple word order errors. Rewrite them correctly.

9. Efficiently processes very the algorithm large datasets quickly.

- **Correction:** _____

10. Was implemented the security protocol by the team last month successfully.

- **Correction:** _____
- 11. The robust extremely system prevents attacks malicious effectively.
 - **Correction:** _____
- 12. Can handle how many the server requests per second?
 - **Correction:** _____
- 13. Often fail tests the when not is configured properly the environment.
 - **Correction:** _____
- 14. The well-designed interface allows users to complete easily tasks.
 - **Correction:** _____
- 15. Provides the API to developers access to resources various.
 - **Correction:** _____
- 16. Must be tested thoroughly all code before deployment to production.
 - **Correction:** _____

EXERCISE 7.8: ADVERB PLACEMENT

Place the adverb in parentheses in the correct position(s). Sometimes multiple positions are possible.

- 9. The system crashes under heavy load. (**frequently**)
 - **Correct position(s):** _____
- 10. The algorithm has been optimized for performance. (**recently**)
 - **Correct position(s):** _____
- 11. We deploy updates to production. (**never, without testing**)
 - **Correct position(s):** _____

12. The database can handle concurrent requests. (**easily, thousands of**)

○ **Correct position(s):** _____

13. The developers work on bug fixes. (**currently**)

○ **Correct position(s):** _____

14. The application runs on mobile devices. (**smoothly**)

○ **Correct position(s):** _____

15. Machine learning has transformed data analysis. (**completely**)

○ **Correct position(s):** _____

16. The system was tested before deployment. (**thoroughly, yesterday**)

○ **Correct position(s):** _____

EXERCISE 7.9: QUESTION FORMATION

Convert these statements into questions using the indicated question words.

9. The algorithm processes 1 000 requests per second. (**How many**)

○

10. The system crashed because of insufficient memory. (**Why**)

○

11. The developers are working on the authentication module. (**What**)

○

12. The application was deployed last Friday. (**When**)

○

13. The senior architect designed the system architecture. (**Who**)

○

14. The data is stored in the cloud. (**Where**)

○

15. The team can complete the project in three months. (**How long**)

○

16. The API supports JSON and XML formats. (**Which formats**)

○

Now create Yes/No questions:

13. The system supports encryption. → _____

14. The algorithm can handle large datasets. → _____

15. The team has completed the testing phase. → _____

16. The application will be released next month. → _____

EXERCISE 7.10: FRAGMENT IDENTIFICATION AND CORRECTION

Identify whether each is a complete sentence or a fragment. Correct all fragments.

9. Although the algorithm is efficient and runs in linear time.

○ **Status:** _____

○ **Correction (if needed):** _____

10. Because the server was experiencing high traffic.

○ **Status:** _____

○ **Correction (if needed):** _____

11. The system that processes user requests in real-time.

- **Status:** _____
- **Correction (if needed):** _____

12. When developers follow best practices and write clean code.

- **Status:** _____
- **Correction (if needed):** _____

13. While the database was being migrated to the new server.

- **Status:** _____
- **Correction (if needed):** _____

14. Which significantly improved the application's performance.

- **Status:** _____
- **Correction (if needed):** _____

15. The API, providing access to various endpoints and supporting multiple authentication methods.

- **Status:** _____
- **Correction (if needed):** _____

16. To optimize the algorithm for better performance.

- **Status:** _____
- **Correction (if needed):** _____

EXERCISE 7.11: RUN-ON SENTENCES AND COMMA SPLICES

Identify the error type and correct using **three different methods**: (1) period + capital, (2) semicolon, (3) coordinating/subordinating conjunction.

Example: Original: "The code compiled, it had errors."

- Method 1: The code compiled. It had errors.
- Method 2: The code compiled; it had errors.
- Method 3: The code compiled, but it had errors.

Correct these:

6. The system crashed, the data was lost.

- **Method 1:** _____
- **Method 2:** _____
- **Method 3:** _____

7. The algorithm is efficient it uses dynamic programming.

- **Method 1:** _____
- **Method 2:** _____
- **Method 3:** _____

8. We tested the application, we found several bugs, we fixed them immediately.

- **Method 1:** _____
- **Method 2:** _____
- **Method 3:** _____

9. The server handles thousands of requests per second, it rarely crashes.

- **Method 1:** _____

○ **Method 2:** _____

○ **Method 3:** _____

10. Python is beginner-friendly, Java is more verbose, C++ offers better performance.

○ **Best correction:** _____

EXERCISE 7.12: ADJECTIVE ORDER

English has a specific order for multiple adjectives. The general order is:

**Opinion → Size → Age → Shape → Color → Origin → Material → Purpose
+ NOUN**

Arrange these adjectives in the correct order before the noun.

7. algorithm / efficient / new / sorting

○ **Correct order:** _____

8. interface / user-friendly / modern / web

○ **Correct order:** _____

9. database / large / relational / enterprise

○ **Correct order:** _____

10. system / powerful / distributed / computing

○ **Correct order:** _____

11. framework / lightweight / JavaScript / open-source

○ **Correct order:** _____

12. servers / reliable / high-performance / dedicated / multiple

○ **Correct order:** _____

EXERCISE 7.13: INVERTED WORD ORDER

In certain cases, English uses inverted word order. Identify whether inversion is correct or incorrect.

Cases where inversion occurs:

- After negative adverbs (Never, Rarely, Seldom, etc.)
- In conditional sentences without "if"
- After "Only" at the beginning
- In questions

Evaluate these sentences:

- Never have I seen such an efficient algorithm.
 - **Status:** _____ (Correct/Incorrect)
- Rarely crashes the system under normal conditions.
 - **Status:** _____ (Correct/Incorrect)
 - **Correction (if needed):** _____
- Only when the data is validated can the system proceed.
 - **Status:** _____ (Correct/Incorrect)
- Had we tested more thoroughly, we would have found the bug.
 - **Status:** _____ (Correct/Incorrect)
- Not only the algorithm is fast, but it is also memory-efficient.
 - **Status:** _____ (Correct/Incorrect)
 - **Correction (if needed):** _____
- Seldom do developers write perfect code on the first attempt.

- **Status:** _____ (Correct/Incorrect)

EXERCISE 7.14: BUILDING COMPLEX SENTENCES

Combine these simple sentences into one complex sentence. Use relative clauses, subordinating conjunctions, or participial phrases.

6. **Simple sentences:** The algorithm sorts data. The algorithm uses merge sort. Merge sort is efficient for large datasets.

- **Complex sentence:** _____

7. **Simple sentences:** The system crashed. The crash occurred at midnight. The crash was caused by a memory leak.

- **Complex sentence:** _____

8. **Simple sentences:** Python is popular. Python has simple syntax. Python is used in data science. Data science is a growing field.

- **Complex sentence:** _____

9. **Simple sentences:** The team deployed the application. The deployment happened last week. The application runs on AWS. AWS is a cloud platform.

- **Complex sentence:** _____

10. **Simple sentences:** The API provides access to data. The data is stored in the database. The database is replicated. The replication ensures reliability.

- **Complex sentence:** _____

EXERCISE 7.15: PARALLEL STRUCTURE

Parallel structure means using the same grammatical form for items in a list or series. Correct the faulty parallelism.

9. The system is fast, reliable, and has scalability.

○ **Correction:** _____

10. The developer fixed the bug, tested the code, and deployment to production.

○ **Correction:** _____

11. We need to optimize the algorithm, reducing memory usage, and improve response time.

○ **Correction:** _____

12. The application supports authentication, authorization, and encrypts data.

○ **Correction:** _____

13. The framework is easy to use, well-documented, and has an active community.

○ **Correction:** _____

14. Good code is readable, maintainable, and you can test it easily.

○ **Correction:** _____

15. The project requires planning carefully, executing efficiently, and to monitor continuously.

○ **Correction:** _____

16. Machine learning involves collecting data, training models, and to evaluate performance.

○ **Correction:** _____

EXERCISE 7.16: SUBJECT-VERB SEPARATION

Long modifiers between subject and verb can cause confusion. Identify the subject and verb, then verify agreement.

5. The algorithm, which processes millions of data points in real-time using advanced machine learning techniques, (is/are) highly efficient.
 - **Subject:** _____
 - **Verb:** _____
 - **Correct choice:** _____
6. The team of developers who have been working on this project for six months (has/have) completed the implementation.
 - **Subject:** _____
 - **Verb:** _____
 - **Correct choice:** _____
7. One of the most challenging aspects of distributed systems, including consensus algorithms and data replication, (is/are) maintaining consistency.
 - **Subject:** _____
 - **Verb:** _____
 - **Correct choice:** _____
8. The system, along with all its components and dependencies, (need/needs) to be updated.
 - **Subject:** _____
 - **Verb:** _____
 - **Correct choice:** _____

EXERCISE 7.17: SENTENCE VARIETY

Rewrite this paragraph to include varied sentence structures (simple, compound, complex, compound-complex).

Original paragraph (all simple sentences):

"Cloud computing is popular. It offers scalability. It reduces costs. Companies adopt cloud solutions. They migrate their infrastructure. The migration process is complex. It requires careful planning. Security is a concern. Data must be protected. Encryption helps. Multi-factor authentication is important. Companies must comply with regulations. They need skilled personnel. Training is essential."

Your revised paragraph with varied structures:

Identify your sentence types:

- Simple: _____
- Compound: _____
- Complex: _____
- Compound-complex: _____

EXERCISE 7.18: DANGLING AND MISPLACED MODIFIERS

Identify and correct dangling or misplaced modifiers.

7. Running the tests, several bugs were discovered.
 - **Problem:** _____
 - **Correction:** _____
8. The developer fixed the bug using advanced debugging techniques that had been causing crashes.
 - **Problem:** _____

- **Correction:** _____
9. After deploying to production, the system experienced issues.
- **Problem:** _____ (Correct or incorrect?)
 - **Correction (if needed):** _____
10. We found a solution to the problem walking through the code.
- **Problem:** _____
 - **Correction:** _____
11. To optimize performance, caching was implemented by the team.
- **Problem:** _____
 - **Correction:** _____
12. The algorithm only processes data when needed.
- **Problem:** _____ (Consider placement of "only")
 - **Alternative meaning:** _____

EXERCISE 7.19: SENTENCE EXPANSION

Expand these basic sentences by adding modifiers, clauses, and details while maintaining correct word order.

Example: Basic: "The algorithm works." Expanded: "The sorting algorithm, which was developed by our team last year, works efficiently on large datasets by utilizing a divide-and-conquer approach."

Expand these:

6. The system crashed.
- **Expanded:** _____
7. Developers write code.

- **Expanded:** _____
- 8. The API returns data.
 - **Expanded:** _____
- 9. Machine learning is useful.
 - **Expanded:** _____
- 10. The application runs.
 - **Expanded:** _____

EXERCISE 7.20: SENTENCE COMBINING STRATEGIES

Combine each set of sentences using the specified method.

Set 1 (Use a relative clause):

- The framework is popular.
- The framework was developed by Facebook.
- Combined: _____

Set 2 (Use a participial phrase):

- The system monitors traffic.
- The system detects anomalies automatically.
- Combined: _____

Set 3 (Use a subordinating conjunction):

- The algorithm is complex.
- It produces accurate results.
- Combined: _____

Set 4 (Use an appositive):

- Python is widely used.
- Python is a high-level programming language.
- Combined: _____

Set 5 (Use coordination with a conjunctive adverb):

- The test failed.
- We decided to debug the code.
- Combined: _____

EXERCISE 7.21: TECHNICAL INSTRUCTIONS - IMPERATIVE SENTENCES

Imperative sentences (commands) have an implied subject "you." Write 8 technical instructions using correct imperative structure.

Example: "Install the dependencies before running the application."

Your instructions (for setting up a development environment):

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

EXERCISE 7.22: CLEFT SENTENCES FOR EMPHASIS

Cleft sentences emphasize specific information by restructuring. Practice both types.

Type 1: It-cleft (It + be + emphasized element + relative clause) Example:

"Python is popular." → "It is Python that is popular for data science."

Type 2: Wh-cleft (What-clause + be + emphasized element) Example:

"We need better security." → "What we need is better security."

Create cleft sentences for emphasis:

5. Original: The memory leak caused the crash.
 - **It-cleft (emphasize "memory leak"):** _____
 - **Wh-cleft (emphasize "caused the crash"):** _____
6. Original: The algorithm's efficiency matters most.
 - **Wh-cleft:** _____
7. Original: The team discovered the bug during testing.
 - **It-cleft (emphasize "during testing"):** _____
8. Original: We need scalable infrastructure.
 - **Wh-cleft:** _____

EXERCISE 7.23: PARAGRAPH COHERENCE - WORD ORDER AND FLOW

This paragraph has choppy sentences and poor word order. Rewrite it for better flow and coherence.

Original:

"Is cloud computing efficient. Many companies use it. Reduces costs it. Is scalable also. Must migrate companies their infrastructure. Is complex the process. Planning requires it careful. Security is important. Must be protected data. Use companies encryption. Important is also authentication."

Your revised paragraph:

EXERCISE 7.24: ERROR ANALYSIS - MULTIPLE ISSUES

This technical description contains various word order errors, fragments, run-ons, and structural issues. Identify **all** errors and provide a corrected version.

Original text:

"The distributed system handles efficiently requests from users multiple. Was designed it to be scalable and reliable. Each node in the cluster processes independently data this prevents single points of failure. When increases the traffic. The load balancer distributes automatically requests across nodes available. The system uses a consensus algorithm. For ensuring consistency across nodes. Rarely fail nodes, the system continues operating. Because of redundancy built-in. Can handle the architecture easily thousands of concurrent users it has been tested thoroughly."

Error analysis:

3. Type and location of errors: _____
4. Total errors found: _____

Corrected version:

EXERCISE 7.25: SENTENCE REDUCTION

Sometimes sentences are too wordy. Reduce these sentences while maintaining meaning and grammatical correctness.

6. **Wordy:** "The algorithm that we developed is one that can process data in a way that is efficient."

- **Concise:** _____
- 7. **Wordy:** "There are several features that have been implemented by the team."
- **Concise:** _____
- 8. **Wordy:** "It is important to note that the system requires regular maintenance."
- **Concise:** _____
- 9. **Wordy:** "The reason why the application crashed is due to the fact that there was insufficient memory."
- **Concise:** _____
- 10. **Wordy:** "In spite of the fact that the code was complex, the developers were able to understand it."
- **Concise:** _____

EXERCISE 7.26: CONDITIONAL SENTENCE STRUCTURE

Write correctly structured conditional sentences for each type.

Type 0 (General truths): If + present simple, present simple Example: "If you divide by zero, the program crashes."

Type 1 (Real future possibility): If + present simple, will + base verb Example: "If we optimize the code, performance will improve."

Type 2 (Hypothetical present/future): If + past simple, would + base verb Example: "If the system had more memory, it would run faster."

Type 3 (Hypothetical past): If + past perfect, would have + past participle Example: "If we had tested thoroughly, we would have found the bug."

Write one sentence for each type:

6. **Type 0:** _____

7. **Type 1:** _____

8. **Type 2:** _____

9. **Type 3:** _____

10. **Mixed conditional:** _____ (If + past perfect, would + base verb)

EXERCISE 7.27: NEGATIVE SENTENCE FORMATION

Form negative sentences correctly. Watch for common errors with auxiliaries.

6. The system supports encryption. (Make negative)

☐

7. The developers have completed the testing. (Make negative)

☐

8. The algorithm can handle large datasets. (Make negative)

☐

9. We optimized the code. (Make negative)

☐

10. The application runs on mobile devices. (Make negative)

☐

Common error to avoid: ❌ The system not supports encryption. ✅ The system does not support encryption.

EXERCISE 7.28: SENTENCE DIAGRAMMING (ADVANCED)

For these complex sentences, identify all clauses and their relationships.

Example: "When the system crashed, the administrators restarted the servers that had failed."

- Main clause: "the administrators restarted the servers"
- Subordinate clause (time): "When the system crashed"
- Relative clause: "that had failed"

Diagram these:

3. "The algorithm that we developed yesterday processes data more efficiently than the one that was used previously."
 - Main clause: _____
 - Subordinate clauses: _____
 - Relationships: _____
4. "Although the code is complex, developers who have experience with functional programming can understand it easily."
 - Main clause: _____
 - Subordinate clauses: _____
 - Relationships: _____

EXERCISE 7.29: PRODUCTION EXERCISE - TECHNICAL PROCESS DESCRIPTION

Write a 200-word description of a technical process (e.g., how an algorithm works, how a system handles requests, how authentication works). Your description must demonstrate:

- Correct SVO word order throughout
- At least 3 different sentence patterns
- At least 2 complex sentences
- At least 1 compound sentence
- Proper adverb placement
- No fragments or run-ons
- Varied sentence beginnings

Your description:

Self-check:

- Sentence patterns used: _____
- Complex sentences: _____
- Compound sentences: _____
- Any fragments or run-ons? _____

EXERCISE 7.30: CRITICAL ANALYSIS - SENTENCE STRUCTURE EFFECTIVENESS

Compare these three versions of the same technical paragraph. Analyze which is most effective and why.

Version A (All simple sentences): "The system is distributed. It handles thousands of requests. Each request is processed independently. The load balancer distributes traffic. Nodes can fail. The system continues operating. Redundancy ensures reliability. The architecture is scalable. It meets enterprise requirements."

Version B (All complex sentences): "The system, which is distributed, handles thousands of requests, each of which is processed independently by nodes that are coordinated by a load balancer that distributes traffic, and even when nodes fail, the system, which has redundancy, continues operating while maintaining the scalability that enterprises require."

Version C (Varied structures): "The distributed system handles thousands of requests, processing each independently. While the load balancer distributes traffic across multiple nodes, redundancy ensures that the system continues operating even when individual nodes fail. This scalable architecture meets enterprise requirements."

Your analysis:

5. **Most effective version:** _____
6. **Reasons:** _____
7. **Weaknesses of other versions:** _____
8. **Improvements you would suggest:** _____

EXERCISE 7.31: REAL-WORLD EDITING

Edit this excerpt from a student's technical report. Focus on sentence structure issues: fragments, run-ons, word order, and overall clarity.

Student's draft:

"In this project developed we a machine learning model. That classifies images with high accuracy. The model uses convolutional neural networks, these are effective for image processing, they can learn complex patterns. Was trained the model on 50,000 images. For achieving optimal performance. The training process it took 24 hours on our GPU cluster very powerful. Although initially the model overfitted. Added we regularization techniques. Which improved generalization. The final model achieves 94% accuracy this is better than baseline models significantly. Can be deployed the system in production environments, will handle it real-time inference efficiently."

Your edited version:

List of major corrections:

- 6.
- 7.
- 8.
- 9.
- 10.

EXERCISE 7.32: FINAL MASTERY EXERCISE

Write a complete technical abstract (150-200 words) about a software project, algorithm, or system. Your abstract must demonstrate mastery of:

- All basic sentence patterns (S+V, S+V+O, S+V+O+O, S+V+C, S+V+O+C)
- Correct word order throughout
- Varied sentence structures (simple, compound, complex)
- No fragments or run-ons
- Proper adverb placement
- Parallel structure where appropriate
- Clear subject-verb relationships
- Professional technical writing style

Your abstract:

Self-assessment checklist:

- ✓ Correct SVO order throughout? _____

- ✓ Sentence variety (at least 3 types)? _____
- ✓ No fragments or run-ons? _____
- ✓ Proper adverb placement? _____
- ✓ Clear and professional? _____

UNIT 8: PARALLEL STRUCTURE

8.1 GRAMMAR EXPLANATION

When expressing similar ideas in a list or series, all items must have the same grammatical form. This is called parallel structure or parallelism.

Parallel: Items in a series have the same grammatical structure

Not Parallel: Items have different structures

8.2 COMMON PATTERNS

LISTS WITH VERBS (SAME FORM)

- ✗ *The system can store data, processing requests, and to analyze patterns.*
- ✓ *The system can **store** data, **process** requests, and **analyze** patterns. (all base verbs)*

LISTS WITH NOUNS

- ✗ *The advantages include speed, efficient, and being reliable.*
- ✓ *The advantages include **speed**, **efficiency**, and **reliability**. (all nouns)*

LISTS WITH -ING FORMS (GERUNDS)

- ✓ *The tasks involve **coding**, **testing**, and **debugging**.*

LISTS WITH PHRASES

- ✗ *The requirements are to improve security, faster performance, and user-friendly.*
- ✓ *The requirements are **to improve security**, **to enhance performance**, and **to increase user-friendliness**.*

8.3 PARALLEL STRUCTURE IN COMPARISONS

When using "than" or "as...as", maintain parallel structure:

- ✗ *Writing code is easier than to debug it.*
- ✓ *Writing code is easier than debugging it.*
- ✗ *The new algorithm is as fast as using the old one.*
- ✓ *The new algorithm is as fast as the old one.*

8.4 CORRELATIVE CONJUNCTIONS

Use parallel structure with: both...and, either...or, neither...nor, not only...but also

- ✗ *The system is both efficient and has reliability.*
- ✓ *The system is both **efficient** and **reliable**.*
- ✗ *Developers must either fix the bug or rewriting the module.*
- ✓ *Developers must either **fix the bug** or **rewrite the module**.*

8.5 COMMON ERRORS

- ✗ *The API is fast, reliable, and has security.*
- ✓ *The API is fast, reliable, and secure.*
- ✗ *Our goals are improving performance, to reduce costs, and increased security.*
- ✓ *Our goals are to improve performance, to reduce costs, and to increase security.*

8.6 EXERCISES

Exercise 8.1: Identify parallel or not parallel

6. The software is efficient, reliable, and has cost-effectiveness.
7. The tasks include designing, implementing, and testing the system.

8. Python is used for web development, data analysis, and to automate tasks.
9. The algorithm is faster than the old one, more accurate, and using less memory.
10. We need to install updates, restarting the server, and configure settings.

Exercise 8.2: Correct the parallel structure errors

9. The advantages are speed, being secure, and reliability.
10. The system can collect data, analyzes it, and to generate reports.
11. Machine learning involves training models, to test them, and deployment.
12. The requirements include improving security, faster performance, and to enhance usability.
13. Developers should write clean code, testing thoroughly, and documenting their work.
14. The application is not only fast but also has reliability.
15. Either we can optimize the algorithm or rewriting it completely.
16. The process involves collecting data, to process it, and storing results.

Exercise 8.3: Complete with parallel structure

6. The three main tasks are ____, ____, and _____. (use: design, implement, test)
7. The system is ____, ____, and _____. (use adjectives)
8. Our objectives are to ____, to ____, and to _____. (use verbs)

9. The advantages include ____, ____, and _____. (use nouns)
10. Programming requires ____, ____, and _____. (use gerunds)

Exercise 8.4: Create parallel sentences

Write sentences using parallel structure for these topics:

6. Three programming languages you know (use noun phrases)
7. Steps in the software development process (use gerunds)
8. Features of a good algorithm (use adjectives)
9. Your goals as a programmer (use infinitives: to + verb)
10. Tasks in database management (use base verbs after "can")

EXERCISE 8.5: PARALLEL STRUCTURE TYPE IDENTIFICATION

Identify what type of parallel structure is used (verbs, nouns, adjectives, gerunds, infinitives, phrases, clauses).

7. "The framework is lightweight, flexible, and extensible."
- **Type:** _____
 - **Parallel elements:** _____
8. "The process involves collecting data, cleaning it, and analyzing results."
- **Type:** _____
 - **Parallel elements:** _____
9. "Our objectives are to improve performance, to enhance security, and to reduce costs."

- **Type:** _____
- **Parallel elements:** _____

10. "The system demonstrates speed, reliability, and scalability."

- **Type:** _____
- **Parallel elements:** _____

11. "The algorithm can sort arrays, search databases, and optimize queries."

- **Type:** _____
- **Parallel elements:** _____

12. "What developers need is clear documentation, responsive support, and regular updates."

- **Type:** _____
- **Parallel elements:** _____

EXERCISE 8.6: MULTI-LEVEL PARALLEL STRUCTURE

These sentences require parallel structure at multiple levels. Correct all parallelism errors.

7. The system is designed to be fast, have reliability, and being secure.

- **Correction:** _____

8. We need developers who can code efficiently, testing thoroughly, and to document clearly.

- **Correction:** _____

9. The API supports JSON format, XML responses, and to return data in CSV.

- **Correction:** _____

10. Machine learning requires large datasets, powerful hardware, and having expertise.

○ **Correction:** _____

11. The advantages include reduced costs, improving performance, and that it's more scalable.

○ **Correction:** _____

12. The team is responsible for developing features, to fix bugs, and testing the application.

○ **Correction:** _____

EXERCISE 8.7: CORRELATIVE CONJUNCTIONS - ADVANCED

Complete these sentences using parallel structure with correlative conjunctions.

Both...and

3. The system is both _____ and _____.

○ Example: efficient and reliable (adjectives)

4. Cloud computing offers both _____ and _____.

○ Use nouns: _____

Either...or 3. Developers must either _____ or _____.

● Use verbs: _____

5. The error occurs either _____ or _____.

○ Use prepositional phrases: _____

Neither...nor 5. The algorithm is neither _____ nor _____.

● Use adjectives: _____

7. The system can neither _____ nor _____.

- Use verbs: _____

Not only...but also 7. Machine learning is not only _____ but also _____.

- Use adjectives: _____

10. The framework not only _____ but also _____.

- Use verb phrases: _____

11. Not only _____, but _____ as well.

- Use clauses: _____

Whether...or 10. Whether _____ or _____, the system continues operating. -
Use clauses: _____

EXERCISE 8.8: PARALLEL COMPARISONS

Correct the parallel structure in these comparison sentences.

9. Writing clean code is more important than to write it quickly.

- **Correction:** _____

10. The new algorithm is as efficient as using the previous version.

- **Correction:** _____

11. Debugging is harder than to write the initial code.

- **Correction:** _____

12. Testing the application is as critical as developing it.

- **Correction:** _____ (Check if correct)

13. The team prefers working remotely rather than to commute to the office.

- **Correction:** _____
- 14. Machine learning is more complex than traditional programming was.
 - **Correction:** _____
- 15. Optimizing code for speed is different from to optimize for memory.
 - **Correction:** _____
- 16. The system handles more requests than the old system could handle.
 - **Correction:** _____ (Check if correct or if it can be improved)

EXERCISE 8.9: PARALLEL STRUCTURE ACROSS CLAUSES

Maintain parallel structure when multiple clauses follow the same pattern.

Example: "We found that the algorithm was efficient, that it used less memory, and that it produced accurate results."

Complete or correct these:

6. The research shows that _____, that _____, and that _____.
 - (machine learning is effective, deep learning outperforms traditional methods, neural networks require large datasets)
 - **Your sentence:** _____
7. The system ensures _____, guarantees _____, and provides _____.
 - (Use noun phrases)
 - **Your sentence:** _____
8. We discovered that the bug occurred during runtime, the error was logged, and _____.
 - **Complete with parallel clause:** _____

9. The developer who wrote the code, who tested it thoroughly, and _____ received recognition.
- **Complete with parallel relative clause:** _____
10. Whether we use SQL or NoSQL, whether we deploy on-premise or in the cloud, and _____, the architecture must be scalable.
- **Complete with parallel clause:** _____

EXERCISE 8.10: FAULTY PARALLELISM - MIXED FORMS

These sentences mix different grammatical forms. Identify the error type and correct it.

7. **Error:** "The goals are to increase efficiency, reducing costs, and improved security."
- **Problem:** _____
 - **Correction:** _____
8. **Error:** "The system is fast, has reliability, and secure."
- **Problem:** _____
 - **Correction:** _____
9. **Error:** "Developers enjoy coding, to solve problems, and working in teams."
- **Problem:** _____
 - **Correction:** _____
10. **Error:** "The advantages include scalability, being cost-effective, and that it's reliable."
- **Problem:** _____

○ **Correction:** _____

11. **Error:** "We can either optimize the existing code or to rewrite it from scratch."

○ **Problem:** _____

○ **Correction:** _____

12. **Error:** "The framework is not only powerful but also has flexibility."

○ **Problem:** _____

○ **Correction:** _____

EXERCISE 8.11: PARALLEL STRUCTURE IN TECHNICAL LISTS

Create properly parallel lists for these technical scenarios.

Scenario A: Describing system capabilities Write a sentence listing what a cloud platform can do (use base verbs):

•

Scenario B: Listing software features Write a sentence listing features of a mobile app (use noun phrases):

•

Scenario C: Describing algorithm characteristics Write a sentence describing qualities of an efficient algorithm (use adjectives):

•

Scenario D: Outlining development phases Write a sentence listing phases of software development (use gerunds):

•

Scenario E: Stating project objectives Write a sentence listing project goals (use infinitives):

•

EXERCISE 8.12: PARALLEL STRUCTURE IN COMPLEX SENTENCES

Maintain parallelism in these complex sentence structures.

5. **Conditional with multiple consequences:** "If the system crashes, we will _____, we will _____, and we will _____."
 - (lose data, need to restart, have to restore from backup)
 - **Your sentence:** _____
6. **Multiple reasons with "because":** "The algorithm is efficient because it _____, because it _____, and because it _____."
 - Use parallel clauses: _____
7. **Series of actions with time sequence:** "First, _____ ; next, _____ ; finally, _____."
 - Use parallel imperative verbs: _____
8. **Multiple characteristics introduced by "that":** "We need a system that _____, that _____, and that _____."
 - Use parallel verb phrases: _____

EXERCISE 8.13: PARALLEL STRUCTURE IN HEADERS AND OUTLINES

Headers and outline items should be parallel. Correct these outlines.

Outline A (Section headers):

5. Introduction to Cloud Computing

6. Understanding the Benefits
7. How to Deploy Applications
8. Security Considerations

Evaluation: Are these parallel? _____ **Correction (if needed):** _____

Outline B (Steps in a process):

5. Installing the software
6. Configuration of settings
7. To test the application
8. Deploy to production

Evaluation: Are these parallel? _____ **Correction:** _____

Outline C (Feature list):

5. Real-time data processing
6. Scalable architecture
7. It has advanced security
8. User-friendly interface

Evaluation: Are these parallel? _____ **Correction:** _____

EXERCISE 8.14: PARALLEL STRUCTURE WITH PREPOSITIONS

When using parallel structure, be careful with preposition repetition.

Rule: You can omit repeated prepositions, but don't mix styles.

Examples:

-  "The data is stored in the database, in the cache, and in the logs."
-  "The data is stored in the database, the cache, and the logs."
-  "The data is stored in the database, cache, and in the logs."

Evaluate and correct if needed:

5. The application runs on Windows, macOS, and on Linux.
 - **Evaluation:** _____
 - **Better version:** _____
6. We searched for the bug in the code, the database, and in the logs.
 - **Evaluation:** _____
 - **Better version:** _____
7. The system communicates with the server, with the database, and the cache.
 - **Evaluation:** _____
 - **Correction:** _____
8. Security is important for users, for developers, and companies.
 - **Evaluation:** _____
 - **Correction:** _____

EXERCISE 8.15: PARALLEL STRUCTURE IN ACADEMIC WRITING

Correct the parallel structure in these academic writing examples.

6. **Research objectives:** "The objectives of this study are to analyze system performance, evaluating security measures, and to compare different architectures."

○ **Correction:** _____

7. **Methodology description:** "Data was collected through surveys, by conducting interviews, and observing user behavior."

○ **Correction:** _____

8. **Results presentation:** "The results indicate that the algorithm is efficient, that it requires less memory, and accuracy is improved."

○ **Correction:** _____

9. **Literature review:** "Previous research has focused on improving speed, to enhance security, and reliability."

○ **Correction:** _____

10. **Conclusion:** "In conclusion, our system offers better performance, has lower costs, and is more scalable."

○ **Correction:** _____

EXERCISE 8.16: PARALLEL STRUCTURE - SENTENCE COMBINING

Combine these sentences while maintaining parallel structure.

Set 1:

- The system is fast.
- The system is reliable.
- The system is secure.

Combined: _____

Set 2:

- The algorithm can sort data.
- The algorithm can search databases.
- The algorithm can optimize queries.

Combined: _____

Set 3:

- Machine learning requires data collection.
- Machine learning requires model training.
- Machine learning requires performance evaluation.

Combined: _____

Set 4:

- Developers must write clean code.
- Developers must test thoroughly.
- Developers must document their work.

Combined: _____

EXERCISE 8.17: PARAGRAPH-LEVEL PARALLEL STRUCTURE

This paragraph lacks parallel structure in multiple places. Rewrite it with proper parallelism.

Original:

"Our cloud platform offers three main advantages. First, it provides scalability that allows businesses to grow. Second, there is cost reduction because infrastructure expenses are minimized. Third, you get enhanced security through advanced encryption. The platform is designed to be user-friendly, having reliability, and secure. Users can deploy applications, managing resources, and to monitor performance through a single dashboard. The system supports both small startups and enterprises that are large. Whether you need basic hosting or to have advanced features, our platform meets your requirements."

Your rewritten version:

EXERCISE 8.18: PARALLEL STRUCTURE WITH ARTICLES

When using parallel structure, maintain consistency with articles (a, an, the).

Examples:

-  "We need a developer, a designer, and a project manager."
-  "We need a developer, designer, and project manager."
(articles omitted)
-  "We need a developer, designer, and a project manager."
(inconsistent)

Correct these:

4. The system requires a database, server, and a load balancer.
 - **Correction:** _____
5. The project involves an architect, a developer, tester, and a manager.
 - **Correction:** _____
6. We used the Python library, the Java framework, and Ruby gem.
 - **Correction:** _____

EXERCISE 8.19: COMPLEX PARALLEL STRUCTURES

These sentences require maintaining parallelism across complex structures. Correct them.

6. "The system not only processes data in real-time but also it stores it securely and analyzing patterns efficiently."
 - **Correction:** _____
7. "Developers who write clean code, who are testing thoroughly, and documenting their work are valued."
 - **Correction:** _____
8. "The algorithm is designed to minimize memory usage, to maximize processing speed, and for improving accuracy."
 - **Correction:** _____
9. "We found that the system was efficient, it used less memory, and that performance exceeded expectations."
 - **Correction:** _____
10. "The advantages include not only cost savings but also improved performance, enhanced security, and it's reliable."

- **Correction:** _____

EXERCISE 8.20: PARALLEL STRUCTURE IN DIFFERENT CONTEXTS

Write parallel sentences for each context.

A) Technical Specifications (listing requirements): "The system must _____, _____, and _____."

- Your sentence: _____

B) User Documentation (listing steps): "To complete the installation: _____, _____, and _____."

- Your sentence: _____

C) Research Paper (stating contributions): "This paper contributes to the field by _____, _____, and _____."

- Your sentence: _____

D) Marketing Copy (highlighting benefits): "Our solution provides _____, _____, and _____."

- Your sentence: _____

E) Code Comments (describing function behavior): "This function _____, _____, and _____."

- Your sentence: _____

EXERCISE 8.21: ERROR ANALYSIS - STUDENT WRITING

This excerpt from a student's technical report contains **10 parallel structure errors**. Find and correct them all.

Student's Report:

"In this project, we developed a web application with three main goals: improving user experience, to enhance security, and performance optimization. The application is fast, reliable, and has scalability. The development process involved designing the architecture, to implement features, testing thoroughly, and deployment to production. Our team consisted of developers who could code efficiently, testers who tested carefully, and managers who were managing the project. The system supports multiple platforms, can handle high traffic, and storing data securely. Both users and administrators appreciate the interface for being intuitive, responsive, and it's accessible. The main challenges were integrating third-party APIs, to optimize database queries, and ensuring compatibility. We chose React because it's flexible, has a large community, and being well-documented. The final product not only meets requirements but also it exceeds expectations and providing additional features."

Corrections:

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

Corrected paragraph:

EXERCISE 8.22: PARALLEL STRUCTURE WITH NUMBERS AND LISTS

When introducing lists with numbers, maintain parallelism.

Correct these:

4. "The system has three components: (1) a database for storage, (2) processing server, and (3) to have a user interface."
 - **Correction:** _____
5. "The process involves four steps: first, collecting data; second, to clean it; third, analysis; and fourth, visualization."
 - **Correction:** _____
6. "We identified five issues: 1) performance is slow, 2) security vulnerabilities, 3) the interface is not user-friendly, 4) lack of documentation, and 5) bugs."
 - **Correction:** _____

EXERCISE 8.23: PARALLEL STRUCTURE - QUESTION FORMS

Maintain parallelism in questions as well.

Correct these:

4. "How does the algorithm work, what are its advantages, and can it scale?"
 - **Correction:** _____
5. "Where is the data stored, how is it secured, and what about backup?"
 - **Correction:** _____

6. "Who developed the system, when was it deployed, and what does it cost?"

○ **Correction:** _____ (Check if correct)

EXERCISE 8.24: PARALLEL STRUCTURE WITH TRANSITIONS

Maintain parallelism when using transitional phrases.

Complete these with parallel structures:

5. "First, the system _____ ; second, it _____ ; finally, it _____."

○ (collect, process, store data)

○ **Your sentence:** _____

6. "On one hand, the algorithm _____ ; on the other hand, it _____."

○ (Use parallel clauses)

○ **Your sentence:** _____

7. "In addition to _____, the platform provides _____ and _____."

○ (Use noun phrases)

○ **Your sentence:** _____

8. "Not only _____, but moreover _____, and furthermore _____."

○ (Use clauses)

○ **Your sentence:** _____

EXERCISE 8.25: ADVANCED PRODUCTION EXERCISE - TECHNICAL ABSTRACT

Write a 150-200 word technical abstract about a software project or research topic. Your abstract must demonstrate:

- At least THREE instances of parallel structure using different forms (verbs, nouns, adjectives, infinitives, or gerunds)
- At least ONE use of correlative conjunctions (both...and, either...or, not only...but also)
- At least ONE parallel comparison
- Perfect parallelism throughout (no errors)
- Professional technical writing style

Your abstract:

Self-check:

- Parallel structure #1 (type and location): _____
- Parallel structure #2 (type and location): _____
- Parallel structure #3 (type and location): _____
- Correlative conjunction used: _____
- Parallel comparison: _____

EXERCISE 8.26: PARALLEL STRUCTURE IN DEFINITIONS

Technical definitions often use parallel structure. Write definitions using the specified forms.

Example: "Machine learning is the process of training models, analyzing data, and making predictions."

Write definitions for:

5. **Cloud computing** (use three gerund phrases):

○

6. **Agile development** (use three noun phrases):

○

7. **Cybersecurity** (use three infinitive phrases):

○

8. **API** (use three adjective clauses with "that"):

○

EXERCISE 8.27: PARALLEL STRUCTURE - BEFORE AND AFTER

Rewrite these non-parallel sentences in two ways: (1) using one grammatical form, (2) using a different grammatical form.

Example: Original: "The system is fast, reliable, and has security."

- Version 1 (adjectives): "The system is fast, reliable, and secure."
- Version 2 (nouns): "The system offers speed, reliability, and security."

Rewrite these:

4. Original: "The goals are to improve performance, reducing costs, and enhanced security."

○ **Version 1:** _____

○ **Version 2:** _____

5. Original: "Programming involves writing code, to test it, and debugging."
- **Version 1:** _____
 - **Version 2:** _____
6. Original: "The framework is lightweight, has flexibility, and extensible."
- **Version 1:** _____
 - **Version 2:** _____

EXERCISE 8.28: PARALLEL STRUCTURE IN CAUSE-EFFECT RELATIONSHIPS

Maintain parallelism when expressing multiple causes or effects.

Complete these:

4. "The system crashed because _____, because _____, and because _____."
- (Use parallel clauses)
 - **Your sentence:** _____
5. "Optimizing the code resulted in _____, _____, and _____."
- (Use noun phrases)
 - **Your sentence:** _____
6. "The error occurred due to _____, _____, or _____."
- (Use noun phrases)
 - **Your sentence:** _____

EXERCISE 8.29: CRITICAL ANALYSIS - EFFECTIVENESS OF PARALLEL STRUCTURE

Analyze these pairs and explain which version is more effective and why.

Pair 1:

- A: "The system provides speed, reliability, and is secure."
- B: "The system provides speed, reliability, and security."

Analysis: _____

Pair 2:

- A: "The algorithm can sort data, search databases, and query optimization."
- B: "The algorithm can sort data, search databases, and optimize queries."

Analysis: _____

Pair 3:

- A: "We need to collect data, analyze it, and then we should visualize results."
- B: "We need to collect data, analyze it, and visualize results."

Analysis: _____

EXERCISE 8.30: FINAL MASTERY CHALLENGE

Edit this technical description to correct all parallel structure errors while maintaining the original meaning. The text contains multiple types of parallelism issues.

Original Text:

"Our distributed system architecture offers several key advantages for enterprise applications. The system is designed to be scalable, having high availability, and secure. It can handle thousands of concurrent users, processing large volumes of data, and to maintain low latency. The architecture consists of three main components: a load balancer that distributes traffic, application servers for processing requests, and databases that are storing data. Each component is optimized for performance, reliability, and to ensure fault tolerance. The load balancer not only distributes traffic evenly but also it monitors server health and rerouting requests when failures occur. Application servers can process requests independently, to scale horizontally, and communicate through message queues. The database layer provides data persistence, ensures consistency, and implementing replication for redundancy. Administrators can monitor system performance, managing resources, and to configure settings through a centralized dashboard. The system supports both synchronous and asynchronous processing, can integrate with third-party services, and providing RESTful APIs. Our benchmarks show that the architecture is faster than traditional monolithic systems, more reliable, and costs less to maintain. Whether you need basic functionality or to have advanced features, our platform meets your requirements. In conclusion, the system offers improved performance, enhanced security, it's cost-effective, and provides excellent scalability for growing businesses."

Your corrected version:

Summary of corrections:

- Total errors found: _____
- Main error types: _____

- Most challenging correction: _____

EXERCISE 8.31: REAL-WORLD APPLICATION - JOB DESCRIPTION

Write a job description for a software developer position (150 words) that demonstrates excellent use of parallel structure. Include:

- List of responsibilities (use parallel verbs)
- Required qualifications (use parallel noun phrases or adjectives)
- Desired skills (use parallel items)
- What the company offers (use parallel benefits)

Your job description:

EXERCISE 8.32: PEER REVIEW EXERCISE

Exchange paragraphs with a partner (or use the sample below) and identify all parallel structure issues.

Sample paragraph for review:

"Modern web development requires mastery of multiple technologies. Frontend developers must know HTML for structure, CSS for styling, and to write JavaScript for interactivity. They should be familiar with frameworks like React, Vue, or using Angular. Backend development involves working with databases, to create APIs, and server configuration. Full-stack developers combine both skillsets, can work independently, and often leading small teams. The best developers are those who write clean code, testing thoroughly, document well, and who are continuously learning. Whether you're building simple websites or to develop complex applications, understanding these fundamentals and having practical experience is essential for success in the field."

Your analysis:

- Number of parallel structure errors: _____
- Errors identified with corrections:
 - 1.
 - 2.
 - 3.
- (continue as needed)

UNIT 9: REPORTING VERBS AND CITATIONS

9.1 GRAMMAR EXPLANATION

Reporting verbs are used to cite sources, present research findings, and discuss other authors' work.

9.2 CATEGORIES BY STRENGTH

NEUTRAL (PRESENTING INFORMATION):

- state, describe, show, present, report, note, observe, find, explain, define

Smith (2023) **describes** the algorithm as efficient.

STRONG (CONFIDENT ASSERTION):

- argue, claim, assert, demonstrate, prove, confirm, establish, emphasize, maintain

The researchers **demonstrate** that the method improves accuracy.

WEAK/TENTATIVE (SUGGESTION/HYPOTHESIS):

- suggest, indicate, propose, hypothesize, speculate, imply, hint

The results **suggest** that further testing is needed.

CRITICAL/NEGATIVE:

- criticize, challenge, question, dispute, reject, refute, contradict

Johnson (2022) **challenges** the assumption that...

9.3 COMMON GRAMMAR PATTERNS

Pattern 1: Verb + that + clause *The authors argue **that** machine learning improves accuracy.*

Pattern 2: Verb + noun phrase *The study presents **a new approach** to encryption.*

Pattern 3: According to + author ***According to** Martinez (2024), cloud computing offers scalability.*

Pattern 4: Author + verb + that/how/whether *Kumar (2023) explains **how** blockchain ensures security.*

9.4 TENSE WITH REPORTING VERBS

Present simple: For current relevance or established ideas
Smith argues that security is crucial.

Past simple: For completed research
The researchers demonstrated the effectiveness of the algorithm.

Present perfect: For recent work with current relevance
Several studies have shown improvements in performance.

9.5 COMMON ERRORS

- ✗ According to the research, it shows that...
- ✓ The research shows that... OR According to the research,...

- ✗ Smith argues the algorithm is efficient.
- ✓ Smith argues that the algorithm is efficient.

- ✗ The study suggest that more testing needs.
- ✓ The study suggests that more testing is needed.

9.6 EXERCISES

Exercise 9.1: Choose the appropriate reporting verb

6. The researchers (argue/suggest/note) that quantum computing will revolutionize cryptography. (strong claim)
7. The paper (describes/demonstrates/challenges) three optimization techniques. (neutral)
8. Johnson (2023) (questions/states/confirms) the validity of previous assumptions. (critical)
9. The data (indicates/proves/claims) a positive correlation. (tentative)
10. The authors (establish/speculate/present) that the algorithm is optimal. (strong)

Exercise 9.2: Complete with correct patterns

6. According ____ Martinez (2024), AI ____ transform healthcare.
7. The study suggests ____ further research ____ needed.
8. The researchers demonstrate ____ their method reduces errors ____ 30%.
9. Smith argues ____ security should be a priority.
10. The paper explains ____ blockchain works.

Exercise 9.3: Choose the correct tense

6. Kumar (2023) (demonstrates/demonstrated) that the algorithm is efficient.
7. Several studies (show/showed/have shown) improvements in recent years.
8. In 1991, Berners-Lee (creates/created/has created) the World Wide Web.
9. Recent research (indicates/indicated/has indicated) new possibilities.

10. Thompson (argues/argued/has argued) consistently throughout his career that...

Exercise 9.4: Correct the errors

7. According to the research, it argues that AI is important.
8. The study suggest more testing needs.
9. Smith demonstrates the algorithm's efficiency in his paper of 2022.
10. The authors explains how the system work.
11. According Johnson, security should be priority.
12. The research shows about the benefits of cloud computing.

Exercise 9.5: Write citation sentences

Create sentences using these reporting verbs to cite fictional sources:

6. argue (Chen, 2024 / machine learning / improve predictions)
7. suggest (the study / further research / required)
8. demonstrate (Rodriguez, 2023 / new algorithm / reduce complexity)
9. challenge (the authors / previous assumptions / scalability)
10. according to (the report / cybersecurity threats / increasing)

EXERCISE 9.6: REPORTING VERB CLASSIFICATION

Categorize these reporting verbs by strength and function. Then use each in a sentence.

Verbs to classify: acknowledge, contend, highlight, observe, posit, reveal, stress, submit, warn, advocate

Category	Verbs	Example Sentence
----------	-------	------------------

Neutral

Strong

Tentative

Critical

Emphasis

EXERCISE 9.7: REPORTING VERB NUANCES

Explain the subtle difference in meaning between these pairs of reporting verbs, then write example sentences.

6. argue vs. claim

- **Difference:** _____
- **Example with "argue":** _____
- **Example with "claim":** _____

7. suggest vs. propose

- **Difference:** _____

- Example with "suggest": _____
- Example with "propose": _____

8. show vs. demonstrate

- Difference: _____
- Example with "show": _____
- Example with "demonstrate": _____

9. question vs. challenge

- Difference: _____
- Example with "question": _____
- Example with "challenge": _____

10. find vs. discover

- Difference: _____
- Example with "find": _____
- Example with "discover": _____

EXERCISE 9.8: GRAMMAR PATTERNS WITH REPORTING VERBS

Complete these sentences using the correct pattern for each reporting verb.

Pattern A: Verb + that + clause

3. Smith (2024) argues _____ machine learning _____ transforming healthcare.
4. The researchers found _____ the algorithm _____ 95% accuracy.

Pattern B: Verb + noun/noun phrase 3. The study presents _____ (new framework / data encryption) 4. Martinez (2023) proposes _____ (innovative solution / this problem)

Pattern C: Verb + how/what/whether/why + clause 5. The paper explains _____ neural networks _____ patterns. 6. Johnson questions _____ the approach _____ scalable.

Pattern D: Verb + preposition + noun 7. The authors focus _____ security vulnerabilities. 8. Recent research points _____ the need for better protocols.

Pattern E: Verb + object + preposition 9. The study attributes the improvement _____ better algorithms. 10. Critics blame the failure _____ poor design.

EXERCISE 9.9: STRENGTH APPROPRIATENESS

Choose the reporting verb with appropriate strength for each context.

6. **Context:** Citing well-established, peer-reviewed findings "The research _____ (suggests/demonstrates/speculates) that encryption is essential for data security."
- **Best choice:** _____
 - **Why:** _____
7. **Context:** Presenting preliminary, exploratory findings "Our pilot study _____ (proves/indicates/establishes) that this approach may be effective."
- **Best choice:** _____
 - **Why:** _____
8. **Context:** Citing a controversial or disputed claim "The author _____ (shows/claims/notes) that quantum computers will replace classical computers within five years."
- **Best choice:** _____
 - **Why:** _____

9. **Context:** Presenting objectively reported data "The report _____ (asserts/presents/argues) statistics on cybersecurity incidents."
- **Best choice:** _____
 - **Why:** _____
10. **Context:** Criticizing a flawed methodology "Several researchers _____ (describe/challenge/note) the validity of this experimental design."
- **Best choice:** _____
 - **Why:** _____

EXERCISE 9.10: TENSE SELECTION WITH REPORTING VERBS

Choose the appropriate tense based on context.

7. Turing _____ (describes/described/has described) the concept of universal computation in 1936.
- **Choice:** _____
 - **Reason:** _____
8. Recent studies _____ (show/showed/have shown) significant improvements in AI performance.
- **Choice:** _____
 - **Reason:** _____
9. Smith (2024) _____ (argues/argued/has argued) that cloud computing offers cost benefits.
- **Choice:** _____
 - **Reason:** _____

10. Since 2010, researchers _____ (develop/developed/have developed) numerous deep learning architectures.

○ **Choice:** _____

○ **Reason:** _____

11. The seminal paper published last year _____ (demonstrates/demonstrated/has demonstrated) the effectiveness of this approach.

○ **Choice:** _____

○ **Reason:** _____

12. Thompson _____ (maintains/maintained/has maintained) throughout his career that security should be prioritized.

○ **Choice:** _____

○ **Reason:** _____

EXERCISE 9.11: "ACCORDING TO" PATTERN - COMMON ERRORS

Correct these common errors with "according to" constructions.

6. According to the research, it shows that AI improves efficiency.

○ **Error:** _____

○ **Correction:** _____

7. According Smith (2024), security is crucial.

○ **Error:** _____

○ **Correction:** _____

8. According to Johnson, he argues that testing is important.

○ **Error:** _____

○ **Correction:** _____

9. According to the study shows increased performance.

○ **Error:** _____

○ **Correction:** _____

10. The system is efficient according to the research suggests.

○ **Error:** _____

○ **Correction:** _____

EXERCISE 9.12: REPORTING VERB + THAT-CLAUSE

Some reporting verbs require "that," while others can omit it. Determine if "that" is required, optional, or incorrect.

Rule of thumb: "That" is usually optional but clearer when included, especially in formal academic writing.

Evaluate these:

6. The study suggests (that) further research is needed.

○ **Status:** _____

7. Smith argues the algorithm is efficient.

○ **Status:** _____

○ **Better version:** _____

8. The data shows that performance improved.

○ **Status:** _____

9. According to Martinez that the system is reliable.

- **Status:** _____
- **Correction:** _____

10. The researchers demonstrate how that the method works.

- **Status:** _____
- **Correction:** _____

EXERCISE 9.13: REPORTING VERBS IN LITERATURE REVIEWS

Write literature review sentences using the specified reporting verbs and patterns.

Topic: Machine Learning in Healthcare

7. Use **"argue"** (strong claim, present tense): Chen (2024) _____
8. Use **"demonstrate"** (evidence-based, past tense): The study by Rodriguez et al. (2023) _____
9. Use **"suggest"** (tentative, present perfect): Several researchers _____
10. Use **"challenge"** (critical, present tense): However, Thompson (2024) _____
11. Use **"highlight"** (emphasis, past tense): Martinez's review (2022) _____
12. Use **"propose"** (suggestion, past tense): Kumar and Lee (2023) _____

EXERCISE 9.14: MULTIPLE CITATIONS IN ONE SENTENCE

Combine information from multiple sources using appropriate reporting verbs.

Example: "While Smith (2023) argues that cloud computing is cost-effective, Johnson (2024) suggests that security concerns may outweigh the benefits."

Combine these:

4. **Sources:** Chen (2024): AI improves diagnosis accuracy | Rodriguez (2023): AI has limitations in rare diseases
 - **Your sentence:** _____
5. **Sources:** Multiple studies: machine learning is effective | Critics: more validation needed
 - **Your sentence:** _____
6. **Sources:** Thompson (2023): quantum computing will revolutionize cryptography | Martinez (2024): practical applications are decades away
 - **Your sentence:** _____

EXERCISE 9.15: INTEGRAL VS. NON-INTEGRAL CITATIONS

Integral citation: Author is part of the sentence structure

- Example: "Smith (2024) argues that encryption is essential."

Non-integral citation: Author is in parentheses

- Example: "Encryption is essential (Smith, 2024)."

Convert between forms:

5. **Integral → Non-integral:** "Kumar (2023) demonstrates that the algorithm reduces complexity."
 - **Non-integral version:** _____

6. **Non-integral → Integral:** "Cloud computing offers significant cost savings (Martinez, 2024)."
- **Integral version:** _____
7. **Integral → Non-integral:** "Johnson and Lee (2022) suggest that further research is needed."
- **Non-integral version:** _____
8. **When to use which?**
- Use integral when: _____
 - Use non-integral when: _____

EXERCISE 9.16: REPORTING QUESTIONS AND UNCERTAINTIES

Use appropriate reporting verbs to discuss research questions and uncertainties.

Reporting verbs for questions: question, wonder, ask, inquire, examine, investigate, explore

Complete these:

6. The researchers _____ whether machine learning can improve prediction accuracy.
7. Smith (2024) _____ the assumption that more data always leads to better models.
8. The study _____ the relationship between algorithm complexity and performance.
9. Several authors _____ how blockchain can ensure data integrity.
10. Martinez _____ if quantum computing will make current encryption obsolete.

EXERCISE 9.17: REPORTING METHODOLOGIES

Use appropriate verbs to describe research methods.

Common verbs: use, employ, apply, adopt, implement, conduct, perform, carry out, utilize

Write sentences describing methodology:

5. **Data collection method:**
6. **Analytical approach:**
7. **Experimental procedure:**
8. **Testing methodology:**

EXERCISE 9.18: REPORTING RESULTS AND FINDINGS

Use appropriate verbs to present results.

Common verbs: find, reveal, show, indicate, demonstrate, discover, observe, detect, identify

Write result sentences:

5. **Statistical finding:** The analysis _____
6. **Experimental outcome:** The experiments _____
7. **Observational data:** The study _____
8. **Comparison result:** The comparison _____

EXERCISE 9.19: HEDGING WITH REPORTING VERBS

Academic writing often requires hedging (cautious language). Compare strong vs. hedged versions.

Rewrite these strong claims with appropriate hedging:

5. **Strong:** "The research proves that AI will replace human programmers."
☐ **Hedged:** _____
6. **Strong:** "The data shows that cloud computing is always more cost-effective."
☐ **Hedged:** _____
7. **Strong:** "The study establishes that quantum computers will solve all cryptographic problems."
☐ **Hedged:** _____
8. **Strong:** "The experiments confirm that this approach is optimal in all cases."
☐ **Hedged:** _____

EXERCISE 9.20: ERROR CORRECTION - MULTIPLE ISSUES

Each sentence has one or more errors with reporting verbs. Correct them.

9. According to Smith, he argues that security should be priority.
☐ **Correction:** _____
10. The study suggest that more data is needed for training the model.
☐ **Correction:** _____
11. Johnson (2023) demonstrates about how the algorithm works efficiently.
☐ **Correction:** _____
12. The researchers explains the system's architecture in their paper.

○ **Correction:** _____

13. According to the report shows increased cybersecurity threats.

○ **Correction:** _____

14. Martinez argues the new framework is more scalable than existing solutions.

○ **Correction:** _____

15. The data indicates about a positive correlation between variables.

○ **Correction:** _____

16. According Thompson, encryption is essential for data protection.

○ **Correction:** _____

EXERCISE 9.21: PARAGRAPH-LEVEL CITATIONS

Write a literature review paragraph (100-150 words) on a technical topic.
Include:

- At least 5 different reporting verbs
- At least 3 different citation patterns
- Appropriate tense usage
- Both integral and non-integral citations
- A mix of neutral, strong, and tentative verbs

Topic: Artificial Intelligence in Cybersecurity (or choose your own)

Your paragraph:

Self-check:

- Reporting verbs used: _____
- Citation patterns: _____
- Tenses used: _____

EXERCISE 9.22: SYNTHESIZING MULTIPLE SOURCES

Academic writing often requires synthesizing information from multiple sources. Practice this skill.

Given these source findings:

- Source A (Chen, 2024): Deep learning improves image recognition accuracy
- Source B (Rodriguez, 2023): Deep learning requires large datasets
- Source C (Thompson, 2024): Deep learning training is computationally expensive
- Source D (Kumar, 2022): Some tasks don't require deep learning

Write a synthesis paragraph using appropriate reporting verbs:

EXERCISE 9.23: REPORTING VERBS WITH DIFFERENT STRUCTURES

Match the reporting verb with its typical grammatical structure(s).

Verbs: argue, describe, suggest, explain, demonstrate, propose, indicate, challenge, emphasize, examine

Structures:

- that + clause
- noun phrase
- how/what/why/whether + clause

- preposition + noun

Create a reference table and example for each:

Verb	Typical Structure(s)	Example
------	----------------------	---------

argue

describe

suggest

EXERCISE 9.24: REPORTING CONFLICTING VIEWS

Use reporting verbs to present contrasting or conflicting research findings.

Useful phrases:

- While X argues..., Y suggests...
- Although X demonstrates..., Y questions...
- X claims..., however, Y challenges...
- Contrary to X's findings, Y shows...

Write sentences showing conflict between:

5. **Optimistic vs. pessimistic views on AI:**
6. **Different methodological approaches:**

7. **Theoretical vs. practical perspectives:**
8. **Competing hypotheses:**

EXERCISE 9.25: REPORTING VERB CHAINS

Sometimes you need to report what one author says about another author's work.

Example: "Smith (2024) challenges Johnson's (2022) assertion that quantum computing will revolutionize cryptography."

Create reporting chains for these scenarios:

4. Author A criticizes Author B's methodology:
5. Author C builds on Author D's findings:
6. Author E questions Author F's interpretation:

EXERCISE 9.26: REPORTING VERBS IN DIFFERENT PAPER SECTIONS

Different sections of research papers use reporting verbs differently. Write appropriate sentences for each section.

Introduction (citing background and gaps):

2.

Literature Review (presenting and evaluating previous work): 2. _____

Methodology (describing your approach, possibly citing methods): 3. _____

Results (presenting findings, possibly comparing to others): 4. _____

Discussion (interpreting and contextualizing): 5. _____

Conclusion (summarizing contributions, possibly citing future work): 6. _____

EXERCISE 9.27: NOMINALIZATION WITH REPORTING VERBS

Academic writing often uses noun forms of reporting verbs.

Verb → Noun transformations:

- argue → argument
- suggest → suggestion
- demonstrate → demonstration
- propose → proposal
- analyze → analysis

Rewrite using nominalization:

5. **Verb form:** "Smith argues that security should be prioritized."
 - **Noun form:** "Smith's argument is that..." OR "Smith makes the argument that..."
 - **Your version:** _____
6. **Verb form:** "The study suggests that further research is needed."
 - **Noun form:** _____
7. **Verb form:** "Johnson proposes a new framework for data encryption."
 - **Noun form:** _____
8. **Verb form:** "The researchers demonstrate the algorithm's effectiveness."
 - **Noun form:** _____

EXERCISE 9.28: REPORTING STATISTICAL INFORMATION

Use appropriate verbs and structures to report statistical findings.

Common patterns:

- The study found/showed/revealed that X% of...
- The data indicates/suggests that there is a correlation between...
- The analysis demonstrates/shows a significant difference...

Report these findings:

5. **Finding:** 85% of participants preferred the new interface
 - **Your sentence:** _____
6. **Finding:** Strong positive correlation ($r=0.87$) between training data size and accuracy
 - **Your sentence:** _____
7. **Finding:** Statistically significant improvement ($p<0.05$) with new algorithm
 - **Your sentence:** _____
8. **Finding:** Performance increased by 40% after optimization
 - **Your sentence:** _____

EXERCISE 9.29: REPORTING DEFINITIONS AND EXPLANATIONS

Use appropriate verbs to report how authors define or explain concepts.

Useful verbs: define, explain, describe, characterize, conceptualize, term, refer to

Write sentences:

5. **Defining a technical term:** Smith (2024) _____ machine learning as _____
6. **Explaining a concept:** The paper _____ how blockchain _____
7. **Characterizing a phenomenon:** Johnson _____ cybersecurity threats as _____
8. **Describing a process:** The study _____ the steps involved in _____

EXERCISE 9.30: ERROR ANALYSIS - STUDENT LITERATURE REVIEW

This excerpt from a student's literature review contains **10 errors** with reporting verbs and citations. Identify and correct them.

Student's Text:

"According to the research shows that machine learning is effective for image recognition. Smith argues about deep learning requires large datasets. The study suggest that convolutional neural networks performs well on this task. Johnson (2023) describes about how the algorithm works. According to Martinez, he claims that more research is needed. The data indicates about a positive trend. Several researchers has demonstrated the effectiveness of this approach. Thompson explains the benefits of using GPU acceleration in his paper of 2022. According the report, cybersecurity threats is increasing. The authors argues that quantum computing will revolutionize the field."

Errors and corrections:

- 11.
- 12.
- 13.
- 14.
- 15.

16.

17.

18.

19.

20.

Corrected version:

EXERCISE 9.31: REPORTING DIRECT QUOTES VS. PARAPHRASING

Academic writing typically favors paraphrasing over direct quotes. Practice both.

Original source (Smith, 2024): "Machine learning algorithms require careful tuning of hyperparameters to achieve optimal performance."

4. Direct quote (when to use):

☐

5. Paraphrase with reporting verb:

☐

6. Indirect speech:

☐

When should you use direct quotes vs. paraphrasing?

- Use direct quotes when: _____
- Use paraphrasing when: _____

EXERCISE 9.32: REPORTING VERBS WITH MODAL VERBS

Combine reporting verbs with modal verbs appropriately.

Examples:

- "Smith argues that developers should prioritize security."
- "The study suggests that the algorithm could be improved."

Write sentences combining:

6. **argue + must:**
7. **suggest + might:**
8. **recommend + should:**
9. **propose + could:**
10. **claim + will:**

EXERCISE 9.33: REPORTING TRENDS AND DEVELOPMENTS

Use appropriate verbs to report trends over time.

Useful verbs: observe, note, track, document, record, report

Write sentences about trends:

5. **Increasing trend:** Recent studies _____
6. **Emerging pattern:** Researchers _____
7. **Declining phenomenon:** The data _____
8. **Stable situation:** Multiple sources _____

EXERCISE 9.34: REPORTING RECOMMENDATIONS AND IMPLICATIONS

Use appropriate verbs for recommendations and implications sections.

For recommendations: recommend, suggest, propose, advocate, urge, call for, advise

For implications: imply, suggest, indicate, mean, signify

Write sentences:

5. **Practical recommendation:** The authors _____ that organizations _____
6. **Theoretical implication:** The findings _____ that _____
7. **Policy recommendation:** The report _____ _____
8. **Future research suggestion:** The study _____ that further investigation _____

EXERCISE 9.35: MULTIPLE REPORTING VERBS IN COMPLEX SENTENCES

Combine multiple reporting verbs in sophisticated academic sentences.

Example: "While Smith (2024) argues that security should be prioritized, he acknowledges that performance cannot be ignored and suggests that developers must balance both concerns."

Write complex sentences:

4. **Combining agreement and disagreement:**
5. **Presenting a claim and supporting evidence:**
6. **Showing evolution of ideas:**

EXERCISE 9.36: REPORTING VERBS IN TECHNICAL DOCUMENTATION

Technical documentation uses reporting verbs differently than academic papers. Adapt your style.

Academic style: "Smith (2024) demonstrates that the algorithm reduces complexity."

Technical documentation style: "The algorithm reduces complexity, as demonstrated by Smith (2024)." OR "This approach reduces complexity (Smith, 2024)."

Convert academic to technical style:

4. **Academic:** "Johnson argues that microservices improve scalability."
 - **Technical:** _____
5. **Academic:** "The study shows that caching improves performance."
 - **Technical:** _____
6. **Academic:** "Research suggests that encryption is essential."
 - **Technical:** _____

EXERCISE 9.37: REPORTING METHODOLOGY FROM MULTIPLE STUDIES

Synthesize methodological approaches from multiple studies.

Given these methodologies:

- Study A: Used surveys with 500 participants
- Study B: Conducted laboratory experiments
- Study C: Analyzed existing datasets

- Study D: Employed mixed methods approach

Write a synthesis:

EXERCISE 9.38: CRITICAL ANALYSIS - VERB CHOICE EFFECTIVENESS

Analyze these pairs and explain which reporting verb choice is more effective and why.

Pair 1:

- A: "The author says that security is important."
- B: "The author emphasizes that security is critical."

Analysis: _____

Pair 2:

- A: "The research proves that AI is effective."
- B: "The research suggests that AI may be effective."

Analysis: _____

Pair 3:

- A: "Smith talks about the benefits of cloud computing."
- B: "Smith discusses the benefits of cloud computing."

Analysis: _____

EXERCISE 9.39: PRODUCTION EXERCISE - LITERATURE REVIEW SECTION

Write a complete literature review section (250-300 words) on a technical topic of your choice. Your literature review must demonstrate:

- At least 8 different reporting verbs from different strength categories
- Appropriate tense usage throughout
- Both integral and non-integral citations
- At least one instance of synthesizing multiple sources
- At least one instance of reporting conflicting views
- Proper use of citation patterns (that-clauses, noun phrases, etc.)
- Academic tone and style

Your literature review:

Self-assessment:

- Reporting verbs used (list with categories): _____
- Tenses used and justification: _____
- Integration of sources (effective synthesis?): _____
- Any areas for improvement: _____

EXERCISE 9.40: FINAL MASTERY CHALLENGE

Edit this problematic literature review paragraph. It contains multiple issues with reporting verbs, tenses, citation patterns, and academic style.

Original Paragraph:

"Machine learning has become very important in cybersecurity. According to Smith, he says that AI can detect threats better than traditional methods. The study by Johnson shows about how machine learning algorithms works. Martinez (2023) talks about the benefits of using neural networks for intrusion detection, he argues the accuracy is improved significantly. According to the research suggests that deep learning is effective. Several authors has demonstrated about the potential of AI in this field. Thompson says in his paper of 2022 that more research is needed, he questions if current approaches are scalable. The data shows about significant improvements. Rodriguez argues machine learning will transform cybersecurity. According to Kumar, he claims that organizations should adopting these technologies immediately. The findings indicates that AI-based systems detects threats faster than conventional systems."

Your corrected and improved version:

Summary of main corrections:

6. Reporting verb errors: _____
7. Tense errors: _____
8. Citation pattern errors: _____
9. Style improvements: _____
10. Other issues: _____

UNIT 10: COMMON ERRORS AND CORRECTION STRATEGIES

10.1 IRREGULAR VERBS

Many common verbs have irregular past and past participle forms.

Common Irregular Verbs in Technical Writing:

Base Form	Past Simple	Past Participle
write	wrote	written
make	made	made
find	found	found
run	ran	run
build	built	built
send	sent	sent
give	gave	given
take	took	taken
get	got	gotten/got

do	did	done
go	went	gone
become	became	become
begin	began	begun
choose	chose	chosen
know	knew	known

10.2 CONFUSING WORD PAIRS

AFFECT VS. EFFECT

- **Affect** (verb): to influence
The bug affects performance.
- **Effect** (noun): a result
The effect of optimization was significant.

ASSURE VS. ENSURE VS. INSURE

- **Assure**: to promise or convince (person)
I assure you the system is secure.
- **Ensure**: to make certain (thing)
We ensure data integrity.

- **Insure:** to protect financially
Insure your equipment against damage.

ITS VS. IT'S

- **Its:** possessive
The system has its limitations.
- **It's:** it is/it has
It's important to test thoroughly.

THAN VS. THEN

- **Than:** comparison
Python is easier than C++.
- **Then:** time sequence
First compile, then run the program.

WHICH VS. THAT

- **That:** restrictive clause (essential information, no commas)
The algorithm that we developed is efficient.
- **Which:** non-restrictive clause (additional information, use commas)
The algorithm, which took three months to develop, is efficient.

10.3 PRONOUN REFERENCE ERRORS

Pronouns (it, this, they, which) must clearly refer to a specific noun.

✗ **The system crashed and the data was lost. This is a serious problem.**
(What does "this" refer to? The crash or the data loss?)

✓ The system crashed and the data was lost. This data loss is a serious problem.

✗ When you connect the server to the network, make sure it is secure.
(Which one? The server or network?)

✓ When you connect the server to the network, make sure the connection is secure.

10.4 CORRECTION STRATEGIES

STRATEGY 1: READ ALOUD

Reading your writing aloud helps identify:

- Awkward phrasing
- Missing words
- Run-on sentences

STRATEGY 2: SYSTEMATIC PROOFREADING

Read multiple times, checking for one type of error each time:

6. First pass: Sentence fragments and run-ons
7. Second pass: Subject-verb agreement
8. Third pass: Verb tenses
9. Fourth pass: Articles and prepositions
10. Fifth pass: Spelling and punctuation

STRATEGY 3: REVERSE EDITING

Read your text backward (last sentence to first) to focus on individual sentences rather than content flow.

STRATEGY 4: USE TOOLS WISELY

- Grammar checkers can help but aren't always correct
- Have peers review your work

- Maintain a personal error log

10.5 EXERCISES

Exercise 10.1: Irregular verb forms

Fill in the correct form:

6. We ____ (write) the code last week and have ____ (write) documentation this week.
7. The system has ____ (run) smoothly since we ____ (run) the tests.
8. The programmer ____ (make) several changes and has ____ (make) improvements.
9. They ____ (find) the bug yesterday after they had ____ (find) similar issues before.
10. The project ____ (begin) in January and has ____ (begin) to show results.

Exercise 10.2: Confusing word pairs

Choose the correct word:

9. The update will (affect/effect) system performance.
10. The (affect/effect) of the optimization was significant.
11. (Its/It's) important to backup data regularly.
12. The database has (its/it's) own encryption system.
13. Python is more versatile (than/then) Java for data science.
14. First install the software, (than/then) configure the settings.
15. We use encryption to (ensure/assure/insure) data security.
16. The manager (ensured/assured/insured) the team that the deadline was achievable.

Exercise 10.3: Which vs. That

6. The algorithm ____ we implemented is very efficient.
7. The server, ____ cost \$50,000, handles all requests.
8. The code ____ contains errors needs to be reviewed.
9. Python, ____ was created in 1991, is popular today.
10. The function ____ returns the result is optimized.

Exercise 10.4: Fix pronoun reference errors

Rewrite these sentences to eliminate ambiguity:

6. When you connect the device to the computer, make sure it is turned on.
7. The program reads the file and processes the data. This takes several minutes.
8. The developers met with the clients, and they discussed the requirements.
9. The system generates reports and sends them to users. This is automatic.
10. The algorithm compares values and sorts them. Which improves performance.

Exercise 10.5: Comprehensive error correction

Correct all errors in these sentences:

9. The algorithm what we developed are very efficient and run quick.
10. According to the research, it shows that machine learning are transforming industries.
11. The system was design to handle large data, but it's performance is limiting.
12. We have wrote the code in python and have ran extensive tests.

13. The effect of optimization was significant, it improve performance by 40%.
14. Each of the programs have its own advantages and disadvantages.
15. The data was collect during three months and then was analyzed.
16. Because the server crashed and data was lost.

EXERCISE 10.6: ADVANCED IRREGULAR VERB PRACTICE

Complete these technical sentences with the correct form of the irregular verb in parentheses.

11. The developers _____ (build) the application last year and have _____ (build) several updates since then.
12. After the system had _____ (run) for 24 hours, we _____ (find) a memory leak.
13. The team _____ (choose) Python for the project after they had _____ (choose) Java for the previous one.
14. We _____ (send) the report yesterday, just as we had _____ (send) the preliminary data last week.
15. The error _____ (become) apparent during testing after the code had _____ (become) more complex.
16. She _____ (write) the documentation after she had _____ (write) the unit tests.
17. They _____ (make) significant improvements since they _____ (make) the initial release.
18. The server has _____ (run) continuously since we _____ (run) the deployment script.
19. We _____ (get) approval for the project after we had _____ (get) budget estimates.

20. The algorithm _____ (begin) processing data at midnight and has _____ (begin) producing results.

EXERCISE 10.7: EXTENDED CONFUSING WORD PAIRS

Choose the correct word from each pair.

Complement vs. Compliment

3. The new feature _____ (complements/compliments) the existing functionality perfectly.
4. The client _____ (complemented/complimented) the team on their excellent work.

Principal vs. Principle 3. Security is the _____ (principal/principle) concern for this project. 4. The system operates on the _____ (principal/principle) of least privilege. 5. The _____ (principal/principle) developer designed the architecture.

Lose vs. Loose 6. Without proper backup, we might _____ (lose/loose) critical data. 7. The network cable connection is too _____ (lose/loose) and needs tightening.

Accept vs. Except 8. The system will _____ (accept/except) all valid input formats. 9. All tests passed _____ (accept/except) the performance benchmark.

Advice vs. Advise 10. The consultant's _____ (advice/advise) was helpful. 11. We _____ (advice/advise) users to change passwords regularly.

Cite vs. Site vs. Sight 12. Remember to _____ (cite/site/sight) all sources in your research paper. 13. The server is hosted at a data center _____ (cite/site/sight) in Virginia. 14. The error message appeared in plain _____ (cite/site/sight).

Stationary vs. Stationery 15. The mobile device must remain _____ (stationary/stationery) during calibration.

Discreet vs. Discrete 16. The algorithm processes _____ (discreet/discrete) data points separately. 17. We need to be _____ (discreet/discrete) about the security vulnerability until it's patched.

EXERCISE 10.8: MORE CONFUSING PAIRS IN TECHNICAL CONTEXT

Further vs. Farther

3. The server is located _____ (further/farther) from the main office than expected.
4. _____ (Further/Farther) investigation revealed additional bugs.

Continuous vs. Continual 3. The system provides _____ (continuous/continual) monitoring 24/7. 4. We made _____ (continuous/continual) improvements throughout the development process.

Imply vs. Infer 5. The error message _____ (implies/infers) that the connection failed. 6. From the logs, we can _____ (imply/infer) that the crash occurred at midnight.

Fewer vs. Less 7. The optimized algorithm uses _____ (fewer/less) memory. 8. The new version has _____ (fewer/less) bugs than the previous one.

Amount vs. Number 9. A large _____ (amount/number) of data needs to be processed. 10. The _____ (amount/number) of active users has increased.

EXERCISE 10.9: THAT VS. WHICH - ADVANCED

Choose "that" or "which" and add commas where necessary.

9. The algorithm _____ we developed last year is now obsolete.
10. Python _____ is known for its simplicity has become very popular.
11. The servers _____ handle the most traffic are located in the US.
12. Machine learning _____ requires large datasets is computationally expensive.

13. The code _____ passes all tests will be deployed to production.
14. The React framework _____ was developed by Facebook is widely used.
15. Any function _____ returns null should be refactored.
16. The database _____ we migrated to last month has better performance.

Now explain: When should you use "that" vs. "which"?

- Use "that" when: _____
- Use "which" when: _____

EXERCISE 10.10: PRONOUN REFERENCE - AMBIGUITY RESOLUTION

These sentences have ambiguous pronoun references. Rewrite them for clarity.

9. The system communicates with the database, and it occasionally crashes.
 - **Problem:** _____
 - **Rewrite:** _____
10. When developers write code without proper testing, this causes problems.
 - **Problem:** _____
 - **Rewrite:** _____
11. The algorithm processes the input and validates the output, which takes time.
 - **Problem:** _____
 - **Rewrite:** _____

12. The manager told the developer that he needed to improve his communication skills.
- **Problem:** _____
 - **Rewrite:** _____
13. We updated the documentation and revised the code. This was necessary.
- **Problem:** _____
 - **Rewrite:** _____
14. The API sends requests to the server, and it responds with JSON.
- **Problem:** _____
 - **Rewrite:** _____
15. Remove the corrupted file from the directory before you delete it.
- **Problem:** _____
 - **Rewrite:** _____
16. The system generates reports for users, which are stored in the database.
- **Problem:** _____
 - **Rewrite:** _____

EXERCISE 10.11: VAGUE "THIS/THESE/THAT/THOSE"

Strengthen these sentences by making vague pronouns more specific.

Example:

- Weak: "The algorithm is inefficient. This is a problem."
- Strong: "The algorithm is inefficient. This inefficiency is a problem."

Improve these:

6. The system crashed during peak hours. This frustrated users.
 - **Improved:** _____
7. We implemented caching and optimized queries. These improved performance.
 - **Improved:** _____
8. The data was corrupted. That caused the analysis to fail.
 - **Improved:** _____
9. Developers often skip documentation. This leads to maintenance issues.
 - **Improved:** _____
10. The API has rate limits. Those prevent abuse.
 - **Improved:** _____

EXERCISE 10.12: COMMONLY MISPELLED TECHNICAL TERMS

Identify and correct the spelling errors in these technical terms.

16. ✗ algorithm → ✓ _____
17. ✗ occured → ✓ _____
18. ✗ recieve → ✓ _____
19. ✗ seperately → ✓ _____
20. ✗ definately → ✓ _____

21. ✗ accomodate → ✓ _____
22. ✗ priviledge → ✓ _____
23. ✗ persistant → ✓ _____
24. ✗ maintainance → ✓ _____
25. ✗ sucessful → ✓ _____
26. ✗ occassionally → ✓ _____
27. ✗ necesary → ✓ _____
28. ✗ existance → ✓ _____
29. ✗ enviroment → ✓ _____
30. ✗ arguement → ✓ _____

EXERCISE 10.13: SUBJECT-VERB AGREEMENT - TRICKY CASES REVIEW

These sentences contain subject-verb agreement errors. Correct them.

8. The data from the sensors are showing unusual patterns.
- **Correction:** _____ (Note: "data" can be singular or plural)
9. Each of the developers have their own coding style.
- **Correction:** _____
10. The number of security incidents have increased dramatically.
- **Correction:** _____

11. Neither the algorithm nor the implementation were optimal.

○ **Correction:** _____

12. Mathematics are essential for understanding algorithms.

○ **Correction:** _____

13. The team of engineers are working on the problem.

○ **Correction:** _____ (*US English*)

14. A series of tests were conducted to verify functionality.

○ **Correction:** _____

EXERCISE 10.14: ARTICLE ERRORS - REVIEW

Correct the article errors in these sentences.

6. The Python is popular language for the data science.

○ **Correction:** _____

7. We need develop a software for managing the databases.

○ **Correction:** _____

8. According to a research, machine learning is transforming the industries.

○ **Correction:** _____

9. The algorithm runs in a linear time and uses the constant space.

○ **Correction:** _____

10. A cybersecurity is critical concern in the modern world.

○ **Correction:** _____

EXERCISE 10.15: PREPOSITION ERRORS - REVIEW

Correct the preposition errors.

6. The application runs in Windows and MacOS.

○ **Correction:** _____

7. We wrote the code with Python.

○ **Correction:** _____

8. The meeting is scheduled on 3:00 PM at Monday.

○ **Correction:** _____

9. The system was deployed at the cloud in AWS.

○ **Correction:** _____

10. In terms in performance, our solution is superior.

○ **Correction:** _____

EXERCISE 10.16: WORD ORDER ERRORS - REVIEW

Correct the word order in these sentences.

6. Efficiently processes the system large amounts of data.

○ **Correction:** _____

7. Was developed the algorithm by researchers at MIT.

○ **Correction:** _____

8. The robust very system prevents attacks effectively.

○ **Correction:** _____

9. Can handle how many requests the server per second?

- **Correction:** _____

10. Must be tested all code before deployment thoroughly.

- **Correction:** _____

EXERCISE 10.17: FRAGMENT AND RUN-ON REVIEW

Identify and correct fragments and run-ons.

6. Although the algorithm is efficient and scalable.

- **Type:** _____
- **Correction:** _____

7. The system crashed, the data was lost.

- **Type:** _____
- **Correction:** _____

8. Because we didn't test thoroughly before deployment.

- **Type:** _____
- **Correction:** _____

9. The code compiled it had errors we fixed them.

- **Type:** _____
- **Correction:** _____

10. Which significantly improved performance and reduced memory usage.

- **Type:** _____
- **Correction:** _____

EXERCISE 10.18: MIXED ERROR TYPES - SENTENCE LEVEL

Each sentence contains 2-3 errors of different types. Identify and correct all errors.

9. The algorithm what we developed are running efficient on multiple platforms.
- **Errors:** _____
 - **Correction:** _____
10. Each of the systems have its own database, which stores data secure.
- **Errors:** _____
 - **Correction:** _____
11. According to the research, it shows that AI are transforming the industry.
- **Errors:** _____
 - **Correction:** _____
12. The data was collected during six months and then were analyzed careful.
- **Errors:** _____
 - **Correction:** _____
13. We have wrote the code in python and have ran tests successful.
- **Errors:** _____
 - **Correction:** _____
14. The effect of optimization was significant, it improve performance by 40%.

- **Errors:** _____
- **Correction:** _____

15. The system which we deployed last month have better performance than the old one.

- **Errors:** _____
- **Correction:** _____

16. Its important to ensure data security and to backup files regular.

- **Errors:** _____
- **Correction:** _____

EXERCISE 10.19: PERSONAL ERROR LOG

Create a personal error log to track your most common mistakes.

Instructions: Fill in this template with your actual errors from your writing.

Error Type	Example (Wrong)	Correction	Why I Made This Error	Strategy to Avoid
Example: Article	"The Python is popular"	"Python is popular"	Overgeneralized article use	Review zero article rules

1.

2.

3.

4.

5.

EXERCISE 10.20: SYSTEMATIC PROOFREADING PRACTICE

Proofread this paragraph using the systematic approach (multiple passes).

Paragraph: "The machine learning algorithm what we have developed are very efficient and runs quick on modern hardware. According to the research, it shows that deep learning are transforming industries. The system was design to handle large amount of data, but it's performance is limiting by memory. We have wrote the code in python and have ran extensive tests during three months. Each of the models have its own advantages. The effect of optimization was significant, it improve accuracy with 40%. The data was collected careful and then were analyzed. Because the algorithm is complex. The results suggests that further research is needed, this is important for improving the system."

Pass 1 - Fragments and run-ons: Errors found: _____ Corrections: _____

Pass 2 - Subject-verb agreement: Errors found: _____ Corrections: _____

Pass 3 - Verb tenses and forms: Errors found: _____ Corrections: _____

Pass 4 - Articles and prepositions: Errors found: _____ Corrections: _____

Pass 5 - Word choice and spelling: Errors found: _____ Corrections: _____

Final corrected version:

EXERCISE 10.21: COMPREHENSIVE ERROR CORRECTION - PARAGRAPH 1

This paragraph contains **15 errors** of various types. Find and correct them all.

Paragraph: "The cloud computing have revolutionized how businesses operates. According to the research, it shows that organizations can reduce costs significant by migrating to cloud. The system which we deployed last year are running smooth and handles thousands of requests daily. Each of the servers have its own backup system, this ensures data security. We have chose AWS because its more reliable than other platforms. The migration process was took three months and then were completed successful. The effect of cloud adoption was remarkable, it improve efficiency with 45%. The team of engineers who was responsible for the project have did excellent work. In terms in scalability, cloud solutions is superior than traditional infrastructure. Data is stored secure in multiple locations, which ensures redundancy. Its important to ensure security and to backup data regular."

Error Analysis:

- Total errors: _____
- Error types found: _____

Corrected version:

EXERCISE 10.22: COMPREHENSIVE ERROR CORRECTION - PARAGRAPH 2

This technical report excerpt contains **20 errors**. Identify and correct all of them.

Report Excerpt: "In this project, we have developed a machine learning model what classifies images with high accuracy. The model was build using convolutional neural networks, which is very effective for image processing. We have chose Python because its simplicity and extensive libraries. The dataset what we used contains over 50,000 images, which was collected during six months. Each of the images have been preprocessed careful before training. The

training process was took 48 hours on our GPU cluster. Although the model was complex. The results shows that our approach are superior than existing methods. The accuracy of the model have improved significant after we added more layers. According to our analysis, it suggests that deep learning is transforming computer vision. The model can process images quick and identify patterns accurate. In terms in performance, our system is faster than the baseline model with 30%. We have ran extensive tests and have found that the model generalizes well. Its important to note that the model requires large amount of data. The effect of data augmentation was significant, it improve robustness. Each of the test cases have passed successful. Because we have optimized the algorithm careful, the system runs efficient."

Error tracking:

- 3. Error type: _____ | Correction: _____
- 4. Error type: _____ | Correction: _____ (Continue for all 20 errors)

Fully corrected version:

EXERCISE 10.23: PEER REVIEW CHECKLIST

Use this checklist when reviewing a peer's technical writing (or your own).

Document being reviewed: _____

Category	Specific Check	✓/✗	Notes/Exam ples
Grammar	Subject-verb agreement correct?		

Verb tenses consistent and appropriate?

All verbs in correct form (irregular verbs)?

Articles

Articles used correctly (a/an/the/zero)?

No missing or extra articles?

Prepositions

Prepositions correct (in/on/at, etc.)?

Dependent prepositions correct?

**Sentence
Structure**

No fragments or run-ons?

Word order correct throughout?

Varied sentence structures?

Pronouns All pronoun references clear?

No ambiguous "this/that/it"?

Word Choice Confusing pairs used correctly?

Technical terms spelled
correctly?

**Parallel
Structure** Lists and series parallel?

Citations Reporting verbs used
appropriately?

Citation format consistent?

Overall assessment: _____ **Main strengths:** _____

Priority improvements: _____

EXERCISE 10.24: ERROR PATTERN ANALYSIS

Analyze these sentences written by the same student. Identify recurring error patterns.

Student's sentences:

6. "The algorithm what we developed are very efficient."
7. "The system which handles requests are running smooth."
8. "The data what was collected shows interesting patterns."
9. "Each of the servers which we deployed have backups."
10. "The code what passes tests are ready for deployment."

Pattern analysis:

- **Recurring error #1:** _____
- **Explanation:** _____
- **How to correct:** _____
- **Recurring error #2:** _____
- **Explanation:** _____
- **How to correct:** _____

EXERCISE 10.25: BEFORE AND AFTER - SELF-EDITING

Edit your own writing using this structured approach.

Step 1: Write a first draft (100 words about a technical topic - don't focus on errors yet) Your draft: _____

Step 2: Identify potential errors Possible errors I notice: _____

Step 3: Apply systematic proofreading After Pass 1 (structure): _____ After Pass 2 (agreement): _____ After Pass 3 (tenses): _____ After Pass 4 (articles/prepositions): _____ After Pass 5 (spelling/word choice): _____

Step 4: Final polished version

Step 5: Reflection

- Most common error type: _____
- Hardest error to spot: _____
- Improvement strategy: _____

EXERCISE 10.26: COMMON ERROR PATTERNS IN TECHNICAL WRITING

Match each error pattern with its correction strategy.

Error Patterns: A. Consistently using "which" instead of "that" B. Forgetting to use past participle with "have/has" C. Using "this" without a clear referent D. Mixing singular/plural with "data" E. Using "in" instead of "on" for platforms

Correction Strategies:

6. Make a list of irregular past participles to memorize
7. Remember: that=restrictive (no commas), which=non-restrictive (commas)
8. Always follow "this" with a specific noun
9. Decide on formal (data are) vs. informal (data is) and be consistent
10. Remember: "on" for operating systems and platforms

Your matches: A → _____ B → _____ C → _____ D → _____ E → _____

EXERCISE 10.27: TECHNOLOGY-ASSISTED EDITING

Compare grammar checker suggestions with your own judgment.

Sentence: "The system which we deployed have been running for three months and processes data efficient."

Grammar checker might flag:

- 4.
- 5.
- 6.

Your analysis:

- Errors the tool found correctly: _____
- Errors the tool missed: _____
- False positives (tool wrong): _____
- Your corrected version: _____

Lesson learned: _____

EXERCISE 10.28: ERROR HIERARCHY - PRIORITIZING CORRECTIONS

Not all errors are equally serious. Rank these errors from most to least serious in professional technical writing.

Errors to rank:

- A. Spelling error in a technical term
- B. Missing comma in a non-restrictive clause
- C. Subject-verb agreement error
- D. Inconsistent verb tense
- E. Ambiguous pronoun reference
- F. Missing article before a noun
- G. Run-on sentence

- H. Using "that" instead of "which"

Your ranking (most serious to least):

9. _____ because _____

10. _____ because _____

11. _____ because _____

12. _____ because _____

13. _____ because _____

14. _____ because _____

15. _____ because _____

16. _____ because _____

EXERCISE 10.29: CONTEXT-SPECIFIC ERROR SEVERITY

The same error may be more or less serious depending on context. Evaluate error severity in different documents.

Error: "The system have multiple components."

Severity in:

- Internal team email: _____ (1=not serious, 5=very serious)
- Client-facing proposal: _____
- Published research paper: _____
- Code comments: _____
- Technical documentation: _____
- Job application: _____

Explain your reasoning: _____

EXERCISE 10.30: REAL-WORLD EDITING - EMAIL

Edit this technical email for all errors.

Original Email:

"Subject: Update on Project Status

Hi Team,

I wanted to give you an update on the project what we have been working on. The system which we deployed last week are running smooth. We have ran tests and have found that performance have improved significant.

Each of the modules have its own database, this ensures data isolation. According to our analysis, it shows that the new architecture are more scalable than the old one. The effect of optimization was remarkable, it reduce latency with 40%.

However, there is some issues what needs attention. The authentication system occasionally fails, which causes problems for users. We need ensure data security and to backup files regular.

I have wrote a detailed report what outlines next steps. The team of developers who is working on this have did excellent work. In terms in timeline, we should be able to complete remaining tasks during two weeks.

Please let me know if you have any questions.

Best regards"

Your edited version:

EXERCISE 10.31: REAL-WORLD EDITING - TECHNICAL DOCUMENTATION

Edit this documentation excerpt for all errors.

Original:

"# Installation Guide

This guide explains how to install and configure the application on your system.

REQUIREMENTS

The system requires following components:

- The Python 3.8 or higher
- A database server (MySQL or PostgreSQL)
- The Node.js for running the frontend

INSTALLATION STEPS

6. First, download the installer from website.
7. Then, run the setup script what is located in bin directory.
8. The installation process will takes approximately 10 minutes.
9. Each of the components are installed separately.
10. When you install the database, make sure it is configured correctly.

CONFIGURATION

After installation is completed, you need configure the system:

5. Edit the configuration file what is located at `/etc/config`.
6. The settings which you need to modify is in the database section.
7. Ensure the connection string are correct.
8. Then restart the service.

TROUBLESHOOTING

If the system crashes or does not start:

- Check that all dependencies has been installed correct.
- Verify the configuration file don't contain errors.
- Review logs, which is located in `/var/log` directory.
- If problem persists, contact support team.

Its important to backup configuration files before making changes."

Your edited version:

EXERCISE 10.32: REAL-WORLD EDITING - RESEARCH ABSTRACT

Edit this abstract for all errors.

Original Abstract:

"Machine learning have revolutionized many fields in recent years. In this study, we have developed a new algorithm what improves classification accuracy. The algorithm was build using deep neural networks, which is very effective for pattern recognition. We have chose to use convolutional layers because its ability to extract features automatically. The dataset what we used contains 100,000 images, which was collected during one year. Each of the images have

been labeled careful by experts. The training process was took 72 hours on GPU cluster. The results shows that our approach are superior than existing methods. The accuracy of our model have improved significant compared to baseline. According to our analysis, it suggests that deeper networks performs better. In terms in computational efficiency, our system is faster than traditional approaches with 35%. The effect of data augmentation was significant, it improve model robustness. Because we have optimized the architecture careful. This research demonstrates that deep learning can achieves high accuracy in image classification tasks."

Your edited version:

EXERCISE 10.33: SPEED EDITING CHALLENGE

Set a timer for 5 minutes. How many errors can you find and correct?

Paragraph:

"The cloud-based system what we have developed are designed to handle large volumes of data efficient. Each of the servers have its own backup mechanism, this ensures reliability. According to our tests, it shows that the system can processes over 10,000 requests per second. We have chose to use microservices architecture because its flexibility and scalability. The API which handles authentication are secure and uses encryption. In terms in performance, our solution is superior than traditional monolithic architectures. The effect of caching was significant, it reduce response time with 50%. Data is stored in distributed database, which ensures high availability. Its important to monitor system performance and to update components regular. The team of engineers who has been working on this have did excellent job. Because the architecture is well-designed. The system have been running stable for six months and have processed millions of requests successful."

Timer start time: _____ **Errors found in 5 minutes:** _____ **Corrections made:** _____
Timer end time: _____

After the timer, identify any remaining errors: _____

EXERCISE 10.34: ERROR PREVENTION - WRITING CHECKLIST

Create a personalized writing checklist based on your common errors.

My Pre-Submission Checklist:

Before I submit any technical writing, I will check:

11. ☐ _____

12. ☐ _____

13. ☐ _____

14. ☐ _____

15. ☐ _____

16. ☐ _____

17. ☐ _____

18. ☐ _____

19. ☐ _____

20. ☐ _____

My top 3 error patterns to watch for:

4.

5.

6.

EXERCISE 10.35: FINAL MASTERY EXERCISE - COMPREHENSIVE EDITING

Edit this complete technical report section (500 words). It contains approximately 40 errors of all types covered in Units 1-10.

Original Report:

"# Performance Analysis of Distributed Database Systems

INTRODUCTION

Distributed databases has become increasingly important in modern applications what require high availability and scalability. In this study, we analyzes the performance of three popular distributed database systems: MongoDB, Cassandra, and PostgreSQL. The objective of this research are to determine which system performs best under different workloads and to identify optimization strategies what can improve performance.

LITERATURE REVIEW

According to recent research, it shows that distributed databases is essential for handling big data. Smith (2023) argues about distributed systems requires careful design to ensure consistency. The study by Johnson et al. (2022) demonstrates about how different consistency models affects performance. Martinez suggests further research are needed to understand trade-offs between consistency and availability. Several researchers has investigated performance optimization techniques, however, there is still challenges what needs to be addressed.

METHODOLOGY

We have conducted experiments using three database systems in controlled environment. Each of the systems was installed on separate cluster with identical hardware. The test dataset contains 10 million records, which was generated

using synthetic data. We have chose to test three types of workloads: read-heavy, write-heavy, and mixed.

The experiments was ran during two months period. Each test was repeated 100 times to ensure statistical significance. The data was collected careful and then were analyzed using standard statistical methods. We have measured several performance metrics, including throughput, latency, and resource utilization.

RESULTS

The results shows that each system have its own strengths and weaknesses. MongoDB performs best for read-heavy workloads, processing over 50,000 queries per second. Cassandra was the most efficient for write-heavy operations. PostgreSQL provides good balance between reads and writes, however, its performance is limiting by single-node architecture.

According to our analysis, it indicates that the choice of database depends in specific requirements. The effect of caching was significant, it improve performance with 40% for all systems. Each of the optimization techniques what we applied has contributed to performance improvements.

In terms in scalability, Cassandra demonstrates superior horizontal scaling capabilities. The system can handles millions of operations per second when deployed on large cluster. MongoDB shows good scalability for read operations but faces challenges with write scaling. PostgreSQL, which traditionally is a single-node system, have improved scalability with recent versions.

DISCUSSION

Our findings suggests that distributed databases offers significant advantages for large-scale applications. However, there is trade-offs what must be considered. According to our experiments, it shows that consistency models has significant impact on performance. Systems what prioritize availability often sacrifices consistency, which may be acceptable for certain applications.

The team of researchers who has been working on this project have observed that configuration is crucial. Each of the systems requires careful tuning to achieves optimal performance. Its important to understand the specific

characteristics of your workload and to choose the appropriate database according.

CONCLUSION

In conclusion, distributed databases has revolutionized how we store and process data. This study demonstrates that the performance of these systems depends in many factors, including workload characteristics, configuration, and hardware resources. We have showed that careful optimization can improves performance significant. Future research should investigates automated tuning strategies and to explore emerging technologies. Because the field is evolving rapid, continuous evaluation is necessary."

Your fully corrected version:

Error summary:

- Total errors found: _____
- Most common error types: _____
- Most challenging corrections: _____
- Key lessons learned: _____

EXERCISE 10.36: REFLECTION AND GOAL SETTING

Reflect on your progress through all 10 units.

Self-Assessment:

7. What error types have I improved most on?
8. What error types still challenge me?
9. What correction strategies work best for me?
10. My specific goals for continued improvement:

- Goal 1: _____
- Goal 2: _____
- Goal 3: _____

11. Action plan:

- Strategy 1: _____
- Strategy 2: _____
- Strategy 3: _____

12. How will I track my progress?

UNIT 11: COMPREHENSIVE REVIEW EXERCISES

EXERCISE 11.1: MIXED GRAMMAR TOPICS

Correct all grammatical errors in this paragraph:

The artificial intelligence have transformed many industries in recent years. According to recent studies, it shows that machine learning algorithms can process data more faster than traditional methods. The system what we developed are designed to handle large datasets, but it's performance depend on many factors. Each of the algorithms have different complexity, some runs in linear time while others requiring exponential time. We have wrote extensive documentation and have ran numerous tests. The results suggests that our approach is more efficient than to use conventional methods. This are particularly important for real-time applications. When the system process data, make sure that it is backup regularly. The optimization what we implemented was improved performance by 40%, this is significant achievement.

EXERCISE 11.2: TECHNICAL WRITING SAMPLE

Rewrite this informal text as formal academic/technical writing, correcting all errors:

So basically, me and my team worked on this really cool project last semester. We was trying to make an app that can detect faces in images super fast. The thing is, existing algorithms are pretty slow, so we thought maybe we can do better. We developed this new algorithm that's way more efficient. It don't use as much memory and can process like 100 images per second, which is pretty awesome compared to the old methods. The results shows that our method is better than other approaches. Hopefully, this will help a lot of applications that needs fast face detection, like security systems and stuff. Also, it could be used for organizing photos and things like that. We tested it on bunch of datasets and it worked great. This is important because face detection is becoming more and more common in various applications. In the future, we plan on making it even faster and more accurate.

EXERCISE 11.3: ARTICLE AND PREPOSITION CHALLENGE

Fill in all articles (a, an, the, or Ø) and prepositions:

___ cloud computing has revolutionized how organizations store and process ___ data. ___ systems that operate ___ cloud offer numerous advantages ___ terms ___ scalability and cost. ___ Microsoft Azure, ___ example, provides ___ infrastructure that can scale automatically based ___ demand. ___ applications run ___ virtual machines ___ cloud rather than ___ physical servers ___ organization's premises. This approach is particularly useful ___ companies that experience variable workload. ___ data is transmitted ___ encrypted connections and stored ___ multiple locations ___ ensure reliability. ___ future ___ cloud computing looks promising, with ___ new services being introduced regularly.

EXERCISE 11.4: VERB TENSE CONSISTENCY

Choose the correct verb tense throughout this research abstract:

This paper (presents/presented/has presented) a novel approach to network security. Cyber attacks (become/became/have become) increasingly sophisticated in recent years. Traditional firewall systems (were/are/have been) often inadequate for detecting modern threats. In 2020, researchers (develop/developed/have developed) machine learning methods for threat detection. Building on this work, we (propose/proposed/have proposed) an enhanced algorithm that (combines/combined/has combined) deep learning with rule-based filtering. We (implement/implemented/have implemented) and (test/tested/have tested) our system over a six-month period. The results (show/showed/have shown) that our approach (detects/detected/has detected) 95% of threats, which (is/was/has been) a significant improvement over existing methods. Our findings (suggest/suggested/have suggested) that hybrid approaches (offer/offered/have offered) the best protection. Future work (explores/will explore/explored) real-time implementation in enterprise environments.

EXERCISE 11.5: CREATING PROFESSIONAL DOCUMENTATION

Write a paragraph (150-200 words) for each scenario, demonstrating proper grammar:

5. **Installation Instructions:** Write instructions for installing and configuring software (use active voice, imperative mood, simple sentences).
6. **Algorithm Description:** Describe how a sorting algorithm works (use present simple, passive voice where appropriate, technical vocabulary).
7. **Research Abstract:** Write an abstract summarizing a hypothetical research project (use appropriate tenses, reporting verbs, formal language).
8. **Problem Report:** Describe a technical problem and its solution (use past simple for what happened, present perfect for results, clear paragraph structure).

EXERCISE 11.6: MULTI-ERROR PARAGRAPH CORRECTION

This paragraph contains errors from multiple grammar categories. Identify the error type for each and correct.

Paragraph:

"The blockchain technology are revolutionizing financial services. According to recent research, it shows that distributed ledgers can process transactions more secure than traditional databases. The system what we have developed uses consensus algorithms, which ensures data integrity. Each of the nodes in network have their own copy of ledger. We have chose this approach because its decentralization and transparency. The transactions are validate by multiple nodes, this prevents fraud. In terms in performance, our system can handles thousands of transactions per second. The testing what we conducted shows that the algorithm are reliable. When you deploy the system, make sure it is

configured correct. The results suggests that blockchain will transforms many industries in future."

Error Analysis Table:

Sentence/Phrase	Error Type(s)	Correction	Grammar Unit
"blockchain technology are"			
"it shows that"			
"more secure"			
"what we have developed"			
(continue...)			

Corrected version:

EXERCISE 11.7: GRAMMAR CATEGORY IDENTIFICATION

Read this corrected technical paragraph. Identify and label examples of concepts from each unit.

Paragraph:

"Cloud computing has transformed how organizations manage their IT infrastructure. The system that we developed enables automatic scaling based on demand. Each component is designed to be fault-tolerant, ensuring high availability. According to recent studies, organizations have reduced costs by 40% through cloud adoption. The migration process requires careful planning and must be executed systematically. Not only does cloud computing provide scalability, but it also offers enhanced security features. The data is encrypted both in transit and at rest, which protects against unauthorized access."

Identify:

11. **Article usage examples:** _____
12. **Subject-verb agreement examples:** _____
13. **Verb tenses used and why:** _____
14. **Active vs. passive voice examples:** _____
15. **Modal verbs used:** _____
16. **Prepositions (at least 5):** _____
17. **Sentence patterns (identify 2):** _____
18. **Parallel structure example:** _____
19. **Reporting verb example:** _____
20. **That vs. which usage:** _____

**EXERCISE 11.8: COMPLETE DOCUMENT EDITING -
TECHNICAL PROPOSAL**

Edit this complete technical proposal (400 words). It contains approximately 35 errors across all grammar categories.

Original Proposal:

"# Proposal for Implementing AI-Powered Customer Service System

EXECUTIVE SUMMARY

This proposal outlines a plan for implementing the artificial intelligence-powered customer service system what will revolutionizes how our company interacts with customers. According to recent research, it shows that AI chatbots can handle over 80% of routine inquiries, this allows human agents to focus on complex issues.

BACKGROUND

Currently, our customer service team are handling approximately 10,000 inquiries per month. Each of the agents have different response times, and the quality of service vary significant. The data what we collected shows that customers often waits over 30 minutes for responses. This have negative impact on customer satisfaction. We believe that implementing AI-powered system will improves response times and to enhance service quality.

PROPOSED SOLUTION

We propose to implement a machine learning-based chatbot what can handles routine inquiries 24/7. The system will be build using natural language processing, which allows it to understand customer questions and to provide accurate responses. Each of the customer interactions will be logged and analyzed, this helps improve the system over time.

The chatbot will integrates with our existing CRM system and can accesses customer data secure. When the bot cannot handle inquiry, it will transfers the conversation to human agent seamless. The system which we plan to deploy are more advanced than traditional rule-based chatbots.

TECHNICAL REQUIREMENTS

The implementation requires following components:

- The cloud-based infrastructure for hosting the AI model
- A natural language processing engine
- Integration with existing systems
- Security measures for protecting the customer data

Each of the components needs to be carefully configured. The system must processes requests quick and must maintains high accuracy. In terms in security, all data will be encrypted and will complies with industry standards.

TIMELINE AND BUDGET

The project will takes approximately six months to complete. We have identified three phases:

Phase 1: System design and planning (2 months) Phase 2: Development and testing (3 months)

Phase 3: Deployment and training (1 month)

The total budget are estimated at \$250,000, which includes software licenses, the development costs, and training.

EXPECTED BENEFITS

According to our analysis, the system will reduces response time with 70% and will handles up to 80% of routine inquiries automatic. This will allows our human agents to focuses on complex customer issues. The effect of improved service quality will be significant, it will increases customer satisfaction and loyalty.

CONCLUSION

The implementation of AI-powered customer service system is critical investment what will transforms how we serve customers. We have demonstrated that the benefits outweighs the costs. The system are more efficient than traditional approaches and will provides better customer experience. We recommends proceeding with this project and beginning implementation at next quarter."

Your fully corrected version:

Error summary:

- Articles: _____
- SVA: _____
- Verb tenses: _____
- Prepositions: _____
- Word order: _____
- That/which: _____
- Other: _____

EXERCISE 11.9: WRITING FROM SCRATCH - SYSTEM ARCHITECTURE DESCRIPTION

Write a technical description of a software system architecture (200-250 words). Your description must demonstrate:

Required elements:

- ✓ Correct article usage (at least 5 instances)
- ✓ Perfect subject-verb agreement throughout

- ✓ Appropriate verb tenses (primarily present simple)
- ✓ At least 2 passive voice constructions (where appropriate)
- ✓ At least 1 modal verb
- ✓ Correct prepositions (at least 8)
- ✓ Varied sentence structures (simple, compound, complex)
- ✓ At least 1 parallel structure
- ✓ Professional technical vocabulary
- ✓ No errors in any category

System to describe: Choose one:

- Microservices architecture
- Database replication system
- Authentication and authorization system
- Content delivery network
- Real-time messaging system

Your description:

Self-check checklist:

- ☐ All required elements included
- ☐ No article errors
- ☐ No SVA errors
- ☐ Appropriate tenses

- ☐ Effective use of passive voice
- ☐ Correct prepositions
- ☐ Sentence variety
- ☐ Professional tone

EXERCISE 11.10: COMPARATIVE ANALYSIS - BEFORE AND AFTER

Compare these two versions of the same technical content. Identify all improvements.

Version A (Student draft):

"Machine learning is very important technology. It can do lots of things like recognizing images and translating languages. The algorithms what we use needs lots of data for training. Each of the models have different accuracy. We have implemented several algorithms and have tested them. The results shows that deep learning is better than traditional methods. This is because it can learns complex patterns. In the future, machine learning will probably change many industries."

Version B (Improved):

"Machine learning has become a critical technology in modern computing. It enables various applications, including image recognition and natural language translation. The algorithms used in machine learning require substantial training data to achieve optimal performance. Each model demonstrates different accuracy levels depending on the task and dataset characteristics. We implemented several algorithms and conducted extensive testing. The results indicate that deep learning approaches outperform traditional methods due to their ability to learn complex, hierarchical patterns. Future developments in machine learning will likely transform numerous industries."

Improvement analysis:

Category	Issues in Version A	Improvements in Version B
Articles		
SVA		
Verb tenses		
Word choice		
Sentence structure		
Formality		
Clarity		

**EXERCISE 11.11: INTEGRATION EXERCISE -
RESEARCH PAPER SECTION**

Write a complete "Related Work" section for a research paper (300-350 words) on a technical topic. Integrate all grammar concepts appropriately.

Requirements:

- Use at least 5 different reporting verbs appropriately
- Include at least 3 citations (make up author names and years)
- Use appropriate tenses for literature review
- Include both integral and non-integral citations
- Demonstrate parallel structure in at least one sentence
- Use "that" and "which" correctly
- Show synthesis of multiple sources
- Maintain academic tone throughout

Topic: Choose one:

- Deep learning in medical imaging
- Blockchain for supply chain management
- Edge computing for IoT applications
- Quantum algorithms for optimization
- Natural language processing for sentiment analysis

Your "Related Work" section:

EXERCISE 11.12: TECHNICAL WRITING STYLES - MULTIPLE FORMATS

Write about the same technical concept in three different formats, adapting grammar and style appropriately.

Concept: How a load balancer distributes traffic across multiple servers

Format 1: User Documentation (100 words)

- Use: Active voice, imperative mood, simple sentences, present simple
- Your text: _____

Format 2: Technical Specification (100 words)

- Use: Mix of active/passive, modal verbs, detailed descriptions, present simple
- Your text: _____

Format 3: Research Paper (100 words)

- Use: Academic style, passive where appropriate, reporting verbs, formal language
- Your text: _____

Reflection: How did grammar usage differ across formats? _____

EXERCISE 11.13: TIMED WRITING CHALLENGE

Set a timer for 15 minutes. Write a technical blog post (250-300 words) about a technology trend. Focus on accuracy across all grammar categories.

Topic: Choose one:

- The rise of artificial intelligence in software development
- Cloud-native application architecture
- Cybersecurity challenges in remote work

- The impact of 5G on mobile applications
- Sustainable computing and green data centers

Your blog post:

Post-writing review (5 minutes):

- Errors found: _____
- Corrections made: _____
- Grammar areas that need more practice: _____

EXERCISE 11.14: ERROR PATTERN RECOGNITION

Analyze this collection of sentences from the same writer. Identify systematic error patterns.

Writer's sentences:

9. "The system what handles requests are very efficient."
10. "Each of the algorithms have different complexity."
11. "According to the research, it shows that AI is important."
12. "We have wrote the code and have ran tests."
13. "The data was collected careful during three months."
14. "In terms in performance, our approach is better."
15. "The results suggests that further research are needed."
16. "Its important to ensure data security."

Pattern Analysis:

Error Pattern #1: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Error Pattern #2: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Error Pattern #3: _____

- **Frequency:** _____
- **Examples:** _____
- **Rule violated:** _____
- **Correction strategy:** _____

Recommendations for this writer: _____

EXERCISE 11.15: COMPREHENSIVE EDITING - ACADEMIC PAPER ABSTRACT

Edit this abstract containing approximately 25 errors.

Original:

"The Internet of Things have transformed how devices communicates. In this paper, we presents a novel architecture for managing the IoT networks. The system what we developed uses machine learning algorithms, which predicts network failures before they occurs. According to recent studies, it shows that proactive maintenance can reduces downtime significant. We have implemented and have tested our approach in large-scale IoT deployment. Each of the sensors in network generates data, which is analyzed in real-time. The results demonstrates that our system detects anomalies accurate and can predicts failures with 90% accuracy. In terms in scalability, the architecture handles millions of devices without performance degradation. The effect of predictive maintenance was remarkable, it reduced downtime with 60%. This research contributes to field by providing practical solution what can be deployed in production environments. We have showed that combining machine learning with traditional monitoring approaches improves reliability significant. Because the system is designed modular. Future work will explores integration with edge computing and to investigate additional machine learning models."

Your corrected version:

EXERCISE 11.16: CROSS-DOCUMENT CONSISTENCY

Edit these three related documents to ensure grammatical consistency and appropriate style for each format.

Document 1: Email to Team (Informal) "Hey team, just wanted to give you update on the API project. We've been making good progress and the system are working pretty well. Each of the endpoints have been tested and they seems reliable. The performance testing what we did shows that we can handles about 5000 requests per second, this is better than we expected. Let me know if you have any questions!"

Document 2: Client Status Report (Formal) "The API development project are progressing according to schedule. All endpoints has been implemented and tested thorough. Performance testing demonstrates that the system can process

approximately 5,000 requests per second, which exceeds the specified requirements. Each of the components have been optimized for reliability and efficiency. We remains on track for the planned deployment date."

Document 3: Technical Documentation (Very Formal) "The RESTful API consists of multiple endpoints what provides access to system resources. Each endpoint have been designed to handle specific operations and returns data in JSON format. The system which we developed uses caching mechanisms to optimizes performance. Load testing indicates that the API can sustains 5,000 requests per second under peak load. All endpoints requires authentication and implements rate limiting to prevents abuse."

Your corrected versions:

Document 1 (maintain informal tone but fix errors):

Document 2 (maintain formal business tone):

Document 3 (maintain technical documentation style):

EXERCISE 11.17: GRAMMAR IN CONTEXT - TECHNICAL TUTORIAL

Write a technical tutorial (300-350 words) explaining how to implement a specific technology or solve a technical problem. Demonstrate mastery of all grammar concepts.

Requirements:

- Mix of imperative sentences (instructions) and declarative sentences (explanations)
- Correct article usage throughout

- Appropriate verb tenses (imperative for steps, present simple for explanations)
- At least 3 modal verbs (for advice/recommendations)
- Correct prepositions (at least 10)
- At least 2 parallel structures
- Varied sentence types
- Professional but accessible tone

Tutorial topic: Choose one:

- How to implement OAuth 2.0 authentication
- How to optimize database queries
- How to set up a CI/CD pipeline
- How to implement caching in web applications
- How to secure a REST API

Your tutorial:

EXERCISE 11.18: PEER REVIEW EXERCISE - COMPLETE WORKFLOW

Exchange documents with a peer (or use the sample provided) and complete a full review cycle.

Sample Document for Review:

"# Code Review Guidelines

Effective code review are essential for maintaining the code quality. This document outlines best practices what every developer should follows.

PURPOSE OF CODE REVIEW

Code reviews serves several purposes. They helps catch bugs before they reaches production, ensures consistency across codebase, and provides learning opportunities for team members. Each of the review should be thorough but also respectful of the developers time.

REVIEW PROCESS

When you review code, follow these steps:

6. Read the entire code what needs review
7. Check that all tests has been passed
8. Verify the code follows our standards
9. Look for potential bugs or security issues
10. Provides constructive feedback

Each reviewer are responsible for checking specific aspects. The senior developers reviews architectural decisions while junior developers checks code style.

BEST PRACTICES

According to our experience, the best reviews is thorough but quick. Reviewers should focuses on important issues rather than minor style preferences. Its important to be respectful and to explain your suggestions clearly. When you finds an issue, explain why its problematic and suggest how to fix it.

The feedback should be specific and actionable. Instead of saying 'this is bad', explains what is wrong and provides better alternative. Remember that code review is about improving the code, not criticizing the developer.

COMMON ISSUES TO CHECK

- Code are following our style guide
- Tests covers all functionality
- Error handling are implemented correct
- Documentation is complete and accurate
- Performance implications has been considered

Each of these areas needs careful attention. The reviewer who spots issue should creates a comment what clearly explains the problem."

Your review:

Part 1: Error identification

- Total errors found: _____
- Errors by category: _____

Part 2: Corrected version

Part 3: Constructive feedback What this writer does well: _____ Priority areas for improvement: _____ Specific recommendations: _____

EXERCISE 11.19: WRITING PORTFOLIO PIECE

Create a complete, polished technical document (500-600 words) suitable for a professional portfolio. This should demonstrate mastery of all grammar concepts and professional writing skills.

Document type: Choose one:

- Technical white paper on a technology trend
- Detailed API documentation
- Research paper methodology section
- Technical blog post for a professional audience
- Software architecture design document

Requirements:

- No grammatical errors of any kind
- Varied, sophisticated sentence structures
- Appropriate technical vocabulary
- Professional formatting and organization
- Clear, logical flow
- Appropriate tone for the document type

Your portfolio piece:

Self-assessment:

- Grammar accuracy: ____ /10
- Clarity: ____ /10
- Professional tone: ____ /10

- Organization: _____ /10
- Technical accuracy: _____ /10
- Overall quality: _____ /50

EXERCISE 11.20: RAPID ERROR DETECTION

You're proofreading under time pressure. How quickly can you spot errors?

Set 1 (30 seconds per sentence):

6. "The algorithm what processes data are highly efficient and runs quick."
7. "According to the research, it shows that machine learning is transforming industries."
8. "Each of the systems have their own database, this ensures data isolation."
9. "We have wrote the documentation and have ran comprehensive tests."
10. "The system which handles authentication are secure and uses encryption."

Your corrections:

- 6.
- 7.
- 8.
- 9.
- 10.

Set 2 (1 minute per sentence - more complex): 6. "The distributed system what we have developed uses consensus algorithms, which ensures data consistency across multiple nodes and prevents the conflicts." 7. "In terms in performance, our approach is more efficient than traditional methods, it reduces processing time

with 40% and uses less memory significant." 8. "Each of the components are designed modular and can be deployed independent, this provides flexibility and allows updates without system downtime."

Your corrections: 6. ____ 7. ____ 8. ____

EXERCISE 11.21: GRAMMAR IN DIFFERENT TECHNICAL DOMAINS

Write a paragraph (100-150 words) for each technical domain, demonstrating domain-appropriate language and perfect grammar.

A. Cybersecurity:

B. Data Science:

C. Cloud Computing:

D. Software Engineering:

Compare: How does technical vocabulary differ while grammar rules remain the same?

EXERCISE 11.22: COMPREHENSIVE ERROR CORRECTION - FULL ARTICLE

Edit this complete technical article (600 words, ~45 errors).

Original Article:

"# The Future of Quantum Computing

INTRODUCTION

Quantum computing have emerged as one of the most promising technologies what could revolutionizes how we process information. Unlike classical computers what use bits, quantum computers uses qubits, which can exists in multiple states simultaneously. This property, known as superposition, allows quantum computers to performs certain calculations exponential faster than classical computers.

HOW QUANTUM COMPUTING WORKS

Classical computers processes information using bits what can be either 0 or 1. Quantum computers, however, uses qubits what can be both 0 and 1 at same time. This are achieved through quantum superposition. When multiple qubits are combined, the computing power increases exponential.

Another key principle is quantum entanglement, which allows qubits to be correlated in ways what has no classical equivalent. When qubits are entangled, the state of one qubit instantly affects the others, regardless of distance. This property can be used for creating powerful quantum algorithms.

The process of quantum computation involves three main steps. First, qubits are initialized in specific state. Then, quantum gates are applied to manipulate the qubits. Finally, the qubits are measured to obtain results. Each of these steps requires extreme precision, and even small errors can affects the computation significant.

CURRENT STATE OF TECHNOLOGY

According to recent reports, it shows that several companies has made significant progress in quantum computing. IBM, Google, and other tech giants has built quantum computers what can perform specific tasks. In 2019, Google announced that they have achieved "quantum supremacy," meaning their quantum computer has solved a problem what would take classical computer thousands of years.

However, current quantum computers are still in early stages. Each of the existing systems have limitations. The main challenge is maintaining quantum coherence, which is necessary for computations. Qubits are extremely sensitive to environmental noise, which causes errors. The systems must be kept at temperature near absolute zero, this requires sophisticated cooling systems.

POTENTIAL APPLICATIONS

Quantum computing have potential to transform many fields. In cryptography, quantum computers could breaks many of encryption methods what are currently used, this raises both opportunities and concerns. New quantum-resistant encryption methods is being developed to address this threat.

In drug discovery, quantum computers could simulates molecular interactions accurate, which would accelerates the development of new medicines. The pharmaceutical industry are particularly interested in this application.

Financial modeling is another promising area. Quantum algorithms could optimizes investment portfolios and analyzes market risks more effective than classical methods. Several financial institutions has started exploring quantum computing for their operations.

CHALLENGES AND LIMITATIONS

Despite the promise, there is significant challenges what needs to be addressed. Building stable quantum computers are extremely difficult and expensive. Each of the qubits needs to be isolated from environment while still being accessible for manipulation.

Error correction in quantum systems is more complex than in classical computers. The quantum error correction requires many physical qubits to create single logical qubit, this significantly increases the resources needed.

Scalability is another major challenge. Current quantum computers has only dozens of qubits, but practical applications will requires thousands or even millions of qubits. The engineering challenges of scaling up quantum systems is immense.

FUTURE OUTLOOK

The future of quantum computing remains uncertain but promising. According to experts predictions, practical quantum computers what can outperforms classical computers in useful tasks may still be decade or more away. However, the progress in recent years has been remarkable.

We expects that quantum computing will not replaces classical computing but will complements it. Certain types of problems will be solved better with quantum computers, while classical computers will continues to be more suitable for other tasks. The effect of quantum computing on technology and society could be profound, it may enables breakthroughs in science, medicine, and cryptography.

Research in quantum computing continues to accelerate. Governments and private companies invests billions of dollars in this technology. As the field matures, we will likely sees new applications what we cannot yet imagine. Because quantum computing has such transformative potential."

Your fully corrected version:

Detailed error analysis:

- Articles: _____ errors
- Subject-verb agreement: _____ errors
- Verb forms/tenses: _____ errors
- Relative pronouns (that/which/what): _____ errors
- Prepositions: _____ errors

- Pronoun reference: _____ errors
- Fragments/run-ons: _____ errors
- Other: _____ errors
- Total: _____ errors

EXERCISE 11.23: STYLE TRANSFORMATION

Take this overly casual text and transform it into professional technical writing while correcting all errors.

Original (Casual):

"So yeah, cloud computing is basically super important nowadays. Like, pretty much every company is using it or thinking about using it. The cool thing about cloud is that you don't gotta worry about buying servers and stuff. You just pay for what you use, which is way better than the old way. Plus, if you need more resources, you can just scale up really fast. There's different types of clouds - public, private, hybrid, whatever. Each one has its pros and cons, you know? The main providers are AWS, Azure, and Google Cloud. They're all pretty good but have different features. Security used to be a big worry, but it's gotten way better. Most cloud providers has really good security now. Overall, cloud computing is awesome and it's definitely gonna keep growing."

Your professional version (150-200 words):

EXERCISE 11.24: TECHNICAL COMMUNICATION SCENARIOS

Write appropriately for each scenario, demonstrating situational grammar awareness.

Scenario A: Executive Summary (100 words) Explain a technical project to non-technical executives.

- Requirements: Clear, concise, business-focused language; no jargon; perfect grammar
- Your text: _____

Scenario B: Technical Specification (100 words) Specify system requirements for developers.

- Requirements: Precise, detailed, technical; modal verbs for requirements; perfect grammar
- Your text: _____

Scenario C: User Guide Section (100 words) Explain a feature to end users.

- Requirements: Clear, accessible, step-by-step; imperative mood; perfect grammar
- Your text: _____

Scenario D: Academic Conference Abstract (100 words) Summarize research for academic audience.

- Requirements: Formal, academic style; reporting verbs; appropriate tenses; perfect grammar
- Your text: _____

EXERCISE 11.25: FINAL MASTERY ASSESSMENT

This is your final comprehensive assessment. Edit this complete document (800 words, ~60 errors) representing a realistic technical writing task.

Original: Software Development Best Practices Guide

INTRODUCTION

Software development have become increasingly complex in recent years. The applications what we build today requires sophisticated architectures, multiple technologies, and large teams. According to industry research, it shows that following best practices can improves productivity significant and reduces bugs.

This guide outlines essential practices what every development team should adopts. Each of the sections covers different aspect of development process. We have compiled these practices based on our experience and have incorporated feedback from industry experts.

CODE QUALITY

Writing high-quality code are fundamental to successful software development. Each line of code what you write should be clean, readable, and maintainable. The code which is difficult to understand creates problems for entire team.

NAMING CONVENTIONS

Variable and function names should be descriptive and follows consistent conventions. Each of the names should clearly indicates its purpose. For example, instead of using 'x' or 'temp', use meaningful names like 'userCount' or 'temporaryUserData'. The names what you choose affects code readability significant.

CODE COMMENTS

According to best practices, it suggests that code should be self-documenting. However, complex logic needs explanation through comments. Each comment should explains why something is done, not what is done. The code itself should makes the 'what' obvious.

Comments should be wrote in clear English and should be updated when code changes. Outdated comments is worse than no comments, they misleads developers.

TESTING

Testing are crucial for ensuring code quality. Without thorough testing, bugs reaches production and affects users. Each of the features should have automated tests.

UNIT TESTING

Unit tests verifies that individual functions works correct. Each test should focuses on single functionality. The tests should be independent and should runs quick. When you write unit tests, make sure they covers edge cases and error conditions.

According to our analysis, teams what writes unit tests catches bugs earlier and spends less time debugging. The effect of comprehensive testing is significant, it reduces production bugs with 70%.

INTEGRATION TESTING

Integration tests verifies that different components works together correct. This tests are more complex than unit tests but is essential for complex systems. Each of the integration test should covers realistic user scenario.

VERSION CONTROL

Using version control systems like Git is mandatory for modern development. Each of the developers should commits code regularly with clear messages. The commit messages what you write should describes what was changed and why.

BRANCHING STRATEGY

Teams should adopt a clear branching strategy. The main branch should always contain stable, deployable code. Feature development should happen on separate branches. When a feature is complete, it should be merged through a pull request.

Each pull request needs to be reviewed by at least one other developer. The reviewer checks code quality, tests coverage, and potential issues. This process ensures that only high-quality code enters the main branch.

CODE REVIEW

Code review is one of the most valuable practices for improving code quality. According to research, teams that do regular code reviews have fewer bugs and better code quality.

REVIEW PROCESS

When you review code, focus on important issues rather than style preferences. Check for logic errors, security vulnerabilities, and performance problems. Each review should be constructive and help the developer improve.

The feedback should be specific and actionable. Instead of saying 'this is bad', explain exactly what the issue is and suggest how to fix it. Remember that the goal is to improve the code, not to criticize the developer.

REVIEW CHECKLIST

Each review should cover these aspects:

- Code follows project standards
- Tests are comprehensive
- Error handling is implemented correctly
- Documentation is complete
- No security vulnerabilities exist

- Performance implications has been considered

DOCUMENTATION

Good documentation is essential for maintainable software. Each of the modules should have clear documentation what explains its purpose and usage. The documentation should be kept up-to-date with code.

API DOCUMENTATION

For APIs, documentation should describes each endpoint, its parameters, and response format. Each parameter should be documented with its type, whether its required, and what values are valid. Examples should be provided for common use cases.

ARCHITECTURE DOCUMENTATION

High-level architecture documentation explains how system components fits together. This documentation helps new team members understands the system and guides design decisions. Each of the major components should be documented with its responsibilities and interactions.

CONTINUOUS INTEGRATION

Continuous integration practices ensures that code integrates smoothly and all tests passes regularly. Each commit triggers automated build and test process. If build fails, the team is notified immediate.

The CI system should runs all tests, checks code quality, and generates reports. This provides quick feedback and catches issues early. According to studies, teams what uses CI deploys more frequent and has fewer production issues.

CONCLUSION

Following these best practices requires discipline and commitment from entire team. However, the benefits is substantial. Code quality improves, bugs

decreases, and development becomes more efficient. Each of the practices contributes to overall software quality.

We recommends implementing these practices gradually. Start with most critical practices like version control and testing, then adds others over time. The effect of good practices becomes apparent quickly, it transforms how team works and improves software quality significant.

Remember that best practices evolves as technology and methodologies changes. Stay informed about new practices and be willing to adapts your approach. Because software development is constantly evolving."

Your complete corrected version:

Comprehensive analysis:

6. Error summary by category:

- Articles: _____
- SVA: _____
- Verb tenses/forms: _____
- That/which/what: _____
- Prepositions: _____
- Word choice: _____
- Sentence structure: _____
- Other: _____
- **Total errors found:** _____

7. Most challenging aspects: _____

8. Strategies used: _____

9. Time taken: _____

10. Confidence level (1-10): _____

EXERCISE 11.26: SELF-ASSESSMENT AND GOAL SETTING

Part A: Grammar Skills Inventory

Rate your current confidence level (1-10) for each grammar area:

Grammar Area	Confidence (1-10)	Evidence	Goals
Articles			
Subject-Verb Agreement			
Verb Tenses			
Active/Passive Voice			
Modal Verbs			
Prepositions			

Sentence Structure

Parallel Structure

Reporting Verbs

Common Errors

Part B: Writing Portfolio Review

Select your best piece of technical writing from these exercises.

5. **Selected piece:** _____
6. **Why this piece:** _____
7. **Strengths demonstrated:** _____
8. **Areas for continued improvement:** _____

Part C: Action Plan

Immediate goals (next month):

- 4.
- 5.
- 6.

Longer-term goals (3-6 months):

- 4.

5.

6.

Strategies for continued improvement:

4.

5.

6.

How will you track progress?

EXERCISE 11.27: FINAL REFLECTION ESSAY

Write a reflection (300-400 words) on your grammar learning journey. Use this as a final demonstration of your writing skills.

Prompts to consider:

- What grammar concepts were most challenging?
- What strategies helped you improve?
- How has your technical writing improved?
- What are your ongoing goals?
- How will you apply these skills professionally?

Your reflection (demonstrating perfect grammar):

ANSWER KEY AND ASSESSMENT NOTES

SCORING RUBRICS

For editing exercises:

- 90-100% errors found: Excellent mastery
- 75-89% errors found: Good competence
- 60-74% errors found: Satisfactory progress
- Below 60%: Needs continued practice

For original writing:

- Grammar accuracy (40%)
- Clarity and organization (30%)
- Appropriate style and tone (20%)
- Technical content (10%)

RECOMMENDED NEXT STEPS

If you scored 90%+:

- Focus on advanced stylistic refinement
- Practice writing for diverse audiences
- Consider mentoring others
- Continue with authentic professional writing

If you scored 75-89%:

- Review specific error categories
- Practice systematic proofreading

- Get peer feedback regularly
- Focus on persistent error patterns

If you scored 60-74%:

- Revisit relevant units
- Work through additional exercises
- Use grammar checkers as learning tools
- Practice daily with focused exercises

If you scored below 60%:

- Consider working with a tutor
- Go back to foundational units
- Practice one grammar concept at a time
- Build confidence gradually

RESOURCES FOR CONTINUED LEARNING

7. **Regular practice:** Write daily, even briefly
8. **Read technical writing:** Observe how professionals write
9. **Peer review:** Exchange feedback with colleagues
10. **Professional editing:** Consider professional feedback on important documents
11. **Grammar tools:** Use Grammarly, ProWritingAid, etc. as learning aids
12. **Keep a personal error log:** Track and learn from your mistakes

Congratulations on completing this comprehensive technical grammar course!

Remember:

- Good grammar is a professional asset
- Improvement comes with consistent practice
- Errors are learning opportunities
- Clear communication requires continuous effort
- Your technical expertise deserves clear expression

CONCLUSION

Mastering English grammar is essential for success in Computer Science academic and professional contexts. This handbook has provided you with:

- Core grammar concepts with CS-relevant examples
- Common error patterns to avoid
- Extensive practice exercises
- Correction strategies

Remember:

6. Read extensively in your field to internalize grammatical patterns
7. Write regularly and seek feedback
8. Proofread systematically, focusing on one error type at a time
9. Keep a personal error log to track your most common mistakes
10. Use this handbook as an ongoing reference resource

Next Steps:

- Complete all exercises and check your answers
- Apply these concepts in your academic writing
- Review sections where you made errors
- Practice writing technical documentation and research papers
- Share your work with peers for feedback

Good luck with your English language development!

REFERENCES AND RECOMMENDED RESOURCES

CORE GRAMMAR REFERENCES

TEXTBOOKS AND COMPREHENSIVE GUIDES

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ADDITIONAL RESOURCES

PODCASTS AND MULTIMEDIA

Grammar Girl Quick and Dirty Tips.

<https://www.quickanddirtytips.com/grammar-girl>

Culips ESL Podcast. <https://esl.culips.com>

The Academic Writing Podcast. <https://academicwritingpodcast.com>

YOUTUBE CHANNELS

English Lessons with Adam - engVid.

<https://www.youtube.com/user/MinooEngVid>

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Write Right. <https://www.youtube.com/c/WriteRightIndia>

Електронне навчальне видання

English for Technical Communication: Grammar Guide for CS Students

Уклали Володимир Кшевецький, Олена Дідич

Формат 60x84/8. Ум. друк. арк. 34,18

Master the essentials of technical writing and grammar tailored specifically for computer science students. This guide will help you write clear, concise, and effective documentation for your projects and reports.

- ✓ Improve Sentence Structure & Punctuation
- ✓ Avoid Common Grammar Mistakes
- ✓ Use Technical Vocabulary Effectively
- ✓ Write with Precision & Clarity

