

МІНІСТЕРСТВО ОСВІТИ І НАУКИ, МОЛОДІ ТА СПОРТУ УКРАЇНИ
ДЕРЖАВНИЙ ВИЩИЙ НАВЧАЛЬНИЙ ЗАКЛАД
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Методичні вказівки з англійської мови (для студентів 2-го курсу напряму підготовки 6.030502 «Економічна кібернетика» денної та заочної форм навчання). Частина II [Електронний ресурс] / укладачі: Т. А. Мараховська, М. В. Борисова. – Електрон. дані. – Горлівка: ДВНЗ «ДонНТУ» АДІ, 2012. – 1 електрон. опт. диск (CD-R); 12 см. – Систем. вимоги: Pentium; 32 MB RAM; WINDOWS 98/2000/NT/XP; MS WORD 2000. – Назва з титул. екрану.

Методичні вказівки з англійської мови складаються із 7 тем. Подаються тематично підібрані тексти та система мовних вправ англійською мовою. Вказівки сприяють розвитку невідготовленої мови за допомогою серії комунікативних вправ та розвитку мовних навичок.

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ПЕРЕДМОВА

Методичний посібник призначено для студентів 2-го курсу напряму підготовки 6.030502 «Економічна кібернетика» денної та заочної форм навчання.

Мета вказівок – розвиток комунікативних вмінь та навичок різних видів мовленнєвої діяльності, а також навичок анотування та реферування літератури за спеціальністю.

Усім текстам, що розміщені в методичному посібнику, передують передтекстові вправи, що спрямовані на запам'ятовування складних для вимови слів, розрізнення значень інтернаціональних та багатозначних слів і термінів; після кожного тексту подається велика кількість вправ на удосконалення володіння термінологічною лексикою, розрізнення синонімів, антонімів, переклад слів, словосполучень та речень іноземною та українською мовами тощо.

Тематика текстів, комунікативна спрямованість вправ сприяють активізації навчальної діяльності студентів та досягненню цілей навчання іноземної мови в технічному вузі.

При відборі текстів автори прагнули того, щоб кожний текст мав загальнонауковий характер (був зрозумілий, корисний та насичений лексикою, що пов'язана з науковою роботою). Активний лексичний і граматичний мінімум визначається темами вказівок.

UNIT 1 FUTURE OF CYBERNETICS

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|-------------------|-------------------------------|
| 1) cybernetics | кібернетика; |
| 2) to occupy | займати місце; |
| 3) phenomena | явища; |
| 4) labour | праця; |
| 5) to accelerate | прискорювати; |
| 6) sphere | сфера; |
| 7) endeavour | спроба, намагання, прагнення; |
| 8) tremendous | гігантський, дуже значний; |
| 9) automation | автоматизація; |
| 10) quality | якість; |
| 11) quantity | кількість; |
| 12) technique | техніка; |
| 13) exceptionally | винятково; |
| 14) primarily | у першу чергу. |

II. Read international words and give their Ukrainian equivalents:

problem, maximum, control, process, resource, progress, organ, information, sphere, economy, computer, method, prospect, talent.

III. While translating the text keep in mind the different meanings of the words:

- | | |
|-------------------|--|
| <i>Advance</i> – | 1) рух уперед;
2) наступ;
3) успіх, прогрес;
4) досягнення. |
| <i>Activity</i> – | 1) активність;
2) діяльність;
3) енергійність. |
| <i>Branch</i> – | 1) гілка;
2) галузь;
3) відділ, філіал. |
| <i>Field</i> – | 1) поле;
2) спортмайданчик;
3) сфера діяльності;
4) аеродром. |
| <i>Turn</i> – | 1) обертання;
2) відхилення;
3) робоча зміна;
4) черга. |

<i>Part</i> –	1) частка;
	2) частина тіла;
	3) том, серія;
	4) участь, роль;
	5) сторона (у спорі тощо).

IV. Word-combinations to remember:

- 1) to deal with smth – мати справу з чимось;
- 2) to govern the process – керувати процесом;
- 3) to accelerate the pace of research – прискорювати темп дослідження;
- 4) to be engaged in smth – бути зайнятим у якійсь сфері;
- 5) breathtaking prospects – перспективи, від яких захоплює подих;
- 6) to predict the achievements – передбачати досягнення;
- 7) to face the task of continuous planning – стикатися із завданням постійного планування;
- 8) with the aim of raising the quality and improving conditions – з метою підвищення якості й покращення умов;
- 9) despite the numerous results – не дивлячись на численні результати;
- 10) to be outcome of talent – бути результатом (наслідком) таланту;
- 11) to ensure a well-balanced development – забезпечувати добре збалансований розвиток.

FUTURE OF CYBERNETICS

The new science dealing with the problems of maximum control and governing of processes, known as cybernetics, occupies a leading place among the sciences of the future. The objective of this new science of controlling complicated natural processes and phenomena of society and industry is to increase the efficiency of human labour. The field of research which has been attracting man's resources and efforts for many centuries is our environment of living nature.

Advances in instrument construction, the theory of information, mathematical logics, electronics and cybernetics open up great prospects of accelerating the pace of research in different spheres of science.

The part played by cybernetics in increasing the efficiency of those engaged in planning, finance, supply and other spheres of economic activity will also grow. This field of human endeavour is becoming increasingly important in our rapidly expanding and well planned economy. We are facing the task of continuous planning and ensuring a well balanced development of all the branches of the national economy.

At present there are thousands of electronic computers in operation throughout the world.

The existence of hundreds of computing centres equipped with learning and rapid acting machines, and connected by automatic communication lines with

industry, supply centres, transport and organs of finance will fundamentally change national economic management. Controlled by cybernetics, enterprises will operate at their most efficient peak. This, in its turn, will result in a tremendous economy of time and resources.

The comparatively simple methods of automation used for some technologies will become more and more complicated. As production techniques become more efficient they can be more effectively controlled, with the aim of raising the quality and the quantity of manufactured goods and improving working conditions. Despite the numerous results of research in cybernetics, opening up breathtaking prospects for science, industry and economics generally, it is still hard to predict the achievements this wonderful science may make in the near future, since the pace of technical progress is exceptionally great and continually increasing. The advance in the technical progress is the outcome primarily of the talent, inventiveness and the effort of man – this great master of nature.

TEXT-BASED ASSIGNMENTS

I. Try to identify the part of speech of the following words according to the word-building elements:

leading, efficiency, increasingly, rapidly, communication, effectively, generally, wonderful, technical, exceptionally, primarily, inventiveness.

II. Find the correct word:

- | | | | |
|------------------------|-------------------|-------------------|----------------|
| 1. керувати | a) to govern; | b) to learn; | c) to lead |
| 2. мета | a) collective; | b) objective; | c) infinitive |
| 3. складний | a) complicated; | b) wanted; | c) engaged |
| 4. оточуюче середовище | a) government; | b) important; | c) environment |
| 5. існування | a) existence; | b) distance; | c) tremendous |
| 6. у свою чергу | a) in its face; | b) in its eyes; | c) in its turn |
| 7. порівняно | a) comparatively; | b) surely; | c) readily |
| 8. винахідливість | a) achievements; | b) inventiveness; | c) enterprises |

III. Interpret the meaning of the following correlated words:

science – scientific – scientist;

control – controllable – controller;

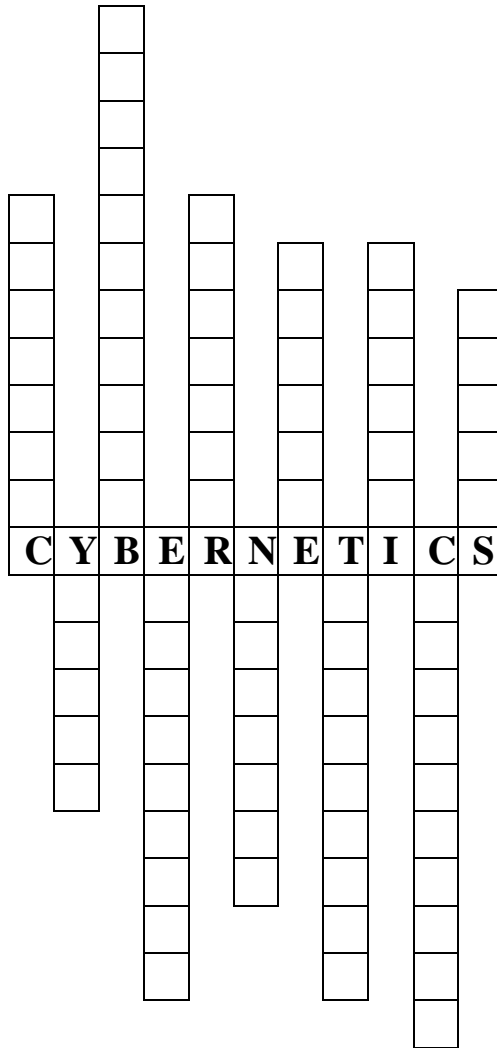
nature – natural – naturalism – naturalist – naturally;

act – acting – action – active – activity – actor – actress;

learn – learned – learner – learning;

invent – invention – inventive – inventor – inventory – inventiveness.

IV. Solve the crossword:



- C** – комп'ютер;
Y – жовтий;
B – захоплюючий подих;
E – ефективність;
R – дослідження;
N – численний;
E – економіка;
T – гігантський;
I – покращувати;
C – ускладнений;
S – постачання.

V. Translate into Ukrainian:

to deal with the problem, complicated natural process, the efficiency of human endeavour, rapidly expanding economy, well-balanced development, rapid acting machines, supply centers, to operate at the most efficient peak, to improve working conditions, an outcome of the talent, to be the great master of nature.

VI. Find the synonyms to the following words:

- | | |
|---------------------------|----------------------------|
| 1) objective; | a) products; |
| 2) to increase; | b) great; |
| 3) labour; | c) to function; |
| 4) the field of research; | d) nowadays; |
| 5) progress; | e) the sphere of research; |
| 6) at present; | f) work; |
| 7) to operate; | g) advance; |
| 8) tremendous; | h) to grow; |
| 9) goods; | i) aim. |

VII. Find out antonyms:

- | | |
|-----------------|-----------------|
| 1) to increase; | a) less; |
| 2) complicated; | b) to decrease; |
| 3) natural; | c) simple; |
| 4) living; | d) unnatural; |
| 5) slow; | e) dead; |
| 6) more; | f) rapid. |

VIII. Complete the following sentences:

1. The objective of the cybernetics is
2. Advances in different spheres of science open up
3. We are facing the task of
4. The existence of hundreds of computing centers will... .
5. The simple methods of automation will... .
6. As production techniques become more efficient they... .
7. Despite the numerous results of research in cybernetics, it is still hard to
8. The advance in the technical progress is... .

IX. Correct the statements if necessary using the phrases of agreement or disagreement:

1. The new science, known as cybernetics, occupies a leading place among the sciences of the future.
2. The objective of cybernetics is to study different living organisms.
3. The advances in different spheres of science slow down the pace of research.
4. Cybernetics is becoming increasingly important in our slowly expanding and bad planned economy.
5. At present there are only some electronic computers in operation throughout the world.
6. Controlled by cybernetics, industrial enterprises will operate at their most efficient peak.
7. Simple methods of automation used for some technologies will become more and more complicated.

X. Answer the following questions:

1. What is cybernetics as a new science?
2. What is the objective of cybernetics?
3. How do advances in different spheres of science influence their pace of research?
4. What tasks are we facing now?
5. How many computers are there in operation throughout the world?
6. What way will industrial enterprises operate when controlled by cybernetics?

XI. Translate the following sentences into English:

1. Нова наука, що займається проблемами посиленого контролю та керування процесами, відома як кібернетика, посідає чільне місце серед наук майбутнього.

2. Прогрес у теорії інформації, математичній логіці, електроніці та кібернетиці відкриває великі перспективи прискорення темпу дослідження в різних галузях наук.

3. Роль, яку грає кібернетика в збільшенні ефективності зайнятих у плануванні, фінансовій справі, постачанні та інших сферах економічної діяльності також зростає.

4. Зараз тисячі електронних комп'ютерів знаходяться у використанні по всьому світові.

5. Контрольовані кібернетикою промислові підприємства будуть працювати дуже гарно і це, у свою чергу, приведе до значної економії часу і ресурсів.

6. Посилення технологічного прогресу – це результат прояву таланту, винахідливості та зусиль людини, цього великого володаря природи.

XII. Read the following text, try to catch the plot of it, paying attention to the active vocabulary. Be ready to do the exercises after it:

THE ICON OF THE AMERICAN BUSINESS

Has everyone heard of Bill Gates? He is the icon of business and the richest man in the world. Microsoft, the business he started with a friend in 1975, has become the world's largest computer software company. Bill Gates was born on October 28th, 1955, in Seattle, USA. From his parents Bill received a good business sense and a quick mind.

At school Bill soon showed that he was very intelligent. His favourite subjects were Maths and Science. At 13 he got interested in computers. Bill Gates and his friend Paul Allen were soon spending all their time writing programs and learning computers instead of doing their homework. After finishing school Bill entered Harvard, the most famous University in the USA. Most of the time he worked on the computers in the University laboratory. He and Paul Allen wrote an operating program for the Altair, one of the world's first microcomputers.

Bill left Harvard before finishing his studies. Two friends started Microsoft in 1975, and very soon it became successful. In 1980 Gates bought a small company that produced an operating system called DOS. He made some changes and renamed it MS-DOS. He sold the rights to use this system to IBM. Since 1980 MS-DOS has been the standard operating system for all PCs. Microsoft has also developed such well known programs as Windows, Excel and Internet Explorer.

Bill's dream is to computerize everything – TV's, telephones, even the way we cook dinner.

One reason of his success is that Bill has always been very ambitious and hard-working. Bill Gates has written two famous books: «The Road Ahead» and «Business and the Speed of Thought». Both books are best-sellers. Bill hasn't got much free time, but when he has a chance he likes playing golf and bridge. He is also fond of reading about science.

For such a rich person his life is very simple, and he spends very little time on himself. When it comes to helping others, Gates is very generous. He has already given more than \$ 300 million to charity.

Discuss the following questions in groups:

- What is a reason of the fact that Gates is called the icon of business?
- Is it possible to repeat such a career?
- Can we wait for the new inventions in computer programming?

XIII. Read this interview with Lynn Dermott, who works for the Low Pay Unit. This is a voluntary organization which monitors the effects of government policy and union action on the worst-paid members of the work force. She talks about possible future trends in working conditions. Computers and the development of the communications industry could mean that many people will work at home.

I = Interviewer;

D = Lynn Dermott.

I.: Miss Dermott, do you think that technology has advanced so far that soon many people could work at home instead of working in offices in the centre of towns?

D.: Oh, yes. It's happening now. You see there have been such enormous advances in the communications industry, with mini- and micro-computers, and, of course, now with cable TV on its way, many people are already working from home who traditionally have had to go into an office every day.

I.: And how do these people manage to work? I mean, what equipment do they have at home?

D.: Well, they have a home terminal that consists of a television, a keyboard and computer, a printer, and a telephone link, to link up to other computers.

I.: Oh, I see. But surely there are many advantages in being able to work from home?

D.: Oh, yes. I mean, people spend a lot of their working day actually getting to and from their place of work, never mind the expense of that, and the stress it can cause. I mean the rush hours... Besides, people don't want to live actually in the centre of cities and towns. And of course the transporting of so many people causes pollution in our cities.

I.: Oh, yes, I see. So what is it that you don't like about the conditions of home-workers?

D.: What I'm afraid of is that the employer doesn't have to accept his

responsibilities. Basically there are three things that might happen. One – lower wages, two – no job security, and three – poorer working conditions.

I.: Why should people working at home be paid a lower wage?

D.: Well, indeed we've done surveys that show that even skilled computer operators are paid nearly £ 2 an hour less than their counterparts in offices. And under British law people working at home, you probably didn't know this, have no protection against unfair dismissal, no sickness benefits and no holiday pay. The employer also has no legal obligation whatsoever to ensure reasonable working conditions.

I.: Yes, but surely such arrangements suit some people, particularly women? If they have young children they don't want to travel a long way from home. And perhaps they want the advantages of flexi-time, where they have a number of hours to do but they can choose when to do them?

D.: Well, of course that's true. These types of arrangements do suit a lot of people. Now, what is clear is that the new technologies are radically changing the working lives of people. We are in favour of the benefits and freedoms that might come with this new situation but we also want to warn people of the risks.

I.: Thank you, very much.

Answer the following questions:

- What in your opinion are the main advantages and disadvantages of working at home?
- Could you do your job at home if you had the right equipment?
- Do you think that soon we will do our shopping by computer from home, and that we will even be able to consult the doctor from home?
- If telephones had television screens with them, how many jobs could be performed from home? (teaching? / selling? / accountancy? / designing?)

UNIT 2 THE ROLE OF COMPUTERS IN BUSINESS

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|-----------------|--------------------------------------|
| 1) to store | 1) запасати; 2) зберігати на складі; |
| 2) application | використання, застосування; |
| 3) increasingly | значною мірою; |
| 4) neighboring | сусідній; |
| 5) advancement | 1) просування; 2) прогрес, успіх; |
| 6) secrecy | секретність; |
| 7) vendor | продавець; |
| 8) purchase | покупка; |
| 9) transaction | переказ грошей; |
| 10) receive | отримувати; |
| 11) integral | цілісний. |

II. Translate the following international words:

process, telecommunication, fibre-optic cable, manager, distributor, financial institution, extensively, category.

III. Use the following words in your own sentences:

- *advancement* – 1) просування; 2) успіх;
- *to allow* – 1) дозволяти; 2) надавати, допускати; 3) визнавати;
- *to share* – 1) ділити, розділяти; 2) ділитися, володіти сумісно;
3) мати частку (у чомусь), брати участь.

IV. Words to remember:

- 1) the processing of payroll – обробка платіжної відомості;
- 2) to involve the secrecy and protection – застосовувати секретність та захист;
- 3) to transmit data – передавати дані;
- 4) to transfer money – переказувати гроші;
- 5) electronic purchase order – електронне замовлення;
- 6) day-to-day business transaction – буденні комерційні операції;
- 7) as well as – також і як;
- 8) long-range planning – довгострокове планування;
- 9) Local Area Networks – локальна мережа;
- 10) Wide Area Networks – глобальна мережа;
- 11) Electronic Funds Transfer – електронний переказ платежів;
- 12) Electronic Data Interchange – електронний обмін інформацією.

THE ROLE OF COMPUTERS IN BUSINESS

When first developed, computers were not used in business. It was not until the late 1950s and early 1960s that computers began to be used to organize, store, process, and present vast amounts of business information. In 1954 the first business application of a computer system was made for the processing of payroll.

By performing data processing tasks such as accounting computers are playing an increasingly important role in business.

The introduction of new computer technology changes the way businesses compute. Telecommunications advancements such as the Internet have shown themselves to be extremely useful in business. Using fibre-optic cables, business people may be linked by a nation wide network of «information superhighways».

Networks are usually divided into two categories. *Local Area Networks*, or LANs, transmit data throughout a building or sometimes a number of neighboring buildings. Enterprise networking ties together multiple firms. Producers are able to share their information with suppliers as quickly as their managers get it. Similarly, manufacturers will be able to share information with distributors rapidly. A major problem here involves the secrecy and protection of information. *Wide Area Networks* (WAN) transmit data from one city or one country to another.

Electronic Funds Transfer (EFT) allows organizations to transfer money from one location to another. Financial institutions are the biggest users of EFT systems, but other organizations also use them extensively. *Electronic Data Interchange* (EDI) allows organizations to communicate electronically with vendors, customers, and other parties. A company may send electronic purchase orders to its vendors and receive electronic orders from its customers.

So, computers have become an integral part of day-to-day business transactions as well as analytic tools for long-range planning, research, and development.

TEXT-BASED ASSIGNMENTS

I. Find out synonyms:

- | | |
|--------------------|----------------|
| 1) to store; | a) to send; |
| 2) an application; | b) a producer; |
| 3) an advancement; | c) a salesman; |
| 4) a manufacturer; | d) daily; |
| 5) location; | e) to keep; |
| 6) a vendor; | f) progress; |
| 7) day-to-day; | g) use; |
| 8) to transfer; | h) place. |

II. Translate the words; state their part of speech according to the word-building elements:

application, increasingly, advancement, organization, electronically.

III. Translate the following word-combinations into Ukrainian:

the processing of payroll, to be able to share information with suppliers, a major problem, an electronic purchase order, an integral part of day-to-day business transactions, analytic tools.

IV. Insert the prepositions:

Of, with, by, from, to, for

vast amounts ___ business information;
 to be made ___ the processing of payroll;
 to be linked ___ a nation wide network;
 to share their information ___ suppliers;
 to transfer money ___ one location ___ another;
 to send electronic purchase orders ___ its vendors;
 analytic tools ___ long-range planning.

V. Correct the statements if necessary using the phrases of agreement or disagreement:

AGREEMENT

You are quite right.
 I agree with you.
 Your statement is correct.
 I share your point of view.

DISAGREEMENT

You are wrong.
 I disagree with you.
 Nothing of the kind!
 You are mistaken.

1. When first developed, computers began to be used to organize, store, process, and present vast amounts of business information.
2. The Internet has shown itself to be extremely useful in business.
3. Networks are usually divided into two categories: Local Area Networks and Wide Area Networks.
4. Electronic Funds Transfer (EFT) does not allow organizations to transfer money from one location to another.
5. Computers have become an integral part of day-to-day business transactions.

VI. Answer the following questions using the phrases given below:

As far as I know
As far as I can judge
In my opinion
To my mind
For all I know
It is evident that

1. When did computers begin to be used in business?
2. What capacities do computers have?

3. What are some aspects of business in which computer systems are used?
4. What can computers do efficiently?
5. Why does a business need to manage information as a resource?
6. What categories of network are there?
7. What does Electronic Funds Transfer (EFT) allow organizations to do?
8. What does Electronic Data Interchange (EDI) allow organizations to do?

VII. Translate the given sentences:

1. Комп'ютери не застосовувалися в бізнесі із самого початку їхнього запровадження.
2. У 1954 році стало можливим перше застосування комп'ютерної системи для обробки платіжної відомості.
3. Прогрес у телезв'язку, Інтернет, наприклад, став дуже корисним для діловодства.
4. Мережі, зазвичай, поділяються на 2 категорії: локальні та глобальні.
5. Комп'ютерна мережа об'єднує численні фірми.
6. Виробники спроможні надавати інформацію постачальникам, як тільки менеджери її отримують.
7. Компанія може надсилати електронні замовлення своїм продавцям і отримувати їх від покупців.

VIII. Working with a partner discuss these issues. Share your arguments with your groupmates.

1. Think of all the computer jobs that have been created since the very first computer was used by a business in 1954.
2. In the 1950's many people underestimated the importance of computers. What are the examples to prove this?

IX. Read the following text, try to catch the plot of it, paying attention to the active vocabulary. Be ready to do the exercises after it.

TYPES OF COMPUTER

Digital computers can be divided into six main types, depending on their size and power: they are mainframes, minicomputers, desktop PCs, laptops, notebooks and handheld computers.

«Mainframes» are the largest and most powerful computers. The basic configuration of a mainframe consists of a central system which processes immense amounts of data very quickly. This central system provides data information and computing facilities for hundreds of terminals connected together in a network.

Mainframes are used by large companies, factories and universities.

«Minicomputers» are smaller and less powerful than mainframes. They can handle multitasking, that is, they can perform more than one task at the same time.

Minicomputers are mainly used as file servers for terminals. Typical applications include academic computing, software engineering and other sophisticated applications in which many users share resources.

PCs carry out their processing on a single microchip. They are used as personal computers in the home or as workstations for a group. Typical examples are the IBM PC, or the Apple Macintosh. Broadly speaking, there are two classes of personal computer: (a) desktop PCs, which are designed to be placed on your desk, and (b) portable PCs, which can be used as a tiny notebook. This is why they are called «notebooks» and «laptops». The latest models can run as fast as similar desktop computers and have similar configurations. They are ideal for business executives who travel a lot.

The smallest computers can be held in one hand. They are called handheld computers or palmtops. They are used as PC companions or as electronic organizers for storing notes, reminders and addresses.

- **Read the text again and say if these sentences are true or false.**

Correct the false ones.

1. Mainframes are multi-user systems – they can be used by many people at the same time.
2. Mainframes are not used for processing large amounts of data.
3. Minicomputers are bigger and more powerful than mainframes.
4. «Multitasking» means doing a number of tasks at the same time.
5. The most suitable computers for home use are minicomputers.
6. Notebooks and laptops are less powerful than desktop computers.
7. Handheld computers are small enough to fit into the palm of one hand.

- **Work in groups. One person chooses a type of computer, the others ask questions trying to find out what type it is. Finally describe each sort of computer.**

- **Choose the correct adjective. Then fill in the gaps with the correct form of the adjective.**

1. (*light* / *heavy*) Laptops are ... than desktop computers, but ... than notebooks.

2. (*large* / *small*) The mainframe is the ... type of computer. A minicomputer is ... than a microcomputer.

3. (*common* / *good*) Personal computers are ... than mainframes but mainframes are ... than personal computers at processing very large amounts of data.

4. (*powerful* / *expensive*) Minicomputers are ... than mainframes but they are also ...

5. (*fast* / *cheap*) New computers are ... and sometimes ... than older machines.

6. (*powerful* / *expensive*) Laptops are often ... than PCs but they are not as ...

• **Put the words in brackets into the correct form to make an accurate description of sizes of computers.**

There are different types of computer. The (large) ... and (powerful) ... are mainframe computers. Minicomputers are (small) ... than mainframes but are still very powerful. Microcomputers are small enough to sit on a desk. They are the (common) ... type of computer. They are usually (powerful) ... than minicomputers.

Portable computers are (small) ... than desktops. The (large) ... portable is a laptop. (Small) ... portables, about the size of a piece of writing paper, are called notebook computers. Subnotebooks are (small) ... than notebooks. You can hold the (small) ... computers in one hand. They are called handheld computers or palmtop computers.

UNIT 3 BUSINESS COMPUTER SOFTWARE

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|-----------------|--------------------------------|
| 1. Software | програмне забезпечення. |
| 2. Procedure | процедура. |
| 3. Standardized | стандартизований. |
| 4. Frequently | часто. |
| 5. Appropriate | слухний, відповідний. |
| 6. Package | пакет, готова програма. |
| 7. Spreadsheet | великоформатна таблиця. |
| 8. Shareware | випробувальна версія програми. |
| 9. Schedule | розклад. |
| 10. Summarize | підбивати підсумки. |

II. Translate the following international words:

electronic equivalent, visually, command, addresses, file.

III. Word-combinations to remember:

- 1) the proper sequence of steps – слухна послідовність кроків;
- 2) the right hardware – правильне забезпечення;
- 3) an accountant's worksheet – бухгалтерський листок обліку роботи;
- 4) deleting unnecessary information – видалення непотрібної інформації;
- 5) to create reports – створювати доповіді;
- 6) drawing bar graphs – креслення гістограм;
- 7) to retrieve information from databases – вилучати інформацію з баз даних;
- 8) to summarize information visually – візуально (наочно) підбивати підсумки даних;
- 9) pie charts – секторні діаграми;
- 10) line charts – лінійні графіки;
- 11) to receive electronic mail – отримувати електронну пошту;
- 12) spreadsheet program – програма табличних розрахунків;
- 13) database programs – програма бази даних;
- 14) computer graphics programs – програма комп'ютерної графіки;
- 15) communications software – програмне забезпечення передачі даних.

BUSINESS COMPUTER SOFTWARE

Software refers to the programs and procedures that make it possible to use the computer. A program is a detailed set of instructions that tells the computer what to do, how to do it, and the proper sequence of steps to follow. Programs are

written in special computer languages by trained people called computer programmers. There are a number of different computer languages used in data processing; COBOL (Common Business Oriented Language) is the one used most frequently in business computer applications.

Today it is more important to find the right software before finding the right hardware. A business person must decide what functions he wants performed by a computer and then choose the appropriate software.

A spreadsheet program is simply the electronic equivalent of an accountant's worksheet. A spreadsheet is a table made up of rows and columns which enables a manager to organize information.

Database programs allow working with information one normally keep in lists: names and addresses, schedules, inventories, and so forth. Simple commands allow adding new information, changing incorrect information, and deleting out-of-date or unnecessary information. Most programs have features that let print only certain information, arrange records in the order you want them, and change the way information is displayed. Using database programs one can create reports with exactly the information you want and the way you want the information to appear.

Computer graphics programs can use data from spreadsheets to visually summarize information by drawing bar graphs, pie charts, and line charts.

Communications software makes it possible for different brands of computers to transfer data into each other. These programs enable a computer to exchange files with other computers, retrieve information from databases, and send and receive electronic mail (messages by computer).

The technological development of computer hardware and software has affected the modern world in numerous ways. Business is one of the areas in which the effect has been the greatest.

TEXT-BASED ASSIGNMENTS

I. Find out synonyms:

- | | |
|--------------------|-----------------------------------|
| 1) to perform; | a) a bookkeeper; |
| 2) an accountant; | b) to eliminate, to erase; |
| 3) schedule; | c) to do, to execute, to fulfill; |
| 4) to delete; | d) time-table, plan; |
| 5) to affect; | e) old-fashioned; |
| 6) trained people; | f) to influence; |
| 7) out-of-date; | g) professionals. |

II. Revise your knowledge of computer terms. Match the terms with their definitions:

<i>Term</i>	<i>Definition</i>
1. Computer system	a) the part of a computer system that presents results to users, either visually on a screen or in printed form;
2. Hardware	b) the part of the computer's CPU that houses the computer's memory of those programs it needs in order to operate;
3. Input device	c) any medium that can be used to store data and information outside the computers primary storage facility;
4. Central processing unit	d) a device through which data are entered into the computer system;
5. Primary storage	e) the physical components of a computer system;
6. Output device	f) an electronic method of turning data into information, its five components are hardware, software, people, control and data;
7. Secondary storage	g) programs that instruct the computer what to do;
8. Software	h) a program that process data according to the special needs of the user;
9. Application program	i) the part of the computer system in which data processing takes place

III. Give Ukrainian equivalents:

I. the proper sequence of steps to follow, adding new information, changing incorrect information, deleting unnecessary information, arrange records in the order you want them, to exchange files with other computers, to receive electronic mail, a table made up of rows and columns.

IV. Complete the following statements:

1. A program is a detailed set of instructions that... .
2. Computer programmers are trained people that... .
3. A spreadsheet program is simply the electronic equivalent of... .
4. Database programs allow working with information... .
5. Computer graphics programs can use data from spreadsheets to... .
6. Communications software makes it possible for different brands of computers to... .

V. Answer the following questions:

1. What plays a more important role – hardware or software? Why? Which one would you prefer to work with if you were going to specialize in computers?
2. What does software refer to?
3. What types of computer hardware and software are available?
4. What computer language is commonly used in business? What are some of the other computer languages?
5. How much do the hardware and software cost (to acquire, operate, and upgrade)?

VI. Translate the sentences into English:

1. Програмне забезпечення – це програми й процедури, які уможливають користування комп'ютером.
2. Програми укладаються спеціальною комп'ютерною мовою кваліфікованими людьми, яких називають програмістами.
3. Бізнесмен повинен спершу визначити, які функції має виконувати його комп'ютер, а вже потім підбирати відповідне програмне забезпечення.
4. Великоформатна таблиця – це таблиця, яка складається зі стовпців та рядків, що дозволяють менеджеру організувати інформацію.
5. Прості команди дозволяють додавати нову інформацію, змінювати неправильну інформацію, видаляти стару та непотрібну інформацію.
6. Технологічний розвиток апаратного та програмного забезпечення мав великий вплив на сучасний світ.

VII. Complete the passage below, choosing the appropriate words:

hardware, saved, programs, retrieved, desktop publishing programs, mainframe computer, communication programs, database management programs, network, IBM compatible, spreadsheets, word processing, graphics, software, keys in / types in, accounting programs, personal computers.

Computer ... consists of a computer, a monitor, a keyboard, a printer, and their connections. The ... contains the various ... you run on your computer. The most common programs used in business are those for ... (writing letters, documents, etc.), ... (for budgets and financial analysis), ... (for keeping names and addresses of customers), ... (for book keeping), ... programs (for drawing charts, etc.), ... (for electronic mail), ... (for producing manuals, catalogues, etc.). The operator ... the information which can be ... and ... at a later date.

Most businesses nowadays use ... or PCs, which are often linked together in a local This is a big change from the days when time had to be rented on a Nowadays these are only used by very large businesses, Universities, or Government departments. The two most popular types of computers currently are those of IBM and Apple (the Macintosh). It was IBM who set the standard for the PC which others later imitated. That is why, to be able to use the widest range of software, a computer has to be

VIII. Discuss the following questions. Support your opinion with arguments:

1. Consider a problem of a «pirate», unlicensed usage of the application software. Is it illegal or may be considered as acceptable under some circumstances? Think about your response in the situation when you find out that all the software and applications at your working computer are unlicensed.

2. Do you consider it being a problem when the more young people use computers in their day-to-day life, the less their ability to write by hand and without spelling check is?

IX. Put the right words in the proper blank spaces. Working with a partner enact the dialogue and continue it:

click, menus, save, mouse, copy, delete, personal computer, word processing, disk, point, spreadsheet, printer, icons, file, select, figures.

A.: So where's the new PC?

B.: PC?

A.: ...

B.: Oh, it's here. But what's the thing you're moving around with your hand?

A.: It's a ...

B.: A what?

A.: Let's switch it on and go into Windows. No, look at all these ... on the screen.

B.: OK.

A.: If ... the cursor at one of them and then double ..., I can open any of them up and take a look inside.

B.: And what is inside?

A.: Well, let's do a bit of ... first – that's just way of saying you're going to create some text.

B.: You mean I'm going to type something.

A.: That's right. You can open up a new ... and then you can access any of these pull-down ... like this.

B.: But what if I type something and make a mistake?

A.: You can ... it like this. But it's also very important to ... everything you produce. You can do that onto a ... in File Manager, here.

B.: And what if I want to move some text from one place to another?

A.: You ... all the text you want to move and then move it like this. And you can also ... text like this.

B.: And how do I get it from the screen onto paper?

A.: Your computer is connected to a ... and so you can send a message to it from here.

B.: And what about figures? Can I add up?

A.: Yes, you can go into software like this and create a table with columns

and rows to enter ... in.

B.: Well, it's not bad, but can't it play any games?

X. Write an essay to disclose your opinion concerning the following questions:

- What is the difference between data and information?
- Do different levels of management have different information needs?
- What features do computers provide to business that make them useful?

UNIT 4 ACCOUNTING INFORMATION SYSTEMS

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|----------------|---|
| 1) to retrieve | вилучати потрібну інформацію; |
| 2) invoice | рахунок-фактура; |
| 3) ledger | головна книга, гросбух; |
| 4) feasible | реальний, можливий (для здійснення); |
| 5) boundary | межа; |
| 6) reliably | надійно; |
| 7) routine | загальноприйнятий, стандартний, регулярний; |
| 8) digestible | такий, що легко засвоюється; |
| 9) value | справедлива оцінка, цінність, важливість; |
| 10) to extend | розширювати; |
| 11) to require | потребувати, вимагати. |

II. Translate the following international words:

system, norm, information, organization, creditor, to analyze, group.

III. While translating the text keep in mind the different meanings of the words:

- | | |
|-----------------------|--|
| <i>Interest</i> – | 1) зацікавленість і інтерес;
2) користь, перевага;
3) частка в капіталі;
4) відсотки на капітал;
5) (множина) капіталовкладення. |
| <i>Level</i> – | 1) рівень;
2) ступінь;
3) горизонтальна поверхня;
4) горизонт (у шахтах). |
| <i>Way</i> – | 1) шлях, дорога;
2) напрямок;
3) засіб, метод;
4) манера, особливість. |
| <i>To interpret</i> – | 1) пояснювати;
2) інтерпретувати;
3) перекладати (усно). |
| <i>To require</i> – | 1) наказувати, вимагати;
2) потребувати чогось. |

IV. Word-combinations to remember:

- 1) delivery systems – системи постачання;

- 2) labour unions – профспілки;
- 3) accounting data base – облікові бази даних;
- 4) for decisions-making purposes – з метою прийняття рішень;
- 5) financial statements – фінансовий звіт;
- 6) applications software – прикладне програмне забезпечення;
- 7) accounting system – система обліку, бухгалтерська система;
- 8) update ledger accounts – оновлювати рахунки в бухгалтерській книзі;
- 9) the boundaries of organizational entity – межі організації;
- 10) to be in digestible form – бути легким, зручним для засвоєння;
- 11) end-user computing – розрахунки для кінцевого користувача;
- 12) to implement – запроваджувати;
- 13) to meet the needs – задовольняти потреби.

ACCOUNTING INFORMATION SYSTEMS

Computerized accounting systems have become the norm in all the industrialized nations.

Accounting systems are the delivery systems that provide accounting information to users within an organization and to stockholders, creditors, government agencies, labour unions and others outside the organization. They process transactions, provide reports and support an accounting data base from which information can be retrieved when needed for decision-making purposes.

In accounting the applications software performs the tasks of direct interest to the user, such as processing invoices, printing checks, updating ledger accounts, and preparing financial statements.

Very little manual processing is still done because computers can process accounting data more rapidly, economically, and reliably. Computers have also made possible types of processing, as well as types of communication of accounting information, that were simply not feasible with manual systems.

Accounting systems can now extend beyond the boundaries of the organizational entity. The integration of accounting and other information systems has brought us closer to the dream of entering data once and using the data many times for many different purposes.

End-user computing and increased automation at all levels of processing have increased accountants value to organizations. Computers have revolutionized the accounting function. Accountants are free from routine manual or semi-automated processing tasks and can play a larger role in decision support. They can spend more time on analyzing and interpreting accounting information and making it available in digestible form to managers.

In small organizations accountants may perform all necessary accounting functions on microcomputers. In larger organizations accountants may use networked microcomputers.

So, an effective accounting information system should be carefully planned, designed, and implemented to meet the needs of the organization and its users. Today's accounting information systems are highly complex, extending into many spheres of the organization's activities. They provide information required by individuals and groups throughout the organization, and affect the way many people do their jobs.

TEXT-BASED ASSIGNMENTS

I. Try to identify the part of speech of the following words according to the word-building elements:

accounting, industrialized, creditor, rapidly, economically, reliably, organizational, to revolutionize, available, digestible, effective.

II. Interpret the meaning of the following correlated words:

Industry – industrial – industrialist – industrialization – industrially – industrious.

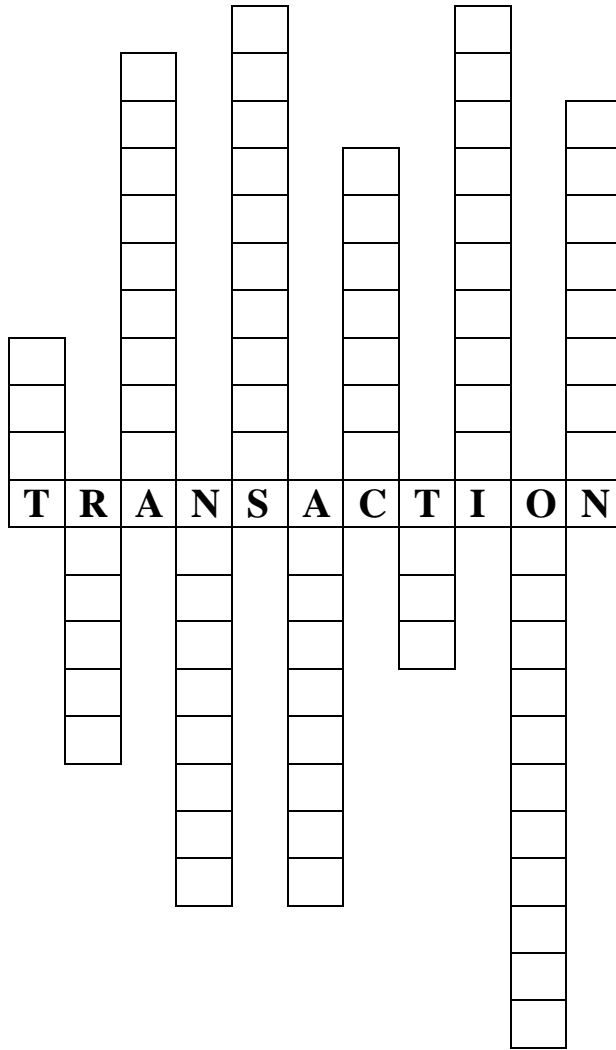
Use – useful – useless – user.

Differ – difference – different – differential – differentiate – differentiation – differently.

Organ – organic – organism – organization – organize – organizer.

III. Find out synonyms:

- | | |
|----------------|----------------------|
| 1. Value | a) method |
| 2. Accountant | b) shareholder |
| 3. Stockholder | c) to need |
| 4. To require | d) bookkeeper |
| 5. Way | e) worth, importance |

IV. Solve the crossword:

- T** – завдання;
R – доповідь, звіт;
A – розрахунковий;
N – необхідний;
S – акціонер;
A – доступний;
C – кредитор;
T – тип;
I – поєднання;
O – організація;
N – поєднаний в Інтернет-мережі.

V. Match Ukrainian and English equivalents:

- | | |
|------------------------------|--------------------------------------|
| 1. Computerized systems. | a) сприймати інформацію; |
| 2. Government agencies. | b) рахунок у бухгалтерській книзі; |
| 3. Financial statement . | c) цінність, важливість бухгалтерів; |
| 4. Manual processing. | d) різноманітні цілі; |
| 5. Different purposes. | e) ручна обробка даних; |
| 6. Accountants value. | f) фінансовий звіт; |
| 7. Ledger account. | g) урядові агенції; |
| 8. To interpret information. | h) комп'ютеризовані системи. |

VI. Translate the following word-combinations into English:

комп'ютерні системи обліку, урядові агенції, підтримувати облікову базу даних, робити запит на інформацію, обробка даних вручну, розрахунки кінцевого користувача, збільшувати важливість бухгалтерів для організації, напівавтоматизована обробка даних, робити доступним, з'єднувати мікро-комп'ютери мережею.

VII. Fill in the missing words using the active vocabulary:

1. Computerized ... systems have become the norm in all the industrialized nations.
2. Very little ... is still done because computers can process accounting data more rapidly.
3. Accounting systems can now extend beyond the boundaries of
4. Accountants are free from ... and can play a larger role in decision support.
5. In small organizations ... may perform all ... functions of computers.
6. An effective accounting information system should be planned, designed and implemented ... of the organizations.

VIII. Correct the statements if necessary using the phrases of agreement or disagreement:

AGREEMENT

- Surely!
- Certainly!
- Of course!
- Right you are!

DISAGREEMENT

- It's absurd!
- It's nonsense!
- On the contrary!
- Just the other way about!

1. Computerized accounting systems have become an unusual sight in the industrialized nations.
2. Accounting systems process transactions, provide reports and support an accounting data base.
3. In accounting the applications software performs the tasks of governing the country.
4. Very little manual processing is still done.
5. Accounting systems cannot now extend beyond the boundaries of the organizational entity.
6. Computers have revolutionized the accounting function.
7. Accounting systems don't affect the way many people do their jobs throughout the organization.

IX. Write the questions to the following answers:

1. _____? The norm in all the industrialized nations.
2. _____? Of direct interest to the user.
3. _____? More rapidly, economically, reliably.
4. _____? Accountants value to organizations.
5. _____? In larger organizations.
6. _____? To meet the needs of the organization and its users.

X. Translate into English:

1. Комп'ютерні системи обліку стали нормою в усіх промислових країнах.
2. Облікові системи підтримують бази даних, з яких можна зробити запит на інформацію, потрібну для прийняття рішення.

3. Облікові системи можуть зараз поширюватися далеко за межі організації.

4. У бухгалтерії облікові програми забезпечення виконують завдання, які безпосередньо цікавлять користувача: обробка рахунків, друкування чеків, оновлення рахунків у бухгалтерській книзі, підготовка фінансових звітів.

5. У малих організаціях бухгалтери можуть виконувати всі облікові функції на мікрокомп'ютерах, а у більших організаціях вони можуть використовувати мікрокомп'ютери, що об'єднані в мережу.

XI. Read this passage about a computer mouse. Fill in the gaps with the verbs from the list:

click, double-click, drag, grab, select, move, control.

A mouse allows you to (1) _____ the cursor and move around the screen very quickly. Making the same movements with the arrow keys on the keyboard would take much longer. As you (2) _____ the mouse on your desk, the pointer on the screen moves in the same direction. The pointer usually looks like an I-bar, an arrow or a pointing hand, depending on what you are doing.

A mouse has one or more buttons to communicate with the computer. For example, if you want to place the insertion point or choose a menu option, you just (3) _____ on the mouse button, and the option is chosen.

The mouse is used to (4) _____ text and items on the screen. You can highlight text to be deleted, or you can select an item from a check-box or questionnaire.

The mouse is widely used in graphics and design. When you want to move an image, you position the pointer on the object you want to move, press the mouse button, and (5) _____ the image to a new location on the screen. Similarly, the mouse is used to change the shape of a graphic object. For example, if you want to convert a square into a rectangle, you (6) _____ one corner of the square and stretch it into a rectangle.

The mouse is also used to start a program or open a document: you put the pointer on the file name and (7) _____ on the file name – that is, you rapidly press and release the mouse button twice.

UNIT 5 MANAGEMENT INFORMATION SYSTEMS

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|-----------------|---|
| 1) to request | робити запит; |
| 2) to overwhelm | (тут) перевищувати; |
| 3) to suit | підходити; |
| 4) promptly | швидко, одразу; |
| 5) furthermore | до того ж, більше того; |
| 6) essential | необхідний, суттєвий; |
| 7) overall | загальний, повний; |
| 8) accuracy | правильність, відповідність, акуратність; |
| 9) feature | риси; |
| 10) comparison | порівняння; |
| 11) internally | внутрішньо; |
| 12) retrieve | вилучати, шукати; |
| 13) arise | поставати. |

II. Translate the following international words:

strategic, specific, information, business, management, system, personal, administrative, transforming, organize.

III. Use the different meanings of following word in your own sentences:

- *Accuracy* – 1) точність, пунктуальність; 2) правильність.
- *To overwhelm* – 1) заливати, *перен.* засипати; 2) поглинати;
3) розбивати (ворога); 4) оволодівати, переповнювати (про почуття).

IV. Words to remember:

- 1) to meet the needs for – задовольняти запити;
- 2) to provide inexpensively and promptly – забезпечувати, постачати недорого й швидко;
- 3) to suit smb's particular needs – задовольняти чийсь особливі потреби;
- 4) decision support systems – системи підтримки прийняття рішень;
- 5) management information system – інформаційна система керування;
- 6) to download the data into personal computers – завантажувати дані до персонального комп'ютера;
- 7) decision-making at all administrative levels – прийняття рішень по всіх адміністративних рівнях.

MANAGEMENT INFORMATION SYSTEMS

Data can now be processed to meet the needs for management information. Managers can request specific types of information without the fear that the request

will overwhelm the accounting system's ability to provide it or that, by the time the information is available, the need will no longer exist. The information can be provided inexpensively and promptly.

Furthermore, the information can be communicated to the managers in different ways to suit their particular needs. Managers have the option of receiving printed data, of displaying the data on screens, or of downloading the data into personal computers.

There are two of the largest custom-made systems used by business Management Information Systems (MIS) and Decision Support Systems (DSS). Currently, businesses are developing overall management information systems in which computers function as essential tools in problem-solving and decision-making at all administrative levels.

A Management Information System (MIS) is an organized method of transforming data into information that can be used for decision-making. MIS needs will vary with the managerial level. Four features that make a computer useful in business are: speed of processing; accuracy of processing; ability to store programs; and ability to make comparisons.

A MIS collects, organizes, and distributes information to managers. In the past, such data were gathered and processed by an electronic data processing (EDP) department. The problem was that the reports sent to managers were often difficult to read, incomplete, and slow in coming.

The latest systems involve a network of computers that can communicate with one another internally. Thus, one manager can talk with other managers and either request information from an EDP department or call up the data on his or her own computer. Thus, all managers are able to receive data, manipulate the data at their desks, and communicate with one another if problems arise.

Decision Support Systems (DSSs) are interactive, computer-based information systems that retrieve, manipulate, and display information for managerial decision-making. Such a system allows managers to ask questions and receive answers in graphic form in addition to written reports. Decision Support Systems are largely designed for top managers. They provide data that assist in tasks such as strategic planning.

TEXT-BASED ASSIGNMENTS

I. Try to identify the part of speech of the following words according to the word-building elements:

decision, addition, comparisons, information, input.

II. Find the synonyms to the following words:

- | | |
|----------------|---------------|
| 1) to request; | a) nowadays; |
| 2) currently; | b) to demand; |
| 3) to receive; | c) to let; |
| 4) to allow; | d) to help; |

- | | |
|---------------|-------------------------------------|
| 5) to assist; | e) to get; |
| 6) essential; | f) fast, quickly, rapidly; |
| 7) promptly; | g) basic, fundamental, substantial. |

III. Give Ukrainian equivalents:

to assist in tasks, to vary with the managerial level, overall management information systems, to call up the data on one's own computer, essential tools in problem-solving, in addition to written reports, the accounting system's ability.

IV. Underline the predicate. Define the tense form of the following sentences. Put general questions to them:

1. The request will overwhelm the accounting system's ability to provide it.
2. The information can be communicated to the managers in different ways.
3. There are two of the largest custom-made systems.
4. Such data were gathered and processed by an Electronic Data Processing (EDP) department.

V. Complete the following sentences:

1. Managers can request specific types of information as...
2. Managers have the option of receiving...
3. A Management Information System (MIS) is an organized method of...
4. Decision Support Systems (DSSs) are interactive, computer-based information systems that...

VI. Answer the following questions:

1. In what ways can the information be communicated to the managers to suit their particular needs?
2. What is a management information system?
3. Where is a MIS the most effective?
4. What are Decision Support Systems?
5. What is the difference between MIS and DSS?
6. Why should one distinguish between MIS and EDP department?

VII. Translate the sentences into English:

1. Менеджери можуть робити запити щодо особливих типів інформації, не хвилюючись, що запит перевищить розрахункові можливості системи забезпечити цю інформацію або інформація вже не буде потрібною, коли менеджер її отримає.

2. Інформація може бути повідомлена менеджерам різними способами для задоволення їх потреб.

3. Інформаційна система управління – це організований метод перетворення даних у інформацію, яку можна використовувати для прийняття рішень.

4. Серед чотирьох рис, які роблять комп'ютер корисним у бізнесі, можна зазначити наступні: швидкість обробки даних, правильність обробки даних, здатність зберігати програми й здатність робити порівняння.

5. Найновіші системи об'єднують мережу комп'ютерів, які можуть у межах системи обмінюватися даними.

VIII. Try to fill in the words in the sentences. The figures in brackets () show the number of letters in the word. Use the necessary form of the word.

Chip, information, scroll, process, ROM, file, graphic, RAM, bug, load, system.

1. Problems in programs are caused by ... (4).
2. Silicon ... (5) contain a set of integrated circuits, reduced to a very small size.
3. Obtaining ... (11) is done by ... (10) data.
4. Software produces images which can appear on the screen as ... (8).
5. Memory that is permanent, cannot be written to, and can only be read, is ... (3).
6. Memory into which information can be loaded and from which data can be read, is ... (3).
7. Operators ... (4) into the computer's memory a program that they want to use.
8. Analyzing ways of doing things, and of improving them, is done by ... (7) analysts.
9. A single disk can contain a large number of different ... (5).
10. ... (6) lines of text up the screen, so that a new line appears at the bottom and the top line disappears.

IX. Read the text carefully. Put the words into the proper blank spaces. Use the necessary form of the word. Then answer the questions that follow and complete the tasks.

Dialing, productivity, cellular, telephone, e-mail, address, sharp attention, network, software, notebook, computer, personal computer, brain, spreadsheet, mainframe, to enhance, message, to process.

MULTITASKING

From the earliest time people have been trying to do several things simultaneously. They can read a book, cook dinner, talk on the phone, and do many other things at the same time. People drive, listen to the radio, eat, and smoke in the cars at the same time.

A lot of businessmen and managers are never far from their ... and They are almost always doing two or three things at once, driving and, speaking and typing on keyboards of their computers. On airplanes they are using their notebook computers to answer e-mail messages.

The computer industry introduced the word «multitasking» to the vocabulary. ... computers that handled ... were the original multitaskers. Apple's and Microsoft's... turned millions of personal computers into multitaskers.

Today millions of people can set their ...to multitask while they are themselves multitask: talking on the phone, receiving faxes, and looking through the newspapers at the same time.

While multitasking is not bad for computers, it may be a bad thing for some people. Psychologists say it is possible for the human brain ... two or more tasks at the same time, but only one of them receives Multitasking makes stressful lives of people more stressful. Experts say that although a lot of people believe that multitasking ... their ..., in fact it can reduce it.

Because of the limitation of human ..., multitasking can lead to many mistakes. Indeed, a person who is doing several things at the same time may put the wrong number in a... or send a ... to the wrong.... Moreover, people on the other end of the line don't usually like to talk to a person who is doing something else while talking to them.

1. Give some examples of multitasking.
2. Think and say whether you are a multitasker.
3. Do you consider multitasking a bad habit? Explain.
4. Is it dangerous to be a multitasker?

• **Decide whether the statements are true or not. Correct the wrong ones.**

Mainframe computer systems include several advanced processing procedures. Two of the most common processing procedures are multiprocessing and multitasking. Which of the following statements about these processing procedures is false?

1. Multiprocessing usually involves two or more computers functioning simultaneously.
2. Multitasking allows multiple programs to be executed at exactly the same time.
3. Multitasking switches back and forth between programs during processing.
4. Multiprocessing allows the sharing of a central memory during processing.
5. Multiprocessing allows multiple programs to be executed at exactly the same time.

X. Write an essay to disclose the following question:

Will computers be able to replace managers in an administrative capacity? Why or why not?

XI. Write an essay to disclose this question:

Describe the elements of a computer system. What people are involved in the construction and use of a computer system? Characterize the computer applications for business.

UNIT 6 THE INTERNET

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

- | | |
|--------------------|----------------------------------|
| 1. Embrace | охоплювати. |
| 2. Dangerous | небезпечний, ризикований. |
| 3. Drastically | рішуче, радикально. |
| 4. Gambling | азартна гра, гра на гроші. |
| 5. Destination | місце, пункт призначення. |
| 6. Intercept | зупиняти, затримувати, заважати. |
| 7. Notwithstanding | не дивлячись на, всупереч. |
| 8. Vainly | даремно, марно. |

II. Translate the following international words:

global, radiation, military experiment, technology, telephone, popular, server, provider, virus.

III. Use the different meanings of following word in your own sentences:

- *To switch* – 1) сікти (прутом); 2) перемикати (струм); 3) спрямовувати (думки, розмову) на іншу тему.
- *To intercept* – 1) бути перепорою; 2) зупиняти, заважати; 3) перехоплювати сигнал; 4) отримати незаконним шляхом (про інформацію); 5) перетинатися, відсікати (про відрізки).

IV. Words to remember:

- 1) to take the shortest and safest path – обирати найкоротший та най безпечніший шлях;
- 2) a single route – єдиний шлях, маршрут передачі інформації;
- 3) packet switching – пакетна комутація;
- 4) to stay in touch with each other – перебувати в контактi один з одним;
- 5) FTP (File Transfer Protocol) servers – сервер, який працює за протоколом передачі файлів;
- 6) to pay a good deal of money – платити велику суму грошей;
- 7) encoding programs – програми кодування;
- 8) to crack easily – легко «зламати» захист якого-небудь ліцензійного програмного забезпечення;
- 9) defensive and offensive technologies – захисні та наступальні технології.

THE INTERNET

The Internet is a global computer network, which embraces hundred of millions of users all over the world and helps us to communicate with each other.

The history of Internet began in the United States in 1969. It was a military experiment, designed to help to survive during a nuclear war when everything around might be polluted by radiation and it would be dangerous to get out for any living being to get some information. Information sent over the Internet takes the shortest and safest path available from one computer to another. Because of this, any two computers on the net will be able to stay in touch with each other as long as there is a single route between them. This technology was called packet switching.

Invention of modems, special devices allowing your computer to send the information through the telephone line, has opened doors to the Internet for millions of people.

Some people use the network only for sending and receiving e-mail messages. Other popular services are available in the Internet too. They are news, available on some dedicated news servers, telnet, FTP servers, game servers etc.

Commercial users can communicate cheaply over the Internet with the rest of the world. When they send e-mail messages, they only have to pay for phone calls to their local service providers, not for international calls around the world, when you pay a good deal of money.

But saving money is only the first step and not the last one. There is a commercial use of this network and it is drastically increasing. Now you can work through the internet, gambling and play through the net.

However, there are some problems. The most important problem is security. When you send an e-mail, your message can travel through many different networks and computers. The data is constantly being directed towards its destination by special computers called routers. Because of this, it is possible to get into any of the computers along the route, intercept and even change the data being sent over the Internet. But there are many encoding programs available. Notwithstanding, these programs are not perfect and can easily be cracked.

Other very serious problems are spam, control and viruses. Scientists try to solve this problem but vainly. Their efforts sink in the deep ocean of competition of defensive and offensive technologies.

TEXT-BASED ASSIGNMENTS

I. Read these words and say what part of speech they are formed of; translate them:

vainly, user, radiation, dangerous, constantly, defensive.

II. Translate into Ukrainian:

to communicate with each other, to help to survive, to be polluted by radiation, to be dangerous to get out for any living being, the shortest and safest path, to send the information through the telephone line, can easily be cracked, to solve this problem but vainly, to sink in the deep ocean of competition.

III. Translate into English:

глобальна комп'ютерна мережа, воєнний експеримент, бути забрудненим через радіацію, винахід модемів, відкрити двері до Інтернету, комерційні користувачі, провайдери локальної мережі, заощадження грошей, міжнародні дзвінки, спрямовувати дані, доступні кодувальні програми, бути досконалим, потонути в глибокому океані конкуренції.

IV. Match the pairs and translate them:

- a) through; b) into; c) of ; d) to; e) for; f) in.
1. to sink ... the deep ocean of competition;
 2. to get... any of the computers along the route;
 3. to play... the net;
 4. to pay... phone calls;
 5. to pay... the local service providers;
 6. because... this.

V. Many common English words have different meanings when they are used to talk about computer: *window, to surf, mouse, icon, menu, address, to crash, hardware*. Use the correct forms of the words to complete the sentences. Use each word twice.

Common usage

1. Could you open the *window*? It's hot in here.
2. My _____ is 223 Oak Street.
3. I went to the _____ store to buy a hammer.
4. The _____ ran into its hole.
5. I'm hungry, but I don't see anything I like on the _____ .
6. Marilyn Monroe is a movie _____ from the 1950s.
7. When I was in California, I went _____ every day.
8. He accidentally _____ his car into a tree.

Computer usage

1. My computer _____. Can you fix it?
2. Plug the _____ into the keyboard.
3. He is always _____ the net for the later news.
4. Open the other web page in a new _____ .
5. An _____ is a small picture on a computer screen.
6. The _____ is the machinery inside a computer.
7. First, click on an item in the _____ .
8. Do you know her e-mail _____ ?

VI. Match the computer terms (1-8) with their meanings (a-h).

- | | |
|--------------|--|
| 1) surf; | a) a list of choices; |
| 2) window; | b) tom@ mymail.com, for example; |
| 3) hardware; | c) a square area on a computer screen; |

- | | |
|-------------|--|
| 4) icon; | d) when a computer stops working; |
| 5) mouse; | e) a picture symbol; |
| 6) menu; | f) explore the Internet; |
| 7) address; | g) move this with your hand to move the arrow on the screen; |
| 8) crash; | h) computer parts. |

VII. Revise your knowledge of computer terms. Match the terms with their definitions:

<i>Term</i>	<i>Definition</i>
1. Browser	a) to press and release a button on your computer mouse;
2. Click	b) a collection of information stored on your computer with its own name;
3. Format	c) to start a program;
4. Internet	d) a little picture on your screen that you can click on with your mouse;
5. To lay out	e) a program used to view the Internet;
6. World Wide Web	f) a device that lets computers communicate through telephone lines;
7. File	g) to determine the size, shape and form of written document;
8. Modem	h) a series of commercial, educational and governmental web pages on the Internet;
9. Icon	i) a series of interconnected computers and databases around the world;
10. Launch	j) to design the technical arrangement of web page

VIII. Put questions to the sentences given below:

1. Today the Internet is so wide-spread service that it starts forcing out TV, newspapers and radio from our ordinary life.

2. The Internet is cheaper for press, agencies, news agencies or advertising agency to work in the net.

3. It doesn't mean that the Internet will abolish TV, newspapers or advertisement.

4. The Internet has started incorporating these services and in the future.

IX. Complete these sentences by putting the verb in brackets into the Present Simple or Present Continuous:

1. At the moment I _____ (work) on a program for schools.

2. We always _____ (ask) the users, not the managers, what they need from the system.

3. Paul is a database expert so usually he _____ (do) anything on databases and I _____ (get) the interfaces.
4. We _____ (use) Active Server for this project because it's a Web-based.
5. Commonly we _____ (use) C++ and Java Script.
6. Whenever we _____ (finish) part of a project, we put a copy of the software in a sub-folder as a record.
7. I _____ (subscribe) to two magazines.
8. Right now I _____ (try) to learn how to use Active Server properly.
9. At the moment we _____ (develop) a Web-based project.
10. It's a magazine for people who know what they _____ (do).

X. Answer the following questions:

1. Does the Internet have the strict definition?
2. How can the Internet be defined?
3. When did the history of Internet begin? Where?
4. How was this technology called?
5. How can people use the network?
6. What popular services are available in the Internet?
7. What way can businessmen use the Internet?
8. What important problems are there?

XI. Translate the sentences into English:

1. Інтернет – це глобальна комп'ютерна мережа, яка охоплює сотні мільйонів користувачів по всьому світові й допомагає нам спілкуватися одне з одним.
2. Історія Інтернету починається в Сполучених Штатах Америки в 1969.
3. Інформація, яку надсилають через Інтернет, обирає найкоротший та найбезпечніший шлях з одного комп'ютера на другий.
4. Винахід модемів, спеціальних пристроїв, які допомагають вашому комп'ютеру надсилати інформацію телефонними лініями, відкрив двері до Інтернету для мільйонів людей.
5. Деякі люди використовують Інтернет тільки для надсилання та отримання електронних повідомлень.
6. Зараз ви можете працювати та грати в азартні ігри за допомогою Інтернету.
7. Дані постійно спрямовуються в пункт призначення спеціальними комп'ютерами, які називаються маршрутизаторами.

XII. Read the text carefully. Put the words into the proper blank spaces:

significantly, resource, households, the impact, on a phone call, research, source, services

70 percent of U.S. (...) now use the Internet as an information (...) when

shopping locally for products and (...). This puts the Internet on a par with newspapers as a local shopping information (...), with the Internet likely to surpass (...) of newspapers in the very near future. Most of the Internet's growth for shopping (...) can be attributed to large search engines such as Google, Yahoo! and Ask Jeeves, the usage of which increased (...). The use of IP telephony is no longer limited to geeks with computer microphones who are willing to put up with an annoying delay and a bad connection to save a few bucks (...).

XIII. Read the text and find definitions of these items:

- | | | |
|---------------|-------------------|-------------|
| 1) menu; | 3) window; | 5) pointer; |
| 2) interface; | 4) active window; | 6) icon. |

Most computers have a Graphical User Interface (GUI). The interface is the connection between the user and the computer. The most common type of GUI uses a WIMP system. WIMP stands for Window, Icon, Menu (or Mouse), Pointer (or Pull-down / Pop-up menu).

A window is an area of the computer screen where you can see the contents of a folder, a file, or a program. Some systems allow several windows on the screen at the same time and windows can overlap each other. The window on the top is the one which is «active», the one in use.

Icons are small pictures on the screen. They represent programs, folders, or files. For example, the Recycle Bin icon represents a program for deleting and restoring files. Most systems have a special area of the screen on which icons appear.

Menus give the user a list of choices. You operate the menu by pressing and releasing one or more buttons on the mouse.

The pointer is the arrow you use to select icons or to choose options from a menu. You move the pointer across the screen with the mouse. Then you click a button on the mouse to use the object selected by the pointer.

UNIT 7 MODERN MEANS OF COMMUNICATION AND ELECTRONIC COMMERCE

PRE-TEXT EXERCISES

I. Memorize the pronunciation of the following words:

1) commerce	торгівля, комерція;
2) to compete	конкурувати, змагатися;
3) secure	надійний, застрахований;
4) essential	важливий;
5) autonomously	автономно, самостійно;
6) auction	аукціон;
7) entirely	повністю, зовсім;
8) fare	плата за проїзд;
9) cyberspace	кіберпростір;
10) to flourish	квітнути;
11) collaboration	співпраця;
12) virtual	віртуальний.

II. Read international words and give their Ukrainian equivalents:

electronic, sector, information, graphical, company, credit, agent, autonomous, specialist, automobile, geographic, equivalent, role, product, form, process.

III. While translating the text keep in mind the different meanings of the words:

<i>Secure</i> –	1) впевнений; 2) безпечний, надійний; 3) гарантований.
<i>Essential</i> –	1) існуючий; 2) невід’ємний; 3) важливий, основний.
<i>Order</i> –	1) соціальна група, клас; 2) відзнака; 3) порядок, послідовність; 4) фінансова вимога; 5) наказ, розпорядження.
<i>Sensitive</i> –	1) чуттєвий; 2) образливий; 3) швидко реагуючий на щось; 4) секретний.

IV. Word-combinations to remember:

- 1) to grow up overnight – вирости (утворитися) раптово, неочікувано;
- 2) sensitive information – секретні відомості, інформація;

- 3) to allocate goods and services – розміщувати товари та послуги;
- 4) intermediary services – посередницькі послуги;
- 5) to facilitate the sale – сприяти продажу;
- 6) to render a service – надавати послугу;
- 7) to deliver a remote education – надавати послуги з дистанційного навчання;
- 8) the former ... the latter ... – попередній та останній (про порядок розташування інформації);
- 9) real estate – нерухоме майно;
- 10) to make entire useless – робити повністю непотрібним, марним;
- 11) to enable ticketing – надавати можливість купувати квитки;
- 12) commodity products – товари, продукти для продажу;
- 13) electronic directory – електронний довідник;
- 14) electronic funds transfer – електронний переказ грошей;
- 15) stock market – фондова біржа;
- 16) to publish fare information – оприлюднити інформацію щодо вартості квитків.

MODERN MEANS OF COMMUNICATION AND ELECTRONIC COMMERCE

Since the mid-1990s electronic commerce has become one of the most rapidly growing retail sectors involving the use of computer telecommunication networks for maintaining business relationships and selling information, services and commodities.

A large part of e-commerce was transferred to the Internet after the first graphical «browser» software for the access to the World Wide Web had been introduced in 1993 and when the number of companies and individuals using «on-line» had greatly increased. In some fields new Internet retailers such as the *Amazon bookseller company* seem to have grown up overnight and begun successfully competing with traditional retailers. Most of recently established companies are known to include the electronic commerce in their business as well.

The further development of secure electronic transfer of sensitive information, such as credit card numbers and electronic funds transfer orders, is certainly to be essential to the continued growth of e-commerce.

Among other innovations that have contributed to the growth of e-commerce are electronic directories and search systems for finding information on the Web; software agents that act autonomously to allocate goods and services; and special identifying services over the Internet. These intermediary services facilitate the sale of goods (actually delivering the goods), the rendering of services such as banking, ticket reservations, and stock market transactions, and even the delivery of remote education and entertainment. Specialists consider electronic auction sales and markets to be other rapidly developing parts of e-commerce. The former offer a

large variety of goods from computers and electronics to books, recordings, automobiles and real estate, while the latter allow a buyer to choose offers from many sellers.

One should mention some more important benefits of e-commerce. Due to its development the role of geographic distance in forming business relationships is being reduced. If you were interested in the beginning of a retail business, it would be relatively inexpensive to start a retail Web site. Some traditional businesses are being replaced by their electronic equivalents or are being made entirely useless. Having published fare information and enabled ticketing directly over the Internet, airlines have greatly decreased the role of traditional agencies. Prices of commodity products are generally lower on the Web and it results not only from the lower costs of doing electronic business but also from the ease of comparison shopping in cyberspace. A new form of collaboration known as a virtual company is flourishing now. This type of company is actually a network of firms, each performing some of the processes needed to manufacture a product or deliver a service.

TEXT-BASED ASSIGNMENTS

I. Read the words, say what parts of speech they belong to:

electronic, rapidly, successfully, autonomously, buyer, relatively, inexpensive, useless.

II. Find the right English equivalent:

- | | | | |
|-----------------|-------------------|-----------------|-------------------|
| 1) роздрібний; | a) retail; | b) wholesale; | c) sailor; |
| 2) товар; | a) software; | b) commodity; | c) network; |
| 3) конкурувати; | a) compete; | b) read; | c) include; |
| 4) подальший; | a) further; | b) weather; | c) father; |
| 5) розміщувати; | a) to chose; | b) to market; | c) to allocate; |
| 6) нерухомість; | a) real state; | b) real estate; | c) unreal estate; |
| 7) переваги; | a) results; | b) benefits; | c) services; |
| 8) співпраця; | a) collaboration; | b) innovation; | c) tradition; |
| 9) мережа; | a) steelwork; | b) network; | c) homework. |

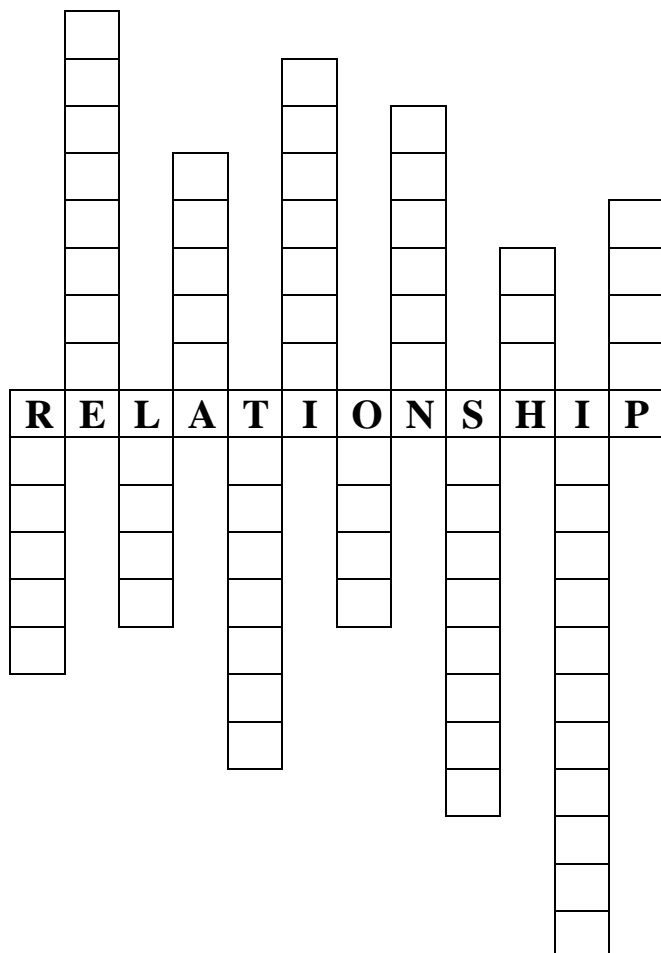
III. Find the synonyms to the following words:

- | | |
|---------------------|--------------------|
| 1) entirely; | a) to produce; |
| 2) increase; | b) to carry out; |
| 3) field; | c) goods; |
| 4) to facilitate; | d) cooperation; |
| 5) stock market; | e) customer; |
| 6) to offer; | f) Stock exchange; |
| 7) buyer; | g) to suggest; |
| 8) collaboration; | h) to assist; |
| 9) commodities; | i) sphere; |
| 10) to perform; | j) to enlarge; |
| 11) to manufacture; | k) completely. |

IV. Translate into Ukrainian:

rapidly growing retail sectors, computer telecommunication networks, graphical «browser» software, credit card numbers, electronic funds transfer orders, stock market transactions, electronic auction sales.

V. Solve the crossword:



R – роздрібний;
E – засновувати;
L – нижче;
A – доступ;
T – переказувати (гроші);
I – збільшувати;
O – пропонувати;
N – мережа;
S – секретний;
H – мати;
I – посередницький;
P – ціна.

VI. Write true (T) or false (F) for the sentences below according to the information given. Correct the statements if necessary using the phrases of agreement or disagreement:

1. Since the mid-1990s electronic commerce has become one of the most rapidly growing retail sectors.

2. A large part of e-commerce was transferred to the Internet after the first graphical «browser» software for the access to the World Wide Web had been introduced in 1987.

3. The further development of secure electronic transfer of sensitive information, such as credit card numbers and electronic funds transfer orders, is certainly not to be essential to the continued growth of e-commerce.

4. Specialists consider electronic auction sales and markets to be other slowly developing parts of e-commerce.

5. Some traditional businesses are being replaced by their electronic equivalents or are being made entirely useless.

6. Prices of commodity products are generally higher on the Web.
7. A new form of collaboration known as a virtual company is flourishing now.

VII. Answer the questions:

1. When did e-commerce become a rapidly growing retail sector?
2. Is there a competition between the Internet and traditional retailers?
3. What factors are essential to the continued growth of the e-commerce?
4. What innovations have contributed to development of e-commerce?
5. What goods are sold and what services are rendered through the Internet?
6. What role do electronic auction sales and markets play in e-commerce?
7. What are benefits of e-commerce?
8. What is the virtual company?

VIII. Translate the following sentences into English:

1. У середині дев'яностих електронний продаж став одним із роздрібних секторів, що зростали дуже швидко.
2. У деяких сферах Інтернет-компанії, здавалося, ставали дійсними за одну ніч і починали успішно конкурувати із традиційними роздрібними торговцями.
3. Подальший розвиток безпечних електронних переказів секретної інформації (номери кредитних карток, замовлення електронних переказів грошей) є обов'язковим для зростання електронної торгівлі.
4. Посередницькі послуги збільшують продаж товарів та надання послуг: банківські операції, замовлення квитків, біржові операції й навіть надання послуг із дистанційного навчання та розваги.
5. Спеціалісти вважають, що електронний продаж з аукціону та електронні ринки – це нові галузі електронної торгівлі, що дуже швидко розвиваються.

IX. Read the following text, try to catch the plot of it, paying attention to the active vocabulary. Be ready to do the exercises after it.

TECHNICAL DETAILS

Floppy disks are so called because they consist of flexible plastic material which has a magnetizable surface.

The surface of a disk is divided into concentric circles or «tracks», which are then divided into «sectors». When you insert a blank disk into a disk drive, it must be «initialized», or formatted, before information can be recorded onto it. This means that magnetic areas are created for each track and sector, along with a catalogue or «directory» which will record the specific location of files.

When you save a file, the operating system moves the read / write heads of the disk drive towards empty sectors, records the data and writes an entry for the directory. Later on, when you open that file, the OS looks for its entry in the

directory, moves the read / write heads to the correct sectors, and reads the file into the RAM area.

Hard disks work in the same way as floppies. But they have important advantages: they can hold much more data and spin at higher speed, so you can store and retrieve information much faster than with floppies. The speed at which a hard drive finds data is called «access time» – or seek time. The average access time is measured in milliseconds (ms). Most hard drives have an access time of 8 to 14 ms.

You have to distinguish between access time (e. g. 9 ms) and «data transfer rate» (the average speed required to transmit data from a disk system to the RAM, e. g. at 10 megabits per second). Remember that the transfer rate depends also on the power of your PC.

If you only use word-processing programs, you will need less storage capacity than if you use CAD, sound and animation programs. If you need an extra hard drive, you should consider the type of mechanism. There are «internal» and «external» drives which are both rigid disks sealed into the drive unit, either within or attached to the computer.

Another type of hard drive, known as «removable», allows you to record data on «cartridges», which can be removed and stored off-line for security purposes. Some systems allow you to back up your entire PC on one disk.

Laptops use pocket-sized drives. Digital cameras and music players use microdrives with special cards.

• **Read the text and match the terms on the left with the explanations on the right:**

- | | |
|------------------------|--|
| 1) backing store; | a) a catalogue of where each piece of data is stored and how to find it; |
| 2) floppies; | b) recording heads; |
| 3) disk drive; | c) secondary memory; |
| 4) formatting; | d) diskettes; |
| 5) directory; | e) initializing; setting tracks and sectors on magnetic disks; |
| 7) read / write heads; | f) a device which spins disks and contains a read / write head. |

• **Now read these sentences and decide if they are true (T) or false (F):**

1. Hard drives are faster than floppy drives.
2. «Access time» refers to the average time required for the recording heads to move and access data.
3. «Access time» and «data transfer rate» mean the same.
4. Hard disks use rigid rotating disks.
5. A hard drive is about 20 times faster than a floppy disk drive.
6. If you use multimedia applications you need the same storage capacity as required for word processors.
7. Removable cartridges are not transportable.

SUPPLEMENT

TERM STUDY

Summarize your knowledge of computer terms. Match the terms with their definitions.

Term	Definition
1. Management Information System (MIS)	a) a system designed to transform raw data into information that can be used for decision-making;
2. Control Unit	b) the part of the computer's CPU that locates instructions, transfers data to the arithmetic logic unit for processing, and transmits results to an output device;
3. Program	c) a sequence of instructions to a computer;
4. Hard Disks	d) rigid metal disks that are permanently enclosed in the computer; used for storing data and information;
5. Floppy Disk	e) portable disks that can be easily inserted into and removed from the computer; used for storing data and information;
6. Database	f) a centralized, organized collection of related data;
7. Database Management	g) applications programs that keep track of all relevant data in a business;
8. Modem	h) a computer-to-computer link via telephone wires;
9. Computer Graphics	i) applications programs that convert numeric and character data into pictorial information such as graphs and pie charts;
10. System Architecture	j) the way in which a computer system's data entry, data processing, database, data output, and computer staff are located;
11. Centralized System	k) a form of computer system architecture in which all processing is done in one location, using a centralized staff of systems analysts and programmers with a centralized database;
12. Decentralized System	l) a form of computer system architecture in which processing is done in many locations, using separate databases and computer staffs;
13. Computer Network	m) a group of interconnected computer systems at different locations that are able to exchange information with one another;

14. Local Area Network (LAN)	n) a network of computers and workstations, usually within a company, that are linked together by a cab;
15. Wide Area Network (WAN)	o) a network of computers and workstations located far from each other and linked together by telephone wires;
16. Microprocessor Chip	p) a single silicon chip, the size of a paper clip, that contains the computer's central processing unit; used by the fourth generation of computers;
17. Electronic Mailbox	q) a computer system that can electronically transmit letters, reports, and other information between computers

TEST

Choose the most appropriate answer to complete the sentence:

1. Raw facts and figures are:

- a) information;
- b) word processing software;
- c) management information systems;
- d) data.

2. Which of the following is designed to transform data into information that can be used for decision-making:

- a) decision support systems;
- b) word processing software;
- c) management information systems;
- d) system programs.

3. The physical components of a computer system are referred to as:

- a) hardware;
- b) software;
- c) programs;
- d) decision support systems.

4. Punched cards, a magnetic tape, a mouse, and a keyboard are examples of:

- a) software;
- b) decision support systems;
- c) the central processing unit;
- d) input devices.

5. Rigid metal disks that are permanently enclosed in the computer are called:

- a) floppy disks;
- b) hard disks;

- c) software;
- d) programs.

6. Programs that tell the computer what resources to use and how to use them are called:

- a) system programs;
- b) application programs;
- c) word processing programs;
- d) secondary storage programs.

7. Personnel who write the instructions that tell the computer what to do are:

- a) operations personnel;
- b) end-users;
- c) programmers;
- d) systems analysts.

8. A method of transforming data into information in which data is collected over a period of time and then processed as a group is called:

- a) word processing;
- b) batch processing;
- c) real-time processing;
- d) systems programming.

9. Programs that keep track of and manipulate all relevant data in a business are called:

- a) database management programs;
- b) spreadsheet programs;
- c) word-processing programs;
- d) decision support services.

10. The largest, fastest, and most expensive form of computer available today is the:

- a) microcomputer;
- b) minicomputer;
- c) supercomputer;
- d) mainframe computer.

11. A group of interconnected computer systems at different locations that are able to exchange information with one another is called a:

- a) computer network;
- b) centralized system;
- c) microcomputer;
- d) management information system.

12. A small electronic device that controls the flow of electric current without the need for a vacuum, whose application marked the start of the second generation of computers is the:

- a) microprocessor chip;
- b) integrated circuit;
- c) transistor;
- d) LSI circuit.

13. The construction and programming of computers to imitate human thought processes is called:

- a) debugging;
- b) artificial intelligence;
- c) generation;
- d) DSS.

14. A system that can electronically transmit letters, reports, and other information between computers is a (an):

- a) electronic mailbox;
- b) fax machine;
- c) expert system;
- d) CAM machine.

15. Properly prepared pieces of information that are put into the computer are termed:

- a) input;
- b) data;
- c) facts;
- d) information.

16. The manipulation step of data processing involves:

- a) handling data for a specific purpose;
- b) making the results available to the users;
- c) putting the information away for future use;
- d) getting the data into the computer.

17. Computer programs tell the computer:

- a) what to do;
- b) how to do something;
- c) the proper sequence of steps to follow;
- d) all of the above.

18. Computer programs are written by:

- a) computer analysts;
- b) computer programmers;

- c) computer operators;
- d) computers.

TEXTS

TEXT 1 DIGITAL COMPUTERS AND THEIR USES

In the digital computer the numbers to be manipulated are represented by sequences of digits which are first recorded suitable code – usually the binary code – and then converted into positive and negative electrical impulses, and stored in electrical or magnetic registers.

The technique of making the computer carry out calculations is known as «programming», which involves first breaking the calculation down into a sequence of arithmetic operations, and then preparing a series of instructions which make the computer carry out the required operations on the stored information, in the correct order. It is now possible to add or subtract two large numbers in one to two microseconds, and to multiply or divide them in ten to twenty microseconds.

There are many situations in which this ability to carry out and analyze large quantities of arithmetic data according to instructions is of great importance. Some examples are fields of scientific investigation such as crystallography, atomic physics and astronomy, where masses of experimental data are involved and complex theoretical concepts need to be tested against them; in engineering design where the design parameters, of which there are many, can be varied systematically and their effects studied and optimized; and for the storage of data in libraries.

A particular important application of the digital computer in simplified form is as a component in the control equipment of manufacturing processes – as the nerve centre which accumulates and analyses data recording the operating conditions and performances of the plant, and sends out instructions for their modifications. This is one aspect of what is called «automation» – the replacement of human control by instrumental control.

TEXT 2 ARTIFICIAL INTELLIGENCE

Expert systems are a class of computer programs that can advise, analyze, design, diagnose, explain, explore, forecast, form concepts, identify, interpret, justify, learn, manage, monitor, plan, present, retrieve, schedule, test and tutor. They address problems normally thought to require human specialists for their solution. Some of these programs have achieved expert levels of performance on the problems for which they were designed.

Expert systems are usually developed with the help of human experts who solve specific problems and reveal their thought processes as they proceed. If this process of protocol analysis is successful, the computer program based on this analysis will be able to solve the narrowly defined problems as well as an expert.

Experts typically solve problems that are unstructured and ill-defined, usually in a setting that involves diagnosis or planning. They cope with the lack of structure

by employing heuristics, which are the rules of thumb that people use to solve problems when a lack of time or understanding prevents an analysis of all the parameters involved. Likewise, expert systems employ programmed heuristics to solve problems.

Experts engaged in several different problems-solving activities: identify the problem, process data, generate questions, collect information, establish hypothesis space, group and differentiate, pursue and test hypothesis, explore and refine, ask general questions, and make a decision.

As researchers of the domain point out a robust expert system that can explain, justify, acquire new knowledge, adapt, break rules, determine relevance and behave as human experts do, will have to use a multitude of knowledge representations, that lie in a space whose dimensions include deep and surface (representations), qualitative / quantitative, approximate / exact, specific / general and descriptive / prescriptive representations.

Expert systems, like human experts can have both deep and surface representations of knowledge. Deep representations are causal models, categories abstractions and analogies. In such cases, we try to represent an understanding of structure and function. Surface representations are often empirical associations. With surface representations, all the system knows is that an empirical association exists; it is unable to explain why, beyond repeating the association. Systems that use knowledge represented in different forms have been termed multilevel systems.

Work is just beginning in building such multilevel systems, and they will be a major research topic for this decade. Work needs to be done in studying and representing in a general way the different problem-solving activities an expert does. When you build expert systems, you realize that power behind them is that they provide a regimen (управління): for experts to crystallize and codify their knowledge and in the knowledge lies the power.

TEXT 3 MICROELECTRONICS AND THE PERSONAL COMPUTER

The future increase in capacity and decrease in cost of microelectronic devices will not only give rise to compact and powerful hardware but also bring changes in the way human beings and computers interact. Both adults and children will be able to have as a personal possession a computer about the size of a large notebook with the power to handle all their information-related needs.

The personal computers can be regarded as the newest example of human medium of communication. The evolution of the personal computer has followed the path similar to that of the printed book, but in 40 years rather than 600. Like the handmade book of the Middle Ages the massive computers built in two decades before 1960 were coarse, expensive, available to only a few.

Just as Industrial Revolution made possible the personal book by providing inexpensive paper and mechanized printing and binding, the microelectronic revolution will bring about the personal computer. Ideally the personal computer

will be designed in such a way that people of all ages and walks of life can model and channel its power to their own needs. Architects should be able to simulate three dimensional space in order to modify their current designs. Physicians should be able to store and organize a large quantity of information about their patients. Composers should be able to hear a composition as they are composing it, especially if it is too complex for them to play.

Children should have an active learning tool that gives them ready access to large stores of knowledge in ways that are not possible with books.

TEXT 4 CYBERNETICS AND TRANSPORT

Man has always been striving to make physical work easier by using ever more efficient tools and mechanical means. The greatest progress has been made in the past 100 –120 years. In 1850 man's muscle power accounted for 15 per cent, animal muscle power for 79 per cent, and water, wind and steam machines for only 6 per cent of mankind's total power balance, nowadays the muscle power of men and animals constitutes about one per cent of the total power expenditure and the other 99 per cent is being generated by steam, gas, electric and other engines.

However, steady technological progress has been accompanied by growing intellectual and nervous strain on man connected with the control of new machinery. To see for yourself how true this is, just look into the driver's cab of a modern diesel locomotive, into the wheel-house of an oceangoing ship or into the cockpit of a modern airliner, with their multitudinous controls and indicator dials.

This has presented today's world with new problems. At present, there is only one way of solving these problems, namely, through extensive use of highly efficient means and methods of cybernetics. Its immense possibilities as a science dealing with the most general laws of control have opened up boundless prospects for the automation of complex and labour-consuming process in all spheres of human activities.

Horizons of Automation. Transport, a vast sphere of material production, has become one of the biggest spheres in which cybernetics methods are being applied. Large-scale research and experimental work are now being carried on in Ukraine with a view to automating transportation process by cybernetics methods in such spheres as locomotive driving, ship handling, air and marine navigation, current control over the functioning of big transport divisions, planning and technical work, such as the drawing up of cargo and passenger transportation plans, time-tables and schedules, the solution of engineering and scientific problems connected with designing, servicing and maintaining the basic units, accounting and stock-taking.

Let us dwell in greater detail on each of the above spheres. To drive a train, to steer a ship or plane strictly to schedule and at high speed, an engine driver, a helmsman or a flier should always look ahead, size up the situation quickly, set the necessary engine operation mode, use braking devices and manoeuvre.

At the same time, one has to ensure the normal operation of all units, using

the appropriate instruments. It goes without saying that the discharge of all these functions is beyond one man's physical and physiological powers. Previously, attempts were made to solve this problem by employing more men to serve as the engine driver's mates, ship mechanics and co-pilots. But this has had an adverse effect on labour productivity and has also violated the vital principle of one-man control. Specialists see a radical solution of the problem in the automation of transport control using the latest technical means and methods of cybernetics.

The first steps in designing a robot engine driver for heavy high-speed trains were made at the beginning of the fifties. The robot incorporated a small-size electronic computer with assorted transducers. All the necessary data – overall distance, time of covering each stretch of the route, speed limits, etc. were programmed and fed into the computer's storage. As the train rolled along, the electronic computer set the optimum speed on the basis of information coming in from the transducers.

A system with one central electronic computer controlling all the trains proved more rational for a closed railway network of the underground type. In this case, all the trains are fitted with actuating devices.

Our country is making substantial progress in the field of automatic ship control systems, above all in the main propulsion plant. World experience shows that the system of comprehensive process automation is the best; it cuts down the crews by 30 – 35 per cent, makes work easier, increases the reliability of machines and prolongs their service life.

New automatic equipment guaranteeing a high degree of ships' navigational and running safety is developed. This system issues timely warnings of obstacles in the ship's way and prevents collisions with other ships in conditions of poor visibility caused by fog, downpours or snowfall.

New automation systems will ensure the most rational cargo distribution on board large ships.

A large number of cybernetic problems are being tackled in air transport, too. The growing intensity of air traffic has called for the automation of its control. The world's biggest airports handle up to 1,000 planes a day. The dangerous situations that often arise as a result tell on an aerodrome's capacity.

The automatic air traffic system takes over a large proportion of the work involved in the information exchange between dispatcher and pilot. At the same time, it carries out all sorts of calculations and warns the dispatcher of potential dangers, thus taking a lot of nervous strain and effort out of his work.

TEXT 5 COMMUNICATION WITH COMPUTER

Programming languages can be divided into five generations. Machine language, the only language the computer's processor can understand, is first-generation language – the digits 0 and 1. Assembly language easier to work with than machine language because it allows the programmer to use abbreviations, is a second-generation language. (Both machine and assembly language are low-level

languages.) High-level, or third-generation, languages were developed to make writing software programs even easier by using human language (for example, Englishlike) statements.

Of the hundreds of high-level languages used today, the following are some of the more popular:

FORTRAN (FORmula TRANslator): the first high-level language, which was formulated for scientific and mathematical applications; this language does not handle the input and output of large volumes of data efficiently. It is not as structured as COBOL.

COBOL (Common Business Oriented Language): its development as a common programming language for business applications was funded by the U.S. government; this language is noted for its machine independence and its data processing and file-handling capabilities.

PL / I (Programming Language I): designed to combine the computational capabilities of FORTRAN and the data processing and file-handling capabilities of COBOL. Although flexible, it is harder to learn than COBOL and requires a great deal of main storage.

BASIC (Beginner's All-purpose Symbolic Instruction Code): developed at Dartmouth College for instructional purposes, but now used on computers and certain business systems to solve a variety of relatively simple problems.

RPG (Report Program Generator): introduced by IBM as a program geared to deal with clear-cut problems and produce reports; users can produce reports by filling out special coding forms and then entering the recorded data.

C: developed by Bell Laboratories as a tool for writing systems software such as UNIX. It works on a variety of different computers, including microcomputers. However, it is not good for checking types of data, and it has no input / output routines.

Pascal: named for French mathematician Blaise Pascal in 17th-century, developed to teach structured programming, has strong mathematical, scientific, and graphics processing capabilities and can be used on large and small computer systems; not used extensively in business.

Modula-2: an improved version of Pascal; better suited for business.

Ada: named for Augusta Ada Byron (1816–1852), daughter of the English poet, Lord Byron, Countess of Lovelace (the first programmer), and developed by the U.S. Department of Defense for use as an embedded system in computerized weapons systems.

Fourth-generation languages do not rely on a long list of detailed procedures that tell the computer *how* to do something. They just use human language statements to tell the computer *what* to do.

Natural languages, which some people refer to as fifth-generation languages, allow users and programmers to interact with the computer by using human language patterns, including misspellings and mistakes.

The advantages and disadvantages of each programming language relative to the information and systems needs of a company should be analyzed before a programmer begins a programming project.

TEXT 6 EUROPE LEADS RESEARCH IN OPTICAL COMPUTING

Until now, the switches inside computers have been electronic. European scientists are going to demonstrate the world's first optical computer. This demonstration will come 22 years after the theory behind optical computers was first predicted by researchers from the computer company IBM. However, there is still a large gap between what theoretical physicists believe can be done, and what electronic engineers know is possible.

In theory, optical switches leave their electrical counterparts standing. It is like comparing the speed of light with the speed of electricity. Optical switches are so fast and yet so small that an optical device of one square centimeter can resolve 10^7 separate spots of light and each can be switched on and off at a speed of 30 nanoseconds. This means that an optical device one square centimeter in area could, in theory at least, handle 3×10^{14} bits per second. This rate is equivalent to everybody in the world having a telephone conversation at the same time.

The optical switch works on the principle of optical «bistability». Usually, when a beam of light is passed through a transparent material, the relationship between the intensities of light entering and the light leaving is linear. However, under certain circumstances a non-linear relationship occurs. A small increase in the intensity of light entering the material leads to a much greater increase in the intensity of light leaving the material.

In optical switches, the material is placed inside a resonant cavity. In practice, this means that the edges of the material are highly polished and parallel to each other. With such materials some of the light entering becomes «trapped» inside as it bounces back and forth against each polished surface. In other words, it resonates. This changes the refractive index of the material, with the result that for a given intensity of light entering the switch are two possible intensities of light leaving it.

In other words, there is the equivalent to an «off» position and an «on» position because there are two stable states and the material shows optical bistability. Up to now a switching speed of 10^{13} seconds has been achieved, although the power needed to generate this is in the kilowatt range. A speed of one nanosecond (10^{-9}) is possible in the milliwatt power range.

TEXT 7 THE HISTORY OF INTERNET

The Internet is a huge network of computers spanning this planet. Some computers share data, others just surf the web as clients downloading the data. Everybody knows that the history of Internet began in the United States in 1969. It was a military experiment, designed to help to survive during a nuclear war. Public Internet began in the late 70's.

In 1973, one U.S. Defense Agency initiated a research program to investigate techniques and technologies for interlinking packet networks of various kinds. The objective was to develop communication protocols which would allow networked computers to communicate transparently across multiple, linked packet networks. This was called the «Interneting project» and the system of networks which emerged from the research was known as the «Internet».

In 1974 Vint Cerf and Bob Kahn used the term «Internet» for the first time in paper on Transmission Control Protocol. The system of protocols which was developed over the course of this research effort became known as the TCP / IP Protocol Suite, after the two initial protocols developed: Transmission Control Protocol (TCP) and Internet Protocol (IP). So, on January 1st, every machine connected to ARPANET had to use TCP / IP. TCP / IP became the core Internet protocol and replaced NCP, entirely.

During the late 1980's, however, the population of Internet users and network constituents expanded internationally and began to include commercial facilities. Indeed, the bulk of the system today is made up of private networking facilities in educational and research institutions, businesses and in government organizations across the globe.

Nowadays the Internet is very helpful because it's a huge database of knowledge, from the pictures of family trips to an analysis of quantum mechanics. Everyone should have the Internet because of its near instantaneous communication and huge wealth of knowledge.

Besides data, one can get from the Internet; we can also send and receive e-mail or electronic mail. This Internet service is cheaper than ordinary mail.

There are many news servers in the web. We can watch movies through the Internet, listen to music and radio, set conferences, etc. i. e. the Internet provides great number of possibilities to use that will help us in our everyday life.

The amount of transmitting information in the net is so huge that the carrying capacity of the net sometimes fails to transmit it. Currently the Internet Society is trying to figure out new TCP / IP to be able to have billions of addresses, rather than the limited system of today. The problem that has arisen is that it is not known how both the old and the new addressing systems will be able to work at the same time during a transition period.

Nowadays the Internet can bring entire libraries, if not classrooms, into the home – for just a few dollars a year. Already «on-line universities» exist, with more to come. It is accredited institutions which facilitate studies home, using texts and information administered over the Internet.

Financial transactions will become easier and faster than ever before. Through «digital cash» products coming soon to the market, purchases can be made without giving a credit card number and exposing it to risk of theft. Instead, the purchaser transmits digitally encoded bits of information which are accepted as «money» by other computers, and securely buys merchandise and services, pays bills, and even pays income taxes.

Television is expected to soon be linked into the Internet, expanding manifolds the entertainment, and information possibilities. Through the TV set will come information, transpiring news and job information. There will be movies on demand and interactive TV in which the audience participates in shows they watch.

Virtual reality, the whole field of equipment and programs which make possible such things as lifelike flight simulations, is also coming to the Internet for high-tech entertainment and also for instruction and training. This is just a sampling of what is yet to come.

Anyway future belongs to the Internet and new revolutionary technologies in computer industry.

TEXT 8 MODERN COMPUTERS

There isn't probably an area of human endeavour that has evolved as rapidly as computing technology has over the last 30 years. Along with that, we've also undergone some significant changes in terms of our understanding of the applications and effects of computing technologies.

On November 15th, 1971 the first microprocessor, the 4004, developed by Marcian E. Hoff for Intel, was released. It contains the equivalent of 2300 transistors and was a 4 bit processor. It was running at a clock rate of 108 KHz. This day became the beginning of the digital computer's era. Next year 8008 Processor released by Intel itself. The great work just began and in 30 years we have 64-bit computers running at a clock rate of 3.5 GHz. The increase in raw processing speed over this time is striking.

Digital computer is an electronic device that can receive a set of instructions that also is called a program, and then carry out them. Computers were invented last century and spread a lot for the last 30 years. Modern digital computers are all conceptually similar, regardless of size. Nevertheless, they can be divided into several categories on the basis of cost and performance. The first one is the personal computer or microcomputer, a relatively low-cost machine usually of desktop size, some, called laptops, are small enough to fit in a briefcase. The second is the workstation, a microcomputer with enhanced graphics and communications capabilities that make it especially useful for office work; and the server computers, a large expensive machine with the capability of serving the needs of major business enterprises, government departments, and scientific research establishments. The largest and fastest of these are called supercomputers.

A digital computer is not actually a single machine, in the sense that most people think of computers. Instead it is a system composed of five distinct elements: a central processing unit; input devices; memory storage devices; output devices and a communications network, called a «bus», which links all the elements of the system and connects the system itself to the external world. The most wide-spread computers in our country are PC computers or IBM clones.

Each brand is represented by several generations of PC microprocessors. Intel

microprocessors can be roughly divided into eight generations. The first generation was represented by processing unit Intel 8086. The second generation central processing unit was represented by processing unit Intel 80286, used in IBM PC AT 286. The third generation is represented by Intel 80386, used in IBM PC AT 386 SX and DX. The microprocessors of the fourth generation were used in computers IBM PC AT 486 SX and DX. There are also central processing units of the fifth generation, used in Intel Pentium 60 and Intel Pentium 66, central processing units of the sixth generation, used in computers Intel Pentium 75, 90, 100 and 133. Recently central processing units of seventh and eighth generations appeared.

The PC chip race, both in price and performance, has been ratcheting up between Intel and AMD. While the initial Pentiums ran at 75 MHz and 90 MHz, systems with chips running at over 3 GHz are commonplace now. The current race is to produce commercially viable 4 GHz chips.

It means that this computer will be capable of executing 4000 million discrete operations each second. Nowadays microcomputers can perform up to 3.6 million operations per second, and supercomputers used in research and defense applications attain speeds of many trillions of cycles per second. Also there is another technology to appear. It consists in two core sectors and 64-bit microprocessors. It means that the average computer speed will remain the same but productivity might be doubled. 64-bit computer is the next step in the evolution of computing, extending the original PC architecture to a new level of computing performance and capability, evolved a standard technology from a 32- to a 64-bit architecture. 64-bit computing allows operating systems and software to process more data and access a tremendous amount of memory.

Humanity is at the threshold of new computer era, when artificial intelligence might be invented. There are no questions with «if», the only question is «when». And time will show us either computer becomes our best friends or our evil enemies as it is shown in some movies.

TEXT 9 MAINFRAMES

Large computer systems, or mainframes, are those computer systems found in computer installations processing immense amounts of data. They make use of very high-speed main memories into which data and programs to be dealt with are transferred for rapid access. These powerful machines have a larger repertoire of more complex instructions which can be executed more quickly. Where a smaller computer may take several steps to perform a particular operation, a larger machine may accomplish the same thing with one instruction.

These computers can be of two types: digital or analog. The digital computer or general-purpose computer as it is often called makes up about 90 % of the large computers now in use. It gets name from the name of the data that are presented to it and which consist of digits. The digital computer can do calculations in steps at tremendous speed and with great accuracy. Digital computer programming is by far

the most commonly used in electronic data processing for business or statistical purposes. The analog computer works something like a car speedometer, in that it continuously works out calculations. It is used essentially for problems involving measurements. It can simulate or imitate different measurements by electronic means. Both of these types are made of electronic computers that may require a larger room to accommodate them. At present, the digital computer is capable of doing anything the analog once did. Moreover, it is easier to program and cheaper to operate. A new type of scientific computer system called the hybrid computer has now been produced that combines the two types into one.

TEXT 10 MINICOMPUTERS

Until the mid-1960s, digital computers were powerful, physically large and expensive. What was really needed were computers of less power, a smaller memory capacity and without such a large array of peripheral equipment. This need was partially satisfied by the rapid improvement in performance of the semiconductor devices (transistors), and their incredible reduction in size, cost and power – all of which led to the development of the minicomputer or mini for short.

Although there is no exact definition of a minicomputer, it is generally understood to refer to a computer whose mainframe is physically small, and has a fixed word length between 8 and 32 bits.

A large number of peripherals have been developed especially for use in systems built round minicomputers. They include magnetic tape, cartridges and cassette, small disk units and a large variety of printers and consoles.

Since the operating environment for most minis is far less varied and complex than large mainframes, it goes without saying that the software and peripheral requirements differ greatly from those of a computer which runs several hundred ever-changing jobs a day. The operating systems of minis also usually provide system access to either a single user or to a limited number of users at a time.

Since many minis are employed in real-time processing, they are usually provided with operating systems that are specialized for this purpose. Because minicomputer systems have been used so often in real-time applications, other aspects of their design have changed; that is, they usually possess the hardware capability to be connected directly to a large variety of measurement instruments, to analog and digital converters, to microprocessors, and to an even larger mainframe in order to analyze the collected data.

TEXT 11 MICROCOMPUTERS

The early 1970s saw the birth of the microcomputer, or micro for short. The central processor of the micro, called the microprocessor, is built as a single semiconductor device; that is, the thousands of individual circuit elements necessary to perform all the logical and arithmetic functions of a computer are manufactured as a single chip. A complete microcomputer system is composed of a microprocessor, a memory and peripheral equipment.

The processor, memory and electronic controls for peripheral equipment are usually put together on a single or a few printed circuit boards. System using microprocessors can be hooked up together to do the work that until recently only minicomputers systems were capable of doing. Micros generally have somewhat simpler and less flexible instruction sets than minis (minicomputers), and are typically much slower.

Different micros are available with 4-, 8-, 16-bit word lengths. Similarly minis can be equipped with much larger primary memory sizes; micros are becoming more powerful and converging with minicomputer technology.

In addition to their extensive use in control systems of all types, they are destined for many new uses from more complex calculators to automobile engine operation and medical diagnostics. They are already used in automobile emission control systems, are the basis of many TV game attachments. There is also a rapidly growing market for personal computers whose application potential in education is only just beginning to be exploited.

TEXT 12 THE COMPUTER REVOLUTION

«The computer, with its promise of a millionfold in man's capacity to handle information, will undoubtedly have the most far-reaching social consequences of any contemporary technical development. The potential for good in the computer and the danger inherent in its misuse exceed our ability to imagine.... We have actually entered a new era of evolutionary history, one in which rapid change is a dominant consequence. Our only hope is to understand the farces at work and to take advantage of the knowledge we find to guide the evolutionary process.»

Dr. Jerome B. Weisner

Without the computer space programs would be impossible and the 21st century would be impossible. The incredible technology we are building, the complexity and the knowledge we are amassing on the way toward the creation of the 21st century are all beyond the unaided mind and muscle of man. More than any other single invention, perhaps even more than wheel, the computer offers a promise so dazzling and a threat so awful that it will forever change the direction and meaning of our lives.

Computers today are running our factories, planning our cities, teaching our children, and forecasting the possible future we may be heir to.

In the new age of exploration the computer is solving in milliseconds the problems a generation of mathematicians would need years to solve without its help. The small, fifty-nine-pound computer, which takes up only one cubic foot of space in the vehicle will do all of the mathematics needed to solve one billion different space-maneuvering, navigation, and reentry problems. Moreover, it translates the answer into simple numbers and tells the astronaut the attitude to which he must bring the spacecraft before firing the thrusters, and indicate to him exactly how long they must be fired.

Even before a rocket is launched, it is flown from ten to a hundred times

through computer-simulated space on flights constructed of mathematical symbols, on trajectories built of information bits, encountering hazards that are numbers without menace. For one of the computer's greatest assets is its ability to simulate one or a million variants of the same theme. «What if?» is the question the computer can answer accurately, swiftly, and over and over again. From this variety of possibilities, a trip from the earth to the moon can be simulated as often as necessary, with every possible trajectory plotted and every mile of the journey through space marked with symbolic signposts that will provide assurance that, mathematically at least, man has traveled this way before.

The computer can do far more than simulate the mechanics of space flight; it can furnish accurate models of life itself. In computer simulation, then, there may come the great breakthrough needed to convert the inexact social sciences – the studies of a man as a social being – into exact science. For the sociologist the problem has always been the lack of an adequate yardstick by which to measure and count. The one absolutely essential tool of science is the measuring device. Anything that can be counted, measured, quantified, can be studied with scientific accuracy. Now it becomes possible to perform controlled experiments, in which every factor that goes in is known in advance and the answers that come out are then valid.

With computer simulation you can have a series of problems in which you can figure out all the ramifications, all the permutations and combinations, and do it very quickly and know the different combinations that are at stake. So you can use it really as a means of controlled experiment. You can get a computer model of a city and play out all the different effects, so that if you decide, for example, to relocate traffic in one way you can trace out very quickly, on the model, the effects on industry locations, residential densities, and the like. And more important, when you have alternative plans of this kind you can then choose, and that is the fundamental aspect of all such notions of planning. It allows you to have a sense of wider choice, to see therefore, the consequences of it and say, I prefer this scheme rather than another.

TEXT 13 MINICOMPUTER REVOLUTION

Only a few years ago, the calculator that could fit a vest pocket was still a dream. But thanks to rapid advances in semiconductor technology, the thousands of transistors and other components required to perform the four basic arithmetic operations (addition, subtraction, multiplication and division) have been placed in a single integrated circuit about the size of two postage stamps.

But these calculators are only a hint of things to come. We're going to see a true pocket computer in the near future. There will appear programmable calculators, machines that can accept complex instructions and use them to automatically perform mathematical operations – just like a computer. The major limitation for vest-pocket computers will be the size of the keyboard, not the electronics which will be required.

Improved memory technology will provide calculators with almost unbelievable capabilities during the next ten years of the calculator evolution. Even existing – semiconductor memories offer truly incredible storage possibilities. Scientists predicted existing semiconductor technology could be used to build a memory capable of storing an incredible 50 million bits of information. The memory would occupy a volume of only one cubic foot.

With only a million-bit memory it will be possible to use a pocket calculator as a combination of a computer, telephone directory, diary, note pad, appointment calendar and dictionary. Frequently used formulas, equations, hard-to-spell words, phone numbers, addresses, names, business contacts and data will be stored in the machine's memory simply by keying in the appropriate data. Readout will be achieved by a paper tape which rapidly and silently prints the requested information when an encoded instruction is keyed into the machine.

Sound impossible? Some of these capabilities are already available in existing pocket machines. For example, the HP-80 business calculator – a shirt-pocket-size device – incorporates a 200-year calendar in its memory. The miniature paper tape printers have already been developed and are in use on several machines slightly larger, but small enough to fit in the side pocket of a jacket.

Only the keyboard size will limit the miniaturization of vest-pocket computers. The keyboard will require keys for the entire alphabet, the ten digits and various function, memory, and instruction keys. Even with a special shift key to double the function of each key, as many as 35 or 40 keys will be required. A typical pocket calculator today has from 17 to 20 keys. Vest-pocket computers will require new kinds of keyboards or perhaps a stylus which is manually touched to various contacts.

As the use of pocket computers and other advanced machines becomes more widespread, their impact on society will become more and more. In schools, they are not only useful in solving problems in maths or physics, but they will store spelling clues for English courses, translations for language studies. In almost any subject they can serve as a teaching aid.

Already many people are using low cost add-subtract-multiply-divide pocket calculators to simplify income tax calculations, count calories, plan budgets and figure gasoline mileage.

The coming pocket computer will have even more everyday applications. Businessman will be able to better plan their schedules; minicomputers with built-in electronic clocks will automatically remind them of previously scheduled appointments and meetings. Investors will be able to analyze market trends and compare projected inflation rates with existing interest figures. And homemakers will have an electronic budget planner with a built-in over-spending reminder.

To top it all, an inexpensive device is now in the works which will permit you to program inputs to your minicomputer's memory bank. It will give you phone numbers on demand, tell you how to spell tough words, perform dozens of complex operations on call.

TEXT 14 THE FASTEST COMPUTER

The computer Illiac IV is the fourth generation in a line of advanced machines that have been conceived and developed at the University of Illinois. Illiac I, a vacuum tube machine completed in 1952, could perform 11,000 arithmetical operations per second. Illiac II, a transistor-and-diode machine completed in 1963, could perform 500,000 operations per second. Illiac III, which became operational in 1966, is a special purpose computer designed for automatic scanning of large quantities of visual data. Since it processes non-arithmetical data, it cannot be compared with earlier Illiacs in terms of operational speed. Illiac IV, employing the latest semiconductor technology, is actually a battery of 64 «Slave» conductors, capable of executing between 100 million and 200 million instructions per second. Unlike its three predecessors, which solve the problems by a series of steps, Illiac IV is designed to perform as many as 64 computations simultaneously. So a typical linear programming problem that might occupy a large past generation computer for six to eight hours is solvable by Illiac IV in less than two minutes – a time reduction of at least 200 to one.

The ultimate limitation of the operating speed of a computer designed to operate sequentially is the speed with which the signal can be propagated through an electrical conductor. In practice this is somewhat less than the speed of light which takes one nanosecond (10^{-9} second) to travel about one foot.

The logical design of Illiac IV a single master control unit sends instruction to a number of independent processing elements. Each of the 64 processing elements is a powerful competing unit and it can perform a wide range of arithmetical operations.

Each processing element has more than 100,000 electronic components. In a system containing more than six million components one can expect a component or a connection to fail every few hours. For this reason much attention has been devoted to testing and diagnostic procedures. Each of the 64 processing units will be subjected regularly to extensive automatic tests. If a unit should fail one of these tests, it can be quickly unplugged and replaced by a spare, with only a brief loss of operating time. When the defective unit has been taken out of service, the precise cause of the failure will be determined by a separate diagnostic computer.

Among the intended use of Illiac IV is the establishment of natural resource inventories. The system will contain a wide range of information on the natural resources of a selected area: geology, hydrology, forestry and vegetation, climate, topography, soil characteristics and current land use. For example, county administration may be looking for a best site for a new hospital. The search for a hospital site could be reformulated in a series of commands that could be presented to the computer. For instance, search all tracts that lie between town A and town B, and that are within two miles of route C; the area should be no smaller than five acres and no larger than 25 acres. If no tracts satisfied all these requirements, one or more of the less important conditions could be relaxed until a site was located.

TEXT 15 COMPUTER VIRUSES AND PIRACY: PROBLEMS FOR BUSINESSES

PCs have transformed the small-business world. Unfortunately, some of the features of computers that have opened up a new world for business people have also put that world in danger. Even the largest, most complex systems hackers can break into without authorization and gain access to important and confidential documents.

Computer crime is often difficult to prove because of the large number of people who can tap into a company's files and the amount of damage they can wreak from a distance. A computer-savvy employee with a grudge can wipe out all the company's records with a few keystrokes on a home computer. And as a recent spate of computer «viruses» has shown, complete strangers can and do sabotage private and company computers in the name of fun or mischief.

Like a physical virus, a computer virus attaches itself to a host program. Some viruses replicate themselves until they take up all the space in a computer's memory, causing the system to crash. Others invade specific programs, slowly altering data (perhaps reversing the digits in numbers) so that the virus remains undetected for a long time. Still others attack the system's vital first track, the track that tells the computer where all other records are stored, thus effectively wiping out records. Thanks to modems and the popularity of computer «bulletin boards» some viruses have been able to cross continents and infect thousands of machines.

The same businesses that fall victim to computer viruses are often guilty of committing another breach of computer ethics: software piracy. For years, software producers built copy protection into their programs. But faced with consumer outcry that such protection caused problems with many programs and made it difficult for legitimate owners of software to use that software on different machines at different times, producers dropped such protection. Today virtually anyone can make hundreds, even thousands, of copies of a popular software program.

Unauthorized copying or use of software programs may well be epidemic in business around the world, industry experts estimate that piracy costs U.S. software firms \$ 2 billion annually. But software companies are striking back around the world.

Over 70 major companies have ended up paying thousands of dollars in fines and agreeing to purchase ample legitimate copies of various software programs. More prosecutions seem likely. It is doubtful that there's a corporation in USA that could say it was clean. Perhaps not yet, but if the raids persist, look for other companies to «copy» the forced changes at raided firms.

ЕЛЕКТРОННЕ НАВЧАЛЬНО-МЕТОДИЧНЕ ВИДАННЯ

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МЕТОДИЧНІ ВКАЗІВКИ
З АНГЛІЙСЬКОЇ МОВИ (ДЛЯ СТУДЕНТІВ 2-ГО КУРСУ
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