Міністерство освіти і науки України

Луцький національний технічний університет

ENGLISH FOR SOFTWARE ENGINEERING

Методичні вказівки до практичних занять та самостійної роботи для здобувачів першого (бакалаврського) рівня вищої освіти освітньої програми «Інженерія програмного забезпечення» галузі знань F Інформаційні технології, спеціальності F2 Інженерія програмного забезпечення денної та заочної форм навчання

ОСВІТНЯ ПРОГРАМА «Інженерія програмного забезпечення»
ГАЛУЗЬ ЗНАНЬ F Інформаційні технології
СПЕЦІАЛЬНІСТЬ F2 Інженерія програмного забезпечення

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До друку
Голова вченої ради факультету освітніх, цифрових та соціальних технологій_____Г. А. Герасимчук

Затверджено вченою радою освітніх, цифрових та соціальних технологій Луцького НТУ, протокол
№ _____ від «___» _____ року

Електронна копія друкованого видання передана для внесення в репозитарій Луцького НТУ
Директор бібліотеки _____Н. П. Поліщук

Рекомендовано до видання на засіданні кафедри іноземної філології та прикладної лінгвістики Луцького НТУ, протокол № _____ від «__» _____ 2025 року.

Завідувач кафедри іноземної філології та прикладної лінгвістики _____ А.П. Мартинюк

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Е 56 ENGLISH FOR SOFTWARE ENGINEERING [Текст] : Методичні вказівки до практичних занять та самостійної роботи для здобувачів першого (бакалаврського) рівня вищої освіти освітньої програми «Інженерія програмного забезпечення» галузі знань F Інформаційні технології, спеціальності F2 Інженерія програмного забезпечення денної та заочної форм навчання / уклад. Л. О. Доложевська. Луцьк : ЛНТУ, 2026. 68 с.

Видання містить теоретичний матеріал та практичні завдання, спрямовані на оволодіння здобувачами англійською мовою як засобом комунікації на професійному рівні, ознайомлення студентів із специфікою професійного мовлення та вироблення в них практичних навичок використання мови в спеціальності. Призначене для здобувачів освіти ОП «Інженерія програмного забезпечення» підготовки бакалавра спеціальності F2 Інженерія програмного забезпечення денної та заочної форм навчання.

Foreword

The textbook *"English for Software Engineering"* is designed for students of higher education specializing in Software Engineering. The course aims to develop professional foreign language communicative competence necessary for future IT specialists in academic, professional, and research contexts.

In today's rapidly evolving digital world, proficiency in English has become an essential requirement for software engineers. It serves not only as a means of international communication but also as a fundamental tool for accessing technical documentation, participating in global projects, collaborating in international teams, and keeping up with technological innovations. Therefore, the integration of English language learning with professional IT content is a key component of modern engineering education.

The textbook is structured into seven thematic units: *My Future Specialty, Computer Literacy, Personal Computers, PC Configuration, Computer Evolution, Types of Computers*, and *Application of a Computer*. Each unit contains professionally oriented reading texts, vocabulary sections, grammar exercises, speaking and writing tasks, as well as additional reading materials aimed at developing critical thinking and independent learning skills.

Special attention is given to the development of communicative competence, academic writing skills, and the ability to operate with professional terminology in real-life and academic situations. The materials encourage interactive learning, problem-solving, and the practical application of language skills in the context of software development and IT systems.

The textbook also includes additional reading texts and summative assessment tasks, which ensure systematic evaluation of students' knowledge and skills. This structure supports both classroom instruction and independent study, promoting continuous language development.

UNIT 1. MY FUTURE SPECIALTY

1. Lead-in Activities

1. *Discuss the following questions:*

Why is software engineering considered one of the most perspective professions today?
What personal qualities should a successful software engineer possess?
Would you prefer working for a large company or a startup?

2. *Match the IT professions with their responsibilities.*

IT Professions	**Responsibilities**
A. Software Engineer	1. Designs and maintains databases to ensure efficient data storage and retrieval.
B. Web Developer	2. Creates and tests applications for smartphones and tablets.
C. Data Analyst	3. Protects computer systems and networks from cyber threats and attacks.
D. Cybersecurity Specialist	4. Develops software solutions based on users' requirements and business needs.
E. Mobile Application Developer	5. Automates software deployment and manages cloud infrastructure.
F. Database Administrator	6. Analyzes large datasets to identify patterns and support decision-making.
G. UI/UX Designer	7. Designs user-friendly interfaces and improves user experience.
H. DevOps Engineer	8. Tests software products to identify bugs and ensure quality standards.
I. Quality Assurance (QA) Engineer	9. Builds intelligent systems capable of learning from data and making predictions.
J. Artificial Intelligence Engineer	10. Develops websites and web-based applications using programming languages and frameworks.

Follow-up Questions

1. Which profession seems the most challenging? Why?
2. Which profession would you like to choose in the future?
3. Which profession do you think will be most in demand in ten years?

3. *Rank the following professional skills from the most important to the least important: communication, coding, teamwork, problem-solving, leadership, creativity.*
4. *Justify Your Ranking* Write one sentence explaining the importance of each skill.

Example:

Problem-solving is essential because software engineers must find effective solutions to technical challenges.

1. Communication is important because _____.
2. Coding is important because _____.
3. Teamwork is important because _____.
4. Problem-solving is important because _____.
5. Leadership is important because _____.
6. Creativity is important because _____.

5. *Discuss the following questions with a partner.*

1. Can a software engineer be successful without strong communication skills?
2. How does creativity help software engineers solve problems?
3. Should leadership skills be developed at university?
4. Which skill is most difficult to acquire?
5. Which skill do you need to improve most?

6. *Read the statement and express your opinion.*

"In the age of artificial intelligence, soft skills will become more valuable than technical skills."

2. Main Text

My Future Specialty

Software engineering has become one of the most influential and rapidly developing professions in the modern world. Today almost every sphere of human activity depends on digital technologies, from healthcare and education to banking and entertainment. As a result, the demand for highly qualified software engineers continues to grow globally.

A software engineer is a specialist who designs, develops, tests, and maintains software systems. Unlike programmers who mainly focus on writing code, software engineers are involved in the entire development process. They analyze user requirements, create system architecture, choose suitable technologies, and ensure that software products operate efficiently and securely.

Modern software engineering combines technical expertise with creativity and communication skills. Software engineers often work in teams where collaboration plays a crucial role. Team members cooperate with project managers, designers,

cybersecurity specialists, and clients to create reliable digital products. Therefore, communication skills are just as important as technical knowledge.

The profession requires continuous learning because technologies evolve extremely quickly. Programming languages, frameworks, and development tools are constantly updated. Successful specialists regularly improve their qualifications by taking online courses, attending conferences, and participating in professional communities.

Software engineers may specialize in different areas. Some focus on web development, while others work with mobile applications, artificial intelligence, cloud computing, cybersecurity, or embedded systems. Artificial intelligence and machine learning are currently among the most перспективних fields because companies increasingly rely on data analysis and automation.

Another important aspect of software engineering is problem-solving. Engineers must analyze complex situations and find effective solutions under time pressure. Critical thinking and attention to detail help developers avoid errors and improve software quality.

Working conditions in the IT industry are generally flexible. Many companies allow remote work and flexible schedules. Competitive salaries and international career opportunities also attract young people to this field. However, the profession can be stressful because specialists often face strict deadlines and demanding projects.

In the future, software engineering is expected to remain one of the key professions driving technological progress. The development of artificial intelligence, virtual reality, and quantum computing will create new opportunities and challenges for software engineers worldwide.

For many students, software engineering is not only a career choice but also an opportunity to contribute to innovation and improve people’s lives through technology.

3. Active Vocabulary

Word / Phrase	Definition
software engineering	the process of designing and developing software
framework	a platform used for software development
cybersecurity	protection of computer systems and networks
cloud computing	delivery of computing services over the Internet
embedded systems	computer systems integrated into devices
debugging	finding and correcting program errors
collaboration	working together with others
deadline	a fixed time for completing work
artificial intelligence	computer systems simulating human intelligence
maintain software	support and update software products

Vocabulary Exercises

Exercise 1. Complete the sentences using the words from the vocabulary list.

1. Modern companies invest heavily in _____ to protect user data.
2. Software engineers often work under strict _____.
3. A good specialist must know how to _____ efficiently.
4. _____ allows companies to store data online.
5. Team _____ is essential for successful projects.
6. Artificial intelligence is transforming many industries.
7. Developers use different _____ for web applications.
8. Engineers must constantly update their technical knowledge.

Exercise 2. Choose the correct answer (a, b, or c).

1. Software engineers often use a _____ to simplify the development process.
    a) framework
    b) deadline
    c) collaboration
2. Protecting company networks from hackers is the responsibility of _____.
    a) cloud computing
    b) cybersecurity
    c) debugging
3. Developers perform _____ when they search for and fix errors in a program.
    a) collaboration
    b) maintenance
    c) debugging
4. Services such as Google Drive and Microsoft OneDrive are examples of _____.
    a) cloud computing
    b) embedded systems
    c) artificial intelligence
5. Smart washing machines and modern cars often contain _____.
    a) frameworks
    b) embedded systems
    c) deadlines
6. Successful software projects usually require effective _____ among team members.
    a) collaboration
    b) cybersecurity
    c) debugging
7. A project manager may set a strict _____ for completing a software product.
    a) framework
    b) artificial intelligence
    c) deadline
8. Chatbots and virtual assistants are common examples of _____.
    a) software engineering

b) artificial intelligence
c) cloud computing

9. One important responsibility of software engineers is to _____ after it has been released.
   a) maintain software
   b) set deadlines
   c) install hardware
10. _____ combines technical knowledge, problem-solving skills, and programming to create digital products.
    a) Cybersecurity
    b) Embedded systems
    c) Software engineering

Exercise 3. Work in pairs and answer the questions:

1. Which of these concepts is the most important in modern software development? Why?
2. How has cloud computing changed the IT industry?
3. Can artificial intelligence replace software engineers in the future?
4. Why is collaboration essential in software engineering projects?
5. What problems may occur if a team misses a deadline?

4. Grammar Focus

Present Perfect vs Present Perfect Continuous

Explanation

Present Perfect is used to emphasize results. Present Perfect Continuous is used to emphasize duration and process.

Examples:

- Developers have created a new application.
- Engineers have been testing the software for three days.

Grammar Exercises

Exercise 1. Put the verbs in the correct form.

1. The company _____ (develop) several mobile applications this year.
2. The engineers _____ (work) on the new system since Monday.
3. Our team _____ (not finish) the project yet.
4. She _____ (study) programming for five years.
5. They _____ (improve) the interface recently.
6. We _____ (test) the application all day.
7. He _____ (learn) Python since last semester.
8. The developers _____ (solve) many technical issues.

Exercise 2. Correct the mistakes.

1. The developers have create a new mobile application this month.
2. She has been worked on the project since January.
3. Our team have finished the testing process yesterday.
4. They have been developping the software for six months.
5. The company has launched three new products since last year.
6. We have been test the application all morning.
7. He has studied programming since five years.
8. The engineers have been solve technical problems since the system crashed.
9. I have wrote several reports this week.
10. The programmers has been working on the database all day.

Exercise 3. Transform the sentences.

1. The developers started working on the application three months ago.
   (Present Perfect Continuous)
2. We started testing the software at 9 a.m. and we are still testing it.
   (Present Perfect Continuous)
3. The company released five updates this year.
   (Present Perfect)
4. She started learning Python in 2023 and continues to learn it now.
   (Present Perfect Continuous)
5. Our team completed the project successfully.
   (Present Perfect)
6. They began discussing the new framework two hours ago and are still discussing it.
   (Present Perfect Continuous)
7. I finished three programming assignments this week.
   (Present Perfect)
8. The engineers started improving the cybersecurity system last month and are still working on it.
   (Present Perfect Continuous)
9. The company introduced several artificial intelligence tools recently.
   (Present Perfect)
10. He started debugging the program in the morning and has not finished yet.
    (Present Perfect Continuous)

5. Speaking Tasks

Task 1. Pair Discussion

Discuss the advantages and disadvantages of working in software engineering.

Task 2. Mini Debate

“Artificial intelligence will replace many IT specialists.” Agree or disagree.

Task 3. Presentation

Prepare a 2-minute presentation about your future career path.

6. Writing Tasks

Task 1. Write a Formal Email

Write an email applying for an internship in an IT company. (120–150 words)

Task 2. Opinion Essay

“Remote work is the future of software engineering.” Write 180–200 words.

Task 3. Professional Profile

Write a short professional profile for LinkedIn.

Additional Reading Text

The Changing Role of Software Engineers

The role of software engineers has changed dramatically over the last two decades. In the past, software developers primarily focused on creating desktop applications and maintaining internal company systems. Today software engineers work on cloud platforms, artificial intelligence solutions, cybersecurity systems, and global digital infrastructures used by millions of people.

One of the main reasons for these changes is the rapid development of the Internet and mobile technologies. Businesses now rely heavily on online services, mobile applications, and digital communication. As a result, software engineers are expected to possess broader technical knowledge and stronger communication skills than ever before.

Modern software development is highly collaborative. International teams often work on the same project from different countries and time zones. Engineers communicate through online platforms, participate in virtual meetings, and use collaborative tools to manage projects efficiently.

Another important trend is automation. Many routine programming tasks are now partially automated with the help of artificial intelligence tools. However, experts believe that AI will not completely replace software engineers because human creativity and critical thinking remain essential for solving complex problems.

Cybersecurity has also become one of the key responsibilities of software engineers. As cyberattacks become more sophisticated, companies must ensure that their software products are secure and reliable. Developers therefore need to understand secure coding practices and data protection principles.

The future of software engineering will likely involve even more interdisciplinary cooperation. Engineers may work closely with specialists in medicine, education, environmental science, and robotics. This means that

communication skills, adaptability, and lifelong learning will become increasingly important.

In conclusion, software engineering continues to evolve together with technology and society. Although the profession is demanding, it offers excellent opportunities for professional growth, creativity, and international collaboration.

Reading Comprehension Tasks

Exercise 1. Answer the questions.

1. How has the role of software engineers changed?
2. Why are communication skills important?
3. What impact does automation have on programming?
4. Why is cybersecurity essential?
5. What skills will future engineers need?

Exercise 2. Read the statements and decide whether they are True (T) or False (F). Correct the false statements.

1. Twenty years ago, software developers mainly worked on desktop applications and internal company systems.
2. Modern software engineers rarely work with cloud platforms and artificial intelligence technologies.
3. The growth of the Internet and mobile technologies has significantly changed the software engineering profession.
4. Today's software engineers need only technical skills to be successful.
5. International software development teams often collaborate across different countries and time zones.
6. Artificial intelligence has completely replaced software engineers in many companies.
7. Cybersecurity has become one of the important responsibilities of modern software engineers.
8. Lifelong learning and adaptability are expected to become less important in the future.

Exercise 3. Discuss the following questions in pairs or small groups. Give reasons and examples to support your opinions.

1. How has the role of software engineers changed over the last two decades?
2. Why are communication skills becoming increasingly important in software engineering?
3. What are the advantages and challenges of working in international development teams?
4. How has artificial intelligence influenced software development?
5. Do you agree that AI will never completely replace software engineers? Why or why not?

6. Why is cybersecurity considered a crucial aspect of modern software engineering?
7. Which industries outside IT may increasingly cooperate with software engineers in the future?
8. What skills should software engineering students develop to remain competitive in the job market?
9. How important is lifelong learning for a software engineer? Can a specialist succeed without continuous professional development?
10. Would you like to work in an international software development team? Why or why not?

Critical Thinking Task

Work in groups and discuss the statement:

"Technical expertise is important, but communication and adaptability are the key skills for future software engineers."

- Do you agree or disagree?
- Which skills will be most valuable in the next 10–15 years?
- How should universities prepare future software engineers for these changes?

Prepare a short summary of your group's conclusions and present it to the class.

UNIT 2. COMPUTER LITERACY

1. Lead-in Activities

Answer the following questions.

1. What does computer literacy mean today?
2. Why are digital skills important for software engineers?
3. Which computer programs do you use most often?
4. How has technology changed education?
5. What cybersecurity risks do Internet users face?
6. Should schools teach digital literacy more actively?
7. What advantages does online communication provide?
8. Can people succeed professionally without digital skills today?

Work in pairs. Make a list of:

- five essential digital skills;
- five common computer problems;
- five advantages of modern technologies.

Then present your ideas to the class.

Match the computer terms with their definitions.

Term	Definition
1. operating system	a) harmful software
2. malware	b) online data storage
3. cloud storage	c) software managing computer hardware
4. browser	d) program used for accessing websites
5. firewall	e) security system protecting networks

2. Main Text

Computer Literacy in the Digital Era

Computer literacy has become one of the most important competencies in the modern world. In the past, people could perform most professional and everyday tasks without digital technologies. Today, however, computers influence nearly every aspect of human activity, including education, business, healthcare, communication, entertainment, and scientific research.

Computer literacy refers to the ability to use computers and digital technologies effectively and responsibly. Basic computer literacy includes working with operating systems, creating documents, browsing the Internet, sending emails, managing files, and using online communication platforms. Advanced computer literacy involves programming, database management, cybersecurity awareness, and understanding cloud technologies.

For software engineering students, computer literacy is especially important because their future profession depends heavily on technology. Software engineers must know how to install software, configure systems, solve technical problems, and work with development environments. They are also expected to adapt quickly to new technologies because the IT industry changes constantly.

One major component of computer literacy is information management. The Internet provides access to enormous amounts of information, but not all online content is reliable. As a result, students should learn how to evaluate information critically, distinguish trustworthy sources from unreliable ones, and avoid misinformation.

Cybersecurity is another essential aspect of digital literacy. Many users become victims of phishing attacks, malware, identity theft, and online fraud because they lack basic security knowledge. Using strong passwords, installing updates regularly, and avoiding suspicious websites can significantly improve online safety.

Communication technologies have also transformed professional environments. Employees now participate in online conferences, collaborate through cloud services, and exchange information electronically. Consequently, digital communication skills are considered essential by modern employers.

Another important issue is digital ethics. Computer users should respect intellectual property rights, avoid plagiarism, protect confidential information, and communicate respectfully online. Responsible behavior in digital environments contributes to safer and more productive online communities.

Artificial intelligence and automation continue to influence computer literacy requirements. People are now expected not only to use digital tools but also to understand how technologies affect society. Lifelong learning therefore becomes increasingly important because digital systems evolve rapidly.

In conclusion, computer literacy is no longer optional. It is a fundamental requirement for academic success, professional competitiveness, and active participation in modern society. Individuals who continuously improve their digital skills are more likely to succeed in the rapidly changing technological world.

3. Active Vocabulary

Word / Phrase	Definition
operating system	software that manages computer hardware and software
cybersecurity	protection of digital systems and data
malware	harmful software designed to damage systems
phishing	online fraud used to steal information
cloud storage	online data storage service
troubleshoot	identify and solve technical problems
database	organized collection of digital information
digital ethics	responsible behavior in online environments
automation	use of technology to perform tasks automatically
intellectual property	legally protected creative work

Vocabulary Exercises

Exercise 1. Complete the Sentences

Use suitable words from the vocabulary list.

1. Many companies use _____ to store information online.
2. Students should learn how to _____ technical problems independently.
3. Weak passwords increase the risk of _____ attacks.
4. _____ protects networks from cyber threats.
5. Artificial intelligence supports industrial _____.
6. A _____ stores large amounts of information.
7. Respecting copyright is part of _____.
8. Hackers often spread _____ through suspicious emails.
9. Software engineers regularly install security updates.
10. Modern operating systems provide user-friendly interfaces.

Exercise 2. Match the Terms with Their Definitions

Words:	Definitions:
1. malware	a) online security protection

2. browser	b) software for browsing websites
3. firewall	c) harmful software
4. phishing	d) organized electronic information
5. automation	e) automatic technological process
6. database	f) fake online attack
7. cloud platform	g) online computing environment
8. cybersecurity	h) network protection system

Exercise 3. Choose the Correct Option

1. The primary purpose of cybersecurity is to:
   a) improve software performance and speed
   b) protect computer systems, networks, and data from unauthorized access
   c) develop new programming languages

2. Cloud storage enables users to:
   a) access and synchronize files through Internet-based services
   b) increase the physical memory of a computer
   c) prevent all forms of cyberattacks automatically

3. Malware is software that:
   a) helps optimize system resources and performance
   b) is designed to damage, disrupt, or gain unauthorized access to systems
   c) monitors network traffic to improve security

4. A web browser is primarily used to:
   a) access, retrieve, and display information from the World Wide Web
   b) create and compile software applications
   c) configure computer hardware components

5. Digital ethics involves:
   a) respecting intellectual property and communicating responsibly online
   b) sharing copyrighted materials for educational purposes without permission
   c) collecting users' personal data without informing them

6. Automation helps organizations by:
   a) reducing efficiency through increased human involvement
   b) performing repetitive tasks with minimal human intervention
   c) eliminating the need for all employees

7. Phishing attacks typically aim to:
    a) persuade users to reveal confidential information
    b) improve user authentication procedures
    c) increase the speed of online transactions

8. Databases are designed to:
    a) organize, store, and retrieve large amounts of structured information
    b) create visual presentations and graphic designs
    c) protect computers from hardware failures

9. Information literacy requires users to:
    a) accept online information without verification
    b) evaluate the reliability and credibility of digital sources
    c) avoid using search engines whenever possible

10. In modern workplaces, digital communication tools are mainly used to:
    a) replace all face-to-face interactions permanently
    b) facilitate collaboration, information exchange, and remote work
    c) reduce access to organizational information

4. Grammar Focus

Modal Verbs for Ability, Obligation, and Advice

Explanation

Modal verbs express ability, obligation, permission, necessity, and advice.

Modal Verb	Function
can / could	ability
must	strong obligation
have to	external obligation
should	advice
may / might	possibility

Examples:

- Students must protect personal information online.
- Software engineers can solve technical problems quickly.
- Users should install antivirus software regularly.

Grammar Exercises

Exercise 1. Complete the sentences

Use suitable modal verbs.

1. Students _____ learn cybersecurity basics.
2. You _____ use strong passwords for online accounts.
3. Software engineers _____ solve technical issues efficiently.
4. Users _____ avoid suspicious websites.
5. Companies _____ protect confidential information.
6. Employees _____ attend online meetings tomorrow.
7. Hackers _____ attack insecure systems.
8. You _____ update your software regularly.
9. Modern technologies _____ improve communication.
10. Developers _____ work remotely.

Exercise 2. Rewrite the sentences using modal verbs.

1. It is necessary to protect personal data.
2. It is possible that the system will fail.
3. Students are advised to back up files.
4. Employees are required to follow security policies.
5. Programmers are able to develop mobile applications.
6. It is forbidden to share passwords.
7. It is necessary to install updates.
8. Perhaps artificial intelligence will transform education.

Exercise 3. Correct the Mistakes

1. Users musts protect their data.
2. Students should to improve digital skills.
3. Hackers can to steal passwords.
4. Employees must attending online meetings.
5. Software engineers should learns programming languages.
6. Users may downloading files safely.
7. Companies have protect information.
8. Students can improving technical competence.

5. Speaking Tasks

Task 1. Discuss the following questions.

1. How important is computer literacy today?
2. Which digital skills are most valuable?
3. Should cybersecurity be taught at school?
4. What are the dangers of social media?
5. How does technology improve communication?
6. Can artificial intelligence replace teachers?
7. Which online platforms do students use most often?
8. How can people protect themselves online?

Task 2. Mini Debate

Topic: “Digital technologies improve people’s lives more than they create problems.”

Prepare arguments for and against the statement.

Task 3. Presentation

Prepare a short presentation on one of the following topics:

- The role of computer literacy in modern society;
- Cybersecurity for students;
- Advantages and disadvantages of online learning;
- The future of digital communication.

6. Writing Tasks

Task 1. Opinion Essay

Write 180–200 words on the topic: “Computer literacy is essential for professional success.”

Task 2. Formal Email

Write an email to technical support describing a computer problem.

Include:

- description of the issue;
- actions already taken;
- request for assistance.

(120–150 words)

Task 3. Instructions

Write instructions for safe Internet use for first-year university students.

Additional Reading Text

Digital Skills in the Workplace

Digital technologies have transformed the modern workplace dramatically. Today employees are expected to use computers not only for basic communication but also for data analysis, project management, online collaboration, and professional presentations. As a result, digital competence has become one of the most valuable professional skills in the twenty-first century.

The rapid growth of remote and hybrid work has further increased the importance of computer literacy. Millions of employees now work from home at least part of the time and rely on digital tools to perform their duties. Video conferencing platforms, cloud-based services, collaborative software, and online project

management systems have become essential components of modern business operations.

Organizations increasingly expect employees to adapt quickly to technological innovation. New software solutions are introduced regularly, and workers must learn how to use them efficiently. Individuals who are comfortable with technology and willing to learn new digital skills often have better career opportunities and greater professional flexibility.

Cybersecurity awareness has become another critical aspect of workplace competence. Employees frequently handle confidential information, customer records, and financial data. Even a small mistake, such as opening a suspicious email attachment or using a weak password, can result in serious security breaches. Consequently, many organizations provide cybersecurity training to help employees recognize potential threats and protect sensitive information.

Digital communication skills are equally important. Modern professionals communicate through emails, instant messaging platforms, video conferences, and collaborative online workspaces. Effective communication requires not only technical competence but also the ability to express ideas clearly, maintain professional etiquette, and collaborate with colleagues from different cultural and linguistic backgrounds.

Artificial intelligence and automation are changing the nature of work across many industries. Routine administrative tasks are increasingly performed by automated systems, allowing employees to focus on more creative, strategic, and analytical responsibilities. However, experts emphasize that human skills such as critical thinking, problem-solving, leadership, and emotional intelligence remain essential in the workplace.

Another important element of digital competence is information literacy. Employees must be able to evaluate online information critically, identify reliable sources, and avoid misinformation. In an era of information overload, the ability to distinguish credible information from inaccurate content is a valuable professional asset.

In conclusion, digital competence is no longer limited to technical professions. It has become a fundamental requirement for success in nearly every career field. As technologies continue to evolve, lifelong learning and adaptability will remain key factors in professional development and career advancement.

Reading Comprehension Tasks

Exercise 1. Answer the Questions

1. Why has digital competence become one of the most valuable professional skills?
2. How has remote work influenced the importance of computer literacy?
3. What digital tools are commonly used in modern workplaces?
4. Why do organizations expect employees to adapt quickly to technological innovation?
5. How can poor cybersecurity practices affect a company?
6. What communication skills are important in digital workplaces?

7. Which human skills remain important despite automation?
8. Why is information literacy considered essential today?
9. How does lifelong learning contribute to professional success?
10. Do you think digital competence will become even more important in the future? Why?

*Exercise 2. Read the statements and decide whether they are **True (T)** or **False (F)**. Correct the false statements.*

1. Digital competence is important only for IT professionals.
2. Remote work has increased the importance of computer literacy.
3. Employees are expected to learn new software systems regularly.
4. Cybersecurity mistakes can create serious problems for organizations.
5. Strong passwords and cybersecurity awareness help protect sensitive information.
6. Automation has completely replaced human workers in most industries.
7. Critical thinking and problem-solving remain valuable workplace skills.
8. Information literacy involves evaluating the reliability of online sources.
9. Lifelong learning is becoming less important due to automation.
10. Digital communication requires both technical and interpersonal skills.

Exercise 3. Choose the Correct Option

1. Digital competence includes:

    a) only technical programming skills
    b) the ability to use digital tools effectively and responsibly
    c) only hardware maintenance

2. Remote work depends heavily on:

    a) cloud services and online collaboration tools
    b) paper documentation
    c) traditional postal services

3. Cybersecurity training helps employees:

    a) increase Internet speed
    b) recognize and avoid security threats
    c) design computer hardware

4. Automation mainly affects:

    a) routine and repetitive tasks
    b) all human decision-making
    c) only software engineering jobs

5. Information literacy involves:

a) accepting all online information as true
b) evaluating information critically
c) avoiding digital resources

Exercise 4. Match the words with their definitions.

Word	Definition
1. competence	a) ability to adjust to new situations
2. adaptability	b) ability to perform tasks effectively
3. automation	c) use of technology to perform tasks automatically
4. information literacy	d) ability to evaluate information critically
5. cybersecurity	e) protection of systems and digital data

Exercise 5. Discussion Questions

1. Which digital skills are most important for software engineering students?
2. How has technology changed the workplace over the last decade?
3. What are the advantages and disadvantages of remote work?
4. Should all university students receive cybersecurity training?
5. Which human skills will remain essential in the age of artificial intelligence?
6. How can people improve their digital competence?
7. What challenges may arise from increasing automation?
8. Do you think lifelong learning is necessary for every profession? Why?

Exercise 6. Discuss the statement:

"In the future, digital competence will be as important as reading and writing."

Consider:

- the role of technology in education;
- the impact of automation on employment;
- the importance of cybersecurity awareness;
- future workplace requirements.

Prepare a 3–5 minute presentation summarizing your group's conclusions.

Exercise 7. Write 180–200 words on the following topic:

Which digital skills will be the most important for software engineers in the next ten years?

Include:

- at least three digital skills;
- examples from the IT industry;
- your personal opinion;

- predictions about future workplace requirements.

Use formal academic style.

UNIT 3. PERSONAL COMPUTERS

1. Lead-in Activities

Exercise 1. Answer the following questions.

1. How often do you use a personal computer?
2. What tasks do you usually perform on your computer?
3. What is more important: hardware or software?
4. What advantages do laptops have over desktop computers?
5. Which computer component is the most important?
6. How have personal computers changed education?
7. Can smartphones replace personal computers completely?
8. What characteristics make a computer powerful?

Exercise 2. Brainstorming Activity

Work in groups and make lists of:

- computer hardware components;
- types of software;
- advantages of personal computers;
- common technical problems.

Present your ideas to the class.

Exercise 3. Match the computer components with their functions.

Component	**Function**
1. CPU	a) stores temporary data
2. RAM	b) displays visual information
3. SSD	c) performs calculations
4. Monitor	d) stores files permanently
5. Keyboard	e) inputs text and commands

2. Main Text

Personal Computers in Modern Society

Personal computers have become one of the most important technological inventions of the modern era. Since their widespread introduction in the late twentieth century, PCs have transformed education, business, communication, entertainment,

and scientific research. Today millions of people rely on personal computers daily for professional and personal activities.

A personal computer is designed for individual use and usually consists of hardware and software components. Hardware includes physical parts such as the processor, motherboard, memory, monitor, keyboard, mouse, and storage devices. Software refers to programs and operating systems that allow users to interact with the hardware effectively.

The central processing unit, commonly called the CPU, is often described as the brain of the computer. It executes instructions and performs calculations required for software operation. Random access memory, or RAM, temporarily stores data while programs are running. Storage devices such as solid-state drives and hard disk drives keep files and applications permanently.

Modern personal computers support a wide variety of tasks. Students use them for online learning, research, programming, and preparing academic assignments. Businesses rely on computers for communication, accounting, data management, and marketing. Engineers and designers use specialized software for simulations, modeling, and technical analysis.

There are several types of personal computers. Desktop computers are powerful systems designed for stationary use. They are often preferred by programmers, gamers, and engineers because they provide high performance and upgrade possibilities. Laptops offer portability and flexibility, making them ideal for students and professionals who travel frequently. Tablets are lightweight devices mainly used for communication, media consumption, and simple tasks.

Technological progress has significantly improved computer performance over the years. Modern computers are smaller, faster, and more energy-efficient than earlier systems. Cloud technologies and high-speed Internet connections also allow users to access data and applications remotely.

Despite their advantages, personal computers also create challenges. Excessive dependence on digital technologies may reduce face-to-face communication and increase cybersecurity risks. Users must therefore develop responsible digital habits and protect their devices from malware and cyberattacks.

Artificial intelligence is expected to influence future computer development significantly. Smart systems may improve automation, voice interaction, and data analysis. At the same time, engineers continue to search for more sustainable and environmentally friendly technologies.

In conclusion, personal computers remain essential tools in modern society. They support innovation, education, communication, and professional development while continuing to evolve together with technological progress.

3. Active Vocabulary

Word / Phrase	Definition
processor (CPU)	the main unit performing calculations
motherboard	the main circuit board of a computer
RAM	temporary memory used during operation
storage device	hardware used to store information

operating system	software managing computer resources
peripheral device	external hardware connected to a computer
desktop computer	stationary personal computer
laptop	portable personal computer
solid-state drive (SSD)	fast storage device without moving parts
upgrade	improvement of hardware or software

Vocabulary Exercises

Exercise 1. Complete the Sentences

Use suitable vocabulary words.

1. The _____ performs all major calculations.
2. A _____ is designed for portable use.
3. Modern computers often use _____ because they are faster than HDDs.
4. The _____ connects all hardware components.
5. Users install an _____ to manage computer resources.
6. Printers and scanners are examples of _____ devices.
7. Students often _____ their computers by adding more RAM.
8. Files are stored permanently on a _____.
9. Desktop computers are usually more powerful than tablets.
10. Software engineers need reliable hardware for programming tasks.

Exercise 2. Match the Terms with Their Definitions

Terms:	Definitions:
1. motherboard	a) portable personal computer
2. processor	b) temporary working memory
3. operating system	c) physical device connected externally
4. peripheral	d) software controlling hardware
5. RAM	e) central computing component
6. SSD	f) stationary computer system
7. laptop	g) main internal circuit board
8. desktop computer	h) fast permanent storage device

Exercise 3. Multiple Choice

1. RAM stores:

a) temporary data
b) printed documents
c) passwords only

2. A laptop is:
   a) portable
   b) mechanical
   c) industrial
3. The operating system:
   a) repairs hardware physically
   b) manages computer resources
   c) creates Internet connections only
4. SSDs are:
   a) slower than HDDs
   b) usually faster than HDDs
   c) external monitors
5. The motherboard:
   a) controls printers only
   b) connects hardware components
   c) stores online files
6. Desktop computers are often used for:
   a) high-performance tasks
   b) cooking
   c) gardening
7. Peripheral devices include:
   a) keyboards and printers
   b) operating systems
   c) websites
8. Software engineers often need:
   a) weak computers
   b) powerful systems
   c) mechanical devices

4. Grammar Focus

Passive Voice

Explanation

Passive voice is used when the action is more important than the person performing it.

Structure:

be + past participle

Examples:

- Computers are used in education.

- New software is developed every year.
- Data can be stored online.

Grammar Exercises

Exercise 1. Change the Sentences into Passive Voice

1. Engineers design modern processors.
2. Companies produce laptops worldwide.
3. Students use computers for research.
4. Developers install security updates.
5. Technicians repair damaged hardware.
6. Universities provide online learning platforms.
7. Programmers create mobile applications.
8. Organizations store information digitally.

Exercise 2. Complete the Sentences

Use the correct passive form.

1. Modern computers _____ (use) in many industries.
2. Data _____ (store) on cloud platforms.
3. New devices _____ (develop) every year.
4. Technical problems _____ (solve) by specialists.
5. Operating systems _____ (update) regularly.
6. Software applications _____ (install) automatically.
7. Information _____ (protect) by cybersecurity systems.
8. Computers _____ (manufacture) globally.

Exercise 3. Correct the Mistakes

1. Computers is used worldwide.
2. Data are stored safely online.
3. New laptops develops every year.
4. Applications are install automatically.
5. Personal computers was invented decades ago.
6. Cybersecurity systems protects information.
7. The processor are connected to the motherboard.
8. Files is stored permanently on SSDs.

5. Speaking Tasks

Task 1. Discuss the following questions.

1. Which type of personal computer do you prefer?
2. What computer characteristics are important for programmers?
3. How often should people upgrade their devices?
4. Are desktop computers becoming less popular?

5. How have personal computers changed communication?
6. What cybersecurity risks do users face?
7. Can tablets replace laptops in education?
8. How will personal computers change in the future?

Task 2. Mini Debate

Topic:
"Smartphones will eventually replace personal computers."
Prepare arguments for and against the statement.

Task 3. Presentation

Prepare a short presentation on one of the following topics:

- My ideal personal computer;
- The future of laptops;
- Hardware requirements for software engineers;
- Advantages and disadvantages of desktop computers.

6. Writing Tasks

Task 1. Descriptive Essay

Write 180–200 words describing your personal computer.

Include:

- hardware characteristics;
- operating system;
- main functions;
- advantages and disadvantages.

Task 2. Product Review

Write a review of a laptop or desktop computer.

Include:

- technical specifications;
- performance evaluation;
- usability;
- recommendation.

(180–220 words)

Task 3. Technical Instructions

Write instructions for installing a new software application.

Use:

- passive voice;
- formal style;
- sequencing expressions.

(150–180 words)

Additional Reading Text

The Development of Home Computers

Home computers became increasingly popular during the 1980s and 1990s. Early systems were relatively expensive and had limited capabilities compared to modern devices. Nevertheless, they introduced millions of people to digital technologies and changed the way information was processed.

The first home computers were mainly used for educational purposes, simple games, and word processing. Although their memory capacity and processing power were limited, they represented a major technological breakthrough. Many users learned basic programming and computer operation using these early systems.

As technology advanced, home computers became more affordable, reliable, and user-friendly. One of the most significant developments was the introduction of graphical user interfaces (GUIs), which allowed users to interact with computers through icons, windows, and menus instead of complex command-line instructions. This innovation made computers accessible to a much wider audience.

The growth of the Internet in the 1990s transformed personal computing dramatically. Home users gained access to email, online information, digital communication, and electronic commerce. Computers became important tools not only for work and education but also for social interaction and entertainment.

During the early 2000s, hardware performance improved rapidly. Faster processors, larger storage devices, and improved graphics capabilities enabled users to perform more complex tasks. Multimedia applications, video editing, and computer gaming became increasingly popular. At the same time, laptop computers became more affordable, providing greater mobility and flexibility.

Cloud computing and wireless technologies further changed the role of personal computers. Users can now access files, applications, and services from almost anywhere with an Internet connection. Remote work and online learning have become common practices, increasing dependence on digital technologies.

Today, personal computers continue to evolve. Artificial intelligence is being integrated into operating systems and software applications. Voice assistants, intelligent search tools, and automated systems are becoming standard features. At the same time, manufacturers are focusing on energy efficiency and sustainability to reduce the environmental impact of electronic devices.

In the future, personal computers may become even more powerful, intelligent, and interconnected. Emerging technologies such as virtual reality, augmented reality, and quantum computing could further transform the way people interact with digital systems. Despite the growing popularity of smartphones and tablets, personal

computers remain essential tools for education, business, research, and software development.

Reading Comprehension Tasks

Exercise 1. Answer the Questions

1. Why were early home computers considered a technological breakthrough?
2. What were the main uses of home computers in the 1980s?
3. How did graphical user interfaces improve computer usability?
4. What impact did the Internet have on personal computing?
5. Why did laptops become increasingly popular?
6. How have cloud computing technologies changed the way people use computers?
7. What role does artificial intelligence play in modern personal computers?
8. Why are sustainability and energy efficiency important for computer manufacturers?
9. Which future technologies are mentioned in the text?
10. Why do personal computers remain important despite the popularity of mobile devices?

*Exercise 2. Read the statements and decide whether they are **True (T)** or **False (F)**. Correct the false statements.*

1. Early home computers were cheaper and more powerful than modern computers.
2. Many users learned basic programming on early home computer systems.
3. Graphical user interfaces made computers more difficult to use.
4. The Internet significantly expanded the functions of personal computers.
5. Multimedia applications became more popular as hardware performance improved.
6. Cloud computing allows users to access files remotely.
7. Artificial intelligence is rarely used in modern software applications.
8. Manufacturers are increasingly interested in sustainable technologies.
9. Smartphones have completely replaced personal computers.
10. Virtual reality and quantum computing may influence future computer development.

Exercise 3. Choose the Correct Option

1. One of the most important innovations in personal computing was:

    a) mechanical keyboards
    b) graphical user interfaces
    c) floppy disks

2. The Internet allowed users to:

a) increase processor speed
b) access online services and communication tools
c) repair hardware automatically

3. Cloud computing enables users to:

a) store and access data online
b) manufacture computer components
c) improve battery performance

4. Artificial intelligence is currently used for:

a) intelligent search tools and automation
b) replacing all software engineers
c) reducing Internet access

5. Future technologies mentioned in the text include:

a) analog television
b) virtual reality and quantum computing
c) typewriters

Exercise 4. Match the words from the text with their definitions.

Word	Definition
1. breakthrough	a) ability to move easily
2. interface	b) major technological achievement
3. mobility	c) point of interaction between user and system
4. sustainability	d) environmentally responsible development
5. interconnected	e) connected with one another

Exercise 5. Discussion Questions

1. Which development had the greatest impact on personal computers: the GUI, the Internet, or cloud computing? Why?
2. How have personal computers influenced education?
3. Do you think laptops will eventually replace desktop computers completely?
4. What are the advantages and disadvantages of cloud computing?
5. How might artificial intelligence change personal computers in the next ten years?
6. Which emerging technology mentioned in the text interests you the most?
7. Should technology companies focus more on sustainability? Why?
8. Do you believe personal computers will remain important in the future? Explain your opinion.

Exercise 6. Read the statement and discuss it in groups:

"The future of personal computing depends more on artificial intelligence than on hardware improvements."

- Do you agree or disagree?
- What evidence can support your opinion?
- Which technological innovation will have the greatest impact on users during the next decade?

Prepare a short group presentation (3–5 minutes) summarizing your conclusions.

UNIT 4. PC CONFIGURATION

1. Lead-in Activities

Exercise 1. Answer the following questions.

1. What hardware components does a personal computer consist of?
2. Which computer component is the most important for performance?
3. How often do you upgrade your computer?
4. What computer specifications are important for software engineers?
5. What is the difference between RAM and storage?
6. Why do gamers often need powerful computers?
7. Would you rather buy a laptop or a desktop computer?
8. How does hardware influence software performance?

Exercise 2. Match the components with their descriptions.

Component	**Description**
CPU	a) displays information visually
RAM	b) stores files permanently
SSD	c) performs calculations and executes instructions
GPU	d) processes graphics and video
Monitor	e) temporarily stores data

Exercise 3. Brainstorming

Work in groups.

Create a list of:

- essential computer components;
- optional peripherals;
- hardware upgrades that improve performance.

Present your ideas to the class.

2. Main Text

Understanding PC Configuration

PC configuration refers to the combination of hardware and software components that determine a computer's performance and capabilities. Understanding computer configuration is essential for software engineers because different tasks require different hardware resources.

The central processing unit (CPU) is often called the brain of the computer. It executes instructions, performs calculations, and manages system operations. Modern CPUs contain multiple cores, allowing them to process several tasks simultaneously. Faster processors generally improve system performance, especially for programming, data analysis, and software development.

Random access memory (RAM) is another crucial component. RAM temporarily stores data that is actively used by the operating system and applications. Insufficient memory can significantly slow down a computer because the system must rely on slower storage devices. Most modern computers contain between 8 and 32 gigabytes of RAM, depending on their intended purpose.

Storage devices are responsible for saving files and software permanently. Traditional hard disk drives (HDDs) use mechanical components, while solid-state drives (SSDs) use flash memory. SSDs offer significantly faster performance, shorter boot times, and improved reliability. As a result, they have become the preferred storage solution for modern computers.

The graphics processing unit (GPU) is responsible for rendering images, videos, and graphical interfaces. While integrated graphics are sufficient for everyday tasks, dedicated graphics cards are often necessary for gaming, video editing, machine learning, and 3D modeling.

The motherboard serves as the main circuit board connecting all hardware components. It allows communication between the processor, memory, storage devices, and peripheral equipment. A well-designed motherboard supports future upgrades and expansion.

Power supply units (PSUs) provide electricity to computer components. Choosing a reliable power supply is essential because unstable power delivery may damage hardware. Cooling systems are equally important since excessive heat can reduce performance and shorten component lifespan.

Software engineers often require balanced computer configurations. Programming, virtual machines, database management systems, and development environments may consume substantial computing resources. Therefore, selecting appropriate hardware depends on specific professional requirements.

In conclusion, understanding PC configuration helps users choose suitable hardware, improve system performance, and ensure efficient operation. Knowledge of computer components is an essential skill for future software engineers.

3. Active Vocabulary

Term	Definition
CPU	Central Processing Unit

Term	Definition
RAM	temporary working memory
SSD	solid-state storage device
HDD	traditional hard disk drive
GPU	graphics processing unit
motherboard	main circuit board
power supply unit	component supplying electrical power
cooling system	hardware preventing overheating
peripheral device	external hardware connected to a computer
upgrade	improvement of hardware

Vocabulary Exercises

Exercise 1. Complete the Sentences

1. The _____ executes instructions and processes data.
2. A computer with insufficient _____ may become slow.
3. Modern computers often use _____ instead of HDDs.
4. The _____ renders graphics and videos.
5. The _____ connects all hardware components.
6. A reliable _____ supplies electricity to the system.
7. The _____ prevents components from overheating.
8. Programmers often _____ their computers by adding memory.

Exercise 2. Match the Terms with Their Definitions

Terms:	Definitions:
1. CPU	a) temporary memory
2. RAM	b) graphics processor
3. GPU	c) power source component
4. SSD	d) main circuit board
5. Motherboard	e) data processing unit
6. PSU	f) external device
7. Peripheral	g) cooling hardware
8. Cooling System	h) solid-state storage device

Exercise 3. Choose the Correct Option

1. RAM stores:

    a) temporary data
    b) permanent files
    c) operating systems only

2. SSDs are generally:

a) slower than HDDs
b) faster than HDDs
c) identical to HDDs

3. The GPU is mainly responsible for:

   a) graphics processing
   b) storing files
   c) supplying power

4. The motherboard:

   a) connects hardware components
   b) stores data permanently
   c) cools the processor

5. The PSU:

   a) manages memory
   b) provides electrical power
   c) processes graphics

6. Cooling systems:

   a) increase heat production
   b) prevent overheating
   c) store information

7. Software engineers often require:

   a) balanced hardware configurations
   b) minimal system resources
   c) no upgrades

8. Upgrading RAM may:

   a) improve performance
   b) reduce storage capacity
   c) damage the monitor

4. Grammar Focus

Comparatives and Superlatives

Examples

- SSDs are faster than HDDs.
- Modern CPUs are more powerful than older processors.
- The GPU is one of the most important components for gaming.

- This workstation is the most expensive system in the laboratory.

Grammar Exercises

Exercise 1. Complete the Sentences

Use the comparative or superlative form.

1. SSDs are _____ (fast) than HDDs.
2. This processor is the _____ (powerful) in the series.
3. Modern laptops are _____ (light) than older models.
4. The GPU is one of the _____ (important) components for gaming.
5. Cloud storage is often _____ (convenient) than physical storage.
6. This workstation is _____ (expensive) than a standard office computer.
7. Among all storage devices, NVMe SSDs are usually the _____ (efficient).
8. Desktop computers are often _____ (easy) to upgrade than laptops.
9. The latest graphics card is _____ (good) than the previous model.
10. This is the _____ (reliable) power supply unit available in the store.

Exercise 2. Correct the Mistakes

1. SSDs are more fast than HDDs.
2. This is the most powerfuler processor available.
3. RAM is importanter than storage.
4. Gaming computers are more expensive that office computers.
5. This motherboard is the goodest option.
6. Laptops are usually more lighter than desktop computers.
7. The newest GPU is the more efficient model on the market.
8. Cloud storage is convenienter than traditional storage methods.
9. This computer case is the most cheapest in the catalogue.
10. The latest processor performs gooder than its predecessor.

Exercise 3. Rewrite the sentences using the word(s) in brackets. Do not change the meaning.

1. HDDs are slower than SSDs. *(faster)*
2. This CPU is more powerful than that CPU. *(less powerful)*
3. No other component is as important as the processor. *(the most important)*
4. Gaming PCs are more expensive than office PCs. *(less expensive)*
5. This workstation is the most efficient system in the company. *(more efficient than)*
6. Laptops are lighter than desktop computers. *(heavier)*
7. No storage device in this category is faster than an NVMe SSD. *(the fastest)*
8. This graphics card performs better than the previous model. *(not as ... as)*
9. Desktop computers are easier to upgrade than laptops. *(more difficult)*
10. This monitor is the largest in the laboratory. *(larger than)*

5. Speaking Tasks

Task 1. Discuss:

1. Which PC configuration is ideal for software engineers?
2. How much RAM is sufficient for programming?
3. Are gaming computers suitable for software development?
4. Which hardware upgrades provide the greatest performance improvement?
5. Is cloud computing reducing the importance of powerful personal computers?

Task 2. Mini Debate

"Every software engineering student should own a high-performance computer."

Prepare arguments for and against.

Task 3. Presentation

Prepare a 3–5 minute presentation:

"My Ideal Computer Configuration for Software Development."

6. Writing Tasks

Task 1. Technical Description

Describe your computer configuration.

Include:

- processor;
- memory;
- storage;
- graphics card;
- operating system.

(180–200 words)

Task 2. Recommendation Report

A first-year software engineering student wants to buy a computer.

Recommend a suitable configuration and justify your choices.

(200–250 words)

Task 3. Comparative Essay

Desktop PCs vs Laptops for Software Engineers

(200–250 words)

Additional Reading Text

Choosing the Right Computer for Software Development

Software development is a demanding field that requires not only strong programming skills but also a properly configured computer system. The performance of a computer directly affects productivity, development speed, and the ability to work with complex software environments. Therefore, choosing the right configuration is an important decision for both students and professional software engineers.

One of the most important components in a development workstation is the central processing unit (CPU). Modern software development often involves running multiple applications simultaneously, including integrated development environments (IDEs), web browsers, compilers, virtual machines, and database systems. A multi-core processor significantly improves performance by allowing parallel processing of tasks. In general, the more cores and higher clock speed a CPU has, the better it performs under heavy workloads.

Random access memory (RAM) is another critical factor. Insufficient memory can slow down the entire system, especially when working with large projects or running virtual environments. For basic programming tasks, 8 GB of RAM may be sufficient, but most experts recommend at least 16 GB for comfortable development. Advanced tasks such as machine learning, data analysis, or mobile application development may require 32 GB or more.

Storage also plays a key role in system performance. Traditional hard disk drives (HDDs) are gradually being replaced by solid-state drives (SSDs) due to their higher speed and reliability. SSDs significantly reduce loading times for applications and operating systems. In professional environments, NVMe SSDs are becoming the standard because they offer extremely fast data transfer rates, which improve overall system responsiveness.

Another important component is the graphics processing unit (GPU). While not always essential for basic programming, GPUs are crucial for fields such as game development, artificial intelligence, 3D modeling, and video processing. A dedicated graphics card can significantly accelerate computational tasks that involve parallel processing.

Software developers also need a reliable motherboard that supports future upgrades. Expandability is important because technology evolves rapidly, and the ability to upgrade components such as RAM, storage, or graphics cards extends the lifespan of a computer system. A well-designed motherboard ensures compatibility between all hardware components and provides stability during intensive workloads.

Cooling systems and power supply units are often overlooked but are essential for maintaining system stability. High-performance components generate heat, and inadequate cooling can lead to overheating, performance throttling, or hardware

damage. Similarly, a stable and efficient power supply ensures that all components receive consistent energy, which is crucial for long-term reliability.

In addition to hardware, software engineers must consider operating systems and development tools. Many developers use Linux-based systems due to their flexibility and performance, while others prefer Windows or macOS depending on project requirements. The choice of operating system can influence compatibility with programming languages, frameworks, and development environments.

Finally, budget is an important factor in selecting a computer configuration. Students often need to balance cost and performance, choosing systems that provide sufficient power without exceeding financial limitations. Professional developers, on the other hand, may invest in high-end systems to maximize productivity and efficiency.

In conclusion, selecting a computer for software development requires careful consideration of multiple factors, including CPU performance, memory capacity, storage speed, GPU capabilities, and system expandability. A well-balanced configuration ensures smooth workflow, higher productivity, and long-term usability in the fast-changing field of software engineering.

Reading Comprehension Tasks

Exercise 1. Answer the Questions

1. Why do software engineers require powerful computers?
2. Why is RAM important for developers?
3. What advantages do SSDs provide?
4. What factors influence the choice between laptops and desktops?
5. Why is scalability important?
6. What computer configuration would you recommend for a first-year software engineering student?
7. Is it better to invest in RAM or a faster processor?
8. How important are upgrades for long-term computer use?
9. Should universities provide hardware recommendations to students?
10. What hardware trends may influence future software development?

*Exercise 2. Read the statements and decide whether they are **True (T)** or **False (F)**. Correct the false statements.*

1. Software engineers rarely use resource-intensive applications.
2. Virtual machines may require large amounts of memory.
3. SSDs are slower than HDDs.
4. Desktop computers usually offer better upgrade opportunities.
5. Scalability can reduce future costs.
6. All developers need identical computer configurations.
7. Mobility is an advantage of laptops.
8. Budget considerations influence purchasing decisions.

Exercise 3.Prepare a group presentation:

"Designing the Ideal Software Engineering Workstation."

Include:

- hardware specifications;
- estimated budget;
- justification of choices;
- future upgrade possibilities.

UNIT 5. COMPUTER EVOLUTION

1. Lead-in Activities

Exercise 1. Discussion Questions

1. What do you know about the first computers?
2. How have computers changed over the last 50 years?
3. Which invention had the greatest impact on modern computing?
4. How will computers look in the future?
5. What devices replaced early computers in everyday life?
6. Why is technological evolution important for software engineers?
7. What is Moore's Law and how does it affect computing?
8. Can you imagine life without computers?

Exercise 2. Put the events in the correct order:

A. Personal computers become widely available
B. First generation computers (vacuum tubes)
C. Introduction of smartphones
D. Development of microprocessors
E. Cloud computing becomes mainstream

Exercise 3. Prediction Task

Work in groups and predict:

- future computer technologies;
- possible replacements for laptops;
- changes in software development tools.

2. Main Text

The Evolution of Computers

The evolution of computers is one of the most significant technological developments in human history. Over the past decades, computers have transformed from large, expensive machines used by specialists into compact, powerful devices accessible to billions of people worldwide.

The first generation of computers, developed in the 1940s and 1950s, used vacuum tubes for processing. These machines were extremely large, consumed a lot of energy, and were unreliable. They were mainly used for scientific calculations and military purposes.

The second generation introduced transistors, which replaced vacuum tubes. This innovation significantly reduced the size of computers and improved their reliability and efficiency. As a result, computers became more practical for business and government use.

The third generation of computers emerged with the development of integrated circuits. This advancement allowed multiple transistors to be placed on a single chip, leading to smaller, faster, and more powerful machines. During this period, operating systems and programming languages also became more advanced.

The fourth generation introduced microprocessors, which revolutionized personal computing. Computers became affordable and accessible to ordinary users. This period marked the rise of personal computers, graphical user interfaces, and software applications for everyday use.

In the 1990s and 2000s, the Internet changed computing forever. Computers became interconnected, enabling global communication, online services, and digital commerce. The development of laptops and mobile devices further increased accessibility and mobility.

Today, we are in the era of cloud computing, artificial intelligence, and big data. Modern systems rely on distributed networks and advanced algorithms to process massive amounts of information. Devices are no longer isolated but connected through global digital ecosystems.

The evolution of computers continues with emerging technologies such as quantum computing, edge computing, and neural networks. These innovations promise to solve problems that are currently impossible for classical computers.

In conclusion, computer evolution reflects continuous progress in hardware, software, and connectivity. Each generation has brought faster, smaller, and more intelligent systems, shaping the digital world we live in today.

3. Active Vocabulary

Term	Definition
vacuum tubes	early electronic components used in first computers
transistor	smaller and more efficient electronic switch
integrated circuit	chip containing many electronic components
microprocessor	central processing unit on a single chip
operating system	software managing computer hardware
graphical user interface	visual way to interact with a computer
cloud computing	Internet-based computing services
distributed system	network of connected computers
quantum computing	advanced computing based on quantum physics
digital ecosystem	interconnected digital environment

Vocabulary Exercises

Exercise 1. Fill in the Gaps

1. Early computers used _____ to process information.
2. The invention of the _____ made computers smaller and faster.
3. An _____ allows users to interact with visual elements.
4. Modern systems rely on _____ instead of standalone machines.
5. A _____ is the main chip in a computer.
6. _____ connects multiple systems through the Internet.
7. An _____ manages hardware and software resources.
8. Future technologies include _____ computing.

Exercise 2. Match the Terms

1. transistor	a) early electronic component
2. microprocessor	b) network of connected computers
3. GUI	c) visual interface
4. integrated circuit	d) CPU on a chip
5. cloud computing	e) software system manager
6. operating system	f) Internet-based services
7. vacuum tube	g) compact electronic circuit
8. distributed system	h) electronic switch

Exercise 3. Choose the Correct Option

1. First generation computers used:

    a) microprocessors
    b) vacuum tubes
    c) SSDs

2. Integrated circuits allowed computers to become:

    a) larger
    b) smaller and faster
    c) mechanical

3. The Internet mainly contributed to:

a) isolation of systems
b) global connectivity
c) hardware failure

4. Microprocessors led to:

   a) personal computing
   b) vacuum tube systems
   c) analog machines

5. Cloud computing provides:

   a) offline storage
   b) distributed online services
   c) hardware repair

4. Grammar Focus

Past Simple vs Present Perfect

Examples

- Computers **were used** for calculations in the past.
- Technology **has changed** dramatically over time.
- The first PCs **appeared** in the 1970s.
- The Internet **has transformed** communication.

Grammar Exercises

Exercise 1. Complete the Sentences

1. The first computers _____ (use) vacuum tubes.
2. Technology _____ (change) significantly over time.
3. The microprocessor _____ (revolutionize) computing.
4. Early systems _____ (be) very large and expensive.
5. The Internet _____ (transform) communication worldwide.
6. Scientists _____ (develop) integrated circuits in the 1960s.
7. Computers _____ (become) much smaller and faster over the past fifty years.
8. Software engineers _____ (create) many innovative applications since the beginning of the twenty-first century.
9. Personal computers _____ (appear) in many homes during the 1980s.
10. Artificial intelligence _____ (improve) the capabilities of modern computer systems in recent years.

Exercise 2. Correct the Mistakes

1. Computers has changed rapidly in the twentieth century.

2. Early computers uses vacuum tubes.
3. The Internet transformeds communication.
4. Microprocessors was invented in the 1970s.
5. Technology have evolved quickly.
6. Scientists has developed faster processors over the last decade.
7. The first personal computers have appeared in the 1980s.
8. Artificial intelligence become more popular in recent years.
9. Engineers has designed smaller computer chips.
10. Modern operating systems improved significantly since their introduction.

Exercise 3. Transform the Sentences

1. Early computers were very large. *(Rewrite using **used to**.)*
2. The Internet has changed communication. *(Rewrite in the Past Simple using **in the 1990s**.)*
3. Microprocessors were invented in the 1970s. *(Rewrite using the Present Perfect Passive.)*
4. Technology has evolved rapidly. *(Rewrite beginning with **Over the last few decades...**)*
5. Computers were expensive in the past. *(Rewrite using **used to**.)*
6. Scientists developed integrated circuits in the 1960s. *(Rewrite using the Passive Voice.)*
7. Software engineers have created many innovative applications. *(Rewrite in the Passive Voice.)*
8. Personal computers became popular in the 1980s. *(Rewrite using **started to**.)*
9. Researchers have improved computer performance considerably. *(Rewrite using the Passive Voice.)*
10. Quantum computing may transform the future of technology. *(Rewrite beginning with **The future of technology...**.)*

5. Speaking Tasks

Task 1. Discussion

1. Which generation of computers was the most important?
2. How has the Internet changed society?
3. Will quantum computing replace classical computers?
4. How do mobile devices influence computing evolution?
5. What will computers look like in 50 years?

Task 2. Discuss the following topic:

"The Internet is the most important invention in computer history."

Task 3. Prepare the presentation on the following topic and present it to the group

"The Evolution of Computers: Past, Present, Future"

6. Writing Tasks

Task 1. Summary

Summarize the text in 150–180 words.

Task 2. Write an opinion essay on the following topic:

Which technological innovation had the greatest impact on computing?

(200–250 words)

Task 3. Future Prediction

Describe future computer technologies.

(180–220 words)

Additional Reading Text

From Mechanical Machines to Intelligent Systems

The evolution of computers represents one of the most influential technological processes in human history. It reflects continuous progress in hardware design, software development, and computational theory. Modern society is deeply dependent on computing technologies, but the origins of these systems can be traced back to simple mechanical devices.

Early computing machines, such as the abacus and mechanical calculators, were used to perform basic arithmetic operations. Although limited in functionality, these devices introduced the idea of automating calculations. The real breakthrough came in the mid-twentieth century with the development of electronic computers based on vacuum tubes. These first-generation systems were extremely large, consumed significant amounts of energy, and required constant maintenance. However, they demonstrated that automated computation was possible on a large scale.

The second generation of computers introduced transistors, which replaced vacuum tubes and significantly improved efficiency, reliability, and size reduction. This innovation marked the beginning of more practical computing systems that could be used in scientific and business environments. Soon after, integrated circuits enabled the development of third-generation computers, where multiple electronic components were placed on a single chip. This advancement greatly increased processing power while reducing physical dimensions.

The invention of the microprocessor in the 1970s marked a turning point in computer evolution. For the first time, the central processing unit (CPU) was integrated onto a single chip, which led to the emergence of personal computers. This development democratized access to computing technology, allowing individuals and small organizations to use systems that were previously available only to large institutions.

During the 1990s, the rapid expansion of the Internet transformed computers into interconnected communication devices. This shift enabled global data exchange, online services, and digital collaboration. As a result, computing moved from isolated machines to network-based systems.

In the twenty-first century, cloud computing has further redefined how computing resources are used. Instead of relying solely on local hardware, users can now access storage, processing power, and applications through the Internet. This model has significantly increased scalability and flexibility in software engineering.

At the same time, artificial intelligence and machine learning have become integral parts of modern computing systems. These technologies allow computers to analyze data, recognize patterns, and make decisions with minimal human intervention. They are widely used in healthcare, finance, cybersecurity, and software development.

Looking toward the future, quantum computing is expected to revolutionize the field by solving complex problems that are currently beyond the capabilities of classical computers. Although still in the experimental stage, quantum systems may drastically change cryptography, optimization, and scientific simulations.

In conclusion, computer evolution is a continuous process driven by innovation and increasing user demands. Each technological generation has contributed to making computers faster, smaller, and more intelligent. For software engineers, understanding this evolution is essential for designing modern systems that align with current and future technological trends.

Reading Comprehension Tasks

Active Vocabulary

1. **computational theory** – theoretical foundations of computing and algorithms
2. **vacuum tube** – early electronic component used in first computers
3. **transistor** – semiconductor device that replaced vacuum tubes
4. **integrated circuit (IC)** – chip containing multiple electronic components
5. **microprocessor** – CPU integrated on a single chip
6. **democratization of technology** – making technology accessible to a wide audience
7. **interconnected system** – network of linked computing devices
8. **scalability** – ability of a system to handle increasing workload
9. **machine learning** – AI method based on data-driven learning
10. **quantum computing** – advanced computation based on quantum mechanics
11. **data processing** – manipulation and analysis of digital information
12. **digital transformation** – integration of digital technologies into society and industry

Exercise 1. Answer the Questions

1. Why are early mechanical devices important in the history of computing?
2. What were the main limitations of vacuum tube computers?
3. How did transistors improve computer performance?

4. Why are integrated circuits considered a breakthrough technology?
5. What was the impact of the microprocessor on society?
6. How did the Internet change the concept of computing systems?
7. What advantages does cloud computing provide for users and companies?
8. In what ways does artificial intelligence influence modern computing?
9. Why is scalability important in software engineering systems?
10. What potential impact may quantum computing have in the future?

Exercise 2. True or False (Correct the false statements)

1. Early mechanical calculators were fully automated and digital.
2. Vacuum tube computers were large and energy-consuming.
3. Transistors reduced the size and improved reliability of computers.
4. Integrated circuits decreased computing performance.
5. The microprocessor enabled the development of personal computers.
6. The Internet led to isolated computing systems.
7. Cloud computing increases flexibility and scalability.
8. Artificial intelligence is not used in modern industries.

Exercise 3.Complete the sentences using the vocabulary from the list above.

1. The development of the _____ allowed computers to become smaller and more efficient.
2. Modern systems rely heavily on _____ to process large amounts of data.
3. The _____ of technology made computers accessible to ordinary users.
4. A fully _____ system allows devices to share data in real time.
5. _____ is essential when designing systems that must handle growing demand.
6. _____ helps systems learn from data without explicit programming.
7. The shift toward cloud services is part of a global _____ process.
8. Early computers used _____ instead of modern semiconductor components.
9. Researchers study _____ to understand future limitations of computing.
10. The Internet created a globally _____ digital environment.

Exercise 4. Discussion

1. Which technological innovation had the greatest impact on computer evolution? Why?
2. Do you think cloud computing will completely replace local computing in the future?
3. How does technological evolution influence the role of software engineers?
4. Can artificial intelligence slow down or accelerate human innovation? Explain.
5. What ethical risks are associated with advanced computing technologies?
6. Should quantum computing be regulated at an international level? Why or why not?

(Optional extension task)

Write a short analytical paragraph (120–150 words):
"The most significant stage in computer evolution and its impact on modern society."

Project Task

"Computer Evolution Museum"

Create a presentation or poster showing:

- five generations of computers;
- key innovations;
- examples of devices;
- future predictions.

UNIT 6. TYPES OF COMPUTERS

1. Lead-in Activities

Exercise 1. Discussion Questions

1. What types of computers do you know?
2. What is the difference between a laptop and a desktop?
3. Which devices are used in software engineering?
4. Why do companies use servers?
5. What is the role of mobile devices in computing?
6. Which type of computer is the most powerful?
7. What are embedded systems?
8. Can a smartphone replace a computer?

Exercise 2. Classification Task

Classify the devices:

Laptop – Server – Smartphone – Supercomputer – Tablet – Desktop – Embedded system

Categories:

- Personal computers
- Mobile devices
- High-performance systems
- Specialized systems

Exercise 3. Compare the Devices

Compare:

- laptop vs desktop
- smartphone vs tablet
- server vs personal computer

(Discuss performance, portability, cost, usage)

2. Main Text

Types of Computers and Their Functions

Computers come in many forms, each designed for specific purposes and levels of performance. Understanding different types of computers is essential for software engineers, as each system has unique capabilities and limitations.

Personal computers (PCs), including desktops and laptops, are the most widely used computing devices. Desktops offer high performance, upgradeability, and cost efficiency, making them suitable for office work, software development, and gaming. Laptops provide portability and flexibility, allowing users to work from different locations.

Mobile devices such as smartphones and tablets have become an essential part of modern computing. They are lightweight, energy-efficient, and highly portable. Although they are less powerful than desktops or laptops, they are widely used for communication, entertainment, and lightweight applications.

Servers are powerful computers designed to manage network resources, store data, and provide services to multiple users simultaneously. They are essential in web hosting, cloud computing, and enterprise systems. Servers are optimized for reliability, scalability, and continuous operation.

Supercomputers represent the highest level of computing power. They are used for complex scientific simulations, weather forecasting, artificial intelligence research, and data-intensive calculations. Supercomputers consist of thousands of processors working in parallel.

Embedded systems are specialized computers integrated into larger devices. They are found in household appliances, cars, medical equipment, and industrial machines. Unlike general-purpose computers, embedded systems are designed for specific tasks and operate with limited resources.

Cloud-based systems are not physical devices but distributed computing environments. They allow users to access computing power, storage, and applications over the Internet. Cloud computing has transformed how individuals and organizations use computer resources.

Each type of computer plays an important role in modern digital infrastructure. While personal computers are essential for everyday tasks, servers and cloud systems support global communication and data processing, and embedded systems ensure the functionality of smart devices.

In conclusion, the diversity of computer types reflects the growing complexity of modern technology. Software engineers must understand these systems to design efficient, scalable, and compatible applications.

3. Active Vocabulary

Term	Definition
desktop computer	stationary personal computer
laptop	portable personal computer
server	computer providing services to others
supercomputer	extremely powerful computing system
smartphone	mobile communication device
tablet	touch-based portable device
embedded system	specialized device computer
portability	ability to be easily moved
scalability	ability to handle growth
distributed system	network of connected computers

Vocabulary Exercises

Exercise 1. Fill in the Gaps

1. A _____ is used to provide services to other computers.
2. A _____ is more powerful than any other type of computer.
3. A _____ is a portable personal computer.
4. _____ are integrated into cars and household devices.
5. A _____ is used for web browsing and communication.
6. _____ refers to the ability to expand system capacity.
7. A desktop computer has low _____ compared to laptops.
8. Cloud systems are examples of _____ computing.

Exercise 2. Matching

1. server	a) mobile touch device
2. supercomputer	b) fixed personal computer
3. laptop	c) portable computer
4. smartphone	d) high-performance system
5. embedded system	e) service provider machine
6. desktop	f) integrated system
7. tablet	g) growth capacity
8. scalability	h) communication device

Exercise 3. Choose the Correct Option

1. Servers are mainly used for:

   a) gaming
   b) providing network services
   c) personal entertainment

2. Supercomputers are used for:

a) simple office tasks
b) complex scientific calculations
c) browsing the Internet

3. Embedded systems are found in:

   a) cars and appliances
   b) only desktops
   c) only laptops

4. Laptops are preferred because of:

   a) portability
   b) high energy consumption
   c) lack of mobility

5. Cloud computing provides:

   a) physical hardware ownership
   b) remote computing resources
   c) offline systems

4. Grammar Focus

Comparatives and Superlatives (Revision)

Examples

- Servers are more powerful than personal computers.
- Supercomputers are the most powerful systems.
- Laptops are more portable than desktops.
- Embedded systems are the most specialized type of computers.

Grammar Exercises

Exercise 1. Complete the Sentences

1. Servers are _____ (powerful) than most desktop computers because they handle multiple requests simultaneously.
2. Supercomputers are the _____ (fast) and most complex machines used in scientific research today.
3. Tablets are _____ (portable) than both laptops and desktop computers due to their compact design.
4. Embedded systems are the _____ (specialized) computers, designed for very specific tasks within larger systems.
5. Desktop PCs are generally _____ (cheap) than high-performance servers used in enterprises.

6. Modern laptops are _____ (light) and more energy-efficient than older generations of portable computers.
7. Cloud servers are often _____ (scalable) than traditional local machines in enterprise environments.
8. Workstations are _____ (powerful) than standard office computers but less expensive than supercomputers.
9. Gaming PCs are usually _____ (expensive) than office computers because of advanced hardware components.
10. Mobile devices are becoming _____ (important) in software development and testing processes.

Exercise 2. Correct the grammatical and comparative errors.

1. Servers are more powerfuler than PCs.
2. Supercomputers are the most fastest systems in the world.
3. Tablets are more lighter than laptops.
4. Embedded systems are the most simplest computers.
5. Desktop computers are more cheap than servers.
6. Laptops are more faster than tablets in most computing tasks.
7. Cloud systems are more reliableer than local systems.
8. Workstations are the most powerfulest type of personal computer.
9. Mobile devices are more easier to use than desktop systems.
10. Gaming PCs are more advanced than most modernest office computers.

Exercise 3. Rewrite the sentences according to the instructions.

1. No computer is more powerful than a supercomputer. *(Use superlative)*
2. Laptops are more portable than desktops. *(Rewrite using "less … than" structure)*
3. Servers are the most reliable systems in networks. *(Rewrite using comparative form)*
4. Tablets are less powerful than laptops. *(Rewrite using comparative of superiority)*
5. Embedded systems are the most specialized computers. *(Rewrite using "no other" structure)*
6. Desktop PCs are cheaper than servers. *(Rewrite using superlative comparison idea)*
7. Supercomputers are faster than any other machines. *(Use superlative structure)*
8. Mobile devices are more flexible than traditional computers. *(Rewrite using "not as … as")*
9. Workstations are more powerful than office PCs. *(Rewrite using "less … than")*
10. Cloud systems are more scalable than local systems. *(Rewrite using passive comparative meaning or equivalent structure)*

5. Speaking Tasks

Task 1. Discussion

1. Which type of computer is best for software engineering?
2. Can smartphones replace laptops?
3. Why are servers important for modern applications?
4. What are advantages of embedded systems?
5. Which computer type will dominate in the future?

Task 2. Discuss the following topic:

"Desktop computers are becoming obsolete."

Task 3. Prepare a presentation:

"Choosing the Right Type of Computer for Different Tasks"

6. Writing Tasks

Task 1. Describe different types of computers. (180–200 words)

Task 2. Write a comparison essay on the following topic:

Laptop vs Desktop for Software Development

(200–250 words)

Task 3. Think and write an opinion essay

Will mobile devices replace personal computers?

(200–250 words)

Additional Reading Text

Types of Computers in Modern Digital Ecosystems

Modern computing environments are characterized by a wide diversity of computer types, each designed to perform specific functions within complex digital ecosystems. Understanding these categories is essential for software engineers, as system design, optimization, and deployment depend on the type of computing infrastructure being used.

Personal computers, including desktops and laptops, remain the most common type of computing devices. They are used for programming, documentation, software testing, and general productivity tasks. Desktops typically offer higher performance, better cooling systems, and easier hardware upgrade options, while laptops provide mobility and energy efficiency. Despite differences in form factor, both categories serve as primary tools for software development.

Mobile computing devices, such as smartphones and tablets, have significantly expanded the scope of digital interaction. These devices are optimized for portability,

touch-based interfaces, and wireless communication. Although their computational power is generally lower than that of personal computers, they play a crucial role in application testing, mobile development, and user experience design. The growth of mobile applications has made these devices central to modern software ecosystems.

Server systems represent another fundamental category of computers. Unlike personal devices, servers are designed to process multiple requests simultaneously, manage databases, host websites, and support cloud-based applications. They are built for reliability, scalability, and continuous operation. In enterprise environments, servers form the backbone of network infrastructure, enabling distributed computing and data management on a global scale.

Supercomputers occupy the highest level of computational performance. They are used in scientific research, climate modeling, cryptography, artificial intelligence training, and complex simulations. Their architecture consists of thousands of interconnected processors working in parallel to achieve extremely high processing speeds. Although not used in everyday applications, supercomputers contribute significantly to technological advancement and scientific discovery.

Embedded systems are specialized computing units integrated into larger mechanical or electronic systems. They are found in automobiles, medical devices, industrial machines, and smart home technologies. Unlike general-purpose computers, embedded systems are designed to perform dedicated tasks with high efficiency and minimal resource consumption. Their role is often invisible to users, yet they are essential for the functionality of modern devices.

Cloud computing systems represent a shift from traditional hardware-based computing to distributed virtual environments. In this model, computational resources such as storage, processing power, and software applications are delivered over the Internet. Cloud systems provide scalability, cost efficiency, and flexibility, allowing organizations to adjust resources dynamically according to demand. This model has become fundamental in modern software engineering and DevOps practices.

The interaction between these different types of computers creates a layered digital infrastructure. Software engineers must understand how applications operate across personal devices, cloud environments, and embedded systems to ensure compatibility and performance optimization.

In conclusion, the classification of computers reflects the complexity of modern computing environments. Each type plays a distinct role in the global digital ecosystem, contributing to the functionality, scalability, and innovation of contemporary technology systems.

Reading Comprehension Tasks

Active Vocabulary

1. **digital ecosystem** – interconnected environment of digital technologies and systems
2. **computational performance** – ability of a system to process data efficiently
3. **form factor** – physical design and structure of a device
4. **mobility** – ability to operate while moving or being portable
5. **scalability** – ability of a system to expand or handle increased workload

6. **distributed computing** – computing model using multiple connected systems
7. **infrastructure** – basic framework of technological systems
8. **parallel processing** – simultaneous execution of multiple computational tasks
9. **resource consumption** – amount of system resources used by a process
10. **cloud-based system** – computing system delivered via the Internet
11. **optimization** – process of improving performance and efficiency
12. **compatibility** – ability of systems to work together without conflict

Exercise 1. Answer the Questions

1. Why is it important for software engineers to understand different types of computers?
2. What are the main differences between desktops and laptops in terms of performance and usage?
3. How do mobile devices influence modern software development?
4. Why are servers essential in enterprise environments?
5. In what ways do supercomputers contribute to scientific progress?
6. What makes embedded systems different from general-purpose computers?
7. How does cloud computing change traditional computing models?
8. Why is scalability important in modern digital systems?
9. How do different computer types interact in a digital ecosystem?
10. What challenges may arise in ensuring compatibility between systems?

Exercise 2. True or False (Correct the false statements)

1. Personal computers are no longer used in software development.
2. Mobile devices are important for application testing and design.
3. Servers are designed for single-user tasks only.
4. Supercomputers perform highly complex calculations.
5. Embedded systems are independent general-purpose computers.
6. Cloud computing provides scalable resources over the Internet.
7. All computer types operate independently without interaction.
8. Digital ecosystems consist of interconnected computing systems.

Exercise 3. Complete the sentences using the vocabulary from the list above.

1. The modern IT environment functions as a complex _____ of interconnected systems.
2. High _____ is essential for running large-scale applications efficiently.
3. A laptop's _____ makes it suitable for mobile work environments.
4. _____ allows multiple processors to execute tasks simultaneously.
5. Cloud platforms are examples of _____ systems.
6. Effective system _____ improves software performance and responsiveness.
7. Large organizations rely on strong IT _____ to support operations.
8. _____ is a key factor when integrating different software systems.

9. Embedded systems are designed to minimize _____ while maintaining functionality.
10. _____ computing enables collaboration across multiple devices and locations.

Exercise 4. Discussion

1. Which type of computer is the most important in today's digital world? Why?
2. Will mobile devices eventually replace personal computers?
3. How does cloud computing influence the role of software engineers?
4. What are the risks of relying too heavily on distributed systems?
5. Should all computing systems be standardized for better compatibility?
6. How might future technologies change the current classification of computers?

Optional Extension Task

Write a short analytical paragraph (120–150 words):
"The importance of understanding different types of computers in software engineering."

Project Task

"Digital Ecosystem of Computer Types"

Create a presentation showing:

- types of computers;
- real-world examples;
- usage scenarios;
- future predictions.

UNIT 7. APPLICATION OF A COMPUTER

1. Lead-in Activities

Exercise 1. Discussion Questions

1. In which areas are computers used today?
2. How do computers change education?
3. What is the role of computers in healthcare?
4. How are computers used in business?
5. Can computers replace humans in all professions?
6. What are the risks of computer dependence?
7. How do computers support scientific research?
8. Which application of computers is the most important?

Exercise 2. Sort the applications into categories:

Applications:

- online banking
- medical diagnostics
- programming software
- e-learning platforms
- weather forecasting
- social media
- robotics control
- digital marketing

Categories:

- Education
- Business
- Science
- Healthcare
- Entertainment/Communication

Exercise 3. Brainstorming

Work in groups:

- list five computer applications in daily life;
- explain how computers improve efficiency;
- identify risks of excessive computer use.

2. Main Text

Applications of Computers in Modern Society

Computers have become an essential part of modern life, influencing nearly every industry and profession. Their applications extend far beyond simple calculations and data processing, transforming how people work, communicate, learn, and solve problems.

In education, computers are widely used for online learning, digital classrooms, and interactive educational tools. E-learning platforms allow students to access courses from anywhere in the world. Teachers use multimedia presentations, simulations, and virtual laboratories to improve learning outcomes.

In business, computers play a crucial role in managing operations, financial transactions, communication, and marketing. Companies use specialized software for accounting, customer relationship management (CRM), and data analysis. Online banking and e-commerce systems have also revolutionized the global economy.

Healthcare is another field heavily dependent on computer applications. Computers assist in medical diagnostics, patient record management, imaging systems, and even robotic surgery. Advanced algorithms help doctors analyze medical data and make accurate diagnoses.

In science and research, computers are used for simulations, data modeling, and complex calculations. Fields such as physics, chemistry, and climate science rely on high-performance computing to analyze large datasets and predict outcomes.

The entertainment industry also benefits from computer technology. Video games, animation, virtual reality, and streaming platforms are all powered by advanced computing systems. Social media platforms enable global communication and content sharing.

In transportation, computers are used in navigation systems, traffic control, autonomous vehicles, and logistics management. Embedded systems in modern cars improve safety and efficiency.

Despite these advantages, computer applications also raise concerns such as data privacy, cybersecurity risks, and overdependence on technology. Therefore, responsible use of computers is essential in modern society.

In conclusion, computers have a wide range of applications that continue to expand as technology evolves. They improve productivity, enhance communication, and enable innovation across all sectors of life.

3. Active Vocabulary

Term	Definition
application	practical use of computers
e-learning	online education system
database	organized collection of data
automation	use of technology to perform tasks automatically
simulation	imitation of real-world processes
diagnostics	identification of problems (especially in medicine)
CRM system	customer management software
cybersecurity	protection of digital systems
logistics	management of resources and transport
virtual reality	simulated digital environment

Vocabulary Exercises

Exercise 1. Fill in the Gaps

1. _____ allows students to learn online from anywhere.
2. Medical _____ helps doctors identify diseases.
3. Businesses use _____ systems to manage customer data.
4. _____ is used to perform tasks automatically.
5. A _____ stores and organizes large amounts of information.
6. _____ protects systems from cyber threats.
7. Scientists use computer _____ to study complex systems.
8. _____ helps manage transport and delivery systems.

Exercise 2. Matching

1. e-learning
2. simulation
3. CRM system
4. cybersecurity
5. automation
6. logistics
7. diagnostics
8. database

a) customer management tool
b) online education
c) system security protection

d) automatic processes
e) transport management
f) medical analysis
g) data storage system
h) virtual model of reality

Exercise 3. Choose the Correct Option

1. E-learning is mainly used in:

    a) education
    b) construction
    c) agriculture

2. CRM systems are used for:

    a) customer management
    b) gaming
    c) hardware repair

3. Automation helps to:

    a) increase manual work
    b) reduce repetitive tasks
    c) slow down processes

4. Cybersecurity protects:

    a) digital systems
    b) physical tools
    c) transportation routes

5. Simulations are used to:

    a) imitate real-world processes
    b) delete data
    c) repair hardware

4. Grammar Focus

Complex Sentences with Purpose and Result

(so that, in order to, to, therefore, as a result, consequently)

Grammar Exercises

Exercise 1. Complete the Sentences (Purpose Clauses)

1. Software engineers design secure systems so that users _____ (protect) their personal data.

2. Companies implement cybersecurity measures in order to _____ (prevent) data breaches.
3. Developers test applications carefully so that errors _____ (minimize) before release.
4. Cloud platforms are optimized so that they _____ (handle) large amounts of traffic.
5. Medical software is updated regularly in order to _____ (ensure) accuracy and reliability.
6. AI systems are trained on large datasets so that they _____ (improve) decision-making.
7. Mobile applications are designed to be simple so that users _____ (navigate) them easily.
8. Engineers document code in order to _____ (support) future development.
9. Systems are encrypted so that hackers _____ (not access) sensitive data.
10. Companies invest in IT infrastructure so that their services _____ (remain) competitive.

Exercise 2. Correct the Mistakes (Purpose & Result Structures)

1. Developers test software so that to avoid errors.
2. Companies invest in cybersecurity in order preventing attacks.
3. Systems are designed careful so that users can using them easily.
4. Data is encrypted therefore to protect information.
5. Engineers work hard so that the system is more reliable.
6. Applications are optimized in order that improve performance.
7. As a result of testing so that errors are reduced.
8. Software is updated therefore users can using new features.
9. Developers document code so that it helps future developers understand it.
10. Companies use cloud services in order that they scaling their systems.

Exercise 3. Transform the Sentences (Purpose & Result)

1. Engineers improve software. They want to increase reliability. *(Use "so that")*
2. Companies use encryption. They want to protect user data. *(Use "in order to")*
3. Systems are regularly updated. Security risks are reduced. *(Use "therefore")*
4. Developers test applications. Bugs are minimized. *(Use "so that")*
5. Cloud systems are scalable. They can support many users. *(Use "as a result")*
6. Engineers optimize performance. Users experience faster systems. *(Use "so that")*
7. Companies invest in AI technologies. Productivity increases. *(Use "consequently")*
8. Software is carefully designed. It meets user needs. *(Use "in order to")*
9. Systems are monitored continuously. Failures are prevented. *(Use "so that")*
10. Developers follow standards. Software becomes more secure. *(Use "therefore")*

5. Speaking Tasks

Task 1. Discussion

1. Which application of computers is most important today?
2. How do computers improve healthcare?
3. Can AI replace human decision-making?
4. How do computers affect communication?
5. What are the risks of computer applications?

Task 2. . Discuss the following topic:

"Computers have made human life better in all aspects."

Task 3. Prepare a presentation on the following topic:

"Applications of Computers in Modern Society"

6. Writing Tasks

Task 1. Summarize the text in 150–180 words.

Task 2. Write an opinion essay

Are computers more beneficial or harmful to society?

(200–250 words)

Task 3. Write an analytical essay

The role of computers in different industries

(200–250 words)

Additional Reading Text

The Role of Computers in Modern Society and Software Engineering

Computers have become a foundational element of contemporary society, influencing nearly every aspect of human activity. Their applications extend across education, healthcare, business, science, transportation, communication, and entertainment. For software engineers, understanding these applications is essential, as modern software systems must operate within complex, interconnected digital environments.

In education, computers support both traditional and remote learning models. Digital platforms enable access to vast educational resources, interactive simulations, and virtual classrooms. Learning management systems allow educators to organize courses, assess student performance, and facilitate communication. As a result, education has become more flexible, accessible, and technology-driven.

In business environments, computers are used for financial management, data analysis, communication, and decision-making processes. Enterprise systems integrate multiple functions such as accounting, customer relationship management, and supply chain optimization. E-commerce platforms have transformed global trade by enabling companies to operate without geographical limitations. This digital shift requires robust and secure software solutions developed by skilled engineers.

Healthcare systems rely heavily on computer technologies for diagnostics, patient monitoring, electronic health records, and medical imaging. Advanced systems assist medical professionals in identifying diseases and planning treatments. Artificial intelligence applications further enhance diagnostic accuracy by analyzing large datasets and detecting patterns that may not be visible to humans.

Scientific research is another area where computers play a crucial role. High-performance computing systems are used to simulate complex processes in physics, biology, and environmental science. These simulations allow researchers to test hypotheses and analyze phenomena that would otherwise be impossible to study experimentally.

Communication technologies have also been transformed by computers. Social media platforms, messaging applications, and video conferencing tools enable real-time global communication. These systems rely on distributed architectures and cloud infrastructure to ensure scalability and reliability.

In transportation, computers are integrated into navigation systems, traffic management solutions, and autonomous vehicles. Embedded systems control critical functions in modern cars, improving safety and efficiency. Logistics systems use real-time data processing to optimize delivery routes and reduce operational costs.

Despite these advantages, the widespread use of computers introduces significant challenges. Cybersecurity threats, data privacy concerns, and system vulnerabilities require constant attention from software engineers. Secure coding practices, encryption methods, and system monitoring are essential components of modern software development.

Another important aspect is the ethical responsibility of technology developers. Software engineers must consider the social and environmental impact of the systems they design. Issues such as algorithmic bias, digital inequality, and overreliance on automation raise important ethical questions.

In conclusion, computers are deeply integrated into all areas of modern life, creating both opportunities and challenges. For software engineers, this means not only developing functional systems but also ensuring their reliability, security, and ethical use. The future of computing will depend on the ability to balance technological innovation with social responsibility.

Reading Comprehension Tasks

Active Vocabulary

1. **digital infrastructure** – underlying technological systems supporting digital services
2. **enterprise system** – large-scale organizational software system

3. **real-time processing** – immediate handling of incoming data
4. **distributed architecture** – system design where components are spread across multiple nodes
5. **scalability** – ability of a system to handle increasing demand
6. **cybersecurity** – protection of systems and data from digital threats
7. **algorithmic bias** – systematic errors in algorithms leading to unfair outcomes
8. **automation** – use of technology to perform tasks without human intervention
9. **data privacy** – protection of personal and sensitive information
10. **embedded system** – specialized computer integrated into larger systems
11. **ethical responsibility** – moral obligations of technology developers
12. **system vulnerability** – weakness in a system that can be exploited

Exercise 1. Answer the Questions

1. Why are computers considered a foundational element of modern society?
2. How do educational platforms change traditional learning models?
3. What role do enterprise systems play in business operations?
4. Why is cybersecurity critical in modern digital environments?
5. How does artificial intelligence improve healthcare systems?
6. What is the importance of real-time processing in communication systems?
7. How do embedded systems contribute to transportation technologies?
8. What ethical issues are associated with software development?
9. Why is scalability important for modern applications?
10. How does digital infrastructure support global communication?

Exercise 2. True or False (Correct the false statements)

1. Computers are used only in technical fields such as programming.
2. E-commerce has expanded global trade opportunities.
3. Cybersecurity is not necessary for modern systems.
4. AI can improve medical diagnostics.
5. Embedded systems are only used in computers.
6. Real-time systems are important for communication technologies.
7. Software engineers do not need to consider ethical issues.
8. Distributed systems improve scalability and reliability.

Exercise 3. Complete the sentences using the vocabulary from the list above.

1. Modern societies rely on strong _____ to support digital services.
2. Large companies use _____ to integrate business operations.
3. _____ allows systems to respond instantly to incoming data.
4. Cloud platforms often use _____ to ensure reliability.
5. _____ is essential for protecting user information online.
6. Software developers must consider _____ when designing algorithms.
7. _____ enables machines to perform tasks automatically.
8. Protection against _____ is a key part of system design.
9. Modern cars rely on _____ for controlling internal functions.

10. Developers have increasing _____ when designing digital systems.

Exercise 4.Discussion

1. Should software engineers be legally responsible for system failures?
2. Can full automation replace human decision-making in critical systems?
3. What is more important: innovation or ethical responsibility in IT development?
4. How can society reduce risks related to cybersecurity threats?
5. Will digital infrastructure become more important than physical infrastructure in the future?
6. How should governments regulate artificial intelligence systems?

Optional Writing Task

Write a short analytical paragraph (120–150 words):
"The impact of computer technologies on modern society and ethical challenges for software engineers."

Project Task

"Computers in My Future Profession"

Prepare a presentation including:

- industry-specific applications;
- benefits and risks;
- future developments;
- personal opinion.

FINAL SUMMATIVE TEST (Units 1–7)

Time: 60–75 minutes | Total: 100 points

Part 1. Vocabulary (20 points)

Exercise 1. Matching (10 points)

Match the terms with definitions:

1. cloud computing
2. embedded system
3. motherboard
4. cybersecurity
5. compiler
6. RAM
7. server
8. application
9. debugging
10. microprocessor

a) temporary memory used for active processes
b) converting code into machine language
c) protection of digital systems

d) integrated computer system in devices
e) central circuit board
f) software for specific tasks
g) finding and fixing errors
h) Internet-based computing services
i) powerful system providing network services
j) CPU on a single chip

Exercise 2. Gap Filling (10 points)

Complete the sentences:

1. _____ protects systems from cyber threats.
2. A _____ stores temporary data.
3. _____ is used for online data storage and services.
4. A _____ is responsible for processing instructions.
5. _____ helps to detect and fix errors in programs.
6. A _____ is used to host websites and services.
7. _____ are integrated into smart devices.
8. Software _____ is the process of finding bugs.
9. An _____ performs specific user tasks.
10. The _____ connects all hardware components.

Part 2. Grammar (25 points)

Exercise 3. Correct the Mistakes (10 points)

1. SSDs are more fast than HDDs.
2. Computers is used in all industries.
3. This is the most powerfuler CPU.
4. Data are stored in cloud.
5. Software are developed by engineers.

Exercise 4. Transform the Sentences (15 points)

1. Engineers develop software. *(Passive)*
2. Computers process data. *(Passive)*
3. Cloud computing changes IT industry. *(Present Perfect)*
4. Early computers were large. *(Present Perfect)*
5. Servers are more powerful than PCs. *(superlative form)*

Part 3. Reading Comprehension (20 points)

Text (Short)

Computers are used in almost every field of modern life. They support communication, education, business, healthcare, and scientific research. Modern systems rely on cloud computing, artificial intelligence, and automation. However, increased use of technology also creates risks such as cybersecurity threats and data privacy issues. Therefore, responsible use of digital technologies is essential.

Exercise 5. True / False (10 points)

1. Computers are used only in IT companies.
2. Cloud computing is widely used today.
3. AI has no role in modern systems.
4. Cybersecurity is important for digital systems.
5. Computers support scientific research.

Exercise 6. Short Answers (10 points)

1. Name three areas where computers are used.
2. What is cloud computing?
3. What are two risks of computer use?
4. Why is cybersecurity important?
5. What technologies are shaping modern IT?

Part 4. Writing (20 points)

Exercise 7. Essay (20 points)

Write **180–220 words**:

“The Role of Computers in Modern Society”

Include:

- at least 3 application areas
- advantages
- disadvantages
- your opinion

Part 5. Speaking (15 points)

Exercise 8. Oral Task

Prepare a **3–5 minute monologue**:

“My Digital Future as a Software Engineer”

Include:

- required skills
- technologies you will use
- future expectations
- challenges

ASSESSMENT SCHEME

Section	Points
Vocabulary	20
Grammar	25
Reading	20
Writing	20
Speaking	15
Total	**100**

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2. McCarthy M., O'Dell F. Vocabulary in Use. Intermediate/Upper-Intermediate. Cambridge: Cambridge University Press.
3. British Council. LearnEnglish. [Електронний ресурс]. – Режим доступу: https://learnenglish.britishcouncil.org

Е 56 ENGLISH FOR SOFTWARE ENGINEERING [Текст] : Методичні вказівки до практичних занять та самостійної роботи для здобувачів першого (бакалаврського) рівня вищої освіти освітньої програми «Інженерія програмного забезпечення» галузі знань F Інформаційні технології, спеціальності F2 Інженерія програмного забезпечення денної та заочної форм навчання / уклад. Л. О. Доложевська. Луцьк : ЛНТУ, 2026. 68 с.

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