

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
МІСЬКОГО ГОСПОДАРСТВА імені О. М. БЕКЕТОВА

МЕТОДИЧНІ ВКАЗІВКИ

для практичних завдань
з дисципліни

**«ІНОЗЕМНА МОВА ТА
ІНОЗЕМНА МОВА ЗА
ПРОФЕСІЙНИМ
СПРЯМУВАННЯМ»**

(англійська мова)

*(для студентів I курсу денної форми навчання
освітньо-кваліфікаційного рівня бакалавр напрямку підготовки
6.050101 – Комп'ютерні науки (Інформаційні технології))*

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INTRODUCTION

These educational materials are designed for the students of the 1st year of studies of the speciality Computer sciences (Information technologies) to develop their knowledge and skills in technical English according to their profession.

This manual is based on the authentic texts from different sources concerning water supply and distribution problems. It contains the tasks for reading and translation, speaking, writing, vocabulary tasks, texts and tasks for summarizing. The manual consists of 9 units.

Each unit contains:

- pre-reading activity
- an authentic text for reading and translation;
- comprehension exercises;
- exercises for memorization and mastering key vocabulary;
- texts for summarizing.

Unit 1. Everyday English and Technical English

Word classes: nouns, verbs, adjectives, etc. Word building. Sentence structure. Direct and indirect objects. Present Simple. Adverbs of frequency. Personal (subject and object pronouns). Possessives.

Pre-Reading Activity

Find Ukrainian equivalents for these words:

- | | |
|----------------------|-------------------------------|
| 1. mother tongue | a. предмети домашнього вжитку |
| 2. to be borrowed | b. рідна мова |
| 3. soft drinks | c. програмне забезпечення |
| 4. Products | d. бути запозиченими (слова) |
| 5. Software | e. Шикарно |
| 6. T-shirt | f. безалкогольні напої |
| 7. Sweater | g. не мати сенсу |
| 8. Chic | h. Футболка |
| 9. Stylish | i. Светр |
| 10. designed items | j. Особливо |
| 11. to make no sense | k. сучасно, стильно |
| 12. in particular | l. написи на виробках |

Reading Focus

1. Read the text and answer the following questions.

THE ENGLISH LANGUAGE

The English language has become the new Latin of the century, the world's top tongue. One billion people speak English. There are many reasons for its popularity.

First, English is easier to learn than most other languages. Second, it borrows words and phrases from every countries which it expands.

80% of all English vocabulary comes from other languages. Many words have entered English as a result of trade and colonial expansion. English is so widespread nowadays because it has become the standard language for all kinds of international communication.

80% of all information in the world's computers is in English nearly 50% of all companies in Europe communicate with one another in English.

English is also the international language of business people, diplomats and politicians, scientists and musicians, doctors and students.

English is the main and most efficient means of information exchange between the people of our planet.

Learning English broadens our mind and way of thinking. So English is a global language nowadays. Problems of the 21st century, such as the problems

of war and peace, ecology, democracy and many others can not be solved if people don't speak the same language. I think that English is going to become even more important as a global language dominating world trade, computers and mass media.

I'm fond of traveling, computing, reading, art and music and I'm sure I can't do without English.

1. Why is English the global language nowadays?
2. Which vocabulary is the largest in the world?
3. What percentage of words in English comes from other countries?
4. Why is English a Language of communications nowadays?
5. Why do you learn English?
6. Do you agree that English broadens our mind and way of thinking?
7. Can the problems of the 21st century be solved if people don't speak the same language?
8. Is English going to become even more important as a global language?

1. Read the text and answer the following questions.

ENGLISH AS A WORLD LANGUAGE

Nowadays English has become the world's most important and most universal language. It is the official language in over forty countries and the most used language in international business, science, medicine, trade and cultural relations. Over 300 million people speak it as a mother tongue. The native speakers of English live in Great Britain, the USA, Australia and New Zealand. English is one of the official languages in the Irish Republic, Canada, the South Africa Republic.

It is one of the official languages of the United Nations Organisation and other political organisations. It is the language of world's scientific literature and computers technology.

England's history helps to understand the present condition of English. Many English words were borrowed from the language of Angles and Saxons. Hundreds of French words came into English. Many new words were brought by traders and travellers.

To know the English language today is absolutely necessary for every educated person, for every good specialist. English is everywhere in our life. It is in signs, clothing, soft drinks, and household products around the world. The names of pop groups, computers software, and magazines are often written in English.

English words are also used as elements of magic to be included on T-shirts, sweaters, caps etc. Some think English is chic, stylish, even when the language on these designed items makes no sense.

That is why in order to understand ourselves and the world around us we have to study foreign languages and English in particular.

1. Has become the English world's most important language? Why?
2. How many people speak it as a mother tongue?
3. In what countries do people use English as native language?
4. Can you any name English words that have entered the Russian language?
5. What is English to you?

Vocabulary Focus

Read the text. Decide which answer A, B, C or D best fits in each space. Then answer the questions.

How to Use a Dictionary

1. Don't look up a (1) _____ in a dictionary unless you are sure of its spelling.
2. Always check all the meanings given for a word because the same word may have a different meaning in a different (2) _____.
3. Remember that consulting a (3) _____ can be very helpful, but during a conversation you should use other methods, for example, asking for an explanation or expressing what you mean by different words.
4. Get to know the range of information that is available in your dictionary (e.g. pronunciation, different uses of the word, etc.), the (4) _____ symbols and the codes that your dictionary uses.
5. When you check the meaning of a (5) _____ verb remember to look up the complete verb, for example 'work out', not just 'work'.
6. Your dictionary can give you a lot of help with the English (6) _____ telling you if a noun is countable or uncountable, giving you all forms of irregular verbs, telling you whether a verb is followed by an infinitive or by a gerund.
7. If you want to check the meaning of an (7) _____, look for information under a key word. For example, if you have trouble understanding 'It's taken for granted today that children should study a foreign language at school', look for help under 'grant[ed]'.
8. Your dictionary will help you to (8) _____ between words with similar meanings.
9. It is very important to study the (9) _____ of each word the dictionary gives you because they will show you how the word is used and in what context.
10. Try and work out the meaning of an (10) _____ word from its context before you look it up in a dictionary.

1. A. word B. sentence C. figure D. picture

- | | | | | |
|-----|---------------|------------------|------------------|----------------|
| 2. | A. meaning | B. context | C. sentence | D. sense |
| 3. | A. book | B. dictionary | C. journal | D. article |
| 4. | A. monetary | B. mathematical | C. transcription | D. written |
| 5. | A. spoken | B. written | C. every | D. phrasal |
| 6. | A. grammar | B. transcription | C. pronunciation | D. syntax |
| 7. | A. word | B. sentence | C. idiom | D. adjective |
| 8. | A. find out | B. know | C. write | D. distinguish |
| 9. | A. examples | B. letters | C. situations | D. meanings |
| 10. | A. well-known | B. familiar | C. unfamiliar | D. famous |

1. Why is it needed to check a word meaning?
2. What range of information is available in any dictionary? in a dictionary for specific purposes?
3. How to check the meaning of an idiom?

Grammar Focus

1. Choose the correct form of the nouns in the Possessive Case.

1. This is the new (children's/ childrens') school.
2. The garden is at (the house's front/ the front of the house).
3. She has just had a (week's holiday/weeks' holiday).
4. I'm (the London office's manager/ the manager of the London office).
5. He wrote a letter to the (President's secretary / secretary of the President).
6. After (three days delay/three days' delay) the plan was adopted.
7. I was surprised by (the announcement of yesterday/ yesterday's announcement).
8. Number 8 of the newspaper is the (reader's / readers' letters page).
9. Look at the (cover of the book/the book's cover).
10. Do you remember (last night's TV programmes/ TV programmes of last night)?

2. Fill in an adverb of frequency:

1. Minicomputers don't require an air-conditioned environment. (generally)
2. The database program asks you for your choice. (usually)
3. Computers make mistakes. (seldom)
4. Computers break down. (occasionally)
5. These days children make contact with a computer through computer games. (often)
6. Millions of people try to find information on the Internet. (every day)
7. People buy CDs nowadays. (usually)
8. I borrow her CDs and she borrows mine. (often)
9. My computer is very reliable. I have a problem with it. (never)
10. A computer system is easier to use if you have a computer mouse. (usually)

3. Make the sentences negative:

1. She uses a computer.
2. When you switch on the computer you see a green light.
3. I want to make a start in computer personnel.
4. These keys carry out special functions.
5. The computer center opens too late.
6. This operating system supports other layers of software.

4. Choose the correct item:

1. MS Windows ... the computer screen into windows.
A. divide B. doesn't divide C. divides D. don't divide
2. Computers ...enormously in size, processing power or cost.
A. varies B. vary C. doesn't vary D. don't vary
3. Each device ... a precisely specified task.
A. performs B. perform C. doesn't perform D. don't perform
4. Input devices ... data to the processor.
A. supply B. don't supply C. supplies D. doesn't supply
5. Output devices ... or ... data from the processor.
A. don't print or display C. print, display
B. prints or displays D. doesn't print or display
6. Minicomputers ... an air-conditioned environment.
A. requires B. don't require C. doesn't require D. require
7. A modem ... data into signals.
A. doesn't change B. changes C. change D. don't change
8. I ... regularly, so I often lose data.
A. back up B. doesn't back up C. backs up D. don't back up
9. Systems programmer ... the systems software for the computer.
A. writes B. doesn't write C. don't write D. write
10. Supercomputers ... information very fast.
A. processes B. don't process C. process D. doesn't process
11. Individual units ... together to achieve some common objectives.
A. works B. don't work C. work D. doesn't work
12. Computers ... you to type and print any kind of document.
A. allow B. don't allow C. doesn't allow D. allows

5. Choose the correct item:

1. How often ... you play computer games?
A. does B. are C. is D. do
2. What type of computer games ... you prefer?
A. are B. do C. does D. is
3. Describe your favourite computer game. What ... the best thing about

it?

- A. are B. do C. does D. is
4.... computer games create addiction or dependence?
A. can B. does C. are D. am
5.... you play computer games for fun?
A. do B. does C. is D. are

6. Choose the correct item:

Journalist: – Everybody 1... the Internet 2... really exciting. But what exactly 3... the Internet?

Mr. Morgan: – Well, it 4... a global network, which 5... users to share all sorts of information and computer resources. The system 6... networks interconnected all over the world, from universities and large corporations to commercial online systems and non-profit organizations.

Journalist: – And how 7... you connect yourself up to the Internet?

Mr. Morgan: – Well, you just need a PC, a modem and a telephone line. Not a lot really.

Journalist: – And 8... it easy to install a modem?

Mr. Morgan: – Oh yes. You just 9... one cable of the modem to the communications ports of the computer and the other to the telephone line.

Journalist: –Right. And I 10... you need special software to get online.

Mr. Morgan: – Yes, that’s right. You need telecommunications software and you have to set up an account with an Internet service provider.

Journalist: – And what 11... the Internet offer?

Mr. Morgan: – It 12... services such as e-mail, file transfer, newsgroups, real-time chats and information retrieval on the World Wide Web.

Journalist: – And what 13... the Web?

Mr. Morgan: – The Web 14... a huge collection of “pages” stored on computers all over the world. Web pages 15... all sorts of information in the form of text, pictures, sounds and video. They also 16 ...links to other resources on the net.

Journalist: – Ok, right. Thanks very much, Mr. Morgan. You’ve been very helpful.

1. A. say B. says C. doesn’t say
2. A. is B. does C. are
3. A. are B. is C. isn’t
4. A. are B. doesn’t C. is
5. A. allow B. allows C. doesn’t allow
6. A. to comprise B. comprise C. comprises
7. A. are B. do C. does
8. A. does B. do C. is
9. A. connect B. connects C. don’t connect
10. A. imagines B. imagine C. don’t imagine

- | | | |
|----------------|-------------|------------------|
| 11. A. do | B. does | C. is |
| 12. A. offers | B. offer | C. doesn't offer |
| 13. A. are | B. does | C. is |
| 14. A. am | B. is | C. are |
| 15. A. contain | B. contains | C. don't contain |
| 16. A. has | B. have | C. do |

7. Ask questions to which the underlined words are the answers.

1. The company designs high specification workstations.
2. This utility detects and eliminates most viruses.
3. The team programs in several different languages.
4. The kernel consists of routines.
5. When my boss isn't looking, I play computer games.
6. We use a word processing program to type letters and faxes.
7. You launch the word processor by double clicking on its icon.
8. The spelling checker doesn't eliminate all spelling mistakes.
9. Users transfer data from one program to another.
10. Operating systems vary in size.
11. These days children often make contact with a computer through computer games.
12. Firms use their computers for a lot of applications.
13. Smart cards are used for performing different tasks.
14. MP3 stands for the Motion Picture Experts Group.

8. Study this description of a student's first term. Ask questions to the words in italics.

In her first term Pauline studies 6 *subjects* (1). She has classes on *four days* (2) each week. On Monday morning she *has IT and Information Systems* (3). *Tuesday* (4) is a free day for home study. On Wednesday she has *Systems Analysis in Room 324* (5). She studies *Computer Architecture* (6) on Thursdays. *Programming* (7) happens on Friday mornings. Communication takes place *once a week* (8) on Friday afternoons. She likes Mr Blunt's *classes* (9) most. She has a 15-minute coffee break each day and lunch break *from 12.00 to 1.00* (10).

Unit 2. O. M. Beketov University of Urban Economy in Kharkiv

Countable and uncountable nouns. Singular/plural verb forms. Constructions 'there is/there are'. Demonstratives (*this-that/these-those*). Articles. Articles with countable and uncountable nouns.

Pre-Reading Activity

Match the following words and translations.

- | | |
|--|----------------------------------|
| 1. technical college | A. інженер міського господарства |
| 2. municipal engineers | B. переходити |
| 3. municipal economy | світло постачання та джерела |
| 4. sanitary engineering | світла |
| 5. transfer | D. підготовче відділення |
| 6. correspondence department | технічне обслуговування будівель |
| lightning engineering and sources of light | очистка природних та стічних вод |
| 8. purification of natural and sewage waters | G. заочний факультет |
| 9. preparatory department | H. сантехніка |
| 10. technical maintenance of building | I. міське господарство |
| | J. технікум |

Reading Focus

1. Read the text and do the following tasks.

Short Course of University History

All-Ukrainian technical college of municipal engineers was founded on November 12, 1922. Technical colleges were considered higher educational establishments and they trained engineers. In 1930 the technical college was reorganized into Kharkiv institute of municipal economy engineers. And that institute trained architects and economists. It was situated in Revolution Street, 12.

During war period from 1941 till 1945 institute was evacuated to the city of Adler and then to Frunze. At that time Odessa municipal institute joined our institute with its 3 departments: building, sanitary engineering and municipal roads communication.

In 1946 the Institute was transferred to the ministry of Higher Education in the former USSR.

In 1955 our institute was called Kharkiv Institute of municipal engineering with 3 departments: building, electric transport and engineer-economists.

The correspondence department was opened in 1956 and the evening department was opened in two years in 1958.

In 1960s new specialities were organized at our institute such as lightning engineering and sources of light, purification of natural and sewage waters.

From 1971 our institute has the preparatory department. New educational buildings and students hotels were put into operation during 1970s – 1980s. During that period two more specialities were added: “Architecture” and “Technical Maintenance of Building”.

In 1994 as a result of accreditation our institute started to train Bachelors and Masters of Science. On the 20th of April 1994 our institute was got the statute of the State Academy.

1. Complete the table.

Date	Events

2. Think and answer the following questions.

1. What specialists does the University train?
2. How many chairs are there in our University?
3. What facilities are the students provided with?

3. Translate the following sentences.

1. 26 грудня 2003 р. ХНАМГ надано статус національної під назвою Харківська національна академія міського господарства (ХНАМГ).
2. 28 листопада 2012 р. Харківська національна академія міського господарства реорганізована в Харківський університет міського господарства.
3. 26 березня 2013 р. Харківський університет міського господарства отримав статус національного університету міського господарства.
4. 25 квітня 2013 р. Харківському національному університеті міського господарства присвоєно ім'я О. М. Бекетова.

Vocabulary Focus

1. Choose the correct words.

1. A complete listing of courses offered will be found in the class _____ (*schedule/plan*).
2. Students must pay all their fees before the start of each _____ (*semester/division*).
3. At university = At _____ (*college/PhD*).
4. A college or university building containing living quarters for students is called a dormitory, or " _____ " (*dorm/dormitorium*) for short.
5. Another way of saying "dormitory" is "student _____ " (*residents/residence*).
6. A student from another university who comes to study for one or two semesters is called an _____ (*exchange/elite*) student.
7. How many _____ (*classes/class*) are you taking this semester?
8. What is the short form for "professor"? _____ (*prof/fessor*).
9. A _____ (*freshman/starter*) is someone in their first year of (an American) university.
10. A _____ (*senior/leaver*) is someone in their final year of (an American) university.

2. Choose the correct words.

1. I have a lot of very difficult _____ this term.
A. exams B. exam C. examination
2. To _____ means to study hard in a short period of time (usually before an exam).
A. cramp B. cram C. crumb
3. I thought that the _____ I wrote for my Spanish Literature class was great, but I only got a C.
A. essay B. article C. work
4. Q: Did you pass? A: No, I _____!
A. fled B. flipped C. failed
5. A _____ student is someone who already has an undergraduate degree, and is trying to get an M.A., M.S., Ph.D., etc.
A. graduating B. graduate C. gradual
6. A Masters _____ is something you have to write in order to obtain a Masters Degree.
A. theory B. work C. thesis

7. The maximum _____ for undergraduate degree students is 21 credit hours in a semester.
 A. course load B. class number C. load
8. A _____ student, is one who doesn't have a full course load.
 A. part-time B. part-study C. full-time
9. When you write a _____, you're writing a formal written report that includes both research findings and your own ideas.
 A. test B. research paper C. research work
10. She is a very smart girl. She always gets good _____.
 A. gradients B. notes C. grades
11. When is your assignment _____? (By when does it have to be finished?)
 A. done B. due C. date
12. A _____ is what one receives after successfully completing four years of college/ university.
 A. decree B. plaque C. degree
13. Exams that are given during the middle of each semester are called _____.
 A. half-exams B. midterms C. middle terms
14. GPA stands for "grade point _____".
 A. average B. attack C. anomaly
15. An _____ is a graduate or former student of a school, college, or university.
 A. alumnus B. alibi C. albatross
16. What is your _____? = What is your main area of study?
 A. minor B. principal C. major
17. What are you going to do after you _____ (finish university)?
 A. graduate B. sum-up C. gradual
18. One of my friends is _____ in Sociology.
 A. majoring B. major C. main topic
19. _____ courses are ones that you must take in order to graduate.
 A. Elective B. Required C. Recruited

20. A T.A., or _____, is someone who helps the professor by grading papers, preparing material, etc.

A. teaching administrator B. teach assistant C. teaching/teacher's assistant

Grammar Focus

1. Fill in the verb to be in the necessary form and tense.

1. Digital cameras ... power hungry.
2. Here ... an example of a simple virus, the Lehigh virus.
3. 'Experience ... the name everyone gives to their mistakes' (Oscar Wild).
4. Where ... robots particularly useful?
5. I ... currently a Systems Programmer.
6. The use of credit cards instead of cash ... increasing rapidly.
7. The keyboard, as well as the mouse and the mouse pad, ... on the desk.
8. The Web Developer and the E-commerce Consultant ... in the negotiation room now.
9. ... electronic mail a system of using computers for sending messages from one place to another?
10. ... these men cyberterrorists or cybercriminals ?
11. Viruses ... an area of pure programming.
12. Multimedia ... (not) a new phenomenon.
13. People who ... computer literate have a better chance of finding a job.
14. It ... a 32-bit computer.
15. It ... nearly midnight. It ... a hard day.
16. The data ... collected by various researchers some years ago.
17. Mathematics ... my favourite subject when I ... at school.
18. We ... linked to the on-line database at our head office.
19. IT ... the science and activity of storing and sending out information by using computers.
20. The money I borrowed ... (not) enough to pay for your course.
21. This ... highly confidential information.
22. On-line services ... a major part of the Internet infrastructure.
23. MS-DOS ... used in the first PCs.
24. Incapsulation, inheritance and polymorphism ... key features of Object - Oriented Programming.
25. John, along with his friends, ... familiar with these software programs.
26. Qualifications ... important.
27. Power consumption and cost ... very significant factors in Bluetooth's design.
28. Two hours per week ... (not) enough to learn a foreign language.
29. ... the number of students learning English rising?
30. Ten dollars ...quite a lot of money to lose.
31. The press ... often unfair to political candidates.

32. A number of students ... being examined now.

2. Fill in the verb to be in the necessary form.

1. There ... about 10 people interested in artificial intelligence.
2. There ... a handful of clipboard computers on the market now.
3. When I came in, there ... pages of computer print-out all over the desk.
4. There ... a few ways to become infected with a virus.
5. There ... a lot of software that is free.
6. There ... a lens, a viewfinder and a CCD (a charge coupled device) in a digital camera.
7. There ... some new laboratories at our faculty next year.
8. There ... no limit to the type of business where data mining can be beneficial.
9. There ... several techniques for achieving that. But you failed to use them.
10. There ... many Flash memory products such as the video cards in video game systems.
11. There ... Hardware, Planning, Design, Software Development, Applications, Communication and Programming in my diploma course last year.
12. There ... something wrong with my PC. Could you help me?
13. There may ... a number of B-frames between I or P-frames.
14. What problem ... there with the existing system?
15. There ... a myriad of certificates to study for.

3. Write sentences by putting the words in the correct order.

1. was/a/practical component/there/the/course/in
2. no/film/there/in/is/digital/a/camera
3. to use/there/courses/are/how/some/good/on/the Internet
4. bite/there/eight/in/are/a/bits
5. systems/a lot of/ file/are/there
6. cybernetics/a/was/lecture/there/on/yesterday
7. eight/there/computer/its/uses/are/steps/in/that/any/work/doing
8. Web/on/restrictions/there/no/are/my space/use/of

4. Ask questions beginning with the words in brackets.

1. There are two solutions of this problem (How many...)
2. There is a help group on the Web. (What...)
3. There are several reasons to use Flash memory instead of a hard disk. (Are...)
4. There are 3 photo-transistors in each pixel in the CCD. (What...)
5. There is nothing to stop you having more than one free ISP account. (Is...)
6. There is a line receiver in the room. (What...)
7. There were 3 stages in planning my Website. (How many...)

5. Complete the sentences with “a”, “an”, “the” or “no” article.

1. More than 100 daily papers in USA and ... Canada are published electronic editions. You can connect with them using your computer, ... modem and ... Internet browser.
2. In .seventeenth century ... calculators more sophisticated thanabacus began to appear.
3. ... computer that was completely modern in conception was designed in ... 1830s. As with ... calculators of Pascal and Leibniz, ... mechanical technology of time was not prepared to realize ... conception.
4. Babbage was ... fellow of ... Royal Society and held ... Chair of ... Lucasian Professor of Mathematics at ... Cambridge University.
5. In 1854, ... Swedish printer built ... Working Difference Engine based on ... Babbage's ideas.
- 6 author of that program has ... honor of being ... world's first computer programmer. Her name was Augusta Ada Byron, later Countess of Lovelace, ... only legitimate daughter of ... poet, Lord Byron.
7. Ada was ... liberated woman when it was hardly fashionable. Not only did she have ... usual accomplishments in ... language and music, she was also ... excellent mathematician. ... latter was most unusual for ... young lady in ... nineteenth century.
8. In 1842, Lady Lovelace discovered ... paper on ... Analytical Engine that had been written in ... French by ... Italian engineer. She resolved to translate ... paper into English.
9. The Mark 1 is ... closest thing to ... Analytical Engine that has ever been built or ever will be. It was controlled by punched paper tape, which played ... same role as ... Babbage's punched cards.
10. In ... late 1930s, John V. Atanasoff of ... Iowa State College demonstrated ... elements of ... electronic computer.
- 11... . clever rather than ... strong inherited ... earth.
12. The term was coined by ... Japanese to describe ... powerful, intelligent computers they wanted to build by ... mid-1930s.
13. During spring of 1959, ... new course was offered at ... Massachusetts Institute of Technology, ... freshman programming class.
14. One of ... legends says that ... hackers have changed under ... influence of "crackers" – ... people who loved to talk on ... phone at somebody else's expense.
15. ... National Bureau of Standards has adopted ... algorithm for encrypting and decrypting ... data processed by ... federal agencies. ... details of ... algorithm have been published in ... Federal Register.
16. Our knowledge of micro world is poor and even though Einstein himself worked at ... Uniform Field Theory, it is still uncompleted. On ... other hand, ... molecules are so many that programming ... Single cell is ... work of ... life for hundreds of programmers.

Unit 3. Higher Education in Great Britain and Ukraine

Present Progressive, the contrast between Present Simple and Present Progressive, non-progressive verbs. The article *the* with geographical names, names of streets, buildings etc.

Pre-Reading Activity

1. Discuss the following questions.

- a) What can you say about the education system in Ukraine?
- b) What are the university degrees of the graduates?
- c) Do the Ukrainian students have to pay the tuition fees?

2. Find Ukrainian equivalents for these words.

- | | |
|-----------------------------------|----------------------------------|
| 1. graduate | a) розташований |
| 2. education | b) витрати, вартість |
| 3. located | c) цінність, значущість |
| 4. cost | d) мета |
| 5. increase | e) зростати |
| 6. value | f) незалежний |
| 7. purpose | g) очікувати |
| 8. independent | h) освіта |
| 9. expect | i) завершення |
| 10. completion | j) випускник |
| 11. full time (part time) courses | a) підзвітний; відповідальний |
| 12. (direct) grant | b) денна (заочна) форма навчання |
| 13. generally accepted | c) реагувати (на) |
| 14. autonomous | d) Загальноприйнятий |
| 15. responsible (to) | e) розширення; експансія |
| 16. governing body | f) (пряма) субсидія, дотація |
| 17. respectively | g) Відповідно |
| 18. to respond (to) | h) Автономний |
| 19. demand (for) | i) керівний орган |
| 20. expansion | j) попит (на) |
| 21. to complet | a) Дослідження |
| 22. research | b) вибирати; вирішувати |
| 23. Dean | c) низка; ряд |
| 24. Term | d) політехнічний (університет) |
| 25. polytechnics | e) далеко (від) |
| 26. to fill the gap | f) Декан |
| 27. a range (of) | g) Завершувати |
| 28. to choose | h) семестр |
| 29. to place value | i) заповнювати прогалину |

- | | |
|-----------------------------|--------------------------------|
| 30. a long way (from) | j) платити за навчання |
| 31. to pay the tuition fees | k) цінувати; надавати значення |
| 32. education authority | l) поєднувати |
| 33. to combine | m) державний орган освіти |

Reading Focus

1. Read the text and do post-reading activities.

Higher Education in Great Britain

In Great Britain only about one third of school leavers receive postschool education, compared with over 80 percent in Germany, France, the United States, and Japan. Full time courses are provided in universities, polytechnics, colleges of higher education (HE), and technical, art and agricultural colleges.

Today there are over 50 universities in Britain. They are all private institutions receiving direct grants from central government. But in GB there is no system of education in the generally accepted meaning of the word. Every university or college is autonomous and responsible only to its governing body.

Oxford and Cambridge, founded in the 13th and 14th centuries respectively, are the most famous of Britain's universities. Today 'Oxbridge', as the two together are known, educate less than one tenth of Britain's total university student population. Cost of studying and living there is higher than at any of the others. Scotland boasts of about four ancient universities: Glasgow, Edinburgh, St. Andrews and Aberdeen, all founded in the 15th and 16th centuries.

In the 19th century many more universities were established to respond to the increased demand for educated people as a result of the Industrial revolution and the expansion of Britain's overseas empire. Many of these were located in the industrial centers, for example Birmingham, Manchester, Nottingham, Newcastle, Liverpool and Bristol.

University examinations now are for Bachelor of Arts, or of Science (BA or BSc) on completion of the undergraduate course, and Master of Arts or of Science (MA or MSc) on completion of post-graduate work, usually one- or two-year course involving some original research. Some students continue to complete a three-year period of original research for the degree of Doctor of Philosophy (PhD).

As a rule each university consists of several faculties. The dean is the head of the faculty. The academic year is divided into three terms, each of them having the same length — about 10 weeks.

Thirty polytechnics in England and Wales provide a range of higher education courses, up to doctoral studies. But their real purpose was to fill the gap between university and further education work, providing an environment in which equal value was placed on academic and practical work, particularly in order to improve Britain's technical and technological ability.

Most British students choose to go to university a long way from their home towns. They think going to university is a time to be independent, to live away from home and develop new interests.

Until 1998 British students did not have to pay the tuition fees. Now they are to pay about 1,000 pounds a year. Many students whose parents do not earn a lot of money are given a grant from the local education authority.

If students do not get a grant, parents are expected to pay for their children. Students often work during the holidays to earn more money. Not all the students study full-time at university or college. Many young people combine their studies with work.

Fill in the blanks with suitable words from the text.

- a) Thirty polytechnics in England and Wales provide a ... of higher education courses.
- b) As a rule each university consists of several
- c) Every university or college is ... and ... only to its governing body.
- d) Until 1998 British students did not have to pay the
- e) In GB there is no system of education in the ... meaning of the word.
- d) The real purpose of polytechnics was to ... between university and further education work.
- e) Many universities in GB were established to ... to the increased ... for educated people.

Study the text and answer the questions.

1. How many universities are there in GB?
2. What can you say about the British system of education in generally accepted meaning of the word?
3. What does the name "Oxbridge" mean?
4. Name the universities located in the British industrial centers.
5. Name the position of the head of university faculty.
6. Why do most British students choose to go to university a long way from their home towns?
7. How many polytechnics are there in England and Wales?
8. What is the usual tuition fee for British students?
5. Read the text once again and try to retell it.

2. Read the text and do post-reading activities.

Higher Education in Ukraine

Higher education is generally recognized as preparing individuals to realize more fully their human potential, enrich their understanding of life and make them more productive to society.

Future specialists in various fields of science, technology, economics and art get a fundamental general and specialized training, all students regardless of their specialty study foreign languages.

Apart from educational work and schooling Ukrainian higher schools carry out a great deal of scientific work in all branches of knowledge. They have either a students' research Society (Club) or a Technological Design Bureau which provide excellent facilities for young researches.

Our country needs specialists in all fields of science and all branches of industry and agriculture. Institutes exist not only in big cities like Kyiv, Kharkiv, Lviv, but in many towns of Ukraine like Irpin.

Higher educational establishments of our country fall into three main types. The first type includes the universities and institutes where there are only full-time students, which receive state grants. Students who do not live at home get accommodation in the hostels.

The second and third types of higher schools provide educational facilities for factory and office workers who combine work with studies. The second type of higher education in establishments includes evening faculties and evening higher schools for those who study in their spare time.

The third type covers extra-mural higher schools where students take correspondence courses. Every year extra-mural students receive from 30 to 40 days' leave to prepare for their exams.

The diplomas by the evening faculties and extra-mural higher schools have the same value as the diplomas of all other institutes and universities.

The period of study at higher schools is from 4 to 6 years. According to the subjects studied there exist three groups of higher schools' universities, polytechnic and specialized institutes.

Comments

1. to realize more fully their human potential – повніше реалізувати людський – потенціал
2. to enrich their understanding of life – їхнє розуміння життя
3. in various fields – в різних сферах
4. regardless of – незважаючи на
5. apart from – поряд з
6. a great deal of scientific work – великий обсяг наукової роботи
7. to provide excellent facilities – забезпечувати відмінні умови
8. higher educational establishment – вищий навчальний заклад
9. full-time students – студенти стаціонару
10. to receive state grants – одержувати державні пільги
11. to combine work with studies – поєднувати роботу з навчанням
12. to take correspondence courses – навчатися заочно
13. to receive a leave – отримувати відпустку
14. according to – відповідно до

Answer the following questions.

1. Does higher education help to develop your human potential and enrich your understanding of life?
2. What training do the future specialists get?
3. What can you say about the role of foreign languages in gaining higher education?
4. What is the role of scientific work in training future specialists?
5. What specialists does our country need?
6. Where do institutes and universities exist in our country?
7. How many types of higher educational establishments so we have in our country?
8. What higher schools does the first type include?
9. Which is the second type?
10. What schools does the third type cover?
11. What do extra-mural students receive every year?
12. Is there any difference between the diplomas by the evening faculties, extra-mural schools and full-time schools?
13. How long does the period of studies at higher schools last?
14. What groups of higher schools exist?

Vocabulary Focus

1. Find the Ukrainian equivalents in the right – hand column for the following

- | | |
|--|---|
| 1. human potential | a) вільний від роботи час |
| 2. to get a fundamental general and specialized training | b) Існувати |
| 3. in all branches of knowledge | c) поряд з |
| 4. higher educational establishment | d) людський потенціал |
| 5. to fall into | e) працівники контор |
| 6. to get accommodation in the hostel | f) розпадатись на |
| 7. office workers | g) одержувати ґрунтовну загальну та фахову підготовку |
| 8. spare time | h) мати однакову вартість |
| 9. extra - mural higher schools | i) вищий навчальний заклад |
| 10. to have the same value | j) в усіх галузях знань |
| 11. to exist | k) отримувати помешкання в гуртожитку |
| 12. apart from | l) заочні вищі школи |

2. Complete the following sentences.

1. All students regardless of their speciality study
2. Ukrainian higher schools carry out a great deal of
3. Higher educational establishments of our

country fall into 4. Students who do not live at home get 5. Extra - mural students receive from 30 to 40 days' 6. According to the subjects studied there exist

3. Fill in the blanks with the words given below.

the same value spare full-time students specialized
to fall into to carry out general

1. Future specialists in various fields of science, technology, economics and art get a fundamental ... and ... training.
2. Ukrainian higher schools ... a great deal of scientific work in all branches of knowledge.
3. Higher educational establishments of our country ... three main types.
4. The first type includes the universities and institutes where there are only which receive state grants.
5. Evening schools are for those who study in their ... time.
6. The diplomas by the evening faculties and extra-mural higher schools have as the diplomas of all other institutes or universities.

4. Translate the following sentences into English.

1. В нашій Академії студенти можуть отримати ґрунтовну загальну та спеціальну (фахову) підготовку.
2. Незважаючи на спеціалізацію, всі студенти нашої академії вивчають іноземну мову.
3. За короткий період існування академії нашими викладачами та студентами було виконано значний обсяг наукової роботи в сфері економіки та оподаткування.
4. Багато робітників та служ-бовців поєднують роботу з навчанням.
5. Третій тип охоплює вищі навчальні заклади, де студенти навчаються заочно.
6. Період навчання в вищій школі триває від 4 до 6 років.

Grammar Focus

1. Choose Present Simple or Present Continuous.

1. He (play) computer games every day. What game he (play) now? He always (play) computer games!
2. What computer languages you normally (use)? What computer languages you (use) in your current project?
3. We are a small company specializing in personal service: we (install) software, we (install) hardware. We (install) a new forms program on the server and it will be online soon! Please keep watching!
4. We usually (not leave out) even a minor detail but we intentionally (leave out) of this chapter features of C that are important for writing bigger programs.

5. This company (work) to develop evolvable software. They currently (work) on the LSI design of a single chip which will integrate a genetic algorithm, a specialized memory system and a dynamic Boolean function.
6. I usually (send) a couple of e-mails every day. Be careful! You (send) your e-mail to the wrong address!
7. Every evening he (try) to hack into Pentagon computers. Look! He (try) to download their UFO files!
8. You often (chat) to people on the Internet? What's the nickname of the person you (chat) right now?
9. You (remember) what device (look after) cache coherency?
10. He even (not understand) what application his computer (run).
11. Look! She (send) him an e-mail! She (write) she (love) him!
12. I (not recognize) the man who (sit) in front of my computer.

2. Put the verb in Present Simple or Present Continuous.

Supermarkets in the US (test)1 a new robot checkout system. The machines (attract)2 interest from several European chains. Shoppers (start)3 by touching a video screen which (give)4 instructions on how to pass the shopping over a scanning window. As the customer (do)5 this, the system (get)6 information from the customer and (print)7 a bill.

Customers can pay by credit without human contact. The largest American supermarket chain (study)8 customer reaction. 25 % of the customers (prefer)9 the system but 25% (hate)10 it because they are afraid of the technology and like human contact.

3. Complete the text using one of these words. Use Present Continuous.

A.	B.	C.	D.	E.
try	develop(2)	use	become	Aim

The Potter group, at the California Institute of Technology,(1) technique for the study of neural cell cultures in vitro. The group has pioneered technologies for the electrical linking of neurons in a petri dish to a computer. The computer is able to electrically stimulate the cells and to record their responses. By analyzing the reactions of his cells to specific stimuli Potter(2) to understand the language used in neural communication. Also, by studying morphological changes in the neurons he(3) to understand how these are related to learning and memory...

...Six scientists at Carnegie Mellon university in the USA now(4) the vision and navigation systems for the Honda robot. They(5) laser range finders and stereo vision to build 3D models of objects and the environment.

Unit 4. The Engineering Profession. Getting the Computer Engineering Profession Abroad

Regular and irregular verbs, Past Simple. Constructions *used to*, *be used to*, *get used to*. Prepositions of time. Cardinal and ordinal numerals. Expressing quantity, reading figures. Telling the time, dates, telephone numbers, addresses.

Pre-Reading Activity

Answer the following questions.

1. Why did you choose this profession? Who helped you to make your decision?
2. What is the most important thing concerning your future profession – high income, fame (or your own idea)?
3. Have you ever thought about your career opportunities after graduating the university?
4. Is it important to you to work as a member of team? Or would you rather be in charge or work alone?
5. What are advantages and disadvantages of your future profession?
6. Which of your personal characteristics will help you to succeed in your career?

2. Translate into Ukrainian.

1. Computer specialists use their skills in such fields as automation, electronic data processing, and systems analysis.
2. Computer operator works at a control unit called a console.
3. Design engineers try to improve computers to make them easier to use.
4. Skilled specialists must have imagination so they can visualize difficult situations and solve the problems.
5. A computer can handle more than one problem at a time because its CPU operates much faster than its peripheral equipment.

3. Find Ukrainian equivalents for these words.

- | | |
|-------------------------------|-----------------------------|
| 1. electronic data processing | a) управляти, регулювати |
| 2. analysis (pl analyses) | b) повний, загальний |
| 3. to handle | c) консоль, клавіатура |
| 4. to visualize | d) електронна обробка даних |
| 5. console | e) Обладнання |
| 6. to improve | f) Аналіз |
| 7. overall | g) Уявляти |
| 8. to solve | h) вдосконалювати |
| 9. equipment | i) Вирішувати |

Reading Focus

Read the text and answer the questions.

COMPUTER / CAREERS

The development of computers has created career opportunities in such fields as automation, electronic data processing, and systems analysis. These fields deal with general principles of information handling and management that apply to all businesses. Computer specialists use their skills wherever computers help do a job.

These experts can choose from an almost unlimited variety of jobs in education, government, industry, or science.

Computer specialists are basically problem solvers. They must have imagination so they can visualize difficult situations, find solutions to problems, and suggest new ideas and methods.

Above all, computer experts need training.

A college degree is desirable for almost every job in the computer field. College students may take courses in computer programming, computer languages, data processing, and systems analysis. At a university, these courses may be offered by the department of computer science, or by the departments of business, engineering, or mathematics.

Jobs associated with computers include: computer operator, computer sales representative, design engineer, programmer, service engineer, systems analyst.

Computer Operator controls the computer and its input and output equipment. This specialist works at a control unit called a console. The computer operator keeps records telling what jobs the computer does and how long each job takes. The operator also may schedule new jobs.

Computer Sales Representative sells computers and related equipment, products, and services.

Design Engineer works on the research and development of computers and of their input and output equipment. The designer tries to create new machines that are faster and smaller than existing machines, but able to do even more work. The design engineer also tries to improve machines to make them easier to use. The job of computer design engineer requires at least a bachelor's degree in a field such as electronics. Many design engineers have master's or doctor's degrees.

Programmer writes the instructions that the computer follows in doing a particular job.

Service Engineer keeps computers in working order.

Systems Analyst determines how a computer will fit into the overall picture of the people and machines that do a particular job. The analyst must know everything about the job and about the equipment that is to do the job. The systems analyst not only serves the persons who want a job done, but also helps the programmers and operator who actually do it.

1. In what fields can computer specialists use their skills?
2. Do they need any special training?
3. What special subjects do you study at the university?
4. What jobs associated with computers do you know?
5. In what field would you like to work after graduating from the university?

Agree or disagree with the statements, share your opinion with the group-mates.

1. Computer specialists need training.
2. Work can be more than just a job. Your work can

Read the text and find the correct heading for each paragraph.

BS in Computer Engineering in the Philippines

The Bachelor of Science in Computer Engineering (BSCpE) program is a combination of electrical engineering and computer science. Its curriculum provides students with a foundation in basic science, mathematics, software and engineering.

The program equips students with the ability to analyze, plan, design, install, operate and maintain digital devices and computer hardware and software systems. These include operating systems (such as Windows and Linux) , middleware (such as android systems, game engines), business applications (such as Microsoft Office, accounting software) and network control systems (such as CISCO) and computer games. You will also be taught on how to design a microprocessor and develop an embedded systems that are used in desktops or handheld devices. In addition, written and oral communication skills are emphasized throughout the program .

The teaching methods used are classroom discussions, practicum exercises spent in computer laboratories, team projects and on the job trainings or internships.

A

Computer Engineering is a profession. Computer engineers evaluate users' needs and utilize principles from computer science and mathematics to create software that meets the requirements. They develop algorithms and convert them into programming language.

A graduate of BS in Computer Engineering automatically becomes a Computer Engineer as the course profession does not require any board examination.

B

The only specific requirement for this course is to have an 85% grade in both Science and Math. If you are a high school graduate, able to submit the necessary credentials/documents, and passed the college entrance examination and interview, you will be admitted in the BS CpE program.

Students who were not able to complete secondary level of education have the chance to be admitted if they pass the Philippine Educational Placement Test (PEPT).

C

Prior knowledge in computers is not a prerequisite for this course. However, there are skills that you need to possess or develop in order to succeed:

Analytical skills – identify and assess inefficiencies and problems in software and hardware processes

Mathematical skills on a high level – the ability to solve and use different computational methods

Logical and critical thinking skills – ability to solve problems systematically and understand the logical connection between ideas

Technical Skills – the ability to accomplish mathematical, engineering, scientific or computer-related duties, as well as other specific tasks

Decision making skills – the ability to make sound judgement with regards to solving problems in computer software applications without aggravating the current problem

Communication skills – sufficient grasp of oral and written English; the ability to start an effective conversation

_____ What are the admission requirements for BSCpE?

_____ What skills are required to succeed in this course?

_____ Is Computer Engineering a profession?

Vocabulary Focus

1. Complete this word-building table. Use a dictionary to help you.

Verb	General noun	Personal noun (s)

employ

solve

imagine

handle

operate

represent

train

employment

employer/employee

2. Complete these definitions.

1. Computer operator ...

2. Programmer ...

3. Design engineer ...

4. Service engineer ...

5. Systems analyst ...

3. Find in the text English equivalents of the following words and word combinations.

Електронна обробка даних, системний аналіз, автоматизація, програмування, обладнання, галузь, підготовка (навчання), ступінь бакалавра, ступінь магістра, вирішувати завдання, вдосконалювати машину.

Grammar Focus

1. All these sentences are not true, so correct them. First, make the sentences negative, then give the right variant using the information in brackets.

1. Apple introduced the Macintosh in 1914. (in 1984)
2. The Mac's processor produced poor graphics. (excellent)
3. The Mac used only words to show machine and program functions. (icons-diagrams)
4. The mouse was developed by Apple. (at Xerox's Palo Alto facility)
5. The Mac was very difficult to use without special training in computers. (very user-friendly)
6. The Internet began for business. (for military reasons)
7. The Internet started in 1959. (in 1969)
8. IBM designed the first microprocessor in 1971. (Intel)
9. Gates and Bush founded Microsoft in Mexico, in 1975. (Gates and Allen, in Albuquerque, New Mexico)
10. Apple launched their new XP operating system in 2001. (OS X operating system)

2. Ask questions to which the underlined words are the answers.

1. Microsoft Corporation purchased and distributed the MS DOS operating system.
2. The installation of the computer took a great deal of time.
3. This science fiction writer gave people the wrong impression of computers.
4. Yesterday she borrowed one of my CDs.
5. I bought a new laptop computer last week.
6. The students worked hard for their exams.
7. I used Macintosh computer in class yesterday.
8. The electronic computer project got under way in April 1943.
9. Pascal calculator consisted of a set of toothed wheels.
10. Different languages express assignment in different ways.
11. A hacker is someone who manages to get information from a computer without permission.

3. Choose the correct item.

1. I _____ the information on their website. It was really useful.
A. look up B. looks up C. looking up D. looked up
2. In airports computers _____ radar systems.
A. manage B. managed C. are managing D. don't manage
3. Computers _____ you to type and print any kind of document.
A. allows B. allowed C. don't allow D. allow
4. This hardware _____ the market last year.
A. reaches B. reached C. didn't reached D. reach
5. He _____ looking for a job in the spring.
A. begin B. begins C. began D. is beginning
6. Yesterday I _____ ten units in this book.
A. work through C. worked through
B. am working through D. works through
7. I _____ an offer of \$10 for her old CD player.
A. am making B. made C. make D. makes
8. My computer, which I _____ last year, is already out of date.
A. buy B. bought C. buys D. am buying
9. Computers _____ racing cars.
A. designs and construct C. are designing and constructing
B. design and construct D. designed and constructed
10. Bill Gates _____ Microsoft.
A. found B. finds C. is founding D. founded
11. PCs _____ sound, text and animated images.
A. combines B. are combining C. combine D. combined
12. You _____ the printers 3 weeks ago.
A. deliver B. delivered C. are delivering D. delivers
13. Many homes _____ computers.
A. are having B. has C. had D. have
14. One in ten people _____ a computer.
A. owned B. are owning C. own D. owns
15. We now _____ a calculator instead of a slide rule.
A. use B. are using C. used D. don't use
16. The history of robots _____ only in the twentieth century.
A. begins B. is beginning C. began D. begun
17. The students _____ the professor at the end of the lecture. It was so interesting.
A. applaud B. applauded C. are applauding D. applauds
18. I _____ really surprised when I got your e-mail.
A. were B. am C. is D. was
19. At that time the program _____ a lot of interest on computer technology.
A. stimulated B. stimulate C. stimulates D. is stimulating

20. I always _____ about cheap holidays on the Internet.
 A. find out B. found out C. am finding out D. founded out
21. The Mark I _____ 50 feet long and 8 feet high.
 A. was B. is C. am D. are
22. All computers _____ of one or more functional devices.
 A. consisted B. consist C. are consisting D. consists
23. The phrase plug-compatible _____ units which may be connected in this manner.
 A. is describing B. describe C. describes D. described
24. Who _____ the digital computer?
 A. did invent B. invents C. is inventing D. invented

4. How do you say these numbers in English? Write your answer after each one.

1. 462
2. $2\frac{1}{2}$
3. 2,345
4. 6.75
5. 0.25
6. $3\frac{1}{3}$
7. 1,250,000
8. 10.04
9. 2% of the British population owned 90% of the country's wealth in 1992.
10. 10 September
11. 3 July
12. 6028477(phone number)
13. -5° Centigrade
14. in 1903
15. 31/1/2005
16. 62.3% of adults have false teeth
17. $0^{\circ}\text{C}=32^{\circ}\text{F}$
18. $\frac{2}{3}+\frac{1}{4}+4^2=16\frac{11}{12}$

Exercise 2. Write answers to these problems.

1. 23 and 36 is.....
2. 24 times 8 is.....
3. 80 minus 20 is.....
4. 65 divided by 13 is....
5. Add 10 and 6, multiply by eight, then subtract 40 and divide by 11. What have you got left?
6. Divide 33 by eleven, multiply by 7, add 10 and subtract 16. What number is left?

5. How numerate are you? Try this number quiz.

1. Name the first four odd numbers.
2. Name the first four even numbers.
3. Name the first four prime numbers.
4. Give an example of a decimal fraction.
5. Give an example of a vulgar fraction
6. How do you read this formula and what does it represent: $E = mc^2$?
7. How do you read this and what does it represent: $2\pi r$?

6. Correct the mistakes in these sentences.

1. After the game I heard the crowd was over thousands.
2. We arrived on the ten September.
3. There were two hundred twenty altogether.
4. I got twenty five from forty in my test.
5. My birthday is thirty one July.
6. My phone number is seven twenty three, six nought nine.

7. Answer these questions. Write your answers in words.

1. When were you born?
2. How much do you weigh?
3. What is the number of the flat or house where you live?
4. Is that an odd or an even number?
5. What is the approximate population of your town?
6. What is the normal temperature of a healthy person?
7. How many kilometers are there in a mile?

Unit 5. Computer User and Architecture

Text A

Pre-reading task. Match the meaning of the following English words with their Ukrainian definitions.

- | | |
|----------------------|---------------------------|
| 1. assumption | a) програма - відладчик |
| 2. event driven | b) сітка, таблиця |
| 3. grid | c) припущення, допущення |
| 4. paradigm | d) керована подія |
| 5. debugger | e) система понянь, модель |
| 6. flowchart | f) постановка завдання |
| 7. problem statement | g) блок-схема |

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

PROGRAM PLANNING

The programming process begins with a problem statement that helps you clearly define the purpose of a computer program. In the context of programming, a **problem statement** defines certain elements that must be manipulated to achieve a result or goal. A good problem statement for a computer program has three characteristics:

1. It specifies any assumptions that define the scope of the problem.
2. It clearly specifies the known information.
3. It specifies when the problem has been solved.

In a problem statement an **assumption** is something you accept as true in order to proceed with program planning. The “**known information**” is the information that you supply to the computer to help it solve a problem. There are also **variables** (values that can change) and **constants** (factors that remain the same) in computer programs.

Formulating a problem statement provides a minimal amount of planning, which is sufficient for only the simplest programs. A typical commercial application requires far more extensive planning, which includes detailed program **outlines**, job assignments, and schedules. To some extent, **program planning** depends on the language and paradigm used to code a computer

program. The phrase **programming paradigm** refers to a way of conceptualizing and structuring the tasks a computer performs. For example, whereas one programmer might focus on the steps required to complete a specific computation, another one might focus on the data that forms the basis for the *computation*. Quite a number of programming paradigms exist, and a programmer might use techniques from multiple paradigms while planning and coding a program.

There are different program planning *tools*, such as *flowcharts*, *structured English*, pseudocode, UML diagrams, and decision tables, which are used to provide sufficient planning.

Regardless of the tools used, when planning is complete, programmers can begin coding, testing, and documenting. The process of coding a computer program depends on programming language you use, the programming tools you select, and the programming paradigm that best fits the problem you are trying to solve. Programmers typically use a text editor, a program editor, or a VDE to code computer programs.

A text editor is any word processor that can be used for basic editing tasks, such as writing e-mail, creating documents, or coding computer programs. When using a text editor to code a computer program, you simply type in each instruction.

A program editor is a type of text editor specially designed for entering code for computer programs.

A **VDE** (visual development environment) provides programmers with tools to build substantial sections of a program by pointing and clicking rather than typing lines of code. A typical VDE is based on a **form design grid** that a programmer manipulates to design the user interface for a program. By using various tools provided by the VDE, a programmer can add objects, such as controls and graphics, to the form design grid. In the context of a VDE, a control is a screen-based object whose behavior can be defined by a programmer.

In visual development environment, each control comes with predefined set of events. Within the context of programming, an **event** is defined as an action, such as click, drag, or key press, associated with the form or control. A programmer can select the events that apply to each control. An event usually requires the computer to make some response. Programmers write **event-handling code** for the procedures that specify how the computer responds to each event.

A programmer's choice of development tools depends on what is available for a particular programming language and the nature of the programming project. Text editors and program editors provide a fine tool set for programs with minimal user interfaces. A visual development environment is a powerful tool for programming software applications for GUI environments, such as Windows. Most GUI applications are “*event-driven*”, which means that when *launched*, the program's interface appears on the screen and waits for the user to initiate an event.

A computer program must be tested to ensure that it works correctly. Testing often consists of running the program and entering test data to see whether the program produces correct results.

When a program doesn't work correctly, it is usually the result of an error made by the programmer. A **syntax error** occurs when an instruction doesn't follow the syntax rules, or grammar of the programming language. Syntax errors are easy to make, but they are usually also easy to detect and correct.

Another type of program *bug* is a **runtime error**, which, as its name indicates, shows up when you run a program. Some runtime errors result from instructions that the computer can't *execute*.

Some runtime errors are classified as logic errors. A **logic error** is an error in the logic or design of a program. It can be caused by an inadequate definition of the problem or an incorrect formula for a calculation, and they are usually more difficult to identify than syntax errors.

Programmers can locate errors in a program by reading through lines of code, much like a proofreader. They can also use a tool called **debugger** to step through a program and monitor the status of variables, input, and output. A debugger is sometimes packaged with a programming language or can be obtained as an add-on.

Anyone who uses computers is familiar with program documentation in the form of *user manuals* and help files. Programmers also insert documentation called **remarks** or “comments” into the programming code. Remarks are identified by language-specific symbols.

A well-documented program contains initial remarks that explain its purpose and additional remarks in any sections of a program where the purpose of the code is not immediately clear.

Comprehension check. Mark the following statements as True or False.

1. The programming process begins with coding.
2. A typical commercial application requires a minimal amount of planning.
3. A programmer might use techniques from multiple paradigms while planning and coding.
4. Programmers typically use a program editor to code computer programs.
5. A visual development environment provides programmers with tools to build substantial sections of a program by pointing and clicking.
6. Text editors and program editors provide a fine tool for programming software interfaces.
7. Syntax errors result from instructions that the computer can't execute.

Vocabulary practice

1. Match up the words that are similar in meaning.

computation	medium
bug	scheme
to execute	error, mistake
environment	calculation
outline	carry out
to launch	instrument
tool	to start (up)

2. Make two-word combinations using the words in columns and then fill in the following sentences.

A: programming	B: planning
problem	error
runtime	statement
structured	manual
event	driven

program

paradigm

user

English

1. Anyone who uses computers is familiar with program documentation in the form of ... and help files.

2 The process of coding a computer program depends on programming language you use, the programming tools you select, and the ... that best fits the problem you are trying to solve.

3. The programming process begins with a ... that helps you clearly define the purpose of a computer program.

4. Most GUI applications are ..., which means that when launched, the program's interface appears on the screen and waits for the user to initiate an event.

5. An assumption is something you accept as true in order to proceed with ...

6. There are different program planning tools, such as flowcharts, ... pseudocode, UML diagrams, and decision tables.

7. ... shows up when you run a program.

3. *Fill in the gaps in the text.*

Computer programmers focus on ___ computer programs, but also plan, test, and document computer programs. Before program code can be written, a programmer needs a clear problem ___, which includes a list of assumptions, a description of known information, and a specification for what constitutes a solution. With a clear plan, a programmer can begin coding using a generic text editor, a program editor, or a ___ development environment. A program is not complete until it has been tested to ensure that it contains no ___ errors or runtime errors. Programmers can use software called a ___ to step through a program. All computer programs should include internal documentation in the form of ___, which are explanatory comments inserted into a computer program along with lines of code.

Speaking. *Discuss the following questions.*

1. What is a problem statement?
2. What is an assumption?
3. Does the problem statement provide sufficient planning to begin coding?

4. How does a programmer code a computer program?
5. What is a text editor and a program editor?
6. What is a VDE?
7. How does a programmer know if a program works?
8. What can cause program errors?
9. How do programmers find errors?
10. Do computer programs contain any special documentation?

Text B

Pre-reading. Match the English words with their Ukrainian equivalents.

- | | |
|--------------------|------------------------|
| 1. sequence | a) зразок, шаблон |
| 2. walkthrough | b) послідовність |
| 3. pattern, sample | c) цикл, повтор |
| 4. loop, iteration | d) наскрізний контроль |
| 5. notational | e) застосовувати |
| 6. implement | f) цифровий запис |

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

PROCEDURAL PROGRAMMING

The traditional approach to programming uses a **procedural paradigm** (sometimes called “imperative paradigm”) to conceptualize the **solution** to a problem as a **sequence** of steps. A program written in a procedural language typically consists of **self-contained instructions** in a sequence that indicates how a task is to be performed or a problem is to be solved.

A programming language that supports the procedural paradigm is called a **procedural language**. Procedural languages are well suited for problems that can be easily solved with a **linear, or step-by-step, algorithm**. Programs created with procedural languages have a starting point and an ending point. The flow of execution from the beginning to the end of the program is essentially linear – that is, the computer begins at the first instruction and carries out the prescribed series of instructions until it reaches the end of the program.

An **algorithm** is a set of steps for carrying out a task that can be written down and *implemented*. An algorithm for a computer program is a set of steps that explains how to begin with known information specified in a problem statement and how to manipulate that information to arrive a solution. In a later phase of the *software development process*, the algorithm is coded into instructions written in a programming language so that a computer can implement it.

To design an algorithm, you might begin by recording the steps you take to solve the problem manually. The computer also needs the initial information, so the part of your algorithm must specify how the computer gets it. Next, your algorithm should also specify how to manipulate this information and, finally, how the computer decides what to display as the solution.

You can express an algorithm in several different ways, including structured English, pseudocode, and flowcharts. These tools are not programming languages, and they cannot be processed by a computer. Their purpose is to give you a way to document your ideas for program design.

Structured English is a subset of the English language with a limited selection of sentence structures that reflects processing activities. Another way to express an algorithm is with pseudocode. **Pseudocode** is a *notational* system for algorithms that has been described as a mixture of English and your favorite programming language.

A third way to express an algorithm is to use a flowchart. A **flowchart** is a graphical representation of the way a computer should progress from one instruction to the next when it performs a task.

Before finalizing the algorithm for a computer program, you should perform a **walkthrough** to verify that your algorithm works. To perform a walkthrough for a simple program, you can use a calculator, paper, and pencil to step through a *sample* problem using realistic “test” data.

For more complex programs, a walkthrough might consist of a *verbal* presentation to a group of programmers who can help identify logical errors in the algorithm and suggest ways to make the algorithm more efficient.

The algorithm specifies the order in which program instructions are performed by the computer. Unless you do otherwise, sequential execution is the normal pattern of program execution. During **sequential execution**, the computer performs each instruction in the order it appears – the first instruction in the program is executed first, then the second instruction, and so on, to the last instruction in the program.

Some algorithms specify that a program must execute instructions in an order different from the sequence in which they are listed, skip some instructions under certain circumstances, or repeat instructions. **Control structures** are instructions that specify the sequence in which program is executed. Most programming languages have three types of control structures: sequence controls, selection controls, and repetition controls.

A **sequence control structure** changes the order in which instructions are carried out by directing the computer to execute an instruction elsewhere in the program. A sequence control structure directs the computer to the statements they contain, but when these statements have been executed, the computer neatly returns to the main program.

A **selection control structure**, also referred to as a “decision structure” or “branch”, tells a computer what to do, based on whether a condition is true or false. A simple example of a selection control structure is the IF...THEN...ELSE command.

A **repetition control structure** directs the computer to repeat one or more instructions until certain condition is met. The section of code that repeats is usually referred to as a **loop** or “*iteration*”. Some of the most frequently used repetition commands are FOR...NEXT, DO...WHILE, DO...UNTIL, and WHILE...WEND (which means “while ends”).

All the first programming languages were procedural. The first widely used *standardized computer language*, FORTRAN, with its procedural paradigm set the *pattern* for other popular procedural languages, such as COBOL, APL, ALGOL, PL/1, PASCAL, C, ADA, and BASIC.

The procedural approach is best suited for problems that can be solved by following a step-by-step algorithm. It has been widely used for transaction processing, which is characterized by the use of a single algorithm applied to many different sets of data. For example, in banking industry, the algorithm for calculating *checking account balances* is the same, regardless of the amounts *deposited* and *withdrawn*. Many problems in math and science also lend themselves to the procedural approach.

The procedural approach and procedural languages tend to produce programs that run quickly and use *system resources* efficiently. It is a classic approach understood by many programmers, software engineers, and system analysts. The procedural paradigm is quite flexible and powerful, which allows programmers to apply it to many types of problems.

The *downside* of the procedural paradigm is that it does not fit gracefully with certain types of problems – those that are unstructured or those with very complex algorithms. The procedural paradigm has also been criticized because it forces programmers to view problems as a series of steps, whereas some problems might better be visualized as interacting objects or as interrelated words, concepts, and ideas.

Comprehension check. *Indicate the paragraph where the following ideas are found in the text.*

1. A program written in a procedural language contains the prescribed series of instructions.
2. An algorithm shows the steps how to manipulate the information to arrive at a solution.
3. There are different tools to express an algorithm.
4. To make sure that your algorithm works, you should verify it.
5. Program instructions can be executed in order they are listed or some instructions can be skipped or repeated.
6. Many problems in banking industry lend themselves to the procedural approach.

Vocabulary practice

1. Match up the words that are opposite in meaning.

sequential	parallel algorithm
downside	problem
to focus	written
solution	advantage
to deposit	to distract
linear algorithm	random
verbal	to withdraw

2. Make three-word combinations using the words in columns and then fill in the gaps in the following sentences.

A: selection	B: account	C: instruction
self	step-by-step	algorithm

software	computer	balances
standardized	development	language
checking	control	process
linear	contained	structure

1. The procedural approach is best suited for problems that can be solved by following a

2. A ..., also referred to as a “decision structure” or “branch”, tells a computer what to do, based on whether a condition is true or false.

3. The first widely used ..., FORTRAN, with its procedural paradigm set the pattern for other popular procedural languages.

4. In banking industry, the algorithm for calculating ... is the same.

5. A program written in a procedural language typically consists of ... in a sequence that indicates how a task is to be performed or a problem is to be solved.

6. The algorithm is coded into instructions written in a programming language which a computer can implement in a later phase of the

3. Fill in the gaps in the text.

Languages such as COBOL and FORTRAN support a traditional approach to programming called the ___ paradigm, which is based on a step-by-step ___. Procedural languages provide a variety of ___ structures that allow programmers to specify the order of program execution. A ___ control structure directs the computer to execute instructions, not coded as a simple succession of steps. A ___ control provides a choice of paths, based on whether a condition is true or false. A ___ control, or “loop”, repeats one or more instructions until a certain condition is met. Procedural languages produce programs that run quickly and use ___ resources efficiently.

Speaking. Discuss the following questions.

1. What is procedural programming?
2. What is an algorithm?
3. How do you write an algorithm?
4. What is the best way to express an algorithm?
5. How do you know if your algorithm is correct?

6. In what order does a computer perform program instructions?
7. Can the computer make decisions while it executes a program?
8. What are the most popular procedural languages?
9. What kinds of problems are best suited to the procedural approach?
10. What are the advantages and disadvantages of the procedural paradigm?

Text C

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

OBJECT-ORIENTED LANGUAGES AND APPLICATIONS

Computer historians believe that SIMULA (SIMUlation LAnguage) was the first computer language to work with objects, classes, inheritance, and methods. SIMULA was developed in 1962 by two Norwegian computer scientists for the purpose of programming simulations and models. SIMULA laid the **foundation** for the object-oriented paradigm, which was later incorporated into other programming languages, such as Eiffel, Smalltalk, C++, and Java.

The second major development in object-oriented languages came in 1972 when Alan Kaye began work on the Dynabook project at the Xerox Palo Alto Research Center (PARC). Dynabook was a prototype for a notebook-sized personal computer, intended to handle all the information needs of adults and children. Kaye developed a programming language called Smalltalk for the Dynabook that could be easily used to create programs based on real-world objects. Dynabook never became a commercial product, but Smalltalk survived and is still in use today. Smalltalk is regarded as a classic object-oriented language, which encourages programmers to take a “pure” OO approach to the programming process.

As the object-oriented paradigm gained popularity, several existing programming languages were modified to allow programmers to work with objects, classes, inheritance, and polymorphism. The concept for the Ada programming language **originated** in 1978 at the U. S. Department of Defense. The first versions of Ada were procedural, but in 1995, the language was modified to **incorporate** object-oriented features. A similar transformation took place with the C language in 1983, except that the object-oriented version earned a new name — C++. Hybrid languages, such as Ada95, C++, Visual

Basic, and C#, give programmers the option of using procedural and object-oriented techniques.

Java is one of the newest additions to the collection of object-oriented languages. Originally planned as a programming language for consumer electronics, such as interactive cable television boxes, Java evolved into an object-oriented programming platform for developing Web applications. Java was officially launched by Sun Microsystems in 1995 and has many of the characteristics of C++, from which it derives much of its syntax. Like C++, Java can also be used for procedural programming, so it is sometimes classified as a hybrid language.

The object-oriented paradigm can be applied to a wide range of programming problems. Basically, if you can *envision* a problem as a set of objects that pass messages back and forth, the problem is suitable for the OO approach.

The object-oriented paradigm is cognitively similar to the way human beings perceive the real world. Using the object-oriented approach, programmers might be able to visualize the solutions to problems more easily. Facets of the object-oriented paradigm can also increase a programmer's efficiency because encapsulation allows objects to be adapted and reused in a variety of different programs. **Encapsulation** refers to the process of *hiding* the internal details of objects and their methods. After an object is coded, it becomes a "black box," which essentially hides its details from other objects and allows the data to be accessed using methods.

A potential disadvantage of object-oriented programs is runtime *efficiency*. Object-oriented programs *tend* to require more memory and processing resources than procedural programs. Programmers, software engineers, and system analysts can work together to weigh the tradeoffs between the OO approach and runtime efficiency.

Comprehension check. Match the beginnings of the sentences in the first column with the endings in the second column.

Beginnings	Endings
1. SIMULA laid foundations for 2. Smalltalk is regarded as 3. Java evolved into an object-oriented programming platform for 4. The object-oriented paradigm is cognitively similar to 5. Encapsulation allows objects 6. Programmers, software engineers and system analysts can work together	a) to be adapted and reused in a variety of different programs. b) a classic object-oriented language. c) to weigh the tradeoffs between the OO approach and runtime efficiency. d) the way human beings perceive the real world. e) the object-oriented paradigm. f) developing Web applications.

Vocabulary practice

1. Put the letters in the following words into the correct order.

migradap papharoc quchetine fifecynice angatdavidse
tulenpasacion

2. Match the beginnings and the endings of the sentences, and then put the sentences into the correct order.

1. SIMULA laid the foundation 2. The second major development of object-oriented languages 3. Computer historians believe that SIMULA was 4. Dynabook never became a commercial product, but 5. Smalltalk is regarded as a classic object-oriented language 6. Dynabook was a prototype	a) the first computer language to work with objects, classes, inheritance, and methods. b) which encourages programmers to take a “pure” OO approach to the programming process. c) Smalltalk survived and is still in use today. d) for a notebook-sized personal computer. e) came in 1972. f) for the object-oriented paradigm, which was later incorporated into other programming languages.
--	--

3. *Fill in the gaps in the text.*

The OO paradigm allows programmers to hide the internal details of objects and their methods. This process, called ____, allows objects to be easily reused, modified, and repurposed.

Computer historians believe ____ was the first programming language to work with objects, classes, inheritance, and methods. It is a language called _____. Recently many procedural languages have been given OO capabilities. ____, which originated at the Department of Defense, was originally a procedural language, but now includes OO features. The C language was modified into a language called ____, and again modified into C#. Recent versions of ____ Basic also offer programmers the option of working within the object-oriented paradigm.

Speaking. *Discuss the following questions.*

1. How did object-oriented languages originate?
2. Which object-oriented languages are popular today?
3. What kinds of applications are suitable for object-oriented languages?
4. What are the advantages and disadvantages of the OO paradigm?

Critical thinking. *Read the article and express your opinion on the problem.*

Human Factors

Today's programming languages provide programmers with sophisticated tools for coding and testing software. Why then, are computers and computer software so often characterized as being difficult to use?

Programmer and user interface designer Alan Cooper offers an explanation and solution in his book "The Inmates Are Running the Asylum". According to Cooper, programmers don't intentionally create bad technology products. "Programmers aren't evil. They work hard to make their software easy to use. Unfortunately, their frame of reference is themselves, so they only make it easy to use for other software engineers, not for normal human beings". Cooper suggests that it is possible to create intuitive, easy-to-use technology products by devoting more time to developing detailed product specifications with the assistance of an "interactive designer" who is familiar with the psychology and habits of a typical computer user.

Clare-Marie Karat, a psychologist and IBM researcher developed

The Computer User's Bill of Rights

1. The user is always right. If there is a problem with the use of the system, the system is the problem, not the user.
2. The user has the right to easily install software and hardware systems.
3. The user has the right to a system that performs exactly as promised.
4. The user has the right to easy-to-use instructions for understanding and utilizing a system to achieve desired goals.
5. The user has the right to be in control of the system and to be able to get the system to respond to a request for attention.
6. The user has the right to a system that provides clear, understandable, and accurate information regarding the task it is performing and the progress toward completion.
7. The user has the right to be clearly informed about all system requirements for successfully using software or hardware.
8. The user has the right to know the limits of the system's capabilities.
9. The user has the right to communicate with the technology provider and receive a thoughtful and helpful response when raising concerns.
10. The user should be the master of software and hardware technology, not vice-versa. Products should be natural and intuitive to use.

Karat agrees with Cooper's comments about programmers being unable to understand the people who use their software. She says, "The profile of the people who use systems has changed, while the system, and the culture in which they have developed, have not adjusted ... The engineers and computer scientists who design hardware and software know little about the needs and frustrations of consumers."

Some efforts to simplify operating system software have created another band of disgruntled users who complain that important features are now "hidden" because of feedback from novice testers who considered such features too advanced or confusing. Some controls, such as those for setting up networks, are not easy to understand, but could be crucial for a successful installation. Hiding

those controls because they might confuse beginners has only caused advanced users to become frustrated.

Who is right? Can technology be simplified, yet remain powerful enough to accomplish complex tasks? A branch of ergonomics called Human Factors, or Human-Computer Interaction (HCI), focuses on factors that make computers easy or difficult to use.

What do you think?

1. Can you think of a specific instance when you have become frustrated with a software user interface?
2. Is it possible to make computer software significantly easier to use?
3. Would you agree that programmers do not understand the viewpoint of a typical computer user and consequently produce bad software?

Unit 6. Operating Systems and Application Programs

Text A

Reading. *Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.*

INFORMATION SYSTEMS

An information system collects, stores, and processes data to provide useful, accurate, and timely information, typically within the context of an organization. Although an information system does not necessarily have to be computerized, today most information systems rely on computers and communications networks to store, process, and transmit information with far more efficiency than would be possible with a manual system. In this unit, the term “**information system**” refers to a system that uses computers and usually includes communications networks.

An information system is used by the people in an organization and its customers. You've undoubtedly used many information systems – for example, when registering for classes, getting cash from an ATM, and purchasing merchandise on the Web. You might even work for a business or nonprofit organization where you have access to an information system. Not everyone in an organization uses an information system in the same way. An information system must support the needs of people who engage in many different organizational activities.

An information system can help the people in an organization perform their jobs more quickly and effectively by automating routine tasks, such as reordering **inventory**, taking customer orders, or sending out renewal notices. Information systems can also help people solve problems. One of the major functions of an information system is to help people make decisions in response to problems.

Because organizations have different missions and face different problems, they require different kinds of information systems. An information system might have one or more of the following components: a transaction processing system, a management information system, a decision support

system, or an expert system. Let's take a closer look at a transaction processing system.

In an information system context, a **transaction** is an exchange between two parties that is recorded and stored in a computer system. When you order a product at a Web site, buy merchandise in a store, or withdraw cash from an ATM, you are involved in a transaction.

Many organizational activities involve transactions. A **transaction processing system (TPS)** provides a way to collect, process, store, display, modify, or cancel transactions. Most transaction processing systems allow many transactions to be entered simultaneously. The data collected by a TPS is typically stored in databases, and can be used to produce a regularly scheduled set of reports, such as monthly bills, weekly *paychecks*, annual inventory summaries, daily manufacturing schedules, or periodic check registers.

Early transaction processing systems, such as **banking** and **payroll** applications of the 1970s, used **batch processing** to collect and hold a group of transactions for processing until the end of a day period. An entire batch was then processed without human intervention, until all transactions were completed or until an error occurred.

In contrast to batch processing, most modern transaction processing systems use **online processing**—a real-time method in which each transaction is processed as it is entered. Such a system is often referred to as an **OLTP system** (online transaction processing system). **OLTP** uses a “*commit* or *rollback*” strategy to ensure that each transaction is processed correctly. This strategy is crucial because most transactions require a sequence of steps, and every step must succeed for the transaction to be completed.

If you *withdraw* cash from an ATM the bank's computer must make sure your account contains sufficient funds before it *deducts* the withdrawal from your account and allows the ATM to deliver cash. If the ATM is out of cash, however, the transaction fails, and the withdrawal should not be deducted from your account. A TPS can **commit** to a transaction and permanently update database records only if every step of the transaction can be successfully processed. If even one step fails, the entire transaction fails and a *rollback* returns the records to their original state.

Although a TPS excels at maintaining transaction data entered by clerical personnel and online customers, its reporting capabilities are limited. A typical TPS generates **detail reports**, which provide a basic record of completed

transactions. However, managers need more sophisticated reports to help them analyze data.

Comprehension check. *Mark the following statements as True or False.*

1. An information system usually helps people to find solutions to their problems.
2. You aren't involved in a transaction when you order a product online.
3. All POS systems automatically calculate, change and identify customers who previously wrote bad checks.
4. Everyone in an organization uses an information system in the same way.
5. An information system has to be computerized.
6. A TPS is one of the components of an information system.

Vocabulary practice

1. *Match the words with their synonyms.*

accurate	subtract
generate	evolve
deduct	essential
commit	perform
crucial	complicated
sophisticated	exact

2. *Make two-word combination using the words in columns and then fill in the gaps in the following sentences.*

A: batch	B: report
online	method
routine	processing
payroll	tasks
detail	customer
real-time	system

1. First transaction processing systems used
2. If you buy goods on the Internet you are
- 3 Online processing is ... in which each transaction is processed as it is entered.
4. A ... provides a basic record of completed transactions.
5. Without a ... we can't calculate deductions and taxes, track employee hours generate paychecks.
6. Often repeated activities are called

4. *Fill in the gaps in the text.*

___ systems play a key role in helping organizations achieve goals, which are set forth in a ___ statement. Workers use information systems to produce and manipulate ___. Transaction ___ systems provide an organization with a way to collect, modify, display or ___ transactions. These systems encompass activities such as general accounting, inventory ___, and e-commerce. ___ information systems typically build on the data collected by a TPS to produce ___ that managers use to make the business decisions needed to solve routine, structured problems.

Speaking. *Discuss the following questions.*

1. What is an information system?
2. Who uses information systems?
3. How do information systems help people in an organization?
4. Do organizations require different kinds of information systems?
5. What is a transaction?
6. What is a transaction processing system?
7. What are the limitations of transaction processing systems?

Text B

Pre-reading. *Match the meaning of the following English words and their Ukrainian equivalents.*

1 discrete step	a) впровадження
2 checklist	b) дискретний режим
3 implementation	c) перелік
4 milestone	d) проміжний етап розробки

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

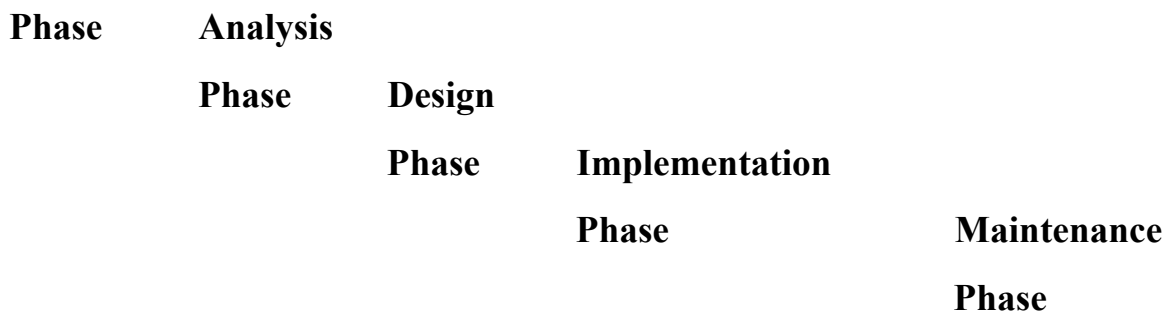
SYSTEMS ANALYSIS

Whether you are a part of a team that is developing a complex corporate information system, or you are developing a small information system for your own use, you will be more likely to succeed if you analyze the purpose of the information system, carefully design the system, test it thoroughly, and document its features. In this text you'll learn about the planning and analysis that's required for an information system.

SYSTEM DEVELOPMENT LIFE CYCLE

An information system progresses through several phases as it is developed, used, and finally retired. These phases are referred to as a **system development life cycle** – usually referred to as **SDLC**.

Planning



The original **waterfall SDLC**, shown above, approaches each phase as a **discrete step** in the development process. One phase is supposed to be completed before the next phase can begin.

The **SDLC** is an outline of a process that helps develop successful information systems. The process of planning and building and information system according to the **SDLC** is referred to as **systems analysis and design**.

Planning Phase

For creating an information system it's important to have a plan. Initial plans for an information system are developed during the planning phase. The planning phase for an information system project includes the following activities:

- Assemble the project team
- Justify project
- Choose development methodology
- Develop a project schedule
- Produce a Project Development Plan.

The main goal of these activities is to create a **Project Development Plan**. Before the project proceeds beyond the planning phase, the Project Development Plan must typically be reviewed and approved by the management. This planning document includes:

A short description of a project, including its *scope*

A justification for the project, which includes an estimate of the project costs and potential financial benefits

A list of project team participants

A schedule for the project, including **an outline** of its phases

Project planning begins in the planning phase but stretches throughout the entire project. As the project takes shape, project managers break down the work into tasks and **milestones**, which can be scheduled and assisted. As tasks are completed, the schedule can be updated and adjusted. Project management software is an effective tool for planning and scheduling. It helps manages track and visualize the complex interactions between tasks. Popular examples include **open source software**, such as Open WorkBench, and commercial software, such as Microsoft Project.

ANALYSIS PHASE

The **analysis phase** begins after the project team selects a development methodology, draws up the **Project Development Plan**, and receives permission to proceed from management. The goal of the **analysis phase** is to produce a list of requirements for a new or revised information system.

Typically, a new information system is designed to replace a system or process that is already in place. It is important to study the current system to understand its strengths and weaknesses before planning a new system.

System requirements are the criteria for successfully solving problems identified in an information system. These requirements guide the design and implementation for a new or updated information system. They also serve as an evaluation checklist at the end of the development project, so they are sometimes called **success factors**. A new or updated information system should meet the requirements the project team defines.

The project team determines requirements by interviewing users and studying successful information systems that solve problems similar to those in the current system. Another way to determine requirements is to construct a prototype as an experimental or trial version of an information system. Often the prototype is not a fully functioning system because it is designed to demonstrate only selected features that might be incorporated into a new information system. A systems analyst shows the prototype to users, who evaluate which features of the prototype are important for the new information system.

After the project team studies the current system and then determines what the new system should do, system requirements are incorporated into a document called a **System Requirements Report** that describes the objectives for an information system. If management or the project sponsor approves the report, the project can move on to the design phase.

Comprehension check. *Indicate the paragraph where the following ideas are found in the text.*

1. These plans are developed during the planning phase.
2. You can determine the system requirements by this way.
3. A list of requirements for a new system should be produced at this phase.
4. Several phases are required for information process.
5. A plan is inseparable part of an information system.
6. There are plenty of tools for diagramming and specifying the current system.

Vocabulary practice

1. *Match up the words that are opposite in the meaning.*

succeed	essential
permission	computerized
updated	fail
manual	destroy
create out	out of date
obsolete	ban

2. Make three-word combinations using the words in columns and then fill in the gaps in the following sentences.

A: information	B: source	C: source
joint	requirements	software
project	application	plan
open	system	report
system	management	project
project	development	software

1. ... describes the objectives for an information system.
2. ... is developed during the planning phase.
3. ... must be reviewed and approved by the management.
4. You can use ... for planning and scheduling.
5. OpenWork Bench and Microsoft Project are ..., aren't they?
6. ... is based on the idea that the best information systems are designed when end-users and system analysts work together as equal partners.

3. Fill in the gaps in the text.

The process of planning and building an information system is referred to as systems _____. The development process is supervised by an organization's Information Systems (IS) department, but the _____ team includes members from other departments as well. System development follows some type of system development _____ cycle (SDLC), which consists of several phases. In the _____ SDLC one phase of the SDLC must be completed before the next phase begins. A project begins with a _____ phase in which a member of the IS department creates a Project Development Plan. The project team then proceeds to the _____

phase, with the goal of producing a list of requirements for a new or revised information system.

Speaking. *Discuss the following questions.*

1. What is a system development life cycle?
2. How does an information project begin?
3. What does the planning phase entail?
4. Do computers offer tools for planning activities?
5. How does the project team determine what the new system should do?
6. How does the project team document system requirements?
7. What does the project team do with system requirements?

Text C

Pre-reading. *Match the terms with their definitions.*

- | | |
|------------------------|---|
| a) system testing | - is the process of modifying a commercial application to reflect an organization's needs; |
| integration testing | - ensures that module operates reliably and correctly; |
| software customization | - is performed to ensure that the modules operate together correctly; |
| acceptance testing | - is a place where software testing can occur without disrupting the organization's regular information system, or it might be located on an entirely separate computer system; |
| unit testing | - ensures that all hardware and software components work together correctly; |
| test area | - is designed to verify that the new Information system works as required; |
| b) user documentation | - is staffed by technical support specialists familiar with the information system's software; |

procedure handbook	- describes a system's features, hardware architecture, and programming;
help desk	- describes how to interact with the system to accomplish specific tasks;
system documentation	- is a type of user documentation that contains step-by-step instructions for performing specific tasks;
c) phased conversion	- means that the old system is completely deactivated and the new system is immediately activated;
direct conversion	- avoids some of the risk of direct conversion because the old system remains in service while some or all of the new system is activated;
pilot conversion	- works well with larger information systems that are modularized because the new system is activated one module at a time;
parallel conversion	- works well in organizations with several branches that have independent information processing systems because the new information system is activated at one branch at a time.

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

IMPLEMENTATION AND MAINTENANCE

After the plan for an information system is approved, it's time to start building it. The implementation phase can include: purchase and install hardware and/or software, create applications, test applications, finalize documentation, train users, convert data, convert to new system.

Application testing is performed in three ways: unit testing, integration testing, and system testing. Unit testing and integration testing are usually performed in a test area. A test area might to be located in an isolated section of storage on the computer system that runs the organization's regular information system, or might be located on an entirely separate computer system. When a

problem is discovered during unit testing or integration testing, the team must track down the source of the problem and correct it. Unit testing and integration testing are then repeated to make sure the problem is corrected, and no new problems were introduced when the original problem was fixed.

The data for a new information system might exist in card files, file folders, or an old information system. This data must be loaded into the new system – a process called “data conversion”. When converting data from a manual system to a computer system, the data can be typed or scanned electronically into the appropriate storage media. When converting data from an existing computer system to a new system, a programmer typically writes conversion software to read the old data and convert it into a format that is usable by the new system.

System conversion refers to the process of deactivating an old information system and activating a new one. It is also referred to as “cutover” or “go live”. There are several strategies for converting to a new system. They are a direct conversion, a parallel conversion, a phased conversion, a pilot conversion.

A new or upgraded information system undergoes a final test called acceptance testing. It includes the use of real data to demonstrate that the system operates correctly under normal and peak data loads. The term “maintenance phase” is a bit misleading because it seems to imply that the information system is maintained in a static state. On the contrary, during the maintenance phase, an information system is likely to undergo many changes to meet an organization’s needs. They can include the following: upgrades to operating system and commercial software, user interface revisions to make the system easier to use, application software revisions to fix bugs and add features, hardware replacements to enhance performance, security upgrades.

To combat an escalating number of viruses, worms, Denial of Service attacks, and intrusions, security has become a top priority for the maintenance phase of an information system’s life cycle. Maintaining security is an ongoing activity. A system operator and a systems programmer are responsible for system maintenance. Even after in-depth training, employees sometimes forget procedures or have difficulty when they encounter a new set of circumstances. Many organizations establish a help desk to handle end-user problems. For example, suppose you encounter a problem with an update procedure and call the help desk. The help desk technician begins to troubleshoot the problem and soon realizes that it is caused by a programming error not caught during system testing. This bug is recorded in a “bug report” that is routed to the programming group, which can determine its severity and take steps to fix it.

Comprehension check. Match the beginnings of the sentences in the first column with the endings in the second.

<p>1. Unit testing and integration testing are</p> <p>2. When a problem is discovered during unit testing or integration testing</p> <p>3. System conversion refers</p> <p>4. When converting data from an existing computer system to a new system</p> <p>5. A system operator and a systems programmer are</p> <p>6. The help desk technician begins</p>	<p>a) responsible for system maintenance. ... a programmer typically writes.</p> <p>b) conversion software to read the old data and convert it into a format that is usable by the new system.</p> <p>c) ... usually performed in a test area.</p> <p>d) ... the team must track down the source of the problem and correct it.</p> <p>e) ... to troubleshoot the problem and soon realizes that it is caused by a programming error not caught during system testing.</p> <p>f) ... to the process of deactivating an old information system and activating a new one.</p>
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Vocabulary practice

1. Put the letters in the following words into the correct order.

sienncover ruvis sinrution shoyubtleroot cascumcritern
agerost

2. Match the beginnings and the endings of the instructions/steps given and put them into correct order.

<p>1. Create debugger as a system software that helps programmers</p> <p>2. After that write the specifications and design the computer system and the methods for the information system</p> <p>3. Write the program in a specific programming language, that specifically refers</p> <p>4. Depending on the organization and its size,</p>	<p>a) to determine their needs, problems, and expectations.</p> <p>b) to solve the problem.</p> <p>c) turn it over to the users with accompanying training, as necessary.</p> <p>d) to writing source code.</p> <p>e) necessary or available to</p>
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<p>the systems analyst's tasks are</p> <p>5. Next step is to interview the people who will be using the system</p> <p>6. With the help of testing and acceptance, make sure the system works properly and</p> <p>7. Then determine which people and what kind of software, hardware, and monetary resources are</p> <p>8. Keep system working properly and, if business procedures or conditions are changed,</p>	<p>solve the problem.</p> <p>f) to analyze the problem to be solved, the data to be input, the expected output, and other system considerations.</p> <p>g) identify errors.</p> <p>h) improve them.</p>
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4. Fill in the gaps in the text.

During the ___ phase of the SDLC, the project team supervises the technicians who set up new hardware, install programming languages and other application ___ tools, create and test applications, and customize software. The team also finalizes the system documentation and trains users. In this phase, three types of testing ensure that new software works correctly. ___ testing is performed on each module, and then ___ testing is performed to make sure that all of the modules work together correctly. ___ testing ensures that the software components work correctly on the hardware and with other, perhaps older, elements of the information system.

When application testing is complete, data is converted from the old system to the new one, users are trained, and the new system goes live. Four types of information system “go live” conversions are possible. At the end of the conversion process, the information system undergoes a final test called ___ testing, designed to assure the system's owner that the new system works as specified.

After installation, an information system enters the ___ phase of its life cycle.

Speaking. *Discuss the following questions.*

1. Does a new information system typically require new hardware?
2. What the next step in the implementation phase?
3. What is application testing?

4. What documentation does the project team create during the implementation phase?
5. How do employees learn how to use the new information system?
6. How does a business switch from the old information system to the new system?
7. What happens during the maintenance phase?
8. How important is system security during this phase?
9. Who is responsible for system maintenance?
10. Why do maintenance activities include user support?

Unit 7. The Networks. The Internet

Text A

Pre-reading. Match the terms with the appropriate definitions.

<u>Protocols</u>	<u>Functions</u>
HTTP(Hypertext Transfer Protocol)	- responsible for address packets
FTR (File Transfer Protocol) packets	- breaks a message or file into
POP (Post Office Protocol) one	- allows users who are logged on to host to access another host
TCP (Transmission Control Protocol) the	- provides secure data transfer over Internet
IP (Internet Protocol) to a	- transfer mail from an e-mail server client Inbox
SMTP (Simple Mail Transfer Protocol) Web	- exchanges information over the
IMAP (Internet Mail Access Protocol) client	- transfers e-mail messages from computers to an e-mail server
TELNET (Telecommunication Network) remote	- transfers files between local and host computers
SSL (Secure Sockets Layer)	- an alternative to POP

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

INTERNET TECHNOLOGY

In 1969 was developed a project called APRANET designed to help scientists communicate and share valuable computer resources. Educators and scientists used primitive command-line user interfaces to send e-mail, transfer files and run scientific *calculations* on Internet supercomputers. At that time

finding the information was not easy. Only in the early 1990s software developers created new user-friendly Internet access tools and Internet became available to anyone. Although exact figure cannot be determined, it is estimated that with approximately 200 *nodes* and 500 million users, Internet traffic exceeds 100 terabytes each week.

The Internet is not “owned” or *operated by* any single corporation or government. It’s a data communication network that grew over time in a somewhat haphazard configuration as networks connected to other networks.

The Internet *backbone* consists of *high-speed* fiber-optic links connecting high-capacity routers that direct network traffic. Backbones links and routers are maintained by **network service providers (NSPs)**. NSP equipment and links *are tied* together by **network access points (NAPs)**.

Large ISPs connect directly to backbone *routers*. Smaller ISPs typically connect to a larger ISP to gain Internet access and supply it to their customers.

You can track the route of data you send using Internet utilities, such as **Ping** and **Traceroute**. An Internet utility called Ping (Packet Internet Groper) sends a signal to a specific Internet address and waits for a reply. If a reply arrives, Ping reports that the computer is online and displays the *elapsed time* for the round-trip message. Ping is useful for *finding out* if the site *is up* and running. Ping is also useful for determining whether a connection offers adequate speed for videoconferencing or online computer games.

Ping also shows whether packets were lost in transmission. Packets can become lost when signal *interference* or network *congestion overwhelms* Internet servers and routers. Too many lost packets during an online gaming session can cause the game to stutter or stall. And if packets don’t arrive in the correct order, your game character might seem to act randomly for a few seconds.

A utility called Tracerouter records a packet’s path-including intermediate routers-from your computer to its destination.

An ISP operates network devices that handle the physical aspects of transmitting and receiving data from your computer. Many ISPs operate e-mail servers to handle incoming and outgoing mail for their subscribers and some also have Web servers for subscriber Web sites. ISPs can also maintain servers for chat groups, instant messaging, music file sharing, FTR (File Transfer Protocol) and other file transfer services.

Computer connects to the Internet in one of two ways: it can link directly to ISP using a device such as a **voiceband modem**, cable modem, **satellite** dish, or DSL modem. Or, if your computer is part of a LAN, an Internet connection can be provided by a LAN link.

A local area network is called an **intranet**. Intranets are popular with businesses that want to store information as Web pages but not provide them for **public** access. An intranet that provides external access is called **extranet**.

A computer can have a permanently assigned **static IP address** or a temporally assigned **dynamic IP address**. As a general rule, computers on the Internet that act as servers use static IP address. Typically, ISPs, web sites, web hosting services, and e-mail servers are constantly connected to the Internet and require static addresses.

Although IP addresses work for communication between computers, people find it difficult to remember long string of numbers. Therefore, many Internet servers also have an easy-to-remember name, i. e. *nike.com* . The official term for this name is “fully qualified domain name” (FQDN), but most people just refer to it as a **domain name**. Every domain name **corresponds to** a unique IP address that has been entered into a huge database called the Domain Name System(DNS).Computers that host this database are referred to as domain name servers. A domain name, such as *travelocity.com*, must be converted into an IP address before any packets can be routed to it.

The Domain Name System is based on a **distributed database**. This database is not stored as a whole in any single location; instead, it exists in parts all over the Internet. Your Internet connection is set up to access one of the many domain servers that **reside on** the Internet. Some domain names are not currently in use, but they are reserved. Internet entrepreneurs have made a business of registering high-profile domain names with the intention of reselling them.

Comprehension check. Mark the following statements as True or False.

1. The Internet backbone consists of high-speed fiber-optic links.
2. A local area network is called extranet.
3. A computer must have a permanently assigned static IP address.
4. The Internet is not “owned” by any single corporation or government.
5. Computer connects to the Internet only by linking directly to ISP.

6. You can track the route of data you send using Internet utilities, such as Ping and Traceroute.

Vocabulary practice

1. Match the words with their synonyms.

computations	congestion
knot	node
connect	find out
run	calculations
overloading	tire
learn	base
backbone	to be up

2. Make two-word combination using the words in columns and then fill in the gaps in the following sentences.

A: distributed	B: modem
elapsed	name
voiceband	dish
dynamic	interference
domain	database
signal	time
satellite	address

1. Packets can become lost when ... or network congestion overwhelms Internet routers.

2. Ping reports that the computer is online and displays the ... for the message.

3. Most people refer to the name of many Internet servers as a

4. A computer can have either or permanent static address or a temporal

5. A ... exists in parts all over the Internet.

6. ... and ... are used for direct connection of a computer to ISP.

3. *Fill in the gaps in the text.*

Network service providers supply ___ links for the Internet backbone. The acronym ___ refers to points where equipment and ___ from these companies intersect.

An Internet utility called ___ helps you discover whether a host, such as a web server, is “alive”. This utility reports the ___ for a packet to travel from your computer to the host and back. Another utility, called ___, records the path of a packet as it travels from your computer to its destination. Most people access the Internet through an ISP, which provides modems, e-mail servers, domain name servers, and ___.

Speaking. *Discuss the following questions.*

1. How did the Internet get started?
2. How is the Internet structured?
3. Is it possible to track data as it travels over the Internet?
4. What kinds of network devices are part of an ISP?
5. What's a domain name?

Text B

Reading. *Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.*

INTERNET ACCESS

One of the most **challenging** aspects of the Internet is selecting a connection. Although most subscribers begin with dial-up connection, many soon explore high-speed Internet options. **Home based** LANs and **wireless** Internet access have become very popular.

A dial-up connection uses **POTS (plain old telephone services)** to transport data between your computer and your ISP. With a dial-up connection, your computer's modem essentially places a regular telephone call to your ISP, when the ISP's computer “answers” your call, a **dedicated circuit** is established between you and your computer. This circuit remains connected for the **duration** of your call and provides a communication link that carries data between your computer and the ISP.

The modem, you use with this type of connection, **converts** the signals from your computer into signals that can travel over the telephone lines. The word “modem” is derived from the words “modulate” and “demodulate”. In communication terminology, **modulation** means changing the characteristics of a signal, as when a modem changes a digital pulse into an analog audio signal.

Demodulation means changing a signal back to its original state, as when a modem changes an audio signal back to a digital.

Another option for Internet connection is cable Internet service; with it your cable TV company becomes your Internet provider. In order to provide this type of connection, satellite dishes are installed; usually they are installed for a community and are referred to as the **head-end**. From the head-end, a cabling system branches out, offering both television and Internet access. Bandwidth of each cable is divided among three activities: TV channels, downstream data (the data you receive) and upstream data (the data you send). Cable Internet service plans offer speeds up to 6 Mbps.

With this connection your computer becomes part of a neighborhood data network and in this case two issues become significant: *bandwidth* and security. Unlike a dial-up connection, cable Internet service provides an **always-on connection**, which is particularly *vulnerable* to hackers and virus attacks. As for the second issue, the cable you share with your neighbors has a certain amount of bandwidth, and as more people use the service, it might seem to get slower and slower.

Other options, such as DSL and ISDN, could be chosen to get a high-speed Internet access. DSL (digital subscriber line) is a high-speed, digital, always-on, Internet access technology that runs over standard phone lines. It is one of the fastest Internet connections that's affordable to individual consumers. Several variations of this technology exist, including ADSL (asymmetric DSL, with *downstream* speed faster than *upstream* speed). DSL is digital, so data doesn't need to be changed into analog form and then back to digital as it does when you use a dial-up connection. A DSL can simultaneously carry voice and data, if permitted by DSL provider.

ISDN (Integrated Service Digital Network) is an all digital service with the potential to simultaneously carry voice and data. ISDN is not fast as DSL or cable Internet service but faster than a dial-up connection. A device called an **ISDN terminal adapter** connects a computer to a telephone wall jack and translated the computer's digital signals into signals that can travel over the ISDN connection. ISDN service is typically regarded as a high-speed Internet connection option for businesses that maintain small LANs.

There are two primary options for getting a wireless access of your home PC or LAN to the Internet: satellite Internet service or fixed wireless Internet service. Satellite Internet service uses a satellite to transmit computer data directly to and from a satellite dish, owned by and individual. A satellite modem connects the satellite dish to a computer. In many areas, satellite Internet service

is the only alternative to a dial-up connection. But on the downside, satellite data transport is subject to **latency** delays of one second or more, which occur as your data is routed between your computer and the satellite that orbits the Earth 22,200 miles above the Earth. Satellite transmission and reception can be blocked by **adverse** weather conditions, which make this type of data transport less **reliable** than most wired options.

Fixed wireless Internet service is designed to offer Internet access to homes and businesses by broadcasting data signals over areas large enough to cover most cities and **outlying** areas. Wireless technologies have less latency than satellite Internet service and can offer connection speeds suitable for online gaming and teleconferencing.

Also it is possible to connect to the Internet through LAN. LAN provides a **cost-effective** way to share one Internet connection among several computers. School computer labs and businesses usually provide access over LANs. LAN Internet access is also **feasible** for home networks. A single cable Internet, DSL, ISDN, or satellite connection can be cabled into your home LAN and accessed by all its workstations.

Comprehension check. Indicate the paragraph where the following ideas are found in the text.

1. If a TV company has necessary equipment it can act as an Internet provider.
2. A lot of people soon switch from dial-up they use at the beginning to other types of connection.
3. If it's allowed by provider, DSL can transmit both voice and data.
4. Satellite Internet service depends on the weather conditions.
5. With cable Internet service your computer is always connected to the Internet.
6. One of the cheapest ways to share Internet connection is LAN.

Vocabulary practice

1. Match up the words that are opposite in meaning.

always-on	relaxing
outlying	insecure
challenging	favourable

feasible	unstable
reliable	close
adverse	unsuitable

2. Make three-word combinations using the words in columns and then fill in the gaps in the following sentences.

A: wireless	B: communication	C: speed
home	terminal	circuit
suitable	Internet	LANs
established	connection	adapter
SDN	based	access
provide	dedicated	link

1. Satellite Internet service is one of the options of getting
2. If you like to play online computer game it's advisable for you to get fixed wireless Internet service since it can offer ... for online gaming.
3. Recently ... have become one of the most popular way of getting Internet access.
4. With a dial-up connection, when the computer of ISP "answers" the call of your computer's modem, you get so called ... between you and ISP.
5. To translate the computer's digital signal into signals that can travel over the ISDN connection you need a device called
6. An established dedicated circuit is used to ... that carries data between the subscriber's computer and ISP.

3. Fill in the gaps in the text.

A cable modem provides Internet access over the TV cables that carry television signals from the cable company's ___ to your home. With this connection two issues become significant: security and ___.

With ___ connections, such as DSL and cable, the ___ can enter the Internet any time his computer is turned on. ___ Internet service provides another high-speed Internet access method, but it has higher latency ___.

Nowadays you can get Internet access through LANs. Besides, LAN is considered to be really ___ way to share one Internet connection among several computers.

Speaking. *Discuss the following questions.*

1. How does a modem work?
2. What is the significance of becoming part of a “neighborhood network”?
3. What is DSL?
4. What are options for wireless Internet access?
5. What are the pros and cons of satellite Internet service?

Unit 8. The World Wide Web. Websites

Pre-reading. Match the meaning of the following English words and their Ukrainian equivalents.

1. Hypertext Markup Language (HTML)	a) Протокол передачі файлів;
2. Uniform Resource Locator (URL)	b) браузер, програма перегляду файлів (Web);
3. Web-Hypertext Transfer Protocol (HTTP)	c) <<подорож>> сайтами (серфінг);
4. hypertext link	d) Web-вузол (сайт–розм.) сторінка, що відображається в браузері;
5. “Surfing” (the Internet)	e) уніфікований покажчик інформаційного ресурсу;
6. Browser	f) мова гіпертекстової розмітки;
7. File Transport Protocol (FTP)	g) сервер електронної пошти;
8. E-mail server	h) <<тег>> – елемент коду розмітки документа;
9. Web site	i) протокол передачі гіпертексту;
10. HTML-tags	j) гіпертекстове посилання;

Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

THE WORLD WIDE WEB

The **World Wide Web** began in 1989 as a project by high-energy physics researchers in Switzerland to distribute research Internet to fellow physicists. Since then, the **Web** has rapidly moved into the forefront of Internet technologies. More people use the Web on the Internet than all other technologies on the Net combined. To most of the general public, the Web is synonymous with the Internet itself and is, in fact, thought by many to have played the dominant role in moving the Internet from an academic research tool to a household word.

The Web is an abstract (imaginary) space of information. On the Web, you find documents, sounds, videos, and information. On the Web connections are **hypertext links**. The Web uses a writing technology called hypertext. A hypertext is a group of unlinked files. Hypertext is a **key concept** for understanding today’s Web, but the idea of hypertext originated much earlier than the Web or even the Internet. Two of the most important elements of the

Web-Hypertext Transfer Protocol (HTTP) and **Hypertext Markup Language (HTML)** – contain “hypertext” in their names.

HTTP is a protocol that works with **TCP/IP** (Transmission Control Protocol/Internet Protocol) to get Web resources to your desktop. A web resource can be defined as any chunk of data that has a URL, such as an HTML document, a graphic, or a sound file. HTTP includes commands called “methods” that help your **browser** communicate with web servers. GET is the most frequently used HTTP method. The GET method is typically used to *retrieve* the text and graphics files necessary for displaying a Web page. This method can also be used to pass a **search query** to a file server. HTTP transports your browser’s *requests* for a Web resource to a Web server. Next, it transports the Web server’s response back to your browser.

HTML is a set of specifications for creating HTML documents that a browser can display as a Web page. HTML is called a *markup language* because authors mark up their documents by inserting special instructions, called HTML tags, that specify how the document should appear when displayed on a computer screen or printed.

On today’s Web, many aspects of hypertext have become a reality. A typical Web page is based on a document stored in a file and identified by a unique address called a **URL (Uniform Resource Locator)**. To **access** any one of these documents, you can type its URL. You can also click an underline word or phrase called a hypertext link (or simply a “link”) to access related Web pages.

HTTP and HTML are two of the major ingredients that define the Web. If you add URLs, browsers, and Web servers to this recipe, you’ll have a pretty complete menu of the basic technologies that make the Web work.

A **web server stores** data from Web pages that form a Web site. One way to store data for a Web page is as a file called an HTML document – a plain text, document with embedded **HTML tags**. Some of these tags *specify* how the document is to be displayed when viewed in a browser. Other tags contain links to related document, graphics, sound, and video files that are stored on Web servers.

As an alternative to HTML documents, Web servers can store Web page data in other types of files, such as **databases**. Data from product databases, college course schedules, and music catalogues can be assembled into HTML format “on the fly” in response to *Web requests*.

To *surf* the Web, you use Web client software called a browser. When you type a URL into the browser's *Address box*, you are requesting HTML data for a specific Web page. Your browser *creates* a request for the data by using the HTTP "GET" command.

A Web server is configured to include *HTTP software*. This software is always running when the server is "up" and ready to fulfill requests. One of the server's ports is dedicated to listening for HTTP requests. When a request arrives, the server software analyzes it and takes whatever action is necessary to fulfill it.

The computer that runs Web software might have other software running on it as well. For example, a computer might operate as a Web server, as an e-mail server, and as an **FTP (File Transport Protocol)** server all at the same time! To efficiently *handle* these diverse duties, a computer devotes one port to HTTP requests, one port to handling e-mail, and another port to FTP requests.

A browser is a software program that on your computer and helps you access Web pages. Technically, a browser is the client half of the client/server software that *facilitates* communication between a personal computer and a Web server. The browser is installed on your computer, and Web server software is *installed* on servers connected to the Internet.

Your browser plays two key roles. First, it uses HTTP to send messages to a Web server – usually a request for a specific HTML document from Web server, your browser *interprets* the HTML tags to display requested Web page. Today's popular browsers are Internet Explorer, Mozilla Firefox, Opera, Google Chrome.

A Web site is a group of *related* Web pages. The Web site is the **master address**, and the individual Web pages are like *subdirectories* to that root *directory*. Many business are creating Web sites for their customers to use. These sites may include price list, information about products, and comparisons of product features with those of competing products. Many sites even allow customers to order products over the Web. Because your site is representing you on the Web, you will want the site to look impressive. For a professional-looking site, you may want to hire a firm that creates Web sites. Such firms employ HTML experts as well as graphic designers and marketing specialists.

Comprehension check. Choose the ending for each sentence from the two versions given.

1. One way to store data for a web page is

- a) a file called an HTML document.
 - b) a unique address called a URL.
2. Some of these tags specify how the document is
- a) to be displayed when viewed in a browser.
 - b) to be identified by a unique address.
3. Business sites may include
- a) price list, information about products and comparisons of product features with those of competing products.
 - b) related document, graphics, sound and video files.
4. HTTP is
- a) a protocol that works with TCP/IP to get Web resources to your desktop.
 - b) a set of specifications for creating HTML documents that a browser can display as a Web page.
5. Your browser creates a request for the data by
- a) using the HTTP “GET” command.
 - b) using Web pages.
6. The Get method can be used to
- a) pass a search query to a file server.
 - b) listen for HTTP requests.

Vocabulary practice

1. *Which word does not belong to the group?*

- a) documents, specifications, protocols, commands;
- b) file, database, data, directory;
- c) screen, display, desktop, browser;
- d) connections, links, addresses, sites;
- e) query, request, response, port.

2. Complete the sentences using one of the given endings.

<ol style="list-style-type: none"> 1. The WWW began as 2. HTTP is a protocol that works with 3. HTML is called a markup language because 4. A typical Web page is based on 5. A browser is a software program that runs 6. As an alternative to HTML documents, Web server can store 	<ol style="list-style-type: none"> a) Web page data in other types of files, such as databases. b) on your computer and helps you access Web pages. c) a document stored in a file and identified by a unique address called URL. d) authors mark up their documents by inserting special instructions, called HTML tags. e) TCP/IP to get Web resources to your desktop. f) a project by high-energy physics researches in Switzerland.
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3. Fill in the gaps with appropriate words.

Many software tools are available today that make it easy to create Web pages. A Web page author can use a ___ editor, such as Notepad, to create Web pages “from scratch” by manually embedding HTML tags within the text of a document. It is also possible to use the HTML conversion routines included with many standard software applications. Another route is to use specialized Web ___ software, such as Microsoft FrontPage.

An HTML document is divided into two sections. The ___ section contains information used to define global properties for the document. The ___ section contains the text you want the browser to display, the HTML tags that format the text, and a variety of links. In addition to embedding HTML tags within the text, a Web page can be formatted with a ___ style sheet, which allows Web page designers to change formats throughout an HTML document without modifying individual HTML tags. To control the position of text and graphics on a Web page, many authors place these elements in the cells of a Web page ___.

Pre-reading. Match the meaning of the following English words and their Ukrainian equivalents.

<ol style="list-style-type: none"> 1. search engine; 2. content; 3. SEO (search engine optimization); 4. marketing; 	<ol style="list-style-type: none"> a) маркетинг, торгівля; b) ступень відповідності; c) база даних; d) індексація; e) кореневий каталог;
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5. database; 6. relevance; 7. indexing; 8. root directory; 9. web masters; 10. domain; 11. (to) parse; 12. spam.	f) практично непотрібна інформація; g) зміст, інформаційне наповнення; h) розбір; i) домен; j) оптимізація пошукових систем; k) пошукова програма; l) розробник Web-сторінок;
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Reading. Read the text and try to guess the meaning of the words in bold. Check your variants in the dictionary.

SEARCH ENGINE OPTIMIZATION

To find information on the **Web**, you may need to use a **search engine**. A search engine is a piece of software that gives you the ability to search for **Internet resources**. Search engines are usually accessed through Web **browser software**. Each search engine provides different **searching options** and has its own look. Search engines also differ greatly in the number of resources they allow you to search. Some search engines have both searching and **browsing capabilities**. The major search engines are Google, Yahoo and Yandex.

If you want to promote your website in the search results of the major search engines, you should use **SEO (search engine optimization)**. Search engine **optimization** is the process of improving the volume and quality of **traffic** to a web site from search engines via “natural” (“organic” or “algorithmic”) search results. Usually, the earlier a site is presented in the search results, or the higher it “ranks,” the more searchers will visit that site. SEO can also **target** different kinds of search, including image search, local search, and industry-specific vertical search engines.

As an Internet marketing strategy, SEO considers how search engines work and what people search for. Optimizing a website primarily involves editing its **content** and **HTML coding** to both increase its relevance to specific **keywords** and to remove barriers to the **indexing** activities of search engines.

The acronym “SEO” can also refer to “search engine optimizers”, a term adopted by an industry of consultants who carry out optimization projects on behalf of clients, and by employees who perform SEO services in-house. Search engine optimizers may offer SEO as a stand-alone service or as a part of a broader marketing campaign. Because effective SEO may require changes to the HTML source code of a site, SEO tactics may be incorporated into web site development and design. The term “search engine friendly” may be used to describe web site designs, menus, content management systems and shopping carts that are easy to optimize.

The leading search engines use **crawlers** to find pages for their algorithmic search results. Pages that are linked from other search engine indexed pages do not need to be submitted because they are found automatically. Some search engines operate a paid submission service that guarantee crawling for either a set fee or cost per click. Search engine crawlers may look at a number of different factors when crawling a site. Not every page is indexed by the search engines. Distance of pages from the **root directory** of a site may also be a factor in whether or not pages get crawled.

To avoid undesirable content in the search indexes, webmasters can instruct *spiders* not to crawl certain files or directories through the standard robots.txt file in the root directory of the *domain*. Additionally, a page can be explicitly excluded from a search engine's database by using a meta **tag** specific to robots. When a search engine visits a site, the robots.txt located in the root directory is the first file crawled. The robots.txt file is then parsed, and will instruct the robot as to which pages are not to be crawled. As a search engine crawler may keep a cached copy of this file, it may on occasion crawl pages a webmaster does not wish crawled. Pages typically prevented from being crawled include login specific pages such as shopping carts and user-specific content such as search results from internal searches. In March 2007, Google warned webmasters that they should prevent indexing of internal search results because those pages are considered *search spam*.

SEO techniques can be classified into two broad categories: techniques that search engines recommend as part of good design, and those techniques of which search engines do not approve. The search engines attempt to minimize the effect of the latter, among them **spamdexing**. Industry commentators have classified these methods, and the practitioners who employ them, as either white hat SEO, or black hat SEO. White hats tend to produce results that last a long time, whereas black hats anticipate that their sites may eventually be banned either temporarily or permanently once the search engines discover what they are doing.

An SEO technique is considered white hat if it conforms to the search engines' guidelines and involves no deception. As the search engine guidelines are not written as a series of rules or commandments, this is an important distinction to note. White hat SEO is not just about following guidelines, but is about ensuring that the content a search engine indexes and subsequently ranks is the same content a user will see. White hat advice is generally summed up as creating content for users, not for search engines, and then making that content easily accessible to the spiders, rather than attempting to trick the algorithm from its intended purpose. White hat SEO is in many ways similar to web development that promotes **accessibility**, although the two are not identical.

Black hat SEO attempts to improve rankings in ways that are disapproved of by the search engines, or involve deception. One black hat technique uses a text that is hidden, either as a text colored similar to the background or

positioned off screen. Another method gives a different page depending on whether the page is being requested by a human visitor or a search engine, a technique known as cloaking.

Search engines may penalize sites they discover using black hat methods, either by reducing their rankings or eliminating their listings from their databases altogether. Such penalties can be applied either automatically by the search engines' algorithms, or by a manual site review.

Comprehension check. Match the beginnings of the sentences in the first column with the endings in the second.

1. To find information on the Web	a) may also be a factor in whether or not pages get crawled.
2. Search engine optimizers may offer	b) either by reducing their rankings or eliminating their listings from their databases altogether.
3. The term “search engine friendly” may be used	c) either as text colored similar to the backgrounds.
4. One black hat technique uses text that is hidden,	d) to describe Web site designs, menus, content management systems and shopping carts that are easy to optimize.
5. Search engines may penalize sites they discover using black hat methods,	e) as a stand-alone service or as a part of a broader marketing campaign.
6. Distance of pages from the root directory of a site	f) you may need to use a search engine.

Vocabulary practice

1. Fill in the blanks in the sentences with the necessary word(s); all the letters of the word(s) are given on the right.

1. A search engine is a piece of ... that gives you the ability to search for Internet resources.	E T A O F W T R S
2. The term “search engine friendly” may be used to describe Web site designs, menus, content ... systems and shopping carts that are easy to optimize.	A G T E E M A M N N
3. To avoid ... content in the search indexes, web-masters can instruct spiders not to crawl certain files	E L D U E I R N S A B
4. SEO ... can be classified into two broad categories.	Q E S T U I N H C E
5. Black hat SEO ... to improve rankings in ways that are disapproved of by the search engines, or involve deception.	T A T S M T P E
6. Search engines may ... sites they discover using black hat methods.	E P Z E A N L I

2. Match the beginnings and the endings of the description given and put them into correct order.

<ol style="list-style-type: none"> 1. As an Internet marketing strategy, SEO considers. 2. The leading search engines use crawlers 3. In March 2007, Google warned webmasters that they 4. An SEO technique is considered white hat if 5. Black hat SEO attempts to improve rankings in ways 6. Search engines may penalize sites they discover 	<ol style="list-style-type: none"> a) using black hat methods, either by reducing their rankings or eliminating their listings from their database. b) that are disapproved of by the search engines, or involve deception. c) it conforms to the search engines guidelines and involves no deception. d) should prevent indexing of internal search results because those pages are spam. e) to find pages for their algorithmic search results. f) how search engines work and what people search for.
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2. Fill in the gaps in the text.

Webmasters and content providers began ___ sites for search engines in the mid-1990s, as the first search engines were cataloging the early Web. Initially, all a webmaster needed to do was submit a page, or URL, to the various engines which would send a spider to “crawl” that page, extract links to other pages from it, and return information found on the page to be ____. The process involves a search engine spider downloading a ___ and storing it on the search engine’s own server, where a second program, known as an indexer, extracts various information about the page, such as the words it contains and where they are located, as well as any weight for specific ____, as well as any and all links the page contains, which are then placed into a scheduler for crawling at a later date.

Site owners started to recognize the value of having their sites highly ranked and visible in search engine ____, creating an opportunity for both white hat and black ___ SEO practitioners. According to industry analyst Danny Sullivan, the earliest known use of the phrase search ___ optimization was a spam message posted on Usenet on July 26, 1997.

Unit 9 The Computer

Reading Skills

Read the text.

WHAT IS THE COMPUTER?

[1] A computer is a machine with an intricate network of electronic circuits that operate switches or magnetize tiny metal cores. The switches, like the cores, are capable of being in one of two possible states, that is, on or off; magnetized or demagnetized. The machine is capable of storing and manipulating numbers, letters, and characters. The basic idea of computer is that we can make the machine do what we want by inputting signals that turn certain switches on and turn others off, or that magnetizes or do not magnetize the cores. [2] The basic job of computers is the processing of information. For this reason, computers can be defined as devices, which accept information in the form of instructions called a program and characters called data, perform mathematical and or logical operations on the information, and then supply results of these operations. The program, or part of it, which tells the computers what to do and the data, which provide the information needed to solve the problem, are kept inside the computer in a place called memory.

[3] Computers are thought to have many remarkable powers. However, most computers, whether large or small have three basic capabilities. First, computers have circuits for performing arithmetic operations, such as: addition, subtraction, division, multiplication and exponentiation. Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of much use. However, certain computers (commonly minicomputers and microcomputers) are used to control directly things such as robots, aircraft navigation systems, medical instruments, etc.

[4] Some of the most common methods of inputting information are to use punched cards, magnetic tape, disks, and terminals. The computer's input device (which might be a card reader, a tape drive or disk drive, depending to the medium used in inputting information) reads the information into the computer. For outputting information, two common devices used are printer which prints the new information on paper, or a CRT display screen which shows the results on a TV-like screen.

[5] Third, computers have circuits which can make decisions. The kinds of decisions which computer circuits can make are not of the type: 'Who would

win a war between two countries?’ or ‘Who is the richest person in the world?’ Unfortunately, the computer can only decide three things, namely: Is one number less than another? Are two numbers equal? and, is one number greater than another?

[6] A computer can solve a series of problems and make hundreds, even thousands, of logical decisions without becoming tired or bored. It can find the solution to a problem in a fraction of the time it takes a human being to do the job. A computer can replace people in dull, routine tasks, but it has no originality; it works according to the instructions given to it and cannot exercise any value judgements. There are times when a computer seems to operate like a mechanical ‘brain’, but its achievements are limited by the minds of human beings. A computer cannot do anything unless a person tells it what to do and gives it the appropriate information; but because electric pulses can move at the speed of light, a computer can carry out vast numbers of arithmetic-logical almost instantaneously. A person can do everything a computer can do, but in many cases that person would be dead long before the job was finished.

Reading Comprehension

1 Main idea. *Which statements best expresses the main idea of the text? Why did you eliminate the other choices?*

Computers have changed the way in which many kinds of jobs are done.
 Instructions and data must be given to the computer to act on.
 Computers are machines capable of processing and outputting data.
 Without computers, many tasks would take much longer to do.

2. Understanding the passage. *Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.*

№п.п.	1	2	3	4	5	6	7	8	9
True									
False									

1. A computer can store or handle any data even if it hasn't received information to do so.
2. All computers accept and process information in the form of instructions and character.
3. The information necessary for solving problems is found in the memory of the computer.
4. Not all computers can perform arithmetic operations, make decisions, and communicate in some way with the user.

5. Computers can still be useful machines even if they can't communicate with the user.
6. There are many different devices used for feeding information into a computer.
7. There aren't as many different types of devices used for giving results as there are for accepting information.
8. Computers can make any type of decision they are asked to.
9. Computers can work endlessly without having to stop to rest unless there is a breakdown.

3 Location information. *Find the passages in the text where the following ideas are expressed. Give line references as in the example below.*

1. Computers accept information, perform mathematical and/or logical operations then supply new information.
2. All computers have three basic capabilities.
3. A computer is a machine that can be made to operate by receiving signals.
4. A computer cannot work without being told what to do.
5. A computer can make three types of decisions.
6. The fundamental job of a computer is processing information.
7. A computer can do the work of hundreds of people in a very short time.
8. The memory of a computer is used for storing information.

Vocabulary in Use

4. Understanding words. *Refer back to the text and find synonyms (i.e. words with a similar meaning) for the following words.*

1. complex (p. 1) _____
2. fundamental (p. 2) _____
3. a way (p. 3) _____
4. uninterested (p. 6) _____
5. accomplishments (p. 6) _____

Now refer back to the text and find antonyms (i.e. words with an opposite meaning) for the following words.

6. large (p. 1) _____
7. receiving (p. 1) _____
8. reject (p. 2) _____
9. unusual (p. 3) _____
10. small (p. 6) _____

5 Content review. Try to think of a definition for each of these items before checking them in the Glossary. Then complete the following statements with the appropriate words. (Some can be used more than ones.) Make sure you use the correct form, i.e. singular or plural.

core	device	data	circuit	terminal
switch	program	CRT display	memory	medium

1. Every computer has _____ for performing arithmetic operations, operating _____ or magnetized _____ .
2. A _____ with a screen is normally referred to as a _____ unit.
3. A computer is a _____ that processes information in the form of _____ and _____ and can store this information in a _____ .
4. Card readers, tape drives, or disk drives are different _____ for inputting information.

6 Word Forms. Fill the each blank with the appropriate form of the words.

1.operation, operate, operator, operational, operationally, operating

- a. A computer can perform mathematical _____ very quickly.
- b. One of the first persons to note that the computer is malfunctioning is the computer _____.
- c. The job of a computer operator is to _____ the various machines in a computer installation.
- d. The new machines installation are not yet _____.

2. acceptance, accept, accepted, acceptable, acceptably

- a. A computer is a device which _____ processes and gives out information.
- b. The students are still waiting for their _____ into the Computer Science program.

c. It is _____ to work without template if the flowcharts are not kept on file.

3. solution, solve, solvable, solver

- a. it may take a lot of time to find a _____ to a complex problem in programming.
- b. A computer can _____ a problem faster than any human being.
- c. A computer has often been referred to as a problem _____.

4. remark, remarkable, remarkably, remarked

- a. Today's computers are _____ faster than their predecessors.
- b. Systems analysts will often make _____ about existing programs so as to help make the operations more efficient.
- c. There have been _____ developments in the field of computer science in the last decade.

5. communication, communicate, communicable, communicative, communicably

- a. A computer must be able to _____ with the user.
- b. Fibre optics is a new development in the field of _____.
- c. Some people working in computer installations aren't very _____ because they are shy.

Grammar Review

Choose the correct item.

1. It's _____ to copy copyrighted movie cassettes.
A. Illegally B. illegal C. legally
2. Exciting Disney animation is using _____ computer graphics.
A. last B. the latest C. the last
3. Do you know when _____ flowcharts?
A. he has used B. did he use C. he used
4. Programming is _____ a complex step.
A. itself B. itselfes C. herself
5. He suggested that these parts _____ under very severe conditions.

- A. will be tested B. are tested C. should be tested
6. You can copy or delete files in a matter of seconds,_____?
- A. don't you B. Can't you C. can you
7. The virus _____ already _____ data at several US companies by that time.
- A. has destroyed B. had destroyed C. destroyed
8. Machine language is _____ only language a computer understands.
- A. the B. a C. an
9. Today very _____ programs are written in machine language.
- A. a few B. few C. little
10. The dual-system method has several advantages _____ the parallel system method.
- A. above B. of C. over

Reading Skills

Read the text.

HISTORY OF COMPUTER

[1] Let us take a look at the history of the computers that we have today. The very first calculation device used was the ten fingers of the man's hands. This, in fact, is why we still count in tens and multiples of tens. Then the abacus was invented, a bead frame in which the beads are moved from left to right. People went on using some form of abacus well into the 16th century, and it is still being used in some parts of the world because it can be understood without knowing how to read.

[2] During the 17th and 18th centuries many people try to find easy ways of calculation. J. Napier, a Scotsman, devised a mechanical way of multiplying and dividing, which is how the modern **slide rule** works. Henry Briggs used Napier's ideas to produce **logarithm tables** which all mathematicians use today. **alculus**, another branch of mathematics, was independently invented by Sir Isaac Newton, an Englishman, and Leibnitz, a German mathematician.

[3] The first real calculation machine appeared in 1820 as the result of several people experiments. This type of machine, which saves a great deal of time and reduces the possibility of making mistakes, depends on a series of ten-toothed gear wheels. In 1830 Charles Babbage, an Englishman, designed a machine that

was called 'The Analytical Engine'. This machine, which Babbage showed on the Paris Exhibition in 1855, was an attempt to cut out the human being altogether, except for providing the machine with the necessary facts about the problem to be solved. He never finished this work, but many of his ideas were the basis for building today's computers.

[4] In 1930, the first **analog** computer was build by an American named Vannevar Bush. This device was used in World War II to help aim guns. Mark I, the name given to the first **digital** computer, was completed in 1944. The men responsible for this invention were Professor Howard Aiken and some people from IBM. This was the first machine that could figure out long lists of mathematical problems, all at a very fast rate. In 1946 two engineers at the University of Pennsylvania, J. Eckert and J. Mauchly, built the first digital computer using parts called **vacuum tubes**. They named there new invention ENIAC. Another important advancement in computers came in 1947, when John von Newmann developed the idea of keeping instructions for the computer inside the computer's memory.

[5] The first generation of computers, which used vacuum tubes, came out in 1950. Univac I is an example of these computers which could perform thousands of calculation per second. In 1960, the second generation of computers was developed and these could perform work ten times faster then there predecessors. The reason for this extra speed was the use of **transistors** instead of vacuum tubes. Second-generation computers were smaller, faster and more dependable than first-generation computers. The third-generation computers appeared on the market in 1965. These computers could do a million calculations a second, which is 1000 times as many as first-generation computers. Unlike second-generation computers, there are controlled by tiny integrated circuits and are consequently smaller and more dependable. Fourth-generation computers have now arrived, and the integrated circuits that are being developed have been greatly reduced in size. This is due to **microminiaturization**, which means that the circuits are much smaller than before; as many as 1000 tiny circuits now fit into a single **chip**. A chip is a square or rectangular piece of silicon, usually from to inch, upon which several layers of an integrated circuit are etched or imprinted, after which the circuit is encapsulated in plastic, ceramic or metal. Fourth-generation computers are 50 times faster than third-generation computers and can complete approximately 1,000,000 instructions per second.

[6] At the rate computer technology is growing, today's computers might be obsolete by 1988 and most certainly by 1990. It has been said that if transport

technology had developed as rapidly as computer technology, a trip across the Atlantic Ocean today would take a few seconds.

Reading Comprehension

1. Main idea. *Which statement best expresses the main idea of the text? Why did you eliminate the other choices?*

1. Computers, as we know them today, have gone through many changes.
2. Today’s computer probably won’t be around for long.
3. Computers have had a very short history.

2. Understanding the passage. *Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then make the necessary changes that the false statements become true.*

№	1	2	3	4	5	6	7	8	9
True									
False									

1. The abacus and the fingers are two calculation devices still in use today.
2. The slide rule was invented hundreds of years ago.
3. During the early 1880s, many people worked on invention a mechanical calculation machine.
4. Charles Babbage, an Englishman, could well be called the father of computers.
5. The first computer was invented and built in the USA.
6. Instructions used by computers have always been kept inside the computer’s memory.
7. Using transistors instead of vacuum tubes did nothing to increase the speed in which calculation were done.
8. As computers evolved, their size decreased and their dependability increased.
9. Today’s computers have more circuits than previous computers.

3. Locating information. *Find the passages in the text where the following ideas are expressed. Give the line references.*

1. During the same period in history, logarithm tables and calculus were developed.
2. It wasn’t until the 19th century that a calculation machine was invented which tried to reduce manpower.

3. Integrated circuitry has further changed computers.
4. People used their fingers to count.
5. The computers of the future may be quite different from those in use today.
6. Today's computers circuits can be put on a chip.
7. Then an instrument with beads was invented for counting before a mechanical way for multiplying and dividing was devised.
8. Transistors replaced vacuum tubes.

Vocabulary in Use

4. Understanding words. Refer back to the text and find synonyms (i.e. words with a similar meaning) for the following words.

- | | | |
|-------------|--------|-------|
| 1. machine | (p. 1) | _____ |
| 2. designed | (p. 9) | _____ |
| 3. a lot | (p. 3) | _____ |
| 4. errors | (p. 3) | _____ |
| 5. solve | (p. 4) | _____ |

Now refer back to the text and find antonyms (i.e. words with an opposite meaning) for the following words.

- | | | |
|-------------------|--------|-------|
| 1. old | (p. 2) | _____ |
| 2. a few | (p. 3) | _____ |
| 3. to include | (p. 3) | _____ |
| 4. contemporaries | (p. 5) | _____ |
| 5. still in use | (p. 6) | _____ |

5 Content review. Match the following words in column A with the statements in column B. The first one is done for you.

- | A | B |
|-------------------------|--|
| 1. abacus | a. instrument used for doing multiplication and division |
| 2. calculus | b. used in the first digital computers |
| 3. analog computer | c. an instrument used for counting |
| 4. digital computer | d. used in mathematics |
| 5. vacuum tubes | e. circuitry of fourth-generation computers |
| 6. transistors | f. invented by Americans in 1944 |
| 7. chip | g. made computers smaller and faster |
| 8. microminiaturization | h. used to help aim guns |
| 9. slide rule | i. the reduction of circuitry into a chip |

10. logarithm tables j. a branch of mathematics

6 Word Form. Fill in each blank with the appropriate form of the words.

1. calculation, calculate, calculating, calculated, calculator, calculable, calculus

- a. A computer can do many kinds of _____ quickly and accurately.
- b. _____ is a branch of mathematics for making _____ without the use of _____ machine.
- c. A computer can _____ numbers much faster than a manual _____.
- d. Some problems aren't _____ without logarithm tables.

2. mechanic, mechanism, mechanise, mechanical, mechanically, mechanistic, mechanics, mechanisation, mechanised

- a. Today's computers are less _____ than they used to be.
- b. The _____ devices in a computer system operate more slowly than the _____ electromagnetic devices.
- c. The _____ of the brain is very complicated but unlike a computer it isn't _____.

3. necessity, necessitate, necessary, necessarily, necessities, need, needed.

- a. Because it is very expensive to set up a computer department it is _____ to the _____ budget well for the basic _____ of the installations.
- b. A good programmer isn't _____ going to be a good systems analyst.
- c. Students' lack of understanding of the basic concepts in computer science may _____ the instructor to restructure the course.

4. dependence, depend on, dependable, dependably, dependent, dependency, depending

- a. The length of time a programmer takes to make a program will vary _____ on the complexity of the problem and his ability and experience.
- b. One can always _____ a computer to obtain accurate answers because it's probably the most _____ machine in the world today.

5. technology, technological, technologically, technologist

- a. Computer _____ is a fast growing discipline.
- b. The _____ improvements of computers are reducing man's workload.

Grammar Review

Choose the correct item.

1. We hope and expect C language _____ into D, as some have predicted.

A. don't change B. not change C. not to change

2. Systems design ____ come before implementation.

A. must B. can C. need

3. Make sure that the software is compatible ____ the other applications you want to run.

A. for B. by C. with

4. I suggest ____ a separate directory to keep these files in.

A. you to create B. you create C. being created

5. Multimedia computers ____ a new group of buyers recently.

A. attracted B. attract C. have attracted

6. A data immediate access diagram helps to identify how ____ be accessed.

A. can a file of record B. a file of records can C. does a file of records

7. You ____ exit the editor or compile the program.

A. don't have to B. don't have C. haven't to

8. The decision may depend ____ the size of the data base.

A. of B. from C. on

9. In programming we are used ____ instructions in English.

A. to give B. to giving C. giving

10. Recently, he works _____ with Microsoft to produce interactive games and videos.

A. worked

B. has been working

C. works

Reading Skills

Read the text.

CHARACTERISTICS

[1] Computers are machines designed to process, electronically, specially prepared pieces of information which are termed data. Handling or manipulating the information that has been given to the computer, in such ways as doing calculations, adding information or making comparisons is called processing. Computers are made up of millions of electronic devices capable of storing data or moving them, at enormous speeds, through complex circuits with different functions.

[2] All computers have several characteristics in common, regardless of make or design. Information, in the form of instructions and data, is given to the machine, after which the machine acts on it, and a result is then returned. The information presented to the machine is the input; the internal manipulative operations, the processing; and the result the output. These three basic concepts of inputs processing, and output occur in almost every aspect of human life whether at work or at play. For example, in clothing manufacturing, the input is the pieces of cut cloth, the processing is the sewing together of these pieces, and the output is (he finished garment.

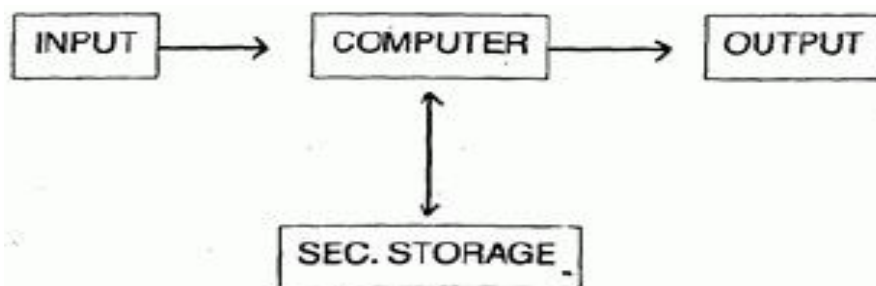


Figure 1

[3] Figure I shows schematically the fundamental hardware components in a computer system. The centre piece is called either [he computer, the processor, or, usually, the central processing unit (CPU). The term 'computer' includes those parts of hardware in which calculations and other data manipulations are performed, and the high-speed internal memory in which data and calculations

are stored during actual execution of programs. Attached to the CPU are the various peripheral devices such as card readers and keyboards (two common examples of input devices). When data or programs need to be saved for long periods of time, they are stored on various secondary memory devices or storage devices such as magnetic tapes or magnetic disks.

[4] Computers have often been thought of as extremely large adding machines, but this is a very narrow view of their function, Although a computer can only respond to a certain number of instructions, it is not a single-purpose machine since these instructions can be combined in an infinite number of sequences. Therefore, a computer has no known limit on the kinds of things it can do; its versatility is limited only by the imagination of those using it.

[5] In the late 1950s and early 1960s when electronic computers of the kind in use today were being developed, they were very expensive to own and run. Moreover, their size and reliability were such that a large number of support personnel were needed to keep the equipment operating. This has all changed now that computing power has become portable, more compact, and cheaper.

[6] In only a very short period of time, computers have greatly changed the way in which many kinds of work are performed. Computers can remove many of the routine and boring tasks from our lives, thereby leaving us with more time for interesting, creative work. It goes without saying that computers have created whole new areas of work that did not exist before their development.

Reading Comprehension

1. Main idea. Which statement or statements best express the main idea of the text?

1. Computers have changed the way in which we live.
2. All computers have an input a processor, an output and a storage device.
3. Computers have decreased man's workload.
4. All computers have the same basic hardware components.

2 . Understanding the passage. Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then, make the necessary changes so that the false statements become true.

№	1	2	3	4	5	6	7	8	9
True									
False									

1. All information to be processed must be prepared in such a way that the computer will understand it.
2. Because of the complex electronic circuitry of a computer, data can be either stored or moved about at high speeds.
3. Not all computers can process data given to them and produce results.
4. The basic concepts of data processing are restricted to computers alone.
5. The processor is the central component of a computer system,
6. All other devices used in a computer system are attached to the CPU.
7. Memory devices are used for storing information.
8. Computers are very much restricted in what they can do.
9. Computers today cost less, are smaller, and need fewer people to operate them than in the past.

3. Locating information. *Find the passages in the text where the following ideas are expressed. Give the line references.*

1. All computers are basically the same.
2. Then arithmetic and/or decision-making operations are performed.
3. Computers are limited by man's imagination more than anything else.
4. All the equipment used in a computer system is the hardware.
5. Computers are electronic machines used for processing data.
6. If programs or data need to be kept for a long time, they are stored on tapes or disks.
7. First the computer accepts data.
8. Finally, new information is presented to the user.

Vocabulary in Use

4. Understanding words. *Refer back to the text and find synonyms (i.e. words with a similar meaning) for the following words.*

1. called (p.2) _____
2. tremendous (p.1) _____

- 3. ideas (p.2) _____
- 4. react (p.4) _____
- 5. take away (p.6) _____

Now refer back to the text and find antonyms (i. e. words with an opposite meaning) for the following words.

- 6. taken away (p.2) _____
- 7. wide (p.4) _____
- 8. limited (p.4) _____
- 9. immovable (p.5) _____
- 10. after (p.6) _____

5. Content review. Try to think of a definition for each of these items before checking them in the Glossary. Then complete the following statements with the appropriate words. (Some can be used more than once.) Make sure you use the correct form, i.e. singular or plural.

secondary memory hardware magnetic tape output personnel
 single-purpose processor magnetic disk input processing

- 1. Information _____ takes place in the _____ not in the _____ device or _____ device.
- 2. The _____ refers to all the electromechanical devices used in a computer installation.
- 3. _____ and _____ units are used as _____ storage devices.
- 4. A computer isn't usually a _____ machine and require quite specialized _____ to operate it and all its related equipment.

6. Word forms. First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

- 1. imagination, imagine, imaginable, imaginative, imaginary

- a) A computer is limited in its ability by the _____ of man.
- b) Some people are good at inventing _____ stories.
- c) It is practically impossible to _____ the speed at which a computer calculates numbers.

2. addition, add, added, additional, additionally, additive

- a) Many terminals can be _____ to a basic system if the need _____ arises.
- b) _____ and subtraction are two basic mathematical operations.
- c) When buying a system there is often no _____ charge for the programs.

3. complication, complicate, complicated, complicating, complicatedly

- a) There can be many _____ involved in setting up a computer in an old building.
- b) It is sometimes a very _____ process getting into a computer installation for security reasons.
- c) It is sometimes very _____ to explain computer concepts.

4. difference, differ, different, differently, differential, differentiate

- a) There isn't a very big _____ in flowcharting for a program to be written in Cobol or Fortran.
- b) There are many _____ computer manufacturers today, and a buyer must be able to _____ between the advantages and disadvantages of each.
- c) The opinions of programmers as to the best way of solving a problem often _____ greatly.

5. reliably, rely on, reliable, reliability

- a) Computers are _____ machines.
- b) If you don't know the meaning of a computer term, you cannot always _____ an all-purpose dictionary for the answer.
- c) Computers can do mathematical operations quickly and _____ .

Grammar Review

Choose the correct item.

1. Large projects involve _____ programmers.

A. a hundred of

B. hundreds

C. hundreds of

2. The complaint accused Microsoft _____ bundling its Outlook Express e-mail software into Windows XP.

A. in B. of C. on

3. Here _____ the news! I _____ some new games on my PC.

A. is, have installed B. are, had installed C. is , installed

4. I want to understand how _____ the output.

A. is interpreted B. do I interpret C. to interpret

5. New customers _____ on the database.

A. put B. are put C. are putting

6. Video games makers were _____ first mainstream of virtual reality.

A. – B. the C. some

7. The design team _____ competing with four other companies for contract to design a suitable “Millennium bug” logo.

A. was B were C. are

8. The IBM Series 360 computers incorporated _____ number of structural advances.

A. the B. – C. a

9. The winner is chosen _____ computer.

A. with B. by C. in

10. The conversion might not work unless it ___ thoroughly.

A. hasn't been planned

B. has been planned

C. would be

planned

Reading Skills

Read the text.

COMPUTER CAPABILITIES AND LIMITATION

[1] Like all machines, a computer needs to be directed and controlled in order to perform a task successfully. Until such time as a program is prepared and stored in the computer's memory, the computer 'knows' absolutely nothing, not even how to accept or reject data. Even the most sophisticated computer, no matter how capable it is, must be told what to do. Until the capabilities and the limitations of a computer are recognized, its usefulness cannot be thoroughly understood.

[2] In the first place, it should be recognized that computers are capable of doing repetitive operations. A computer can perform similar operations thousands of times, without becoming bored, tired, or even careless.

[3] Secondly, computers can process information at extremely rapid rates. For example, modern computers can solve certain classes of arithmetic problems millions of times faster than a skilled mathematician. Speeds for performing decision-making operations are comparable to those for arithmetic operations but input-output operations, however, involve mechanical motion and hence require more time. On a typical computer system, cards are read at an average speed of 1000 cards per minute and as many as 1000 lines can be printed at the same rate.

[4] Thirdly, computers may be programmed to calculate answers to whatever level of accuracy is specified by the programmer. In spite of newspaper headlines such as 'Computer Fails', these machines are very accurate and reliable especially when the number of operations they can perform every second is considered* Because they are man-made machines, they sometimes malfunction or break down and have to be repaired. However, in most instances when the computer fails, it is due to human error and is not the fault of the computer at all.

[5] In the fourth place, general-purpose computers can be programmed to solve various types of problems because of their flexibility. One of the most important reasons why computers are so widely used today is that almost every big problem can be solved by solving a number of little problems - one after another.

[6] Finally, a computer, unlike a human being, has no intuition. A person may suddenly find the answer to a problem without working out too many of the details, but a computer can only proceed as it has been programmed to.

[7] Using the very limited capabilities possessed by all computers, the task of producing a university payroll, for instance, can be done quite easily. The following kinds of things need be done for each employee on the payroll. First: Input information about the employee such as wage rate, hours worked, tax rate* unemployment insurance, and pension deductions- Second: Do some simple arithmetic and decision making operations. Third: Output a few printed lines on a cheque. By repeating this process over and over again, the payroll will eventually be completed.

Reading Comprehension

1. Main idea. *Which statement best expresses the main idea of the text?*

1. The most elaborate of computers must be programmed in order to be useful.
2. It is important to know what a computer can and cannot do.
3. A computer is useless without a programmer to tell it what to do.

2. Understanding the passage. *Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.*

№	1	2	3	4	5	6	7	8	9	10
True										
False										

1. A computer cannot do anything until it has been programmed.
2. A computer is a useless machine if its capabilities and limitations are unknown.
3. A computer can repeat the same operation over and over again forever if permitted.

4. The speed at which different computer components function is considered to be one of the limitations of a computer.
5. Computers do not usually make mistakes unless they break down.
6. A computer can think and solve problems by itself.
7. A computer is a single-purpose machine in that it cannot be programmed to solve various types of problems.
8. Computers can solve big problems by following a series of simple steps.
9. A computer usually solves problems by doing some mathematical and decision-making operations.
10. Computers are used because they are fast and exact.

3. Locating information. Find the passages in the text where the following ideas are expressed. Give the line references.

1. A computer can do the same operation millions of times without stopping.
2. A computer must work out the details of a problem before reaching a solution.
3. A computer needs to be told what to do.
4. Computers can solve all kinds of different problems.
5. Knowledge of a computer's capabilities and limitations is important.
6. A computer can process information very rapidly.
7. Computers are exact and dependable.
8. Input and output devices operate more slowly than the arithmetic and decision-making devices.

Vocabulary in Use

4. Understanding words. Refer back to the text and find synonyms (i.e. words with a similar meaning) for the following words.

- | | |
|-----------------|-------------|
| 1. job | (p.1) _____ |
| 2. comprehended | (p.1) _____ |
| 3. clever | (p.3) _____ |
| 4. cases | (p.4) _____ |
| 5. salary sheet | (p.7) _____ |

Now refer back to the text and find antonyms (i.e. words with an opposite meaning) for the following words.

6. basic (p.1) _____
7. exceptional (p.3) _____
8. run well (p.4) _____
9. slowly (p.6) _____
10. employer (p.7) _____

5. Content Review. Look back at the text and find out what the words in bold typeface refer to.

1. no matter how capable it is (p.1) _____
2. to those for arithmetic operations (p.3) _____
3. they are man-made machines (p.4) _____
4. they sometimes malfunction (p.4) _____
5. because of their flexibility (p.5) _____
6. one after another (p.5) _____
7. one after another (p.5) _____
8. as it has been programmed to (p.6) _____
9. The following kinds of things need be done (p.7) _____
10. by repeating this process (p.7) _____

6. Word forms. First choose the appropriate form of the words to complete the sentences. Then check the differences of meaning in your dictionary.

1. repetition, repeat, repetitive, repeatedly, repeating
 - a) There are some people who _____ arrive late to class whenever they're working on a program because they forget the time.
 - b) A computer can do _____ operations without getting tired or bored.
 - c) _____ s which can be a boring and unproductive task has been eliminated with the use of computers.

d) A computer can _____ the same operation over and over again accurately without becoming bored or tired.

2. comparison, compare, comparable, comparatively, comparative

a) Renting a computer isn't _____ to owning one.

b) Computers can _____ numbers.

c) There is sometimes very little _____ to be made between two different brand-name microcomputers.

d) The difference in price of microcomputers from different manufacturers can be _____ small.

3. repairs, repaired, repairable, repair

a) When the computer is down it needs to be _____ .

b) Electronic equipment often takes a long time to _____ .

c) _____ to a computer system are often done by the same company who manufactured the system,

4. accuracy, accurate, accurately

a) A computer is always _____ in its results if well prepared.

b) _____ is one of the advantages of using computers in research or in statistical analysis.

c) Computers can produce results quickly and _____ .

Grammar Review

Choose the correct item.

1. Mail.ru's mailboxes are nearly _____ Yahoo's!

A. twice large as

B. twice as large as

C. twice larger than

2. A computer is a digital electronic machine capable _____ information.

A. to store

B. of storing

C. in storing

3. The C compiler and various text editors are _____ many software packages of UNIX.

A. between

B. one of

C. among

4. We were sorry we _____ our data.

A. had lost B. lost C. have lost

5. _____ I borrow your calculator for a moment? — I'm sorry but I _____ it.

A. may, am using B. must, use C. should ,have used

6. Changing software from one language to another was, until recently, tedious and time-consuming. Programmers _____ look at each line of software in one language and then translate it into another.

A. must B. had to C. could

7. You will get a handshake, telling you what system is on _____ end.

A. another B. other C. the other

8. Several large operating systems _____ already _____ in high-level languages.

A. have written B. have been written C. were written

9. The resulting design _____ differ from its original version.

A. is likely to B. likes to C. is likely to be

10. You usually have classes in the morning, _____? A. haven't you B. have you C. don't you

Reading Skills

Read the text.

HISTORY OF COMPUTER

[1] Let us take a look at the history of the computers that we have today. The very first calculation device used was the ten fingers of the man's hands. This, in fact, is why we still count in tens and multiples of tens. Then the abacus was invented, a bead frame in which the beads are moved from left to right. People went on using some form of abacus well into the 16th century, and it is still being used in some parts of the world because it can be understood without knowing how to read.

[2] During the 17th and 18th centuries many people try to find easy ways of calculation. J. Napier, a Scotsman, devised a mechanical way of multiplying and dividing, which is how the modern **slide rule** works. Henry Briggs used Napier's ideas to produce **logarithm tables** which all mathematicians use today. **Calculus**, another branch of mathematics, was independently invented by Sir Isaac Newton, an Englishman, and Leibnitz, a German mathematician.

[3] The first real calculation machine appeared in 1820 as the result of several people experiments. This type of machine, which saves a great deal of time and reduces the possibility of making mistakes, depends on a series of ten-toothed gear wheels. In 1830 Charles Babbage, an Englishman, designed a machine that was called 'The Analytical Engine'. This machine, which Babbage showed on the Paris Exhibition in 1855, was an attempt to cut out the human being altogether, except for providing the machine with the necessary facts about the problem to be solved. He never finished this work, but many of his ideas were the basis for building today's computers.

[4] In 1930, the first **analog** computer was build by an American named Vannevar Bush. This device was used in World War II to help aim guns. Mark I, the name given to the first **digital** computer, was completed in 1944. The men responsible for this invention were Professor Howard Aiken and some people from IBM. This was the first machine that could figure out long lists of mathematical problems, all at a very fast rate. In 1946 two engineers at the University of Pennsylvania, J. Eckert and J. Mauchly, built the first digital computer using parts called **vacuum tubes**. They named there new invention ENIAC. Another important advancement in computers came in 1947, when John von Newmann developed the idea of keeping instructions for the computer inside the computer's memory.

[5] The first generation of computers, which used vacuum tubes, came out in 1950. Univac I is an example of these computers which could perform thousands of calculation per second. In 1960, the second generation of computers was developed and these could perform work ten times faster then there predecessors. The reason for this extra speed was the use of **transistors** instead of vacuum tubes. Second-generation computers were smaller, faster and more dependable than first-generation computers. The third-generation computers appeared on the market in 1965. These computers could do a million calculations a second, which is 1000 times as many as first-generation computers. Unlike second-generation computers, there are controlled by tiny integrated circuits and are consequently smaller and more dependable. Fourth-generation computers have now arrived, and the integrated circuits that are being developed have been greatly reduced in size. This is due to

microminiaturization, which means that the circuits are much smaller than before; as many as 1000 tiny circuits now fit into a single **chip**. A chip is a square or rectangular piece of silicon, usually from to inch, upon which several layers of an integrated circuit are etched or imprinted, after which the circuit is encapsulated in plastic, ceramic or metal. Fourth-generation computers are 50 times faster than third-generation computers and can complete approximately 1,000,000 instructions per second.

[6] At the rate computer technology is growing, today's computers might be obsolete by 1988 and most certainly by 1990. It has been said that if transport technology had developed as rapidly as computer technology, a trip across the Atlantic Ocean today would take a few seconds.

Reading Comprehension

1. Main idea. *Which statement best expresses the main idea of the text?*

1. Computers, as we know them today, have gone through many changes.
2. Today's computer probably won't be around for long.
3. Computers have had a very short history.

2. Understanding the passage. *Decide whether the following statements are true or false(T/F) by referring to the information in the text. Then make the necessary changes that the false statements become true.*

№	1	2	3	4	5	6	7	8	9	10
True										
False										

1. Charles Babbage, an Englishman, could well be called the father of computers.
2. The abacus and the fingers are two calculation devices still in use today.
3. Today's computers have more circuits than previous computers.
4. The slide rule was invented hundreds of years ago.
5. Using transistors instead of vacuum tubes did nothing to increase the speed in which calculation were done.
6. During the early 1880s, many people worked on invention a mechanical calculation machine.
7. Instructions used by computers have always been kept inside the computer's memory.
8. The first computer was invented and built in the USA.
9. As computers evolved, their size decreased and their dependability increased.

3. Locating information. Find the passages in the text where the following ideas are expressed. Give the line references.

1. The computers of the future may be quite different from those in use today.
2. Today's computers circuits can be put on a chip.
3. Then an instrument with beads was invented for counting before a mechanical way for multiplying and dividing was devised.
4. Transistors replaced vacuum tubes.
5. During the same period in history, logarithm tables and calculus were developed.
6. It wasn't until the 19th century that a calculation machine was invented which tried to reduce manpower.
7. Integrated circuitry has further changed computers.
8. People used their fingers to count.

Vocabulary in Use

4. Understanding words. Refer back to the text and find synonyms (i.e. words with a similar meaning) for the following words.

1. a lot (p. 3) _____
2. designed (p. 9) _____
3. errors (p. 3) _____
4. machine (p. 1) _____
5. solve (p. 4) _____

Now refer back to the text and find antonyms (i.e. words with an opposite meaning) for the following words.

1. a few (p. 3) _____
2. contemporaries (p. 5) _____
3. old (p. 2) _____
4. still in use (p. 6) _____
5. to include (p. 3) _____

5. Content review. Match the following words with the statements

1. abacus
division
 2. analog computer
 3. calculus
 4. chip
- a. instrument used for doing multiplication and division
 - b. an instrument used for counting
 - c. used in the first digital computers
 - d. made computers smaller and faster

- | | |
|-------------------------|---|
| 5. digital computer | e. used in mathematics |
| 6. logarithm tables | f. a branch of mathematics |
| 7. microminiaturization | g. used to help aim guns |
| 8. slide rule | h. the reduction of circuitry into a chip |
| 9. transistors | i. invented by Americans in 1944 |
| 10. vacuum tubes | j. circuitry of fourth-generation computers |

6. Word Form. Fill in each blank with the appropriate form of the words.

1. calculation, calculate, calculating, calculated, calculator, calculable, calculus

- A computer can do many kinds of _____ quickly and accurately.
- _____ is a branch of mathematics for making _____ without the use of _____ machine.
- A computer can _____ numbers much faster than a manual _____.
- Some problems aren't _____ without logarithm tables.

2. dependence, depend on, dependable, dependably, dependent, dependency, depending

- The length of time a programmer takes to make a program will vary _____ on the complexity of the problem and his ability and experience.
- One can always _____ a computer to obtain accurate answers because it's probably the most _____ machine in the world today.

3. necessity, necessitate, necessary, necessarily, necessities, need, needed.

- Because it is very expensive to set up a computer department it is _____ to the _____ budget well for the basic _____ of the installations.
- A good programmer isn't _____ going to be a good systems analyst.
- Students' lack of understanding of the basic concepts in computer science may _____ the instructor to restructure the course.

4. mechanic, mechanism, mechanise, mechanical, mechanically, mechanistic, mechanics, mechanisation, mechanised

- Today's computers are less _____ than they used to be.
- The _____ devices in a computer system operate more slowly than the _____ electromagnetic devices.
- The _____ of the brain is very complicated but unlike a computer it isn't _____.

5. technology, technological, technologically, technologist

- Computer _____ is a fast growing discipline.
- The _____ improvements of computers are reducing man's workload.

Grammar Review

Choose the correct item.

1. This requirement is the most important reason ___ agreed upon standards for both hardware and software.

- A. of B. for C. on

2. Computer technology is only ___ powerful___ we can design it to be.

- A. so...as B. such...as C. as...as

3. How many_____ pages do I have to translate?

- A. else B. more C. still

4. The advantage of COBOL is that it is easy_____ to write and to understand.

- A. both B. all C. either

5. He is _____ man who set up the computer company.

- A. the B. a C. –

6 I can't help you now. The system_____.

- A. is tested B. is testing C. is being tested

7. During systems analysis, the logical data flow diagram ___ and_____.

- A. develops and analyses B. is developed and analysed C. is developing and analyzed

8. The results _____ less than ideal.

- A. turned out to be B. turned out being C. turned out

9. Microprocessors _____ all areas of our life.

- A. entered in B. have entered C. had entered

10. I wanted to know if the system _____ the objectives.

- A. meets B. has met C. Met

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