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АНГЛИЙСКИЙ ЯЗЫК

Методические рекомендации к практическим занятиям для студентов направлений подготовки 09.03.04 «Программная инженерия» и 09.03.01 «Информатика и вычислительная техника» очной и заочной форм обучения

ЗАДАНИЯ ДЛЯ ОБУЧЕНИЯ ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННОМУ ЧТЕНИЮ НА АНГЛИЙСКОМ ЯЗЫКЕ

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Задания для обучения чтению профессионально-ориентированных текстов на английском языке представляют собой часть единого учебно- методического комплекса для работы со студентами направлений подготовки 09.03.04 «Программная инженерия», 09.03.01 «Информатика и вычислительная техника». Учебный материал и система упражнений направлены на развитие навыков ознакомительного и изучающего чтения, перевода, говорения и реферирования на английском языке. Данные задания могут использоваться для работы на аудиторных занятиях, а также для самостоятельной работы студента.

Учебно-методическое издание

АНГЛИЙСКИЙ ЯЗЫК

Unit 1

Reading
Read the following text.

Text. What can computers do?

Computers and microchips have become part of our everyday lives; we visit shops and offices, which have been designed with the help of computers, we read magazines which have been produced on computer, we pay bills prepared by computers. Just picking up a telephone and dialing a number involves the use of a sophisticated computer system, as does making a flight reservation or bank transaction.

We encounter daily many computers (e. g. calculators, the car's electronic ignition, the timer in the microwave, or the programmer inside the TV set), all of which use chip technology.

What makes your computer such a miraculous device? Each time you turn it on, it is capable of doing anything you ask. It is a calculating machine that speeds up financial calculations. It is an electronic filing cabinet which manages large collections of data such as customers' lists, accounts, or inventories. It is a magical typewriter that allows you to type and print any kind of document – letters, memos or legal documents. It is a personal communicator that enables you to interact with other computers and with people around the world. If you like gadgets and electronic entertainment, you can even use your PC to relax with computer games.

Task 1. Fill in the blanks with the correct form of the verbs in brackets.

> **Example**   *Houses (design) … with the help of computers.*
> *Houses are designed with the help of computers.*

1. Various terminals (connect) … to this workstation.
2. Microcomputers (know) … as "PCs".
3. Magazines (typeset) … by computers.
4. When a particular program is run, the data (process) … by the computer very rapidly.
5. The Web (use) … to search for information and buy products online.
6. The drug-detecting test in the Tour de France (support) … by computers.
7. All the activities of the computer system (coordinate) … by the central processing unit.
8. In some modem systems information (hold) … in optical disks.

Task 2. Rewrite these sentences in the passive.

1. They use computers in education.
2. We use financial software to make calculations.
3. They write and edit the newspaper on PCs and Macintosh computers.
4. They use different data communications systems – fax machines, e-mail, etc. – to communicate with newspaper correspondents.

5. They convert files into HTML code and display them on the Web.
6. Epson ink-jet and laser printers print black-and-white proofs.
7. Compatible word processors type and edit the text.

Unit 2

Reading
Read the following text.

Text. From mainframes to wearable computers

A mainframe is the most powerful type of computer. It can process and store large amounts of data. It supports multiple users at the same time and can support more simultaneous processes than a PC. The central system is a large server connected to hundreds of terminals over a network. Mainframes are used for large-scale computing purposes in banks, big companies and universities.

A desktop PC has its own processing unit (or CPU), monitor and keyboard. It is used as a personal computer in the home or as a workstation for group work. Typical examples are the IBM PC and the Apple Macintosh. It's designed to be placed on your desk. Some models have a vertical case called a tower.

A laptop (also called a notebook PC) is a lightweight computer that you can transport easily. It can work as fast as a desktop PC, with similar processors, memory capacity, and disk drives, but it is portable and has smaller screen. Modern notebooks have a TFT (Thin Film Transistor) screen that produces very sharp images.

Instead of a mouse, they have a touchpad built into the keyboard - a sensitive pad that you can touch to move the pointer on the screen.

They offer a lot of connectivity options: USB (Universal Serial Bus) ports for connecting peripherals, slots for memory cards, etc.

They come with battery packs, which let you use the computer when there are no electrical outlets available.

A tablet PC looks like a book, with an LCD screen on which you can write using a special digital pen. You can fold and rotate the screen 180 degrees. Your handwriting can be recognized and converted into editable text. You can also type at the detached keyboard or use voice recognition. It's mobile and versatile.

A personal digital assistant or PDA is a tiny computer which can be held in one hand. The term PDA refers to a wide variety of hand-held devices, palmtops and pocket PCs.

For input, you type at *a* small keyboard or use a stylus - a special pen used with a touch screen to select items, draw pictures, etc. Some models incorporate handwriting recognition, which enables a PDA to recognize characters written by hand. Some PDAs recognize spoken words by using voice recognition software.

They can be used as mobile phones or as personal organizers for storing notes, reminders and addresses. They also let you access the Internet via wireless technology, without cables.

A wearable computer runs on batteries and is worn on the user's body, e.g. on a belt, backpack or vest; it is designed for mobile or hands-free operation. Some devices are equipped with a wireless modem, a small keyboard and a screen; others are voice-activated and can access email or voice mail.

Task 1. 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 … .

Task 2. 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

Reading
Read the following text.

Text. What's inside a PC system?

The nerve centre of a PC is the central processing unit or CPU. This unit is built into a single microprocessor chip – an integrated circuit – which executes program instructions and supervises the computer's overall operation. The unit consists of three main parts:

1) the control unit, which examines the instructions in the user's program, interprets each instruction and causes the circuits and the rest of the components – disk drives, monitor, etc. – to be activated to execute the functions specified;

2) the arithmetic logic unit (ALU), which performs mathematical calculations (+, -, etc.) and logical operations (and, or, etc.);

3) the registers, which are high-speed units of memory used to store and control information. One of these registers is the program counter (PC) which keeps track of the next instruction to be performed in the main memory. Another is the instruction register (IR) which holds the instruction that is currently being executed.

One area where microprocessors differ is in the amount of data – the number of bits – they can work with at a time. There are 16, 32 and 64-bit processors. The computer's internal architecture is evolving so quickly that the new 64-bit processors are able to address 4 billion times more information than a 32-bit system.

The programs and data which pass through the central processor must be loaded into the main memory (also called the internal memory) in order to be processed. Thus, when the user runs an application, the microprocessor looks for it on secondary storage devices (disks) and transfers a copy of the application into the RAM area. RAM (random access memory) is temporary, i.e. its information is lost when the computer is turned off. The amount of RAM determines the number of programs you can run simultaneously and how fast they operate. It can be expanded by adding extra RAM chips. However, the ROM section (read only memory) is permanent and contains instructions needed by the processor; the BIOS (basic input/output system) uses ROM to control communication with peripherals, e. g. disk drives.

The main circuit board is known as the mother-board. This contains the CPU, the memory chips, expansion slots and controllers for peripherals, connected by internal busses, or paths, that carry electronic signals. For example, the front side bus carries all data that passes from the CPU to other devices.

Most of today's computers have internal expansion slots that allow users to install 45 adapters or expansion boards. Popular adapters include high-resolution graphics boards, memory expansion boards, and internal modems.

The power and performance of a computer is partly determined by the speed of its microprocessor. A clock provides pulses at fixed intervals to measure and synchronize circuits and units. The clock speed is measured in MHz (megahertz) or GHz (gigahertz) and refers to the frequency at which pulses are emitted. For example, a CPU running at 1,600 MHz (1,600 million cycles per second) will enable the computer to handle the most demanding applications.

Task 1. Decide if the sentences are true (T) or false (F), and rewrite the false ones to make them true.

1. The CPU directs and coordinates the activities taking place within the computer system.
2. The arithmetic logic unit performs calculations on the data.
3. 32-bit processors can handle more information than 64-bit processors.
4. A chip is an electronic device composed of silicon elements containing a set of integrated circuits.
5. RAM, ROM and secondary storage are the components of the main memory.
Information cannot be processed by the microprocessor if it is not loaded into the main memory.

7. 'Permanent' storage of information is provided by RAM (random access memory).
8. The speed of the microprocessor is measured in gigahertz or megahertz. One GHz is equivalent to one thousand MHz. One MHz is equivalent to one million cycles per second.

Task 2. Look back in the text and find what the words in bold print refer to.

1. ... **which** executes program instructions and supervises ... .
2. ... the instruction **that** is currently being executed.
3. ... the amount of data – the number of bits – **they** can work with at a time.
4. ... the microprocessor looks for **it** on ... .
5. ... **its** information is lost when the computer is turned off.
6. ... expansion slots **that** allow users to install adapters or expansion boards.

Unit 4

Reading
Read the following text.

Text. How does digital processing work?

There are three basic elements in digital processing: memory circuits to store data; logic circuits to change data; and control circuits to direct the operations of the whole system. The various elements are linked together by wire channels called buses. Memory circuits store bits permanently or temporarily. A typical memory circuit contains thousands of capacitors arranged in rows. The capacitors hold bits either in the form of an electricity charge or the absence of a charge.

Each capacitor is connected to the system by a metal conductor, with transistors or diodes acting as switches. When a signal opens a switch, bits can travel along the conductor. Other circuits then restore the bits by recharging the capacitors with the same sequence of charges. There are two basic kinds of memory circuits-read-only memory (ROM) and random-access memory (RAM).A ROM circuit can be neither erased nor added to. It is a permanent store of information and normally contains instructions or programs, for operating the system. By contrast, the information in RAM can be added to or erased. It is used to store information for short periods. Data is stored only when the power is on. When the power is turned off, all the stored charges are erased.

Logic circuits, in CPU, manipulate data according to instructions. The bits go through a sequence of switches that changes them in some way, for example by adding two of them together. During this processing, bits are stored temporarily in areas called registers, while they wait for the next instruction.

Switches can also be used to compare two bits in order to generate a particular output based on precise logical rules. In this case binary digits represent the ideas "true" or "false", instead of 1 or 0. The process is carried out through small groups of

circuits called logic gates. Large combinations of these gates can solve complex mathematical or logical problems.

Control circuits direct and coordinate the work of all other parts of the system according to instructions stored in the memory. In particular, the control circuits organize the movement of bits through the system. This is done by means of an oscillator, called the clock, which generates continuous pulses. The bits through the circuit, following the rhythm of the clock, at frequencies of millions of cycles per second.

Task 1. Fill in the gaps with the following words:

activate, analogue, brain, decode, digital, erase, RAM, ROM

1. Information required only for short periods is held in the … memory.
2. When you switch off the computer you … all the data in the short-term memory.
3. Sophisticated software is needed to … secret messages.
4. You have to press buttons … the control.
5. Messages from the … are carried by the body's nervous system.
6. An … computer makes calculations by measuring and comparing changing quantities.
7. A … computer performs calculations and logical operations by transforming information into a numerical code.
8. A … memory is used as a permanent store of information since it can be neither erased nor added to.

Task 2. Match each word (1-10) with the correct definition(a-j)

1. binary   a. a computer switching circuit that performs specific problem-solving functions
2. bit   b. a device or program for connecting two items of hardware or software so that they can communicate with each other
3. bus   c. a group of bits, typically 16 or 32,forming a basic unit of data in a computer
4. byte   d. a method of representing numbers in which only the digits 0 and 1 are used
5. cache   e. a part of microprocessor where groups of binary digits are stored momentarily as the computer is processing them.
6. clock   f. a set of conductors carrying data and control signals within a computer system.
7. interface   g. a single character of a language having just two characters, the binary digits 0 or 1
8. logic gate   h. a source of regularly occuring pulses used to measure the passage of time in a microprocessor.
9. register   i. a unit of computer information equal to 8 bits
10. word   j. an auxiliary memory from which it is possible to retrieve data at high speed.

Unit 5

Reading
Read the following text.

Text. Bits - basic units of memory

Information is processed and stored in computers as electrical signals. A computer contains thousands of electronic circuits connected by switches that can only be in one of two possible states: ON (the current is flowing through the wire) or OFF (the current is not flowing through the wire). To represent these two conditions we use binary notation in which 1 means ON and 0 means OFF. This is the only way a computer can 'understand' anything. Everything about computers is based upon this binary process. Each 1 or 0 is called a binary digit or bit.

Bytes and characters

1s and 0s are grouped into eight-digit codes that typically represent characters (letters, numbers and symbols). Eight bits together are called a byte. Thus, each character in a keyboard has its own arrangement of eight bits. For example, 01000001 for the letter A, 01000010 for B and 01000011 for C.

The ASCII code

The majority of computers use a standard system for the binary representation of characters. This is the American Standard Code for Information Interchange, known popularly as 'ASCII' (pronounced 'ask-key'). There are 256 different ways of combining 0 and 1 bits in a byte. So they can give us 256 different signals. However, the ASCII code only uses 128 bytes to represent characters. The rest of the bytes are used for other purposes.

The first 32 codes are reserved for characters such as the Return key, Tab, Escape, etc. Each letter of the alphabet, and many symbols (such as punctuation marks), as well as the ten numbers, have ASCII representations. What makes this system powerful is that these codes are standard.

Kilobytes, megabytes and gigabytes

In order to avoid astronomical figures and sums in the calculation of bytes, we use units such as kilobytes, megabytes and gigabytes. One kilobyte is 1,024 bytes (2^{10}) and it is represented as KB, or more informally as K, One megabyte is equivalent to 1,024 KB, and one gigabyte is 1,024 MB.

We use these units (KB, MB, GB) to describe the RAM memory, the storage capacity of disks and the size of any application or document.

Task 1. Fill in the blanks with the correct unit of memory.

1. One … represents one character.
2. One … represents 1,024 characters (about a small page of text).
3. One … represents 1,000,000 characters (about the text of the book).
4. One … represents 1,000,000,000 characters (about 1,000 books in a library).

Unit 6

Reading
Read the following text.

Text. Bits for pictures

Each tiny dot on the screen of a computer is called a picture element or pixel. Images and text are formed by combining a large number of pixels.

In a bit-mapped display, the dots displayed on the screen correspond, pixel by pixel, with bits in the main memory of the computer. The bits are held in an area of the memory called the 'refresh buffer' and are stored in groups that represent the horizontal and vertical position of the pixels on the screen and whether the pixels are on or off.

On monochrome systems, one bit in this 'map' represents one pixel on the screen and can be either 'on' or 'off (black or white).

On colour systems, each pixel is a certain combination of the three primary colours: red, green and blue. The total number of colours which can be shown on the screen is called the colour palette. The size of this palette depends on the graphics adaptor, a separate video card that converts the bits into visual signals. A graphics adaptor with 1 bit per primary colour can generate up to 8, or 2^3, colours, as you can see from the table on page 19. A graphics adaptor with 8 bits per primary colour can generate 16.7 million or $(2^3)^8$ colours.

Colour	Red	Green	Blue
Black	0	0	0
Blue	0	0	1
Green	0	1	0
Cyan	0	1	1
Red	1	0	0
Magenta	1	0	1
Yellow	1	1	0
White	1	1	1

(*One bit per primary colour*)

Task 1. Using the information in the passage and the illustrations, match the terms in the box with the appropriate explanation or definition.

a) *pixel*; *b*) *bit*; *c*) *bit-mapped display; d*) *primary colours*; *e*) *palette.*

1 The menu of colours available on a graphics system; its size depends on the hardware.
2 Red, green and blue (RGB) in computers.
3 The smallest element of a display surface.
4 A display on the screenstored in memory cells.
5 The acronym for 'binary digit'; one of the digits (0 and 1) used in binary notation.

Task 2. *Translate these sentences into English.*

1. Все числа внутри компьютера представляются с помощью нулей и единиц.
2. Иными словами, компьютеры обычно работают в двоичной системе.
3. Единицей информации в компьютере является один бит, т. е. двоичный разряд, который может принимать значение 0 и 1.
4. Восемь последовательных битов составляют байт.

Unit 7

Reading
Read the following text.

Text. About the keyboard

A standard PC keyboard has various groups of keys.
1. Alphanumeric keys represent letters and numbers in the same order as a typewriter.
2. Function keys are at the top of the keyboard and can be programmed to do special jobs.
3. Numeric keypad is a set of numeric or editing keys, which are to the right of the main keyboard. The Num Lock key is used to switch from numbers to editing functions.
4. Editing (or cursor) keys are cursor and other keys used within word processors to page up and down in a long document or to edit text.
5. Special (dedicated) keys are used to issue commands or to produce alternative characters in key combinations, for example, the Alt key.

Task 1. Match these descriptions with the names of keys:

arrow keys, return, caps lock, shift, tab, escape, space bar, backspace, alt.

1. A long key at the bottom of the keyboard. Each time it is pressed, it produces a blank space.
2. It moves the cursor to the beginning of a new line. It is also used to confirm command.
3. It stops a program without losing the information from the main memory. Sometimes its use depends on the applications.
4. It works in combination with the other keys to produce special characters or specific actions.
5. It removes the character on the left of the cursor or any selected text.
6. It produces upper-case characters (or the upper-case character of the key).

Task 2. Fill in the gaps in these sentences. Use the correct word from the list:

shift key, alt key, control key, escape key, delete key, tab key, caps lock key, backspace key, standard keyboard, key in (or type in), enter, data input.

1. To go back one space, hit the …
2. To change to capital letters, press the …
3. To change the capital letters permanently, hit the …
4. To insert a tabulation, press the …
5. To activate the 'Ctrl' functions, press the …
6. To activate the 'alt' functions, hit the …
7. To stop the computer doing something, you can press the …
8. Select the text you want remove, and hit the …
9. Please … your password.
10. It took me two hours to… all the text.
11. A keyboard is a … device.
12. Do you have a …?

Unit 8

Reading
Read the following text.

Text. Plug-in Boards

If you take a look inside your PC, you will see various printed circuit boards anchored in connector strips on the main board.

These circuit boards are known as plug-in boards and the connector strips as slots.

The slots play an important part when equipping your PC with various additional functions. Their function and mechanical design are therefore described in more detail below, so that you can install the system and is therefore also known as an expansion boards with which to expand your system without difficulty in future.

To put it simply, a plug-in board expands the functions to the system and is therefore also known as an expansion board.

Many expansion boards belong to peripheral devices which cannot be connected to one of the normal ports (serial/parallel). When connecting a scanner, for instance, a special plug-in board must be installed in the system and the scanner connected directly to the board.

Modem boards, ISDN boards, telefax boards, sound boards and boards for connecting a backup drive (streamer) are common examples of such expansion boards.

One of the advantages of plug-in boards is that they allow the system to be expanded on a modular basis; another is that boards can be replaced by more modern technology in the course of time.

This also explains why a number of plug-in boards are already installed in your Highscreen PC. The components and functions of these plug-in boards could just as easily have been installed on the main board, but then you would be restricted, throughout the lifetime of your PC, to using only the technology that happened to be in line with the state of the art when you bought your PC.

If your requirements grow or technology advances, you WOULD HAVE to replace the entire system. Thanks to the plug-in boards, however, you need only replace a single board if applicable.

The mechanical design and functions of the plug-in boards which have already been installed are described in more detail first.

Task 1. Explain the following compound nouns using suitable prepositions or phrases:

1. plug-in board
2. printed circuit boards
3. connector strips
4. backup drive
5. expansion board
6. 16-bit-bus
7. sound board
8. peripheral devices

Task 2. Fill in the gaps with the following words:

replace, connect, install, belong, plug, equip

1. A board is … on a PC to expand its functions.
2. A new software release can be … with the old one.
3. This new PC model is … with a lot of additional devices.
4. It is not very difficult … a board in a system.
5. A scanner must be … to a PC to store images.
6. Some expansion boards can … to peripheral devices.

Unit 9

Reading
Read the following text.

Text. Types of printers

Printing is the final stage in creating a document. That is the purpose of the printers. Printers vary in cost, speed, print quality and other factors such as noise or compatibility. In fact, printing technology is developing so quickly that there is always a printer for every application or personal requirement.

Dot-matrix printers use pins to print the dots required to shape a character. They print text and graphics and some of them can print up to 500 characters per second, however, they produce relatively low resolution output – 72 or 144 dots per inch. This level of quality is not recommended for reports or books. They are slower than laser printers but much cheaper.

Ink-jet printer operates by projecting small ink droplets onto paper to form the required image. This type of printer is quite fast, silent and so expensive as a laser printer. Their resolution is 720 dpi.

Laser printers produce output at great speed and with a very high resolution of 600/ 2,400 dpi. They scan the image with a laser beam and transfer it to paper with a special ink powder. They are constantly being improved.

We must not forget to mention <u>thermal</u> printers. They use heat, a special kind of paper and electrosensitive methods. They are silent and considered to be inexpensive. However, some colour models emulate HP (Hewlett Packard) plotters cost too much to be included in the same category.

Imagesetters can be regarded as an attractive alternative. They produce very high-resolution output (up to 3, 540 dpi) on paper and microfilm. They are extremely fast. They are used in desktop publishing. Although they produce the highest quality output they are expensive for homes and offices.

Finally, plotters are a special kind of printer.

Plotters use ink and fine pens held in a carriage to draw very detailed designs on paper. They are used for construction plans, engineering drawings and other technical illustrations.

Task 1. Choose the most appropriate type of printer for these situations.

1. A home user who wants to print text documents and family photographs.
2. Business people who need to print in large quantities at high quality in an office.
3. Engineers who want to make detailed line drawings.
4. Professional typesetters in desktop publishing.
5. A company that wants to print carbon copies of bills and receipts.

Task2 . Agree or disagree with the following statements.

1. Ink-jet printers are quieter than dot-matrix printers.
2. Ink-jet printers are cheaper than dot-matrix printers.
3. Ink-jet printers are not real competition for laser printers.
4. Ink-jet printers can easily print on envelopes, labels and transparencies.
5. Ink-jet colour printers use four inks: magenta, yellow, cyan and black.
6. Ink-jet printers are ideal for workgroups and large businesses.

Unit 10

Reading
Read the following text.

Text. 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 is 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.

Task 1. 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.

Task 2. Translate the following sentences into English.

1. Затем поверхность диска разделяется на «секторы».
2. Гибкие диски состоят из гибкого пластического материала
3. Операционная система считывает файл на ЗУПВ.
4. Жесткие диски вращаются на более высокой скорости.
5. Время выборки (из ЗУ) измеряется в миллисекундах.

Task 3. Look at the groups of words and decide what class each word belongs to: *noun, verb, adjective or adverb.* **Complete the sentences.**

magnet   magnetic   magnetically
magnetism   magnetize   magnetized

1. … is the science of magnetic phenomena and properties.
2. Floppy and hard disks are considered as … storage devices.
3. Data is recorded on a disk in the form of … spots called bits.

record [ri'kO:d]   recorder   recording   recorded

All disks must be initialized before information can be … onto them.
5. The … heads follow the tracks and magnetize the coating along each track.
6. A disk drive works very much like a tape … that can both play and record.

fragment   fragmentation   fragmented   defragmenter

7. After you create, delete and modify a lot of files, the hard disk becomes …, with bits and pieces spread all over the disk.
8 … slows down the speed at which data is accessed because the disk drive has to work harder to find the parts of a file stored in many different locations.
9. To reorganize your hard disk, you can use a disk optimizer or … ; this will reorder your files into contiguous clusters.

Unit 11

Reading
Read the following text.

Text. Graphics and design

Types of graphics software:
Computer graphics are pictures created, changed or processed by computers.
There are different types of graphics software.

Image manipulation programs let you edit your favourite images. For example, you can scar a picture into your PC or transfer a photo from your camera and then add different effects, or filters.

Painting and drawing programs, also called illustration packages, offer facilities for freehand drawing, with a wide choice of pens and brushes, colours and patterns. One example is **Windows Paint**.

Business graphics programs, also called presentation software, let you create pie charts, bar charts and line graphs of all kinds for slide shows and reports. You can import data from a database or spreadsheet to generate the graphs.

Computer-aided design (CAD) is used by engineers and architects to design everything from cars and planes to buildings and furniture. First they make a wireframe, a drawing with edges and contour lines. Then if they want to colour the objects and add texture, they create a surface for the object; this is called "filling the surface". Finally, the design is rendered to make the object look realistic. Rendering is a process that adds realism to graphics by using shading, light sources and reflections.

Desktop publishing (DTP) is based around a page layout program, which lets you import text from a word processor, clip-art (ready-made pictures) from graphics packages, and images from scanners or cameras, and arrange them all on a page. It is used to design and publish books, newspapers, posters, advertisements, etc …

Digital art, or computer art, is done with applets that use mathematics formulae to create beautiful bright shapes called fractals. A fractal is a geometrical figure with special properties, e.g. the Koch snowflake or the Mandelbrot set. Fractals can also be used to model real objects like clouds, coastlines or landscapes.

Computer animation uses graphics programs (e.g. digital cartooning systems) to create or edit moving pictures. Each image in a sequence of images is called a 'frame'.

Geographic information systems (GIS) allow cartographers to create detailed maps.

Task 1. Look through the text and decide which type of graphics software is best for the users.

1. a person who wants to edit photos at home
2. an economist who wants to present statistics in a form that can be easily understood
3. engineers who need to design the interior and exterior of a new aeroplane
4. a company which needs to design and publish a magazine
5. an artist who wants to produce illustrations and freehand drawings for a book
6. an organization that needs to make- maps and 3D virtual models of the surface of the Earth
7. computer animators who make movies like Toy Story and Shrek a mathematician who wants to make fractal shapes of natural phenomena.

Task 2. Fill in the gaps with the following words:

wireframe, rendering, bitmap, filters, fractals, clip-art

1. Painting programs work by giving a colour to each pixel in an image, creating a … . Unlike vector graphics, the image is a single layer, so once something is painted, it becomes part of the whole picture.
2. In painting programs and image editors, … are special effects that can be applied to a picture, including drop shadows, textures, distortions, etc.
3. The … model is the simplest: interpretation of a true three-dimensional object. Here the object is represented by its edges and contours and is therefore similar in form to a normal engineering drawing or sketch.
4. … adds textures to each surface, and generates realistic reflections, shadows and highlights.
5. Most illustration packages come with a bundle of resources that include ready-made … images and a selection of fonts.

Unit 12

Reading
Read the following text.

Text. Programming languages

Unfortunately, computers cannot understand ordinary spoken English or any other natural language. The only language they can understand directly is called machine code. This consists of the 1s and 0s (binary codes) that are processed by the CPU.

However, machine code as a means of communication is very difficult to write. For this reason, we use symbolic languages that are easier to understand. Then, by using a special program, these languages can be translated into machine code. For example, the so-called assembly languages use abbreviations such as ADD, SUB,

MPY to represent instructions. These mnemonic codes are like labels easily associated with the items to which they refer.

Basic languages, where the program is similar to the machine code version, are known as low-level languages. In these languages, each instruction is equivalent to a single machine code instruction, and the program is converted into machine code by a special program called an assembler. These languages are still quite complex and restricted to particular machines.

To make the programs easier to write and to overcome the problem of intercommunication between different types of machines, higher-level languages were designed such as BASIC, COBOL, FORTRAN or PASCAL. These are all problem-oriented rather than machine-oriented. Programs written in one of these languages (known as source programs) are converted into a lower-level language by means of a compiler (generating the object program). On compilation, each statement in a high-level language is generally translated into many machine code instructions.

People communicate instructions to the computer in symbolic languages and the easier this communication can be made, the wider the application of computers will be. Scientists are already working on Artificial Intelligence and the next generation of computers may be able to understand human languages.

Task 1. Look at the groups of words and decide what part of speech each word is. Then complete the sentences with the correct word.

Compile, compiler, compilation.

1. Programs written in a high-level language require …, or translation into machine code.
2. A … generates several low-level instructions for each source language statement.
3. Programmers usually … their programs to create an object program and diagnose possible errors.

Program, programmers, programming, programmable.

4. Most computer … make a plan of the program before they write it. This plan is called a flowchart.
5. A computer … is a set of instructions that tells the computer what to do.
6. Converting an algorithm into a sequence of instructions in a programming language is called …

Bug, debug, debugger, debugging.

7. New programs need … to make them work properly.
8. Any error or malfunction of a computer program is known as a …
9. The best compilers usually include an integrated … which detects syntax errors.

Task 2. Make sentences as in the example.

Example   Not easy/ write instructions in Pascal
              It is not easy to write instructions in Pascal.

Some grammar to know!
The infinitive is used:
a. after adjectives
-       It is **difficult** *to use* machine code.
b. after modal verbs with to: **ought to, used to**.
-       I **ought to** *make* a back-up copy.
-       Using a computer is much easier than it **used to be**.
c. after modal and auxiliary verbs without to: **can, could, may, might, shall,
should, will, would, would rather, would sooner.**
-       Unfortunately, computers *can't understand* English.
- **I'd rather** *buy* a game than a spreadsheet.
1.   advisable/ test the program under different conditions.
2.   expensive/ set up a data-processing area.
3.   unusual for a program/ work correctly the first time it is tested.
4.   difficult for students/ learn FORTRAN.
5.   important/ consider the capabilities of the programming language.
6.   quite easy/ write instructions in BASIC.

Task 3. Look at these pairs of examples and decide where there is an 'important' change in meaning.

1. a. I remember shutting down the computer before I left the room.
   b. Please remember to buy the new program.
2. a. They stopped to look at the flowchart.
   b. They stopped looking at the flowchart.
3. a. I like studing C language.
   b. I like to study C language.
4. a. It has started to rain.
   b. It has started raining.
5. a. He needs to work hard.
   b. This hard disk needs repairing.

Unit 13

Reading
Read the following text.

What is Java?

Java is a programming language developed by Sun Microsystems. When you see a web page that uses Java, a small program called 'applet' is done automatically. Java applets let you watch animated characters and moving text, play music and interact with information on the screen.

Characteristics of the Java language.

Java is an object-oriented language similar to C++, but it is more dynamic and simplified to eliminate possible programming errors.

A Java program is both compiled and interpreted. First the source code is compiled and converted into a format called bytecode, which can then be executed by a Java interpreter. Compiled Java code run on most computers, because there are Java interpreters, known as Java Virtual Machines.

Java is a multi-threaded. A Java program can have multiple threads (parts), i.e. many different things processing independently and continuously.

Why is Java cool?

Java lets you create moving images and animated drawings. You can also create graphical objects (e.g. bar charts, graphs, diagrams) and new 'controls' (e.g. buttons, check boxes, pushbuttons with special properties). A web page that uses Java can have inline sounds that play in real-time, music that plays in the background, cartoon style animations, real-time video and interactive games.

Alternatives to Java.

One alternative technology is ActiveX, the Microsoft product for including multimedia effects on web pages. Another competitor is Macromedia's Shockwave, a plug-in that lets you animate pictures, add sound and even make interactive pages so that people can play games on websites.

Task 1. *These statements about Java are all false. Correct them.*

1. Java was invented by Microsoft.
2. Small applications written in Java are called 'animations'.
3. With the interpreter, a program is first converted into Java bytecodes.
4. Java is not compatible with most computing platforms.
5. The Java language is single-threaded, one part executing at a time.
6. Java doesn't let you watch animated characters on your webpages.
7. ActiveX and Shockwave are not real competitors for Java.

Task 2. a) Match each word on the left with its partner to make a common technical term.

1. programming   a. browser
2. web   b. error
3. Java   c. code
4. multimedia   d. protection
5. source   e. format
6. virus   f. effects
7. compression   g. applet

b) Which verbs on the left are often found with nouns on the right?

1. to download   a. the Web
2. to play   b. a source program
3. to run   c. files
4. to browse   d. an application
5. to compile   e. data
6. to process   f. music

Unit 14

Reading
Read the following text.

Security and privacy on the Internet

There are a lot of benefits from an open system like the Internet, but we are also exposed to hackers who break into computer systems just for fun, as well as to steal information or propagate viruses. So how do you go about making online transactions secure?

Security on the Web

The question of security is crucial when sending confidential information such as credit card numbers. For example, consider the process of buying a book on the Web. You have to type your credit card number into an order form which passes from computer to computer on its way to the online bookstore. If one of the intermediary computers is infiltrated by hackers, your data can be copied. It is difficult to say how often this happens, but it's technically possible.

To avoid risks, you should set ail security alerts to high on your Web browser. Netscape Communicator and Internet Explorer display a lock when the Web page is secure and allow you to disable or delete "cookies".

If you use online bank services, make sure your bank uses digital certificates. A popular security standard is SET (secure electronic transactions).

E-mail privacy

Similarly, as your e-mail message travels across the net, it is copied temporarily on many computers in between. This means it can be read, by

unscrupulous people who illegally enter computer systems.

The only way to protect a message is to put it in a sort of 'envelope', that is, to encode it with some form of encryption. A system designed to send e-mail privately is Pretty Good Privacy, a freeware program written by Phil Zimmerman.

Network security

Private networks connected to the Internet can be attacked by intruders who attempt to take valuable information such as Social Security numbers, bank accounts or research and business reports.

To protect crucial data, companies hire security consultants who analyse the risks and provide security solutions. The most common methods of protection are passwords for access control, encryption and decryption systems, and firewalls.

Virus protection

Viruses can enter a PC through files from disks, the Internet or bulletin board systems. If you want to protect your system, don't open e-mail attachments from strangers and take care when downloading files from the Web. (Plain text e-mail alone can't pass a virus.)

Remember also to update your anti-virus software as often as possible, since new viruses are being created all the time.

Preventative tips

Don't open email attachments from unknown people; always take note of the file extension.

Run and update antivirus programs, e.g. virus scanners.

Install a firewall, a program designed to prevent spyware from gaining access to the internal network.

Make backup copies of your files regularly.

Don't accept files from high-risk sources.

Use a digital certificate, an electronic way of proving your identity, when you are doing business on the Internet. Avoid giving credit card numbers.

Don't believe everything you read on the Net. Have a suspicious attitude toward its contents.

Task 1. Fill in the gaps with the following words:

digital, certificate, malware, virus, scanner, spyware, firewall, antivirus

1. Malicious software, (1) … , can be avoided by following some basic rules.
2. Internet users who like cybershopping should get a (2) … , an electronic identity card.
3. To prevent crackers from breaking into your internal network and obtaining your data, install a (3) … . It will protect you from (4) … .
4. If you have been hit by a (5) … , don't panic! Download a clean-up utility and always remember to use on (6) … program, for example, a virus (7) ….

Unit 15

Reading
Read the following text.

Internet crime

The Internet provides a wide variety of opportunities for communication and development, but unfortunately it also has its dark side.

Crackers, or black-hat hackers, are computer criminals who use technology to perform a variety of crimes: virus propagation, fraud, intellectual property theft, etc.

Internet-based crimes include scam, email fraud to obtain money or valuables, and phishing, bank fraud, to get banking information such as passwords of Internet bank accounts or credit card details. Both crimes use emails OF websites that look like those of real organizations.

Due to its anonymity, the Internet also provides the right environment for cyberstalking, online harassment or abuse, mainly in chat rooms or newsgroups.

Piracy, the illegal copying and distribution of copyrighted software, information, music and video files, is widespread.

But by far the most common type of crime involves malware.

Malware: viruses, worms, trojans and spyware

Malware (malicious software) is software created to damage or alter the computer data or its operations. These are the main types.

Viruses arc programs that spread by attaching themselves to executable files or documents. When the infected program is run, the virus propagates to other files or programs on the computer. Some viruses are designed to work at a particular time or on a specific date, e.g. on Friday 13th. An email virus spreads by sending a copy of itself to everyone in an email address book.

Worms are self-copying programs that have the capacity to move from one computer to another without human help, by exploiting security flaws in computer networks. Worms are self-contained and don't need to be attached to a document or program the way viruses do.

Trojan horses are malicious programs disguised as innocent-looking files or embedded within legitimate software. Once they are activated, they may affect the computer in a variety of ways: some are just annoying, others are more ominous, creating a backdoor to the computer which can be used to collect stored data. They don't copy themselves or reproduce by infecting other files.

Spyware, software designed to collect information from computers for commercial or criminal purposes, is another example of malicious software. It usually comes hidden in fake freeware or shareware applications downloadable from the Internet.

Task 1. Identify the Internet crimes sentences (1-6) refer to. Then match them with the advice below (a-f).

1. Crackers try to find a way to copy the latest game or computer program.
2. A study has revealed that half a million people will automatically open an email they believe to be from their bank and happily send off all their security details.
3. This software's danger is hidden behind an attractive appearance. That's why it is often wrapped in attractive packages promising photos of celebrities like Anna Kournikova or Jennifer Lopez.
4. There is a particular danger in Internet commerce and emails. Many people believe they have been offered a special gift only to find out later they have been deceived.
5. 'Nimda' spreads by sending infected emails and is also able to infect websites, so when a user visits a compromised website, the browser can infect the computer.
6. Every day, millions of children spend time in Internet chat rooms talking to strangers. But what many of them don't realize is that some of the surfers chatting with them may be sexual predators.

a. People shouldn't buy cracked software or download music illegally from the Internet.
b. Be suspicious of wonderful offers. Don't buy if you aren't sure.
c. It's dangerous to give personal information to people you contact in chat rooms.
d. Don't open attachments from people you don't know even if the subject looks attractive.
e. Scan your email and be careful about which websites you visit.
f. Check with your bank before sending information.

Test yourself

Say whether the following statements are true (T) or false (F)

1. A modem transforms the signal from an audio frequency signal to digital form.
2. Laser printers use a system of heating an ink in the form of liquid powder.
3. Portable computers use flat-screen displays.
4. An optical character reader can read crosses in boxes in a questionnaire.
5. A scanner copies the image of a document and sends it to the computer.
6. Portable computers have a lasertrack instead of a movable mouse.
7. A floppy disc is suitable for storing large files.
8. A ROM memory is volatile.
9. An encoder is an input device that changes the format of information.
10. A register is a memory location operating inside the computer at high speed.
11. An optical character reader can read sentences in a questionnaire.
12. Dot-matrix printers use a system of heating an ink in the form of liquid powder.
13. An MP3 file enables over four hours of music to be recorded on a Compact Disc.
14. Portable computers have a trackpad instead of a movable mouse.

15. A cache is a small low-speed memory buffer.
16. A ROM memory is non-volatile.
17. CD-ROMS can be used for storing large quantities of text.
18. DVD technology offers a hard disc with a very large capacity.
19. DVD-Video was launched in 1987 in the USA.
20. The MP3 file is created from an audio source using 'ripping' software.
21. The programmes stored in the ROM are called firmware.
22. BASIC is much faster than assembly language.
23. COBOL is used for office work.
24. FORTRAN is more suitable for scientific and mathematical work.
25. Mainframe computers are used in the home.
26. Dumb terminals are linked to the mainframe where all the processing is carried out.
27. Smart terminals are capable of doing some processing.
28. The first industrial modern robots were developed by G.Devol and J. Engelberger.
29. Stepping motors move parts of machines without commands from a computer.
30. A deprogrammer translates the language into a machine operating code.

Glossary

ASCII – American Standard Code for Information Interchange, an encoding system for converting keyboard characters and instructions into the binary number code that the computer understands.

Bandwidth – the capacity of a networked connection. Bandwidth determines how much data can be sent along the networked wires. Bandwidth is particularly important for Internet connections, since greater bandwidth also means faster downloads.

Binary code – the most basic language a computer understands, it is composed of a series of 0s and 1s. The computer interprets the code to form numbers, letters, punctuation marks and symbols.

Bit – the smallest piece of computer information, either the number 0 or 1. In short they are called binary digits.

Boot – to start up a computer. Cold boot means restarting computer after the power is turned off. Warm boot means restarting computer without turning off the power.

Browser – software used to navigate the Internet. Google Chrome, Firefox, Netscape Navigator and Microsoft Internet Explorer are today's most popular browsers for accessing the World Wide Web.

Bug – a malfunction due to an error in the program or a defect in the equipment.

Cache – a small data-memory storage area that a computer can use to instantly re-access data instead of re-reading the data from the original source, such as a hard drive. Browsers use a cache to store web pages so that the user may view them again without reconnecting to the Web.

CAD-CAM – Computer Aided Drawing – Computer Aided Manufacturing. The instructions stored in a computer that will be translated to very precise operating instructions to a robot, such as for assembling cars or laser-cutting signage.

CD-ROM – Compact Disc Read-Only Memory, an optically read disc designed to hold information such as music, reference materials, or computer software.

CGI – Common Gateway Interface, a programming standard that allows visitors to fill out form fields on a Web page and have that information interact with a database, possibly coming back to the user as another Web page.

Chat – typing text into a message box on a screen to engage in dialogue with one or more people via the Internet or other network.

Chip – a tiny wafer of silicon containing miniature electric circuits that can store millions of bits of information.

Cookie – a text file sent by a Web server that is stored on the hard drive of a computer and relays back to the Web server things about the user, his or her computer, and/or his or her computer activities.

CPU – Central Processing Unit. The brain of the computer.

Cracker – a person who breaks in to a computer through a network, without authorization and with mischievous or destructive intent.

Crash – a hardware or software problem that causes information to be lost or the computer to malfunction. Sometimes a crash can cause permanent damage to a computer.

Cursor – a moving position–indicator displayed on a computer monitor that shows a computer operator where the next action or operation will take place.

Cyberspace – an international conglomeration of interconnected computer networks. Begun in the late 1960s, it was developed in the 1970s to allow government and university researchers to share information. The Internet is not controlled by any single group or organization. Its original focus was research and communications, but it continues to expand, offering a wide array of resources for business and home users.

Database – a collection of similar information stored in a file, such as a database of addresses. This information may be created and stored in a database management system (DBMS).

Desktop – the main directory of the user interface. Desktops usually contain icons that represent links to the hard drive, a network (if there is one), and a trash or recycling can for files to be deleted. It can also display icons of frequently used applications, as requested by the user.

Desktop publishing – the production of publication-quality documents using a personal computer in combination with text, graphics, and page layout programs.

Disk – two distinct types. The names refer to the media inside the container. A hard disc stores vast amounts of data. It is usually inside the computer but can be a separate peripheral on the outside. Hard discs are made up of several rigid coated metal discs. A floppy disc usually inserted into the computer.

DOS – Disk Operating System. An operating system designed for early IBM-compatible PCs.

Drop-down menu – a menu window that opens vertically on-screen to display context-related options. Also called pop–up menu or pull-down menu.

Ethernet – a type of network.

Ethernet card – a board inside a computer to which a network cable can be attached.

File – a set of data that is stored in the computer.

Firewall – a set of security programs that protect a computer from outside interference or access via the Internet.

Folder – a structure for containing electronic files. In some operating systems, it is called a directory.

FTP – **File Transfer Protocol**, a format and set of rules for transferring files from a host to a remote computer.

Glitch – the cause of an unexpected malfunction.

GUI – **Graphical User Interface**, a system that simplifies selecting computer commands by enabling the user to point to symbols or illustrations (called icons) on the computer screen with a mouse.

Hacker – a person with technical expertise who experiments with computer systems to determine how to develop additional features. Hackers are occasionally requested by system administrators to try and break into systems via a network to test security. The term hacker is sometimes incorrectly used interchangeably with cracker. A hacker is called a white hat and a cracker a black hat.

Hardware – the physical and mechanical components of a computer system, such as the electronic circuitry, chips, monitor, disks, disk drives, keyboard, modem, and printer.

Home page – the main page of a Web site used to greet visitors, provide information about the site, or to direct the viewer to other pages on the site.

HTML – **Hypertext Markup Language**, a standard of text markup conventions used for documents on the World Wide Web. Browsers interpret the codes to give the text structure and formatting (such as bold, blue, or italic).

HTTP – **Hypertext Transfer Protocol**, a common system used to request and send HTML documents on the World Wide Web. It is the first portion of all URL addresses on the World Wide Web.

HTTPS – **Hypertext Transfer Protocol Secure**, often used in intracompany internet sites. Passwords are required to gain access.

Hyperlink – text or an image that is connected by hypertext coding to a different location. By selecting the text or image with a mouse, the computer jumps to (or displays) the linked text.

Hypermedia – integrates audio, graphics, and/or video through links embedded in the main program.

Icons – symbols or illustrations appearing on the computer screen that indicate program files or other computer functions.

Input – data that goes into a computer device.

Input device – a device, such as a keyboard, stylus and tablet, mouse, puck, or microphone, that allows input of information (letters, numbers, sound, video) to a computer.

Interface – the interconnections that allow a device, a program, or a person to interact. Hardware interfaces are the cables that connect the device to its power source and to other devices. Software interfaces allow the program to communicate with other programs (such as the operating system), and user interfaces allow the user to communicate with the program (e.g., via mouse, menu commands, icons, voice commands, etc.).

Internet - an international conglomeration of interconnected computer networks. Begun in the late 1960s, it was developed in the 1970s to allow government and university researchers to share information. The Internet is not controlled by any single group or organization. Its original focus was research and communications, but it continues to expand, offering a wide array of resources for business and home users.

Java – an object–oriented programming language designed specifically for programs (particularly multimedia) to be used over the Internet. Java allows programmers to create small programs or applications (applets) to enhance Web sites.

Linux – a UNIX – like, open-source operating system developed primarily by Linus Torvalds. Linux is free and runs on many platforms, including both PCs and Macintoshes. Linux is an open-source operating system, meaning that the source code of the operating system is freely available to the public. Programmers may redistribute and modify the code, as long as they don't collect royalties on their work or deny access to their code. Since development is not restricted to a single corporation more programmers can debug and improve the source code faster.

Memory – a storage for information, including applications and documents. The information must be stored to a permanent device, such as a hard disc or CD-ROM before the power is turned off, or the information will be lost. Computer memory is measured in terms of the amount of information it can store, commonly in megabytes or gigabytes.

Menu – a context-related list of options that users can choose from.

Menu bar – the horizontal strip across the top of an application's window. Each word on the strip has a context sensitive drop-down menu containing **features and actions that are available for the application in use.**

Microprocessor – a complete central processing unit (CPU) contained on a single silicon chip.

Minimize – a term used in a GUI operating system that uses windows. It refers to reducing a window to an icon, or a label at the bottom of the **screen, allowing another window to be viewed.**

Modem - a device that connects two computers together over a telephone or cable line by converting the computer's data into an audio signal. Modem is a contraction for the process it performs : modulate-demodulate.

Monitor - a video display terminal.

Mouse - a small hand-held device, similar to a trackball, used to control the position of the cursor on the video display; movements of the mouse on a desktop correspond to movements of the cursor on the screen.

Multimedia – software programs that combine text and graphics with sound, video, and animation. A multimedia PC contains the hardware to support these capabilities.

Network – a system of interconnected computers.

Operating system – a set of instructions that tell a computer on how to operate when it is turned on. It sets up a filing system to store files and tells the computer how to display information on a video display. Most PC operating systems are DOS (disc operated system) systems, meaning the instructions are stored on a disc (as opposed to being originally stored in the microprocessors of the computer). Other well-known operating systems include UNIX, Linux, Macintosh, and Windows.

Output – data that come out of a computer device. For example, information displayed on the monitor, sound from the speakers, and information printed to paper.

Open source – computer programs whose original source code was revealed to the general public so that it could be developed openly. Software licensed as open source can be freely changed or adapted to new uses, meaning that the source code of the operating system is freely available to the public. Programmers may redistribute and modify the code, as long as they don't collect royalties on their work or deny access to their code. Since development is not restricted to a single corporation more programmers can debug and improve the source code faster.

PDA – **Personal Digital Assistant**, a hand-held computer that can store daily appointments, phone numbers, addresses, and other important information. Most PDAs link to a desktop or laptop computer to download or upload information.

PDF – **Portable Document Format**, a format presented by Adobe Acrobat that allows documents to be shared over a variety of operating systems. Documents can contain words and pictures and be formatted to have electronic links to other parts of the document or to places on the web.

Platform – the operating system, such as UNIX, Macintosh, Windows, on which a computer is based.

Plug and play – computer hardware or peripherals that come set up with necessary software so that when attached to a computer, they are recognized by the computer and are ready to use.

Pop-up menu – a menu window that opens vertically or horizontally on-screen to display context-related options. Also called drop–down menu or pull-down menu.

Printer – a mechanical device for printing a computer's output on paper. There are three major types of printer: **Dot matrix** – creates individual letters, made up of a series of tiny ink dots, by punching a ribbon with the ends of tiny wires. (This type of printer is most often used in industrial settings.) **Ink jet** – sprays tiny droplets of ink particles onto paper. **Laser** – uses a beam of light to reproduce the image of each page using a magnetic charge that attracts dry toner that is transferred to paper and sealed with heat.

Program – a precise series of instructions written in a computer language that tells the computer what to do and how to do it. Programs are also called software or applications.

Puck – an input device, like a mouse. It has a magnifying glass with crosshairs on the front of it that allows the operator to position it precisely when tracing a drawing for use with CAD-CAM software.

Programming language – series of instructions written by a programmer according to a given set of rules or conventions (syntax). High-evel programming languages are independent of the device on which the application (or program) will eventually run; low-level languages are specific to each program or platform. Programming language instructions are converted into programs in language specific to a particular machine or operating system (machine language). So that the computer can interpret and carry out the instructions. Some common programming languages are BASIC, C, C++, FORTRAN, and Perl.

Pull-down menu – a menu window that opens vertically on-screen to display context–related options. Also called drop–down menu or pop-up menu.

QuickTime – audio-visual software that allows movie-delivery via the Internet and e-mail. QuickTime images are viewed on a monitor.

RAID – Redundant Array of Inexpensive Disks, a method of spreading information across several disks set up to act as a unit, using two different techniques: disk striping – storing a bit of information across several discs; disk mirroring – simultaneously storing a copy of information on another disc so that the information can be recovered if the main disc crashes.

RAM – Random Access Memory, one of two basic types of memory. Portions of programs are stored in RAM when the program is launched so that the program will run faster. Though a PC has a fixed amount of RAM, only portions of it will be accessed by the computer at any given time.

ROM – Read–Only Memory, one of two basic types of memory. ROM contains only permanent information put there by the manufacturer. Information in ROM cannot be altered, nor can the memory be dynamically allocated by the computer or its operator.

Scanner – an electronic device that uses light–sensing equipment to scan paper images such as text, photos, and illustrations and translate the images into signals that the computer can then store, modify, or distribute.

Search engine – Software that makes it possible to look for and retrieve material on the Internet, particularly the Web. Some popular search engines are Alta Vista, Google, HotBot, Yahoo!, Web Crawler, and Lycos.

Server – a computer that shares its resources and information with other computers, called clients, on a network.

Shareware – software created by people who are willing to sell it at low cost or no cost for the gratification of sharing. It may be freestanding software, or it may add functionality to existing software.

Software – computer programs; also called applications.

Spider – a process search engines use to investigate new pages on a web site and collect the information that needs to be put in their indices.

Spreadsheet – software that allows one to calculate numbers in a format that is similar to pages in a conventional ledger.

Storage – devices used to store massive amounts of information so that it can be readily retrieved. Devices include RAIDs, CD-ROMs, DVDs.

Streaming – taking packets of information from the Internet and storing it in temporary files to allow it to play in continuous flow.

Stylus and tablet – an input device similar to a mouse. The stylus is pen shaped. It is used to draw on a tablet and the tablet transfers the information to the computer. The tablet responds to pressure. The firmer the pressure used to draw, the thicker the line appears.

Telnet – a way to communicate with a remote computer over a network.

Trackball – input device that controls the position of the cursor on the screen; the unit is mounted near the keyboard, and movement is controlled by moving a ball.

UNIX – a very powerful operating system used as the basis of many high–end computer applications.

Upload – the process of transferring information from a computer to a web site (or other remote location on a network). To transfer information from a computer to a web site (or other remote location on a network).

URL – Uniform Resource Locator.

UPS – Universal Power Supply or Uninterruptible Power Supply. An electrical power supply that includes a battery to provide enough power to a computer during an outage to back–up data and properly shut down.

USB – A multiple-socket USB connector that allows several USB–compatible devices to be connected to a computer.

USENET – a large unmoderated and unedited bulletin board on the Internet that offers thousands of forums, called newsgroups. These range from newsgroups exchanging information on scientific advances to celebrity fan clubs.

User friendly – a program or device whose use is intuitive to people with a non–technical background.

Video teleconferencing – a remote "face-to-face chat," when two or more people using a webcam and an Internet telephone connection chat online. The webcam enables both live voice and video.

Virtual reality (VR) – a technology that allows one to experience and interact with images in a simulated three–dimensional environment. For example, you could design a room in a house on your computer and actually feel that you are walking around in it even though it was never built. Current technology requires the user to wear a special helmet, viewing goggles, gloves, and other equipment that transmits and receives information from the computer.

Virus – an unauthorized piece of computer code attached to a computer program or portions of a computer system that secretly copies itself from one computer to another by shared discs and over telephone and cable lines. It can destroy information stored on the computer, and in extreme cases, can destroy operability. Computers can be protected from viruses if the operator utilizes good virus prevention software and keeps the virus definitions up to date. Most viruses are not programmed to spread themselves. They have to be sent to another computer by e-mail, sharing, or applications.The worm is an exception, because it is programmed to replicate itself by sending copies to other computers listed in the e–mail address book in the

computer. There are many kinds of viruses, for example: Boot viruses place some of their code in the start–up disk sector to automatically execute when booting. Therefore, when an infected machine boots, the virus loads and runs. File viruses attached to program files. When you run the infected program, the virus code executes.

Macro viruses copy their macros to templates and/or other application document files. **Trojan Horse** is a malicious, security-breaking program that is disguised as something being such as a screen saver or game. **Worm** launches an application that destroys information on your hard drive. It also sends a copy of the virus to everyone in the computer's e–mail address book.

WAVA – sound format used to reproduce sounds on a computer.

Window – a portion of a computer display used in a graphical interface that enables users to select commands by pointing to illustrations or symbols with a mouse. "Windows" is also the name Microsoft adopted for its popular operating system.

Word processor – a computer system or program for setting, editing, revising, correcting, storing, and printing text.

World Wide Web ("WWW" or "the Web") – a network of servers on the Internet that use hypertext–linked databases and files. It was developed in 1989 by Tim Berners-Lee, a British computer scientist, and is now the primary platform of the Internet. The feature that distinguishes the Web from other Internet applications is its ability to display graphics in addition to text.

WYSIWYG – What You See Is What You Get. When using most word processors, page layout programs and web page design programs, words and images will be displayed on the monitor as they will look on the printed page or web page.

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