МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЧЕРНІГІВСЬКИЙ НАЦІОНАЛЬНИЙ ТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ

PROFESSIONAL ENGLISH IN USE: ICT

(Частина І)

Фахові тексти та завдання для опрацювання професійної лексики для студентів за напрямом підготовки 6.050102 – "Комп'ютерна інженерія" денної форми навчання

Обговорено і рекомендовано
на засіданні кафедри іноземних мов

Протокол № 4 від 25.11.14 р.

Чернігів ЧНТУ 2014

PROFESSIONAL ENGLISH IN USE: ICT. (Частина І). Фахові тексти та завдання для опрацювання професійної лексики для студентів за напрямом підготовки 6.050102 – "Комп'ютерна інженерія" денної форми навчання. / Укладач: Юсухно С.І. – Чернігів: ЧНТУ, 2014. – 86 с.

Укладач: Юсухно Світлана Іванівна, старший викладач

Відповідальний за випуск: Литвин С.В., завідувач кафедри іноземних мов, кандидат педагогічних наук, доцент

Рецензент: Литвин С.В., кандидат педагогічних наук, доцент, завідувач кафедри іноземних мов Чернігівського національного технологічного університету

ВСТУП

Згідно Програми англійської мови для професійного спілкування (2005 р.) вивчення іноземної мови повинно розвивати мовну компетенцію студентів, а також стратегії, необхідні для ефективної участі в процесі навчання та в ситуаціях професійного спілкування.

Методичні вказівки «PROFESSIONAL ENGLISH IN USE: ICT. », що включають фахові тексти та завдання, мають на меті допомогти студентам напряму підготовки 6.050102 – "Комп'ютерна інженерія" опрацювати спеціалізовану лексику, яка може знадобитися їм під час англомовного професійного спілкування.

Двадцять розділів, представлених у методичних вказівках, базуються на лексичному матеріалі, що охоплює термінологію, пов'язану з персональними комп'ютерами, системами управління базами даних, операційними системами тощо. Тематика і зміст текстів, не лише відповідають вимогам програми, а й задовольняють професійні інтереси та потреби студентів. Крім того, кожен розділ містить завдання, спрямовані на розширення словникового запасу, розвиток умінь говоріння та письма.

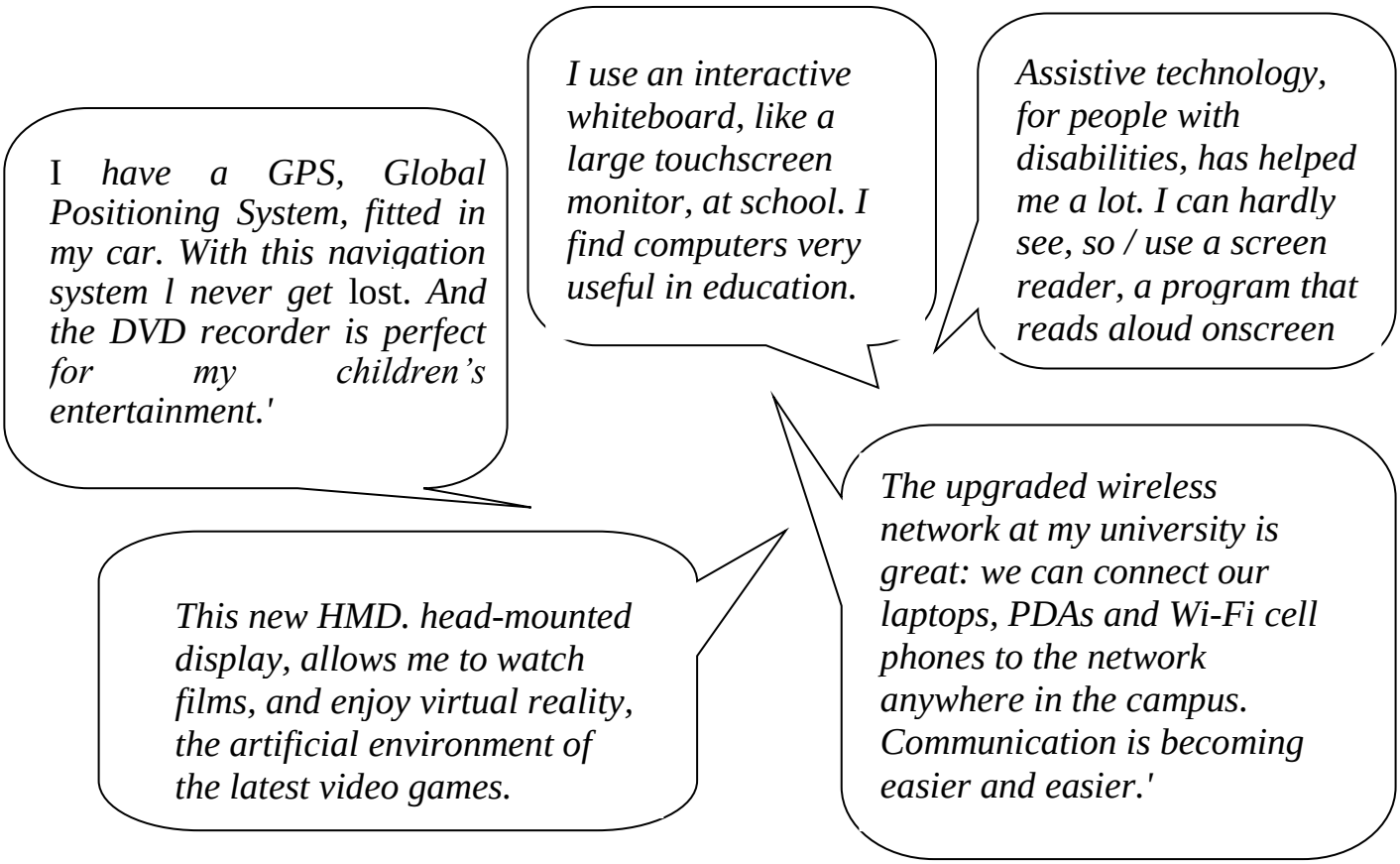
У додатках представлений список поширених абревіатур та англо український словник комп'ютерних термінів.

Матеріал, вміщений у методичних вказівках, спрямований на формування у студентів лінгвістичної та фахової компетенції, дає інструменти для використання англійської мови у професійній діяльності та має привчити їх до читання оригінальної літератури за професійним спрямуванням з мінімальним використанням словника.

1 Living with computers

A Computers: friend ...

People who have grown up with PCs and microchips are often called the digital generation. This is how some people answered when questioned about the use of computers in their lives.

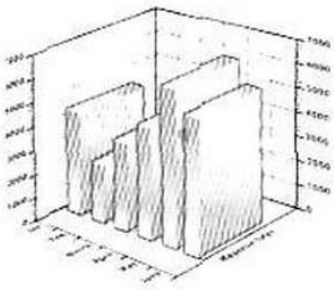


B ... or foe?

■ Our society has developed **technological dependence**. When computers are down, our way of life breaks down: planes stop flying, telephones don't work, banks have to close.
■ Computers produce **electronic waste**, plastic cases and microchips that are not biodegradable and have to be recycled or just thrown away.
■ They are responsible for health problems, e.g. **computer addiction**, an inappropriate and excessive use of computers.
■ **Cybercrime**, crime committed with the help of computers, is creating serious problems.
■ Citizens may feel a **loss of privacy** because of unauthorized use of personal data or receiving unwanted electronic messages.

C Things we can do on the computer

A publication


A business graph

Web pages and email


Photo editing

A secretary: 'I use computers to do the usual office things like **write letters** and **faxes**, but what 1 find really useful is email. We are an international company and I **send emails** to our offices all over the world.'

A publisher: 'We use PCs to produce all sorts of texts in digital format. We **publish e-books** (electronic books) and interactive e-learning programs on CD, and we help a local company to **design an online newspaper**, displayed on the Web."

A bank manager: 'We use financial software to **make calculations** and then generate graphs or charts. We also use a database **to store information** so that it can be easily searched.'

A home user: I like to **retouch photos** on my computer; I improve them by making a few touches and then save them on a CD. I also enjoy looking at music portals on the Web. I **surf the Web** every day and I often **download files**, I copy music files from the Net to my PC.'

Complete these sentences with words from A opposite.

1 The is a piece of software that interfaces with your PC and allows you, via keyboard commands, to get any text information read to you in synthetic speech.

2 A .....- ....., as popularized by virtual reality, lets the user immerse him/herself in a synthetically generated environment.

3 An ..... is a touch-sensitive device where a special pen or your finger can act as a mouse.

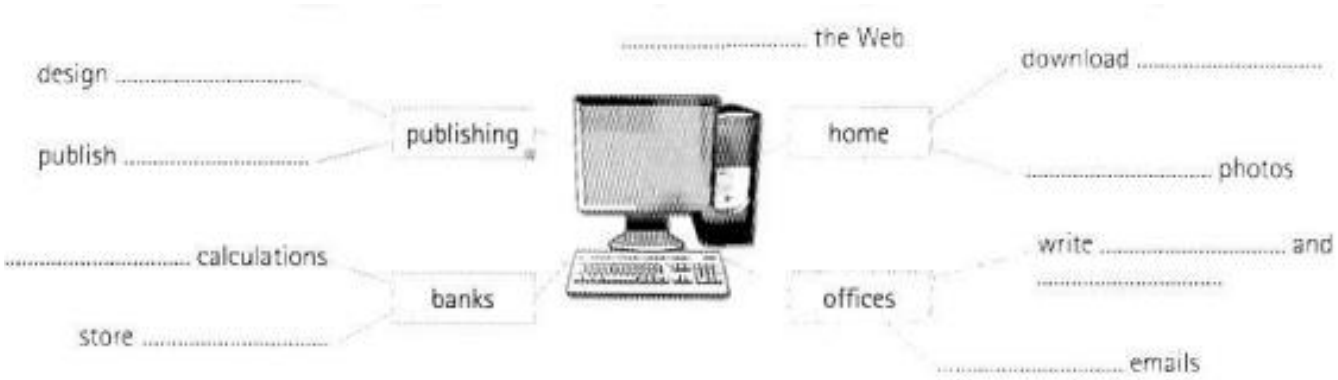
4 Tony Adams is now the proud owner of a dark silver Vogue, complete with leather interior,
navigation, and a .....with LCD TV screens.

1.1 Which computer use in A do these pictures illustrate?

1.2 Read B opposite. What problem do these sentences refer to?

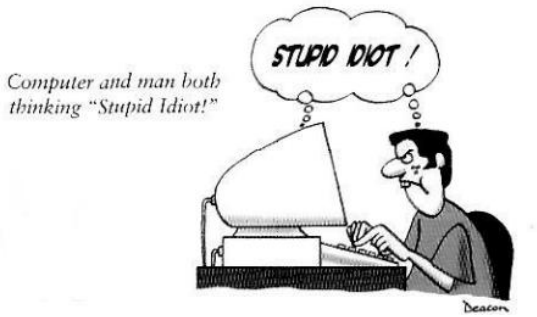
1 We are sorry to announce that most flights are delayed or cancelled.
2 He should go to a psychologist. He spends hours surfing the Web.
3 Technology changes so quickly that we have to scrap computers when they become obsolete.
4 I've been getting emails about offers for lots of different products.
5 Computer system has been broken into and some useful information has been destroyed.

1.4 Some words often appear together in IT. Complete these computer uses with word partners from C opposite.



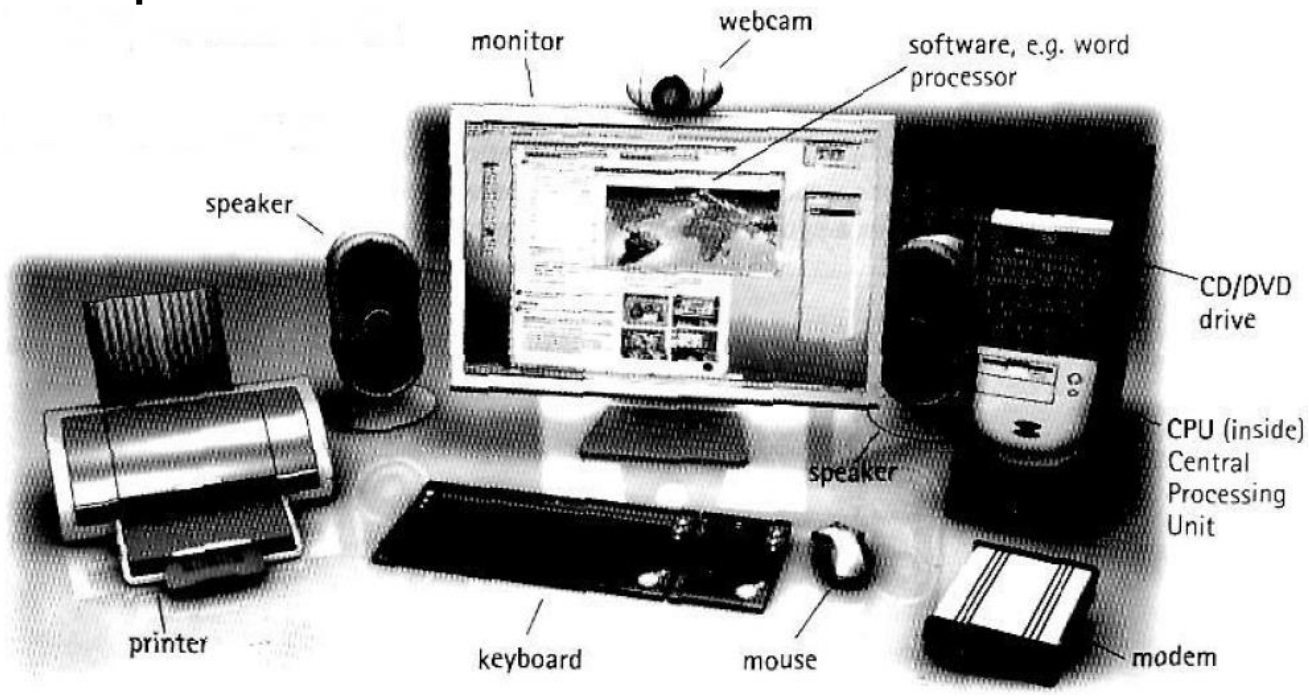
You and computers

Make a list of the ways you use computers at work and in your free time.



2 A typical PC

A Computer essentials



B Parts of a computer

A computer is an electronic machine that accepts processes, stores and outputs information. A typical computer consists of two parts: hardware and software.

Hardware is any electronic or mechanical part of the computer system that you can see or touch.

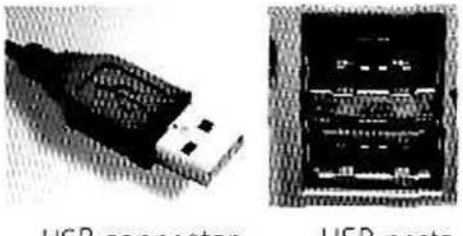
Software is a set of instructions, called a program, which tells a computer what to do. There are three basic hardware sections.

1 The **CPU** is the heart of the computer, a microprocessor chip which processes data and coordinates the activities of all the other units.

2 The main memory holds the instructions and data which are being processed by the CPU. It has two main sections: **RAM** (random access memory) and **ROM** (read only memory).

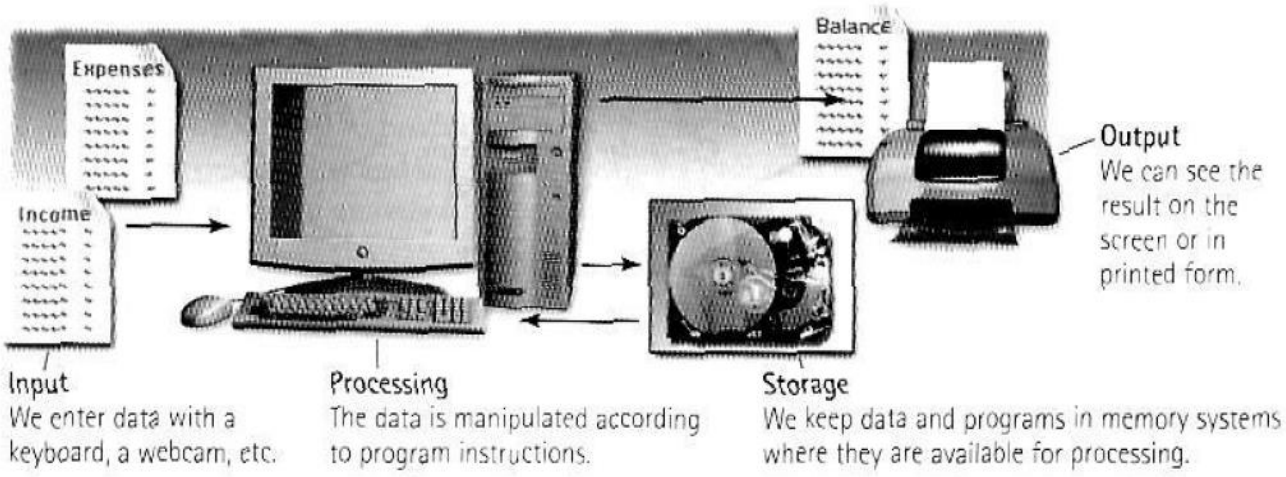
3 Peripherals are the physical units attached to the computer. They include:

- **Input devices**, which let us enter data and commands (e.g. the keyboard and the mouse).
- **Output devices**, which let us extract the results (e.g. the monitor and the printer).
- **Storage devices**, which are used to store information permanently (e.g. hard disks and DVD-RW drives).



Disk drives are used to read and write data on disks.
At the back of a computer there are **ports** into which we can plug external devices (e.g. a scanner, a modem, etc.). They allow communication between the computer and the devices.

C Functions of *a* PC: input, processing, output, storage



2.1 Look at A opposite. Read these quotations and say which computer essential they refer to.

1 'Accelerate your digital lifestyle by choosing a Pentium at 4.3 GHz.'

2 'Right-click to display a context-sensitive menu.'

3 'You will see vivid, detailed images on a 17" display.'

4 'This will produce high-quality output, with sharp text and impressive graphics.'

5 'Use it when you want to let the grandparents watch the new baby sleeping.'

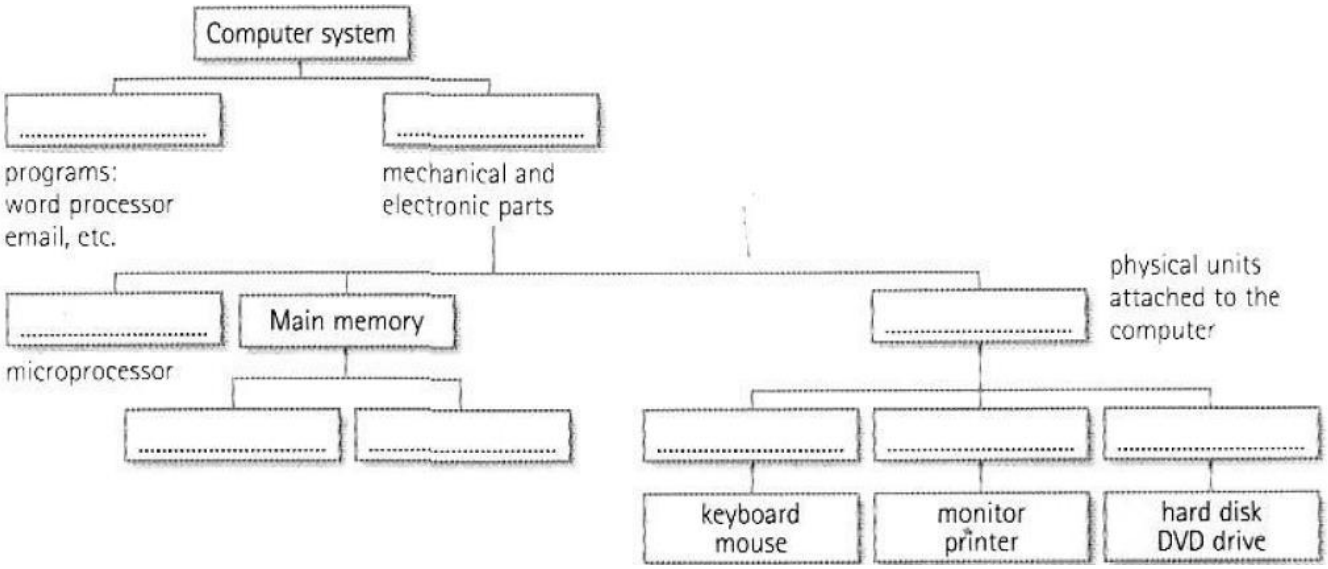
6 'Press any key to continue.'

2.2 Match the terms with their definitions

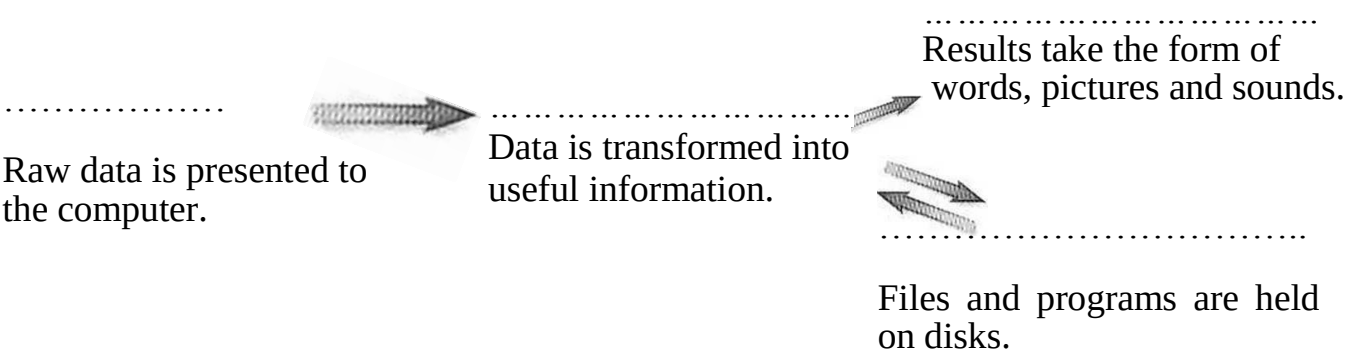
- CD/DVD drive
- speaker
- modem
- port

a any socket into which a peripheral device may be connected
b device used to produce voice output and play back music
c mechanism that reads and/or writes to optical discs
d device that converts data so that it can travel over the Internet

2.3 Look at B opposite and label this diagram with the correct terms.



2.4 Complete the diagram and sentences below with words from C opposite.
Functions of computer



1 Computer ……..is the visible or audible result of data processing – information that can he read, printed or heard by the user.
2 The CPU will process data as instructed by the programs you're running…….. includes functions like calculating, sorting, editing, drawing and searching.
3 DVDs are expected to replace CDs as ..... devices.
4 As a scanner, the Sigma-100 can be used to ..... photographs as well as documents into the computer.

You and computers

Access the Professional English in Use ICT website at www.cambridge.org/elt/ict. Then do the activity Computer history.

3 Types of computer systems

A 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 rime 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 a 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 handheld 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.

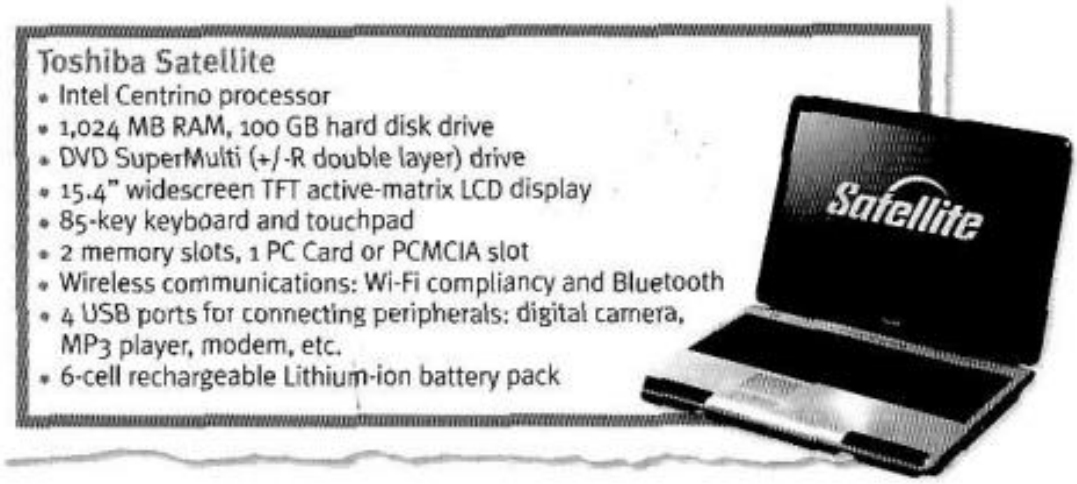
A **wearable computer** runs on batteries and is worn on the user's body, e.g. on a belt, backpack or vest; it is designed for mobile or hands-free operation. Some devices are equipped with a wireless modem, a small keyboard and a screen; others are voice-activated and can access email or voice mail.

3.1 Look at A opposite. Which type of computer do these descriptions refer to?

1. a hand-held computer which can be used as a telephone, a web explorer and a personal organizer.
2. a typical computer found in many businesses and popular for home use
3. a large computer used for intensive data processing and often linked to many terminals
4. a small computer that fits into items of clothing
5. a portable computer that can be closed up like a briefcase, but it can be as powerful as a desktop PC
6. a full-function PC, though it only weighs 1.2 kg - you can go to a meeting and write your notes oil it, like a paper notepad; its screen mode can be changed from portrait to landscape

3.2 Look at the computer advertisement and find this information.

1 What type of computer is advertised?
2 What kind of screen does it have?
3 Which pointing device replaces the mouse?
4 What type of ports does it have for connecting cameras and music players?
5 What sort of power supply does it use?



3.3 Read this interview with Adam Hawkins, an IT manager, and complete it with words from the PDA section opposite.

Interviewer: What are the basic features of a PDA?
Adam: Well, a typical PDA is a (1)……. device that runs on batteries and combines computing, phone and Net capabilities.
Interviewer: And how do you enter information?
Adam: For input, you use a (2) ……. or pen to write and make selections on a (3) ……. ; they also have buttons for launching programs. Some models have a small keyboard. They may have a (4) ……. system that reacts to the user's voice.

Interviewer: Do they need special software?
Adam: Yes, most of them run on *Windows Mobile.* Palmtops supported by Palm Inc. use *Palm OS.* Pen-based systems include (5) ……. so you write on the screen and the computer recognizes your handwriting and inserts the appropriate letters.
Interviewer: What sort of things can you do with a PDA?
Adam: You can store personal information, take notes, draw diagrams and make calculations. Many PDAs can access the Net via (6) …….technology.

You and computers

1 Write down two benefits and two limitations of PDAs.
2 Explain in a paragraph how laptops can be beneficial to business people.
3 Write three examples of how tablet PCs can be used in the classroom.

4 Input devices: type, click and talk!

A Interacting with your computer

Input devices are the pieces of hardware which allow us to enter information into the computer.

B The keyboard

A standard PC keyboard has various groups of keys.

■ **Alphanumeric keys** - these represent letters and numbers, arranged as on a typewriter.

■ A **numeric keypad** appears to the right of the main keyboard and contains numeric and editing keys; the Num Lock key is used to switch from numbers to editing functions.

■ **Function keys** appear at the top of the keyboard and can be programmed to do special jobs.

■ **Cursor keys** include ‘arrow keys' which move the insertion point, and keys such as Home, End, Page Up, and Page Down, which let you move around documents.

■ **Dedicated keys** are used to issue commands or produce alternative characters. For example:

- **Ctrl** changes the functions of other keys (e.g. Ctrl + X cuts the selected text).
- **Caps Lock** sets the keyboard in ‘CAPITALS' mode; it only affects letters.
- **Enter** (or **Return**) is pressed to select options from a menu or to start a new paragraph.
- **Backspace** deletes the character to the left of your current position.

C The mouse

A mouse is a hand-held device that lets you move a pointer (or cursor) and select items on the screen. It has one or more buttons to communicate with the PC. A scroll wheel lets you move through your documents or web pages. The pointer looks like an I-bar, an arrow or a pointing hand.

An optical mouse has an optical sensor instead of a ball underneath.

A cordless (wireless) mouse has no cable; ir sends data via infrared signals or radio waves.

Mouse actions:

- to **click**, press and release the left button.
- to **double**-click, press and release the left button twice.
- to **drag**, hold down the button, move the pointer to a new place and then release the button.
- to **right-click**, press and release the right button; this action displays a list of commands.

D Voice input

Today you can also interact with your computer by voice with a **voice-recognition system** that converts voice into text, so you can dictate text directly onto your word processor or email program. You can also control your PC.' with voice commands; this means you can launch programs, open, save or print files. Some systems let you search the Web or chat using your voice instead of the keyboard.

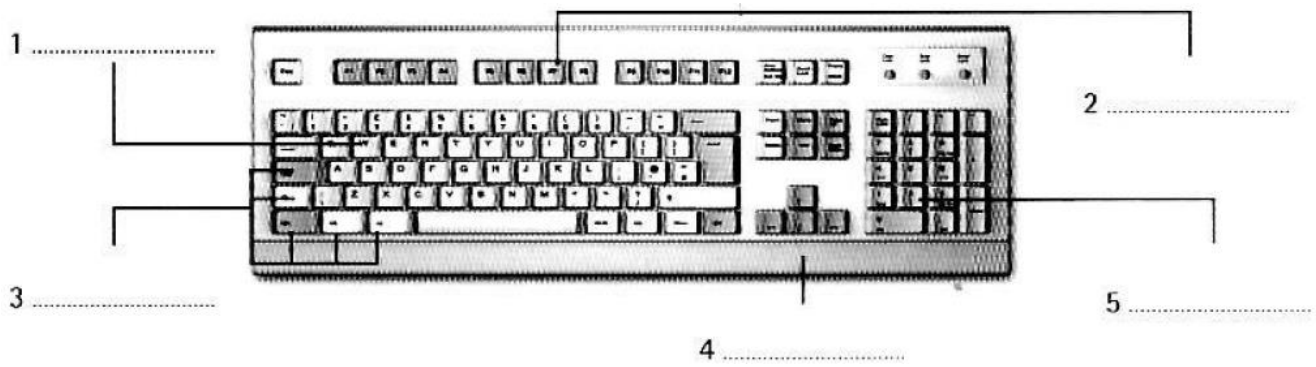
4.1 Look at A opposite. Which input device would you use for these tasks?

1 to play computer games
2 to copy images from paper into a computer
3 to read price labels in a shop
4 to select text and click on links on web pages
5 to enter drawings and sketches into a computer
6 to input voice commands and dictate text
7 to draw pictures or select menu options directly on the screen
8 to take and store pictures and then download them to a computer

4.2 Complete each sentence by choosing from the following devices: *touch screen, trackball, touchpad, webcam.*

1 A..... is a stationary device that works like a mouse turned upside down. You roll the ball with your hand to move the pointer on the screen.
2 Interactive..... are used in museums, information centres and Internet kiosks. You use your finger to point directly to objects on the screen.
3 A…….is used to send live video images via the Internet.
4 A..... is found on notebook PCs. You use it by pressing the sensitive pad with a finger.

4.3 Label the groups of keys with terms from B opposite. Then identify the keys described below.



6 It produces upper-case letters, but it does not affect numbers and symbols.
7 It removes the character to the left of the cursor or any selected text.
8 It works in combination with other keys, e.g. you press this key and C to copy the selected text.
9 It is used to confirm commands; in a word processor, it creates a new paragraph.

4.4 Look at C opposite. Complete these sentences with the correct ‘mouse action'.

1 To start a program or open a document you ..... on its icon

- that is, you rapidly press and release the mouse button twice.

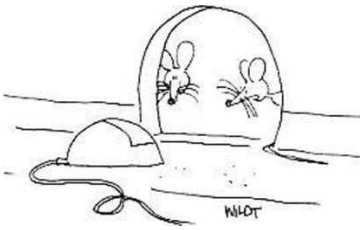
2 If you want to select a menu option, you just ..... on the left button.

3 If you want to find the commands for a particular text, image, etc., you have to…….on it.

4 If you want to move an object, press the button and…… the object to the desired location.

You and computers

1. Read D opposite and make a list of the things you can do with a voice-recognition system.
2. What do you think of this idea? *Some day, we'll be talking to our PC naturally, like a friend.* Write down your opinions.

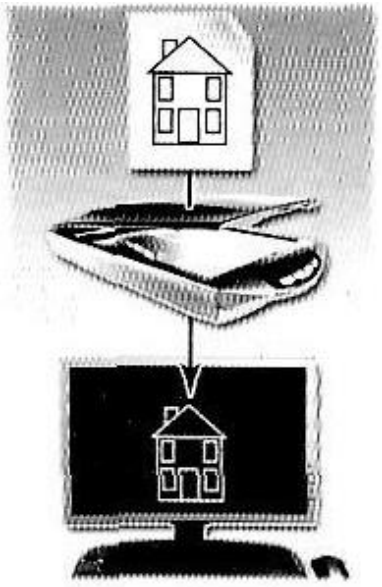


"Thai must he the new neighbor.
I hear he's a real computer geek. "

5 Input devices: the eyes of your PC

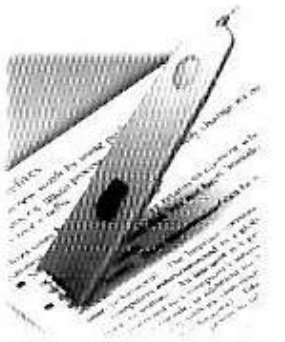
A Scanners

Input devices such as scanners and cameras allow you to capture and copy images into a computer.



A **scanner** is a peripheral that reads images and converts them into electronic codes which can be understood by a computer. There are different types.

- A **flatbed** is built like a photocopier and is for use on a desktop; it can capture text, colour images and even small 3D objects.
- A **film scanner** is used to scan film negatives or 35 mm slides – pictures on photographic film, mounted in a frame.
- A **hand-held scanner** is small and T-shaped, ideal to capture small pictures and logos.
- A **pen scanner** looks like a pen; you can scan text, figures, barcodes and handwritten numbers.



A pen scanner

Barcode scanner read barcodes on the products sold in shops and send the price to the computer in the cash register. **Barcodes** consist of a series of black and white stripes used to give products a unique identification number.

Barcode and reader

The **resolution** of a scanner is measured in **dpi** or dots per inch. For example, a 1,200 dpi scanner gives clearer, more detailed images than a 300 dpi scanner.

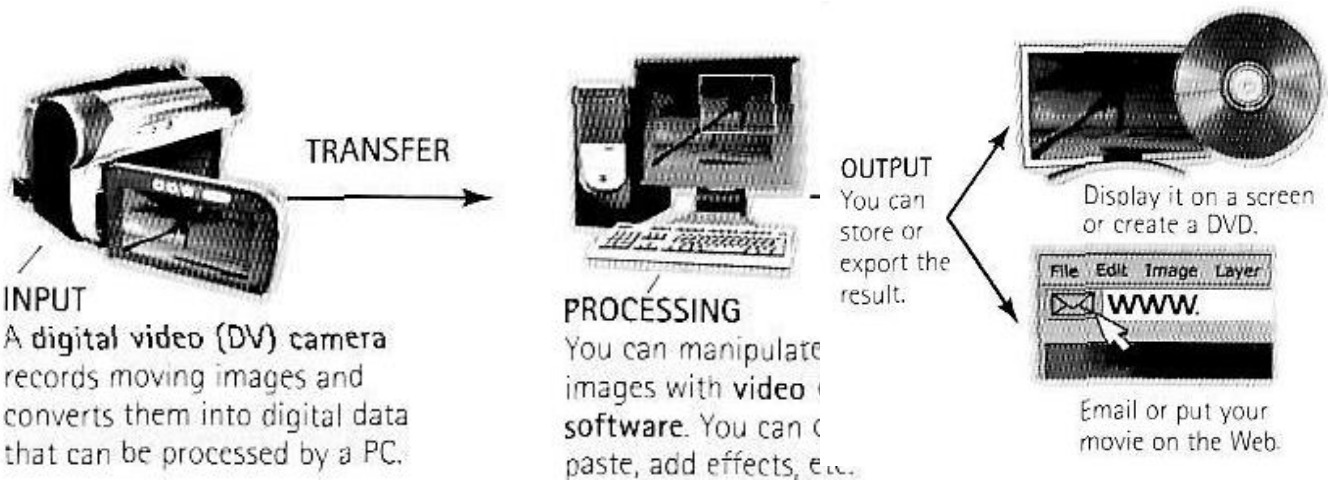
Most scanners come with **Optical Character Recognition** software. OCR allows you to scan pages of text and save them into your word processor; they can then be edited.

B Digital cameras

A **digital camera** doesn't use film. Photos are stored as digital data (bits made up of 1s and 0s), usually on a tiny storage device known as **flash memory** card. You can connect the camera or memory card to a PC and then alter the images using a

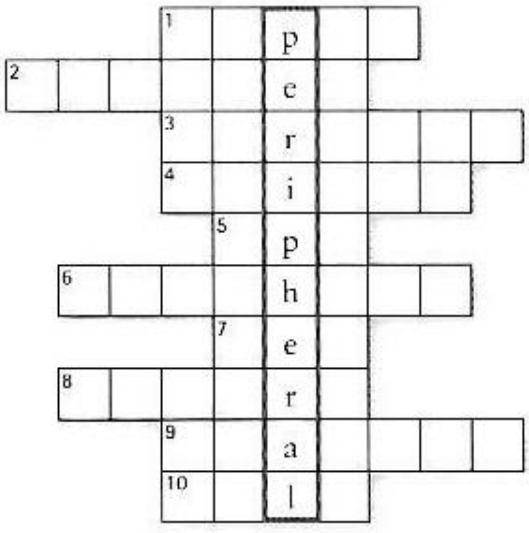
program like Adobe Photoshop, or you can view the images on a TV set. Many printers have a special socket so that you can print images directly from a memory card or camera.

C Digital video cameras and webcams



Webcams (short of Web cameras) let you send and receive live video pictures through the Internet. They're primarily used for video conferences – video calls – but they can be used to record photos and video onto your hard disk.
The resolution of webcams is expressed in megapixels (million pixels). Webcams connect to the PC via a USB (universal serial bus) or FireWire port; they display video at 24 to 30 frames (pictures) per second. Some include a headset with a microphone and earpiece.

5.1 Solve the clues and complete the puzzle with words from A and B opposite.



1. Scanners and cameras are ……. Devices used to transfer images into a format that can be understood by computers.
2. A …….. lets you copy photos and printed documents into your PC.
3. It has become one of life's most familiar sounds – the beep of the supermarket till whenever a …… is scanned.
4. If you need to scan 35mm …… you should go for a dedicated 35mm film scanner which concentrates all its dots in tiny area.
5. This scanner has a resolution of 300 x 600 …….. .
6. A …….. scanner is small enough to hold in your hand.
7. A …….. scanner is used to capture lines of text, barcodes and numbers.
8. Most digital cameras use flash …… cards to store photos.
9. ……. scanners have a flat surface and take at least A4-sized documents.
10. To scan photographic negatives or slides you will need a …….. scanner.

5.2 Decide if these sentences are *True* or *False*. If they are false, correct them.

1. The details detected by a scanner are not determined by its resolution.
2. A barcode scanner is a computer peripheral for reading barcode labels printed on products.
3. Scanners cannot handle optical character recognition.
4. A digital camera uses a light sensitive film instead of a memory card for storing the images.
5. A digital video (DV) camera is used to take still photographs.
6. Video editing software allows you to manipulate video clips on the computer.

5.3 Complete this advertisement with words from the webcam section of C opposite.

Having (1)……. …….. with friends and family has never been easier or more enjoyable. You get the highest-quality audio and video, no matter which chatting solution you use. With the WebCam Live! Ultra, its CCD image sensor with 640 x 480 (VGA) resolution produces rich, vibrant colours. Combined with its (2)……. 2.0 Hi-Speed connection, the result is top quality, full-motion video at 30 (3)…….. per second for all your web conversations, even in dimly-lit rooms. The WebCam Live! Ultra lets you do more. Let your voice be heard

clearer than ever before with the included (4)……., unlike the built-in microphones in most other (5)……. take still pictures at up to 1.3 (6)…… resolution (interpolated), and enjoy the many great features that accompany the bundled award-winning WebCam Center software, such as motion detection, remote security monitoring, timelapse video capture and much more.

You and computers

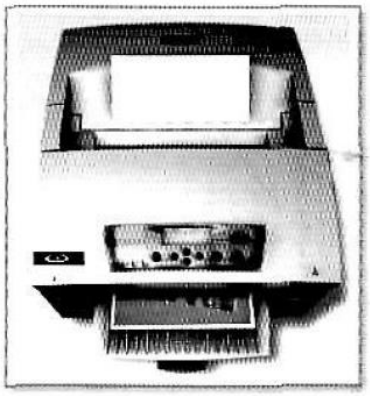
1. Write one reason for using a scanner at home or at work.
2. Do you have a digital camera? Describe its basic features and the things you do with it.

6 Output devices: printers

A Technical details

A printer is a device that prints your texts or graphics on paper

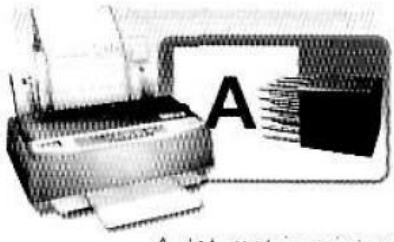
The output on paper or acetate sheets is called
A program in your computer, called the printer driver, converts data into a form that your printer can understand.
A print spooler stores files to be printed when the printer is ready. It lets you change the order of documents in the queue and cancel specific print jobs.



The output quality, or resolution, is measured in dpi or dots per inch.
The speed of your printer is measured in pages per minute(ppm).
In network, users can share a printer connected to a print server, a computer that stores the files waiting to be printed.

B Types of printers

A **dot-matrix printer** uses a group or matrix, of **pins** to create precise dots. A print head containing tiny pins strikes and inked ribbon to make letters and graphics. This **impact printing** technology allows shops, for example, to print multi-part forms such as receipts and invoices, so it's useful when self-copying paper is needed. It has two important disadvantages: noise and a relatively low resolution (from 72 to 180 dpi).



A dot-matrix printer

An **ink-jet** (also called bubble-jet) **printer** generates an image by spraying tiny, precise drops of ink onto the paper. The resolution ranges from 300 to 1,200 dpi, suitable for small quantities or home use.

A standard ink-jet has a three-colour **cartridges**, plus black cartridge. Professional ink-jets have five-colour cartridges, plus black ; some can print in wide format, ranging from 60 cm up to 5 meters (e.g. for printing advertising graphics).

An ink-jet printer and ink cartridges

Some ink-jet based printers can perform more than one task. They are called **multi-function printers** because they can work as a scanner, a fax and a photocopier as well as a printer. Some units accept memory cards and print photos directly from a camera.

A laser printer uses a laser beam to fix the ink to the paper. A laser works like a photocopier; a powder called toner is attracted to paper by an electrostatic charge and then fused on by a hot roller.

Laser printers are fast and produce a high resolution of 1,200 to 2,400 dpi, so they are ideal for business and for proofing professional graphics work.

Lasers use a **page description language** or PDL which describes how to print the text and draw the images on the page. The best-known languages are Adobe PostScript and HP Printer Control Language.

A professional **imagesetter** is a typesetting printer that generates very high-resolution output (over 3,540 dpi) on paper or microfilm. It's used for high-quality publications.

A **plotter** is a special type of printer which uses ink and fine pens held in carriage to draw detailed designs on paper. It's used in computer-aided design, maps, 3-D technical illustrations, etc.

A plotter

6.1 Complete these sentences with words from A opposite.

1 The differences in …….. are noticeable: the more dots per inch, the clearer the image.
2 A print resolution if between 600 …….. and 2,400 …….. ensured that even text as small as 2 pt was legible.
3 Passengers with an electronic ticker will need a …….. of ticket configuration or a boarding pass to be admitted to secured gate areas.
4 The key advance of recent years is printing speed: the latest generation of ink-jets pints black-and-white text at 15 ……..…….…….. (……..).
5 With appropriate software, you can view the images on a computer, manipulate them, or send them to a …….. and produce excellent quality colour copies.
6 A …….. …….. is a dedicated computer that connects a printer to a network. It enables users to share printing resources.
7 A …….. …….. is a utility that organizes and arranges any documents waiting to be printed.
8 In computers, a …….. …….. is a program installed to control a particular type of printer.

6.2 Choose the most appropriate type of printer these situations from the descriptions in B opposite.

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 (e.g. to publish catalogues and magazines)
5 a company that wants to print carbon copies if dills and receipts

6.3 Find terms in B opposite which correspond to these definitions.

1 a container that holds the ink in an ink-jet printer
2 powdered ink used in laser printers
3 small needles that press on the inked ribbon to make the characters on paper
4 printer technology that produces text and pictures by hammering pins against a ribbon and the paper
5 a language that tells a printer how to print a document
6 a peripheral which combines a printer, a fax machine and photocopying and scanning capability into one device

Dangerous laser printers

You and computers

Describe the characteristics of the printer that you have or would have like to have at home or at work.
Give details about: type of printers, speed, resolution, ink cartridges, price and customer support.

7 Output devices: display screens

A CRTs and LCDs

The screen of a computer is often known as the monitor, or VDU (visual display unit). Inside the computer, there is a video card which processes images and sends signals to the monitor.

When choosing a monitor, you have to take into account a few basics.

- Type of display - the choice is between a CRT or an LCD screen.
  The Cathode Ray Tube of a monitor is similar to a traditional TV set. It has three electron guns (one for each primary colour: red, green and blue) that strike the inside of the screen, which is coated with substances called phosphors, which glow and create colours. CRTs are cheap, bur they are heavy, can flicker and emit radiation.

- A Liquid Crystal Display is made from flat plates with a liquid crystal solution between them. The crystals block the light in different quantities to create the image. Active-matrix LCDs use T FT (thin film transistor) technology, in which each pixel has its own transistor switch. They offer better quality and take up less space, so they arc replacing CRTs.

- Screen size - the viewing area is measured diagonally: in other words, a 17" screen measures 17 inches from the top left corner to the bottom right.

- Resolution - the clarity of the image depends on the number of pixels (short for picture elements) contained on a display, horizontally and vertically. A typical resolution is 1,024 x 768. The sharpness of images is affected by dot pitch, the distance between the pixels on the screen, so a dot pitch of 0.28 mm or less will produce a sharp image.

- Brightness - the luminance of images is measured in cd/m- (candela per square meter).

- Colour depth - the number of colours a monitor can display. For example, a VGA monitor produces 256 colours, enough for home use; a SuperVGA can produce up to 16.7 million colours, so is ideal for photographic work and video games.

- Refresh rate - the number of times that the image is drawn each second. If a monitor has a refresh rate of 75 Hertz (Hz), it means that the screen is scanned 75 times per second. If this rate is low, you will notice a flicker, which can cause eye fatigue.

B Big screens: plasma and projection TVs

1 ‘I sometimes use a video projector in my Geography lessons. I prepare audiovisual presentations on my laptop and then connect if to a front-screen projector which displays the images on a distant screen or white wall.’

2 ‘I use a portable DLP projector for my business presentations. This is a digital light-processing device which creates the image with millions of microscopic mirrors arranged on a silicon chip.’

3 ‘I am a home cinema enthusiast. I’ve set up a system with a DVD recorder, speakers for surround sound, and a rear projection TV, which has the video projector and the screen within a large TV box. It s a real cinema experience.’

4 ‘I’ve got a 52-inch plasma display and really enjoy its advantages: high-contrast images and bright colours, generated by a plasma discharge which contains noble, non-harmful gases. Gas-plasma TVs allow for larger screens and wide viewing angles, perfect for movies!’

7.1 Read A opposite and then correct these false statements.

1 The images shown on a monitor are not generated by the video card.
2 All visible colors can be made from mixing the three primary colors of red, yellow and blue.
3 Typical CRT-based displays occupy less space than LCD displays.
4 Active-matrix LCDs do not use a technology called thin film transistor or TFT.
5 The size of the screen is measured horizontally.

7.2 Match each term with the correct definition.

1. phosphors
2. LCD screen
3. pixel
4. dot pitch
5. refresh rate

a) the frequency at which a monitor renews its image, measured in Hz
b) a flat-panel display which works by emitting light through a special liquid
c) the space between a display's pixels
d) the smallest element in a displayed image
e) materials that emit light and produce colours when they are activated by an electron beam

7.3 Complete the technical specifications of this monitor with words from A opposite.

Quick specs	
The new Paintview XT-85 combines a television and a computer (1) …… in one display.	
Type of display	Flat panel LCD |
(2)……	19 inches
(3) Display ……	1,280 x 1,024 pixels
Dot pitch	0.294 mm
(4) ……	16.7 million colours
Contrast ratio	1,000:1
(5) ……	450 cd/m2
Built-in TV tuner	Yes
Audio	Two 3-watt speakers and a 5-watt subwoofer, headphone jack
The Picture-in-Picture function allows you to watch more than one program at the same time and lets you adjust the size of each window.	

7.4 Complete these sentences with words from B opposite.

1 If you intend to set up a …… consider getting a very big screen, a DVD recorder and a good set of speakers.
2 A …… takes digital images and displays them on a screen or wall.
3 The company announced plans to expand it's …… (DIP) cinema technology, which has thrilled test audiences with its dazzling colours and pin-sharp images.
4 In a …… TV, a large box contains both the projector and the screen built in.
5 The gas mixture in a …… is not dangerous.

You and computers

Describe the 'home cinema' of your dreams. Use these notes to help you.

1 Type of display: CRT television, LCD screen, plasma TV or video projector
2 Screen size
3 Resolution (image quality)
4 Video source: TV, VCR or DVD recorder
5 Sound capabilities

8 Processing

A The processor

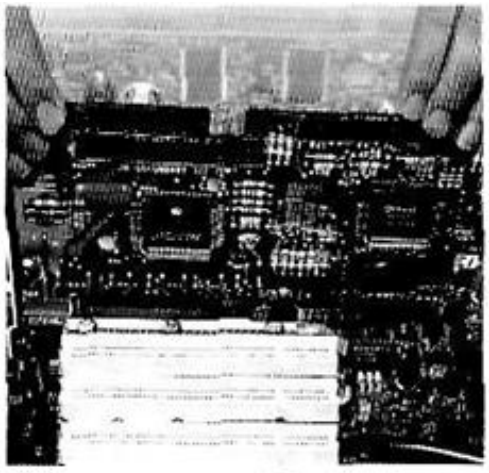
The processor, also called the CPU or central processing unit, is the brain of your computer. In PCs, it is built into a single chip – a small piece of silicon with a complex electrical circuit, called an integrated circuit – that executes instructions and coordinates the activities of all the other units.

An Intel microprocessor chip, the nerve centre of many PCs

Three typical parts are:

- the control unit, which examines instructions from memory and executes them;
- the arithmetic and logic unit (ALU), which performs arithmetic and logical operations;
- The registers , high-speed units of memory used to store and control data .

The speed of a processor is measured in gigahertz (GHz). Thus, a CPU running at 4 GHz can make about four thousand million calculations a second. An internal dock sends our signals at fixed intervals to measured and synchronize the flow of data.



Fitting an expansion card

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

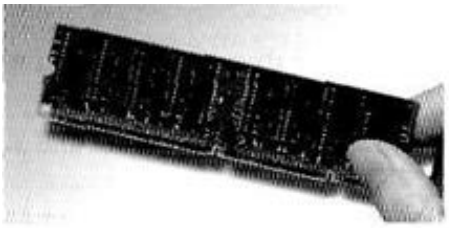
Expansion slots allow you to install expansion cards which provide extra functions, e.g. a video card or a modem.

Laptops have PC cards, the size of a credit card, which add features like sound, memory and network capabilities.

B RAM and ROM

When you run a program, the CPU looks for it on the hard disk and transfers a copy into the RAM. RAM (random access memory) is temporary or volatile, that is, it holds data while your PC is working on it, but loses this data when the power is switched off.

However, ROM (read only memory) is permanent and contains instructions needed by the CPU; the BIOS (basic input/output system) uses ROM to control communication with peripherals, e.g. disk drives.

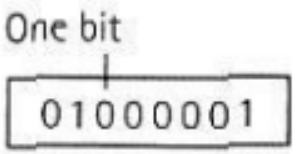


A RAM module

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.

C Units of memory

The electronic circuits in computers detect the difference between two states: ON (the current passes through) or OFF (the current doesn't); they represent these states as 1or 0. Each 1or 0 is called a binary digit or bit.



Example of a byte

Bits are grouped into eight-digit codes that typically represent characters (letters, numbers and symbols). Eight bits together are called a byte. For example, 01000001 is used for the character A. Computers use a standard code called ASCII for the binary representation of characters.

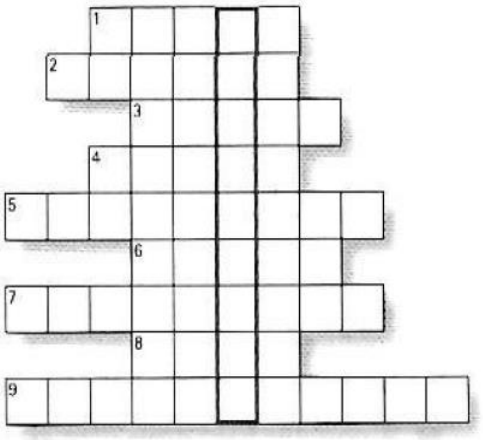
In order to avoid complex calculations of bytes, we use bigger units. A kilobyte (KB) is 1,024 bytes; a megabyte (MB) is 1,024 kilobytes; a gigabyte (GB) is 1,024 megabytes; a terabyte (TB) is 1,024 gigabytes. We use these units to describe the RAM memory, the operating capacity of disks and the size of a program or document.

8.1 Look at A and B opposite. Then march the sentence beginnings (1-6) with the correct endings

1 The CPU processes data and
2 The control unit is the part of the CPU that
3 The arithmetic and logic unit is able to make
4 The registers are high-speed storage
5 Data contained in RAM is lost when
6 ROM memory can only be read:

a) areas within the CPU.
b) you can't make changes to it.
c) controls the way instructions are executed.
d) the computer is turned off.
e) coordinates the other parts of the computer.
f) calculations: add, subtract, multiply and divide.

8.2 Solve the clues and complete the puzzle with words from the opposite page.

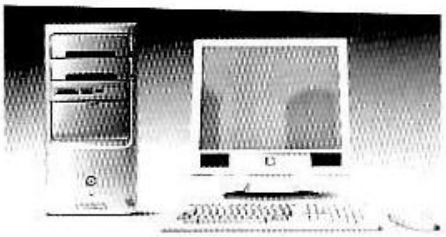


1. Intel ..... are used in many computers.
2. Teach 0 or 1 is called a bit, short for..... digit.
3. Special cards can be inserted into expansion …… .
4. A ..... controls the timing within the PC by sending signals to synchronize its circuits and operations.
5. The processor speed is measured in..... .
6. ..... carry signals between different parts of a PC.
7. ..... cards improve the computer's performance.
8. The ..... uses ROM to control the input/output of data.
9. The main printed circuit board is called the..... .

Down: The brain of a computer

8.3 Read this product description and answer the questions below

1 How fast is the CPU?
2 Which term is used to describe the CPU data bus?
3 How much RAM does the computer have?
4 Can you add extra RAM chips? How many?

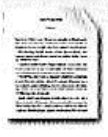


Processor and memory:
- Intel Core 2 Duo processor at 2.4 GHz
- 533 MHz Front Side Bus
- 1,024 MB of RAM; can be expanded up to 4 GB

200 GB Hard disk
Double Layer DVD +/-R/RW drive
Microsoft Windows

8.3 Look at C opposite. Fill in the blanks with the correct unit of memory.

English




1 One ..... represents one character.

2 One ..... represents 1,024 characters (about a small page of text).

3 One ..... represents about one million characters (about the text of a small book).

4 One ..... represents about 1,000,000,000 characters (about 1,000 books).

5 One ..... represents about 1,000,000,000,000 characters (about one million books in a big library).

You and computers

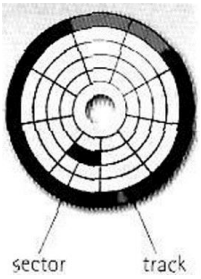
Access the *Professional English in Use ICT* website at www.cambridge.org/elt/ict. Then do the activity Acronyms and abbreviations.

9 Disks and drives

A Magnetic storage

Magnetic devices store data magnetically. A disk drive spins the disk at high speed and reads its data or writes new data onto it.

- A **floppy disk drive** uses 3.5 inch diskettes which can only hold 1.44 MB of data; it's often called A: drive and is relatively slow.
- Most PCs have one internal **hard disk**, usually called C: drive, which can hold several gigabytes of data. It's used to keep the operating system, the programs and the user's files easily available for use.



When you format a disk, or prepare it for use, its surface is divided into concentric circles called tracks. Each track is further divided into a number of sectors. The computer remembers where information is stored by noting the track and sector numbers ill a directory.
The average time required for the read/write heads to move and find data is called access time; it is measured in milliseconds (ms). Don't confuse 'access time' with 'transfer rate', the rare of transmission of data from the disk to the CPU (e.g. 15 megabytes per second).

- A portable hard drive is an external unit with the drive mechanism and the media all in one sealed case. You can use it to make a backup, a spare copy of your files, or to transport data between computers.

B Optical storage

Optical drives use a laser to read and write data, so they are not affected by magnetic fields; but they are slower than hard drives. Modern DVD recorders accept all CD and DVD formats.

CDs (compact discs) can store up to 650-700 MB of data. • **CD-ROMs** (read only memory) are 'read-only' units, so you cannot change data stored on them (e.g. a dictionary or a game). • **CD-R** (recordable) discs are write-once devices which let you duplicate CDs • **CD-RW** (rewritable) discs enable you to write onto them multiple sessions, like a hard disk.	**DVDs** (digital versatile discs) are similar in size to CDs (both are 1.2 mm thick), but they differ in structure and capacity. DVDs have more tracks and more pits (tiny holes) per track, and can store from 4.7 GB to 17 GB of data, movies, high-definition sound, etc., so they will probably replace CDs. DVD formats include: • **DVD-ROM** (read-only memory) • **DVD-R** or **DVD+R** (recordable only once) • **DVD-RW** or **DVD+RW** (rewritable, so it can be erased and reused many times).

Portable DVD players let you watch movies or TV, play games and listen to music, wherever you are. They usually run on batteries, have a widescreen (rectangular 16:9 format) LCD and support multi-format playback, allowing you access to many file formats including DVD video, JPEG pictures, MP3 music, etc. They have two built-in stereo speakers, or headphones if you don't want to disturb other people.

CompactFlash memory card

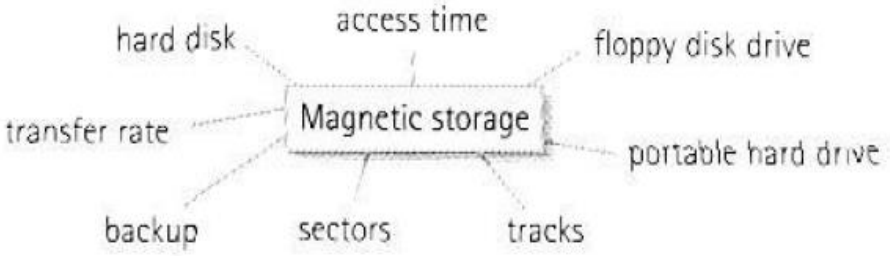
C Removable flash memory

Flash memory is solid-state, rewritable memory; it is non-volatile, so it retains data when the power is turned off. This explains its popularity in small devices.

- Flash memory cards such as CompactFlash or Secure Digital are found in cameras, PDAs and music players.
- Flash drives, also known as thumb or pen drives, are connected to a USB port of the computer. They let you save and transfer data easily.


Mini flash drives

9.1 Read A opposite. Choose a term from this word web to complete the sentences below.



1 The first rule of data storage is to make a……of all important files.
2 A……is slower than a hard drive and can only hold 1.44 MB disks.
3 The……..inside your PC is made of aluminum alloy covered with a magnetic coating. This makes the disk itself a rigid plate, hence its name.
4 The…….are circles around a disk and the…….are segments within each circle.
5 This hard drive is a 60 GB IBM model with a fast……of 8 ms.
6 The……is the rate of transmission of data from the disk to the CPU. This is usually described in megabytes per second.
7 Apple's iPod music player can double as a……for transporting computer data.

9.2 Look at the opposite page and find:

1 the CD end DVD formats that can be rewritten many times
2 the CD and DVD formats that can be written to by the user only once

3 the CD and DVD formats that can he read by a computer bur not written to
4 the type of cards used in digital cameras
5 a type of drive that plugs into a USB port and lets you share photos and music with friends
6 the memory without moving parts; it is erasable, non-volatile and used in small devices
7 the expression that means to 'initialize a disk and prepare it to receive data

9.3 Complete this product description with words from B opposite.

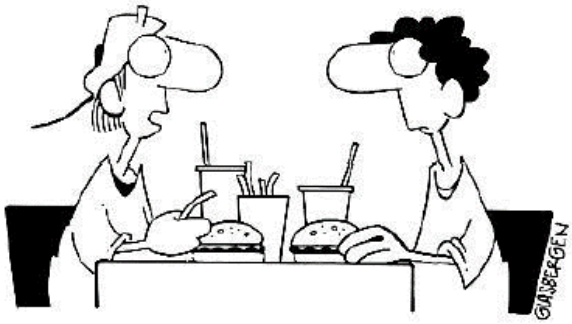
The Panasonic DVD-LS91 is a top-of-the-range (1)…… ……, which provides pure entertainment wherever you go.
It has a big 9 inch built-in (2)……LCD, so you can really enjoy movies. The built-in stereo speakers allow you to listen along, or if you want to listen alone, just plug in a pair of (3)…… This portable machine provides (4)…….. so you can play DVD Audio/Video, CD-R/RW, DVD-RAM, DivX and MP3 files. Its compact design features a built-in rechargeable 6 hour battery pack.

The DVD-LS91 allows 6 hours of playback, and provides a perfect way to entertain yourself and your kids during long trips.

You and computers

Which device or format would be most suitable for storing these things?

1 the operating system and the programs on a home computer
2 an electronic encyclopedia for children
3 a movie in digital format
4 the music tracks by your favorite artist
5 all the files generated by a company in one day
6 the photos taken with a digital camera



"I forgot to make a backup copy of my brain, so everything I learned last semester was lost."

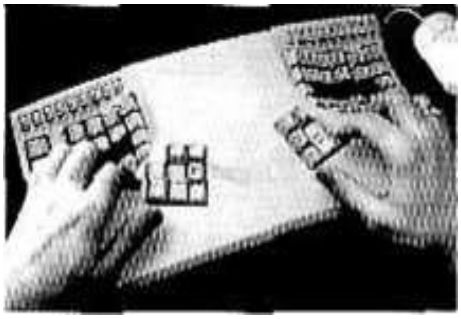
10 Health and safety

A Computer ergonomics

There are a number of health and safety problems that may result from continuous use of computers.

- Typing constantly at high speed may provoke repetitive strain injury or RSI, which causes pain in the neck, arms, wrists, hands and fingers.
- Bad work postures and sitting in uncomfortable chairs may cause backache and stress.
- Looking at the screen for long periods of time, and lights reflecting off the screen, can cause headaches and eye strain, pain and fatigue of the eyes.
- Cathode Ray Tube monitors can emit electromagnetic radiation which can be dangerous to health.

The study of how people interact safely and efficiently with machines and their work conditions is called ergonomics. In computing, ergonomics is about designing computer facilities so they are safe and comfortable. Here are a few tips.



An ergonomic keyboard helps you type in a more natural, relaxed position

1 Get an adjustable chair so you can change its height and angle.
2 Make sure your feet rest firmly on the ground or on a foot rest.
3 Ensure you have enough leg room under the desk.
4 Put the monitor at eye level or just below.
6 Sit at arms' length from the monitor (40-80 cm). Don't sit near the sides or back of CRT monitors; or use LCD screens, which are free from radiation.
7 Use a document holder, in line with the screen, to reduce awkward neck and eye movements between the document and the screen.
8 Position the keyboard at the same height as your elbows, with your arms parallel to the work surface. Try to keep your wrists straight and flat when typing.
9 Take regular breaks from the computer and look away from the screen at regular intervals.

5 We should reduce, reuse and recycle e-waste

B Electronic rubbish

Taking on mobile phone when driving is illegal in most countries

Irresponsible disposal of electronic waste, from old computers and mobile phones to hi-fi and video systems, can cause severe environmental and public health problems. For example, children or workers who come into contact with the toxic components of electronic products may suffer from skin and breathing problems.

- We should recycle or treat ICT equipment (e.g. plastics from mobiles could be used to make pens and rulers).
- Manufacturers should pay to finance recycling programs.

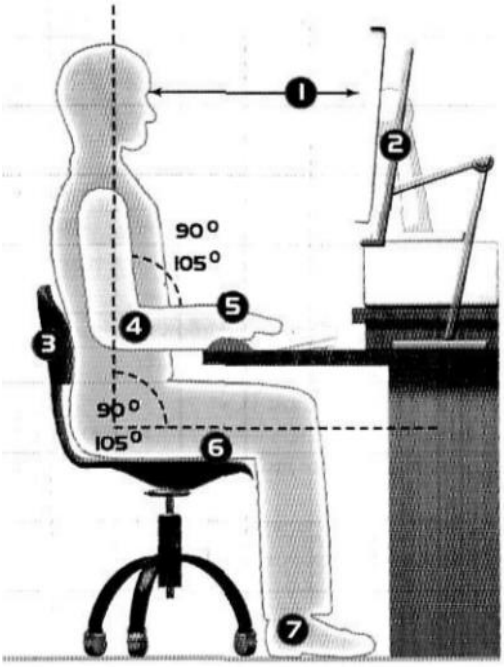
C The risks of using mobiles and in-car computers

Frequent use of mobile phones has been the cause of concern and there is ongoing research into whether radiation emitted causes health problems.

A serious risk is the use of mobiles and navigation systems in cars; this can distract the driver and cause accidents.

- Don't use your mobile while driving.
- Another health problem is Internet addiction, including obsessive game playing, gambling, etc.
- If you are an Internet addict, you should ask for help from specialists.

10.1 Match the numbers in the picture to the correct tips in the checklist.



Tips for user-friendly workstation

a) Consistent chair support for the lower back. Seat height and angle adjustable.
b) Feet flat on the floor.
c) Document holder beside the screen, at the same height and distance as the screen.
d) Text on the screen in line with the eyes. Viewing distance at arm's length.
e) Thighs horizontal, with feet on the floor. Adequate room for legs beneath the desk.
f) Keyboard height at a comfortable open angle for the elbows and arms.
g) Wrists and hands in a neutral position, in line with the forearms. Optional rest for wrists at the same height as the keyboard.

10.2 Complete the sentences with words from the opposite page.

1. Experts believe the best way to reduce musculoskeletal injuries is through …….. – designing jobs to fit people instead of making people fit the job. It can mean everything from adjusting the height of a desk to buying a new chair or overhauling a production line.
2. The Safetype ergonomic keyboard may look strange, but its makers claim that it can prevent …….. …….. …….. or RSI.
3. Visual problems, such as …….. …….. and irritation, are often reported by computer users. Causes of these problems include glare, poor lighting, and focusing the eyes on the screen for a prolonged period.
4. Some companies have begun to test ways to …….. and dispose of …….. . For example, Epson Portland sponsored an electronics collection day this year on Earth Day.
5. Road safety campaigners say motorists using …….. while driving are six times more likely to crash.
6. When a person is spending so much time on the Internet that their lives are affected negatively, they are suffering from …….. …….. .

You and computers

Imagine you are designing an ICT classroom with 16 networked PCs, Internet access and peripherals. What safety precautions should be taken into account? Use these notes to help you write four tips or suggestions.

1 Room conditions (space, desks, chairs, lights and windows)
2 Ergonomic devices
3 Electrical safety: layout of cables and connectors, hotspots for a wireless network, etc.
4 Noticeboards and posters with health and safety recommendations

11 Operating system and the GUI

A Types of software: the operating system (OS)

1 **System software** controls the basic functions of a computer, e.g. operating systems, programming software and utility programs.
2 **Application software** lets you do specific jobs such as writing letters, doing calculations, drawing or playing games. Examples are a word processor or a graphics package.

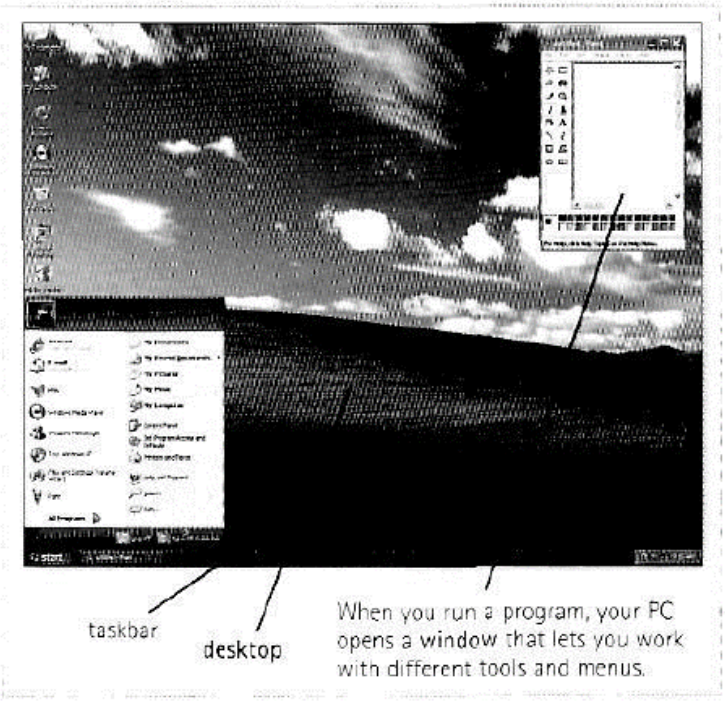
Tux, the Linux mascot

An **operating system** is a set of programs that control the hardware and allow people and applications to communicate with the hardware. Typical functions of the OS are handling input/output operations, running programs and organizing files 011 disks. The OS also gives access to networks and allows multitasking: a user can run several programs (and do various tasks) at a time. Examples are:

- the **Windows** family - designed by Microsoft and used on most PCs
- **Mac OS** - created by Apple and used on Macintosh computers
- **Unix** - found on mainframes and workstations in corporate installations, as it supports multi-users
- **Linux** - developed under the GNU General Public License; anyone can copy its source code, modify and redistribute it. It is used 011 PCs and in appliances and small devices.

B The Graphical User Interface

A GUI makes use of a WIMP environment: Windows, Icons, Menus and Pointer. This type of interface is user-friendly, where system functions are accessed by- selecting self-explanatory icons (pictures representing programs or documents) and items from menus. A drop-down menu, or pull-down menu, is a list of options that appear below a menu bar when you click 011 an item.



The Windows environment is a typical example of a GUI

The pointer is the arrow, controlled by the mouse, which lets you choose options from menus.

The background screen that displays icons, representing programs, files and folders (directories) is called the desktop. Double-clicking a folder icon opens a window which shows the programs, documents and other folders contained GUI within the folder.

C System utilities

These are small programs included with an OS that improve a system's performance. They can be desk accessories, device drivers, or system extensions activated when you turn on the PC.

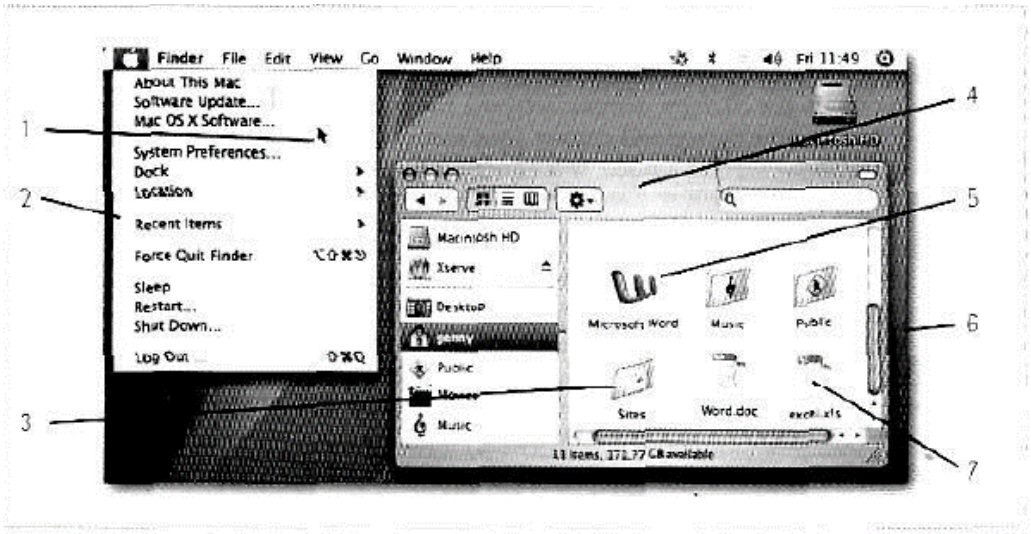
- A crashed disk rescuer is used to restore disks and corrupted files.
- An accessibility program makes a PC easier for disabled users to use.
- A compression utility rewrites data so that it takes less space on disk.
- A media player lets you watch DVDs, play music and listen to the radio on the Web.

11.1 Read A and B opposite and find the following.

1 the difference between system software and application software
2 software that enables users and programs to communicate with hardware
3 the meaning of 'multitasking'
4 a multi-user OS used on large, powerful computer systems
5 the operating system that is freely distributed
6 the operating system designed by Apple
7 the OS created by Microsoft
8 the meaning of WIMP in a graphical user interface (GUI)
9 the expression used to describe a system that is easy to use

11.2 Look at B opposite and then identify these interface elements.

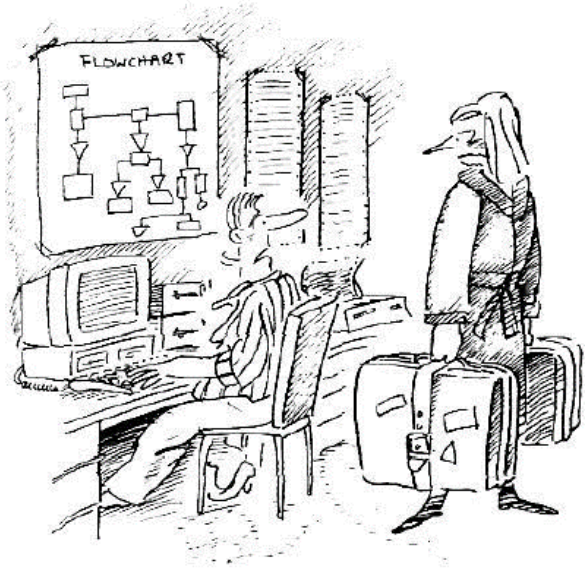
desktop	window	drop-down menu
pointer	folder	program icon
document icon		



Apple Macintosh programs use a graphical user interface

11.3 Look at C opposite. Which utility would you use to do these task?

1 to play and organize multimedia on your PC.
2 to diagnose and repair damaged disks.
3 to help computer users with sight, hearing or mobility difficulties.
4 to make files smaller, so you can send them with emails.



"Susan! ... Are you trying to tell me we have an interface problem?"

You and computers

1 Write a sentence explaining why Windows is so popular.

2 Look at the internet and find two operating systems designed for hand-held devices such as PDAs palmtops and Blackberries.

12 Word processing features

Word processing

A **word processor** enables you to create a document, store it electronically on a disk, display it on a screen, modify it by entering commands and characters from the keyboard, and print it on a printer.
The great advantage of word processing over using a typewriter is that you can make changes without retyping the entire document. If you make a typing mistake, you simply back up the cursor and correct your mistake. If you want to delete a paragraph you simply remove it, without leaving a trace. It is equally easy to insert a word, sentence or paragraph in the middle of a document
Word processors usually support these features (and a few others)

- **Cut and paste**: allows you to remove (cut) a section of text and insert (paste) it somewhere else.
- **Find and replace**: allows you to direct the word processor to search for a particular word or phrase. You can also direct the word processor to replace one group of characters with another everywhere that the first group appears.
- **Word wrap**: the word processor automatically moves to the next line when you have filled one line with text, and it will readjust text if you change the margins.
- **Print**: allows you to send a document to a printer to get hard copy.
- **Font** specifications: allows you to change fonts within a document. For example, you can specify bold, *italics*, and underlining. Most word processors also let you change the font size and the typeface.
- **Graphics**: allows you to include illustrations and graphs in a document. Some programs let you create the illustrations within the word processor; others let you insert a picture from a different program.
- **Headers, footers** and page numbering: allows you to specify customized headers and footers that the word processor will put at the top and bottom of every page. The word processor automatically keeps track of page numbers so that the correct number appears on each page.
- **Layout**: allows you to specify different margins within a single document and to specify various methods for indenting paragraphs – how much space you leave between the margins and the paragraphs.
- **Merge**: allows you to merge text from one file into another file. This is particularly useful for generating many files that have the same format different data. Generating mailing labels is the classic example of using merges.
- **Spell checker**: a utility that allows you to check the spelling of words. It will highlight any words that it does not recognize.
- **Thesaurus**: allows you to search for synonyms without leaving the word processor.

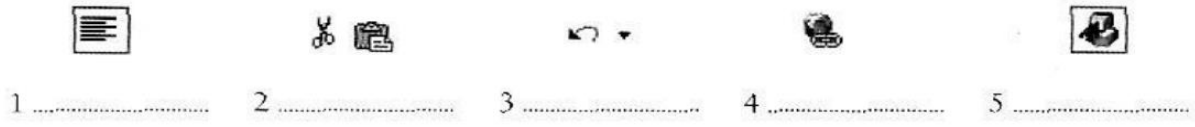
The line dividing word processors from desktop publishing systems is constantly shifting. In general, thought, DTP applications support finer control over layout and more support for full- color documents.

12.1 Match words from the opposite page with these definitions

1 a program used for preparing documents and letters
2 a row of words that open up menus when selected
3 the distinctive design of letters and characters, e.g. Arial, courier
4 text printed in the top margin
5 text printed in the bottom margin
6 the way text is arranged on the page, including margins, paragraph format, columns, etc.
7 a function that enables you to combine two files into one

12.2 Label these word processing icons with the correct function.

a cut and paste b graphics c align left d undo e insert hyperlink



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

12.3 Complete these statements with a term from A opposite.

1 A …… consist of the elements: typeface, type style and type size; for example **Arial bold at 12 points**.
2 Notice that when you get to the end of each line, Word starts a new line automatically. It moves the word you are typing to a new line when it enters an invisible margin running down the right-hand side of the screen. This feature is called …… .
3 …… and …… lets you find a word and change it into another word throughout the text.
4 A good …… program can be used not only to rectify accidental spelling mistakes and typing errors, but also to speed typing input.
5 Many word processors include a ……, so you can look for words with similar meanings.
6 The …… contains a row of icons that perform particular actions when clicked.
7 …… a paragraph involves moving your writing in from the margins of the page. For example, a left indent is the distance between the left margin and the text.

You and computers

Type the letter or copy it from the website to your word processor. Then edit it by making these changes.

1) Use Times New Roman at 10 points
2) Insert this phrases in the correct places:
   a) Yours sincerely
   b) If you require any further information
   c) Please find enclosed
   d) Dear Mr. Vazquez
   e) We would be pleased
3) Align the sender's address to the right
4) Insert this e-mail address below the fax number: mercury@tinyworld.co.uk
5) Change Cobra M2 to italic style and Mercury Warranty to bold style.
6) Insert a company logo and a picture of a robot: you can download them from the Web.

Mercury Robots
49 Charles Place
London SW10 6BA

Phone 020 7385 1541
Fax 020 7385 1390

Mr Vázquez
Alonso Cano, 52
Madrid

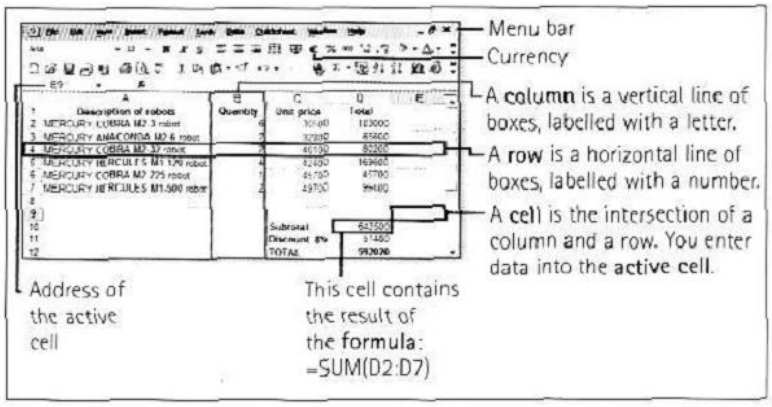
(1) ..... ,
Thank you for your interest in Mercury industrial robots.
(2) ..... some descriptive leaflets with the technical details of six robots – Cobra and Hercules models. I would like to draw your attention to the Cobra M2 which is designed for arc welding.
The prices shown in our leaflets are net, but we offer discounts by negotiation. Mercury Warranty provides 2-year coverage.
(3) ..... deliver one of our robot systems on approval, for your inspection.
Please do not hesitate to contact us (4) ..... .
I look forward to hearing from you again soon.
(5) ..... ,

Liz Brown
Sales Office Manager

13 Spreadsheets and databases

A Spreadsheet basics

A spreadsheet program helps you manage personal and business finances. Spreadsheets, or worksheets, are mathematical tables which show figures in rows and columns.



A cell can hold three types of data: text, numbers and formulae.

Formulae are entries that have an equation which calculates the value to display; we can use them to calculate totals, percentages, discounts, etc.

Spreadsheets have many built-in functions, prewritten instructions that can be carried our by referring to the function by name. For example, =SUM(D2:D7) means add up all the values in the cell range D2 to D7.

The format menu lets you choose font, alignment, borders, etc.

B Parts of a database

Database basics

A database is essentially a computerized record-keeping system.

Each unit of information you create is called a record and each record is made up of a collection of fields. Typically, a single record consists of a set of field names like: Title, FirstName, Surname, JobTitle, TelNo and ID. You fill in a form with the relevant information for each field to add a new record to the database. There are different data types.

A database file stores information in fields grouped on records

- Text- holds letters and numbers not used in calculations
- Number -can only hold numbers used in calculations and reports
- Memo -can store long texts
- Date/Time – a date or time or combination of both
- AutoNumber - assigns a number to each record
- OLE Object - (object linking and embedding) holds sounds and pictures
- Yes/No -for alternative values like true/false, yes/no, on/off, etc.

- Hyperlink -adds a link to a website

Once you have added data to a set of records, indexes must be created to help the database find specific records and sort (classify) records faster. An index performs the same function as in the back of a book or in a library. For example, if you regularly search your database by surname, the index should be defined on this field.

Relational databases

Two database files can be related or joined as long as they hold a piece of data in common. A file of employee names, for example, could include a field called 'DEPARTMENT NUMBER' and another file, containing details of the department itself, could include the same field. This common field can then be used to link the two files together.

Extracting information from a database is known as performing a query. For example, if you want to know all customers that spend more than £9,000 per month, the program will search the name field and the money field simultaneously.

13.1 Look at A opposite and find the terms which correspond with these definitions.

1 software which allows data to be displayed and managed in a table format
2 it goes up and down and has letter labels
3 it goes across and has number labels
4 an area in a spreadsheet which contains data
5 the current cell where you enter information
6 mathematical equations that help you calculate and analyze data
7 ready-to-use formulae that help you perform specialized calculations, e.g. SUM, AVERAGE, etc.

13.2 Study the tables and then complete the text below with words from B opposite.

Students: Table

ID	Name	Surname	Address	Teacher ID
1	Lucy	Reeve	3 Pond Road	106
2	Joe	Davey	7 Oxbury Close	107
3	Adam	Moore	4 Quebec Street	108

Teachers: Table

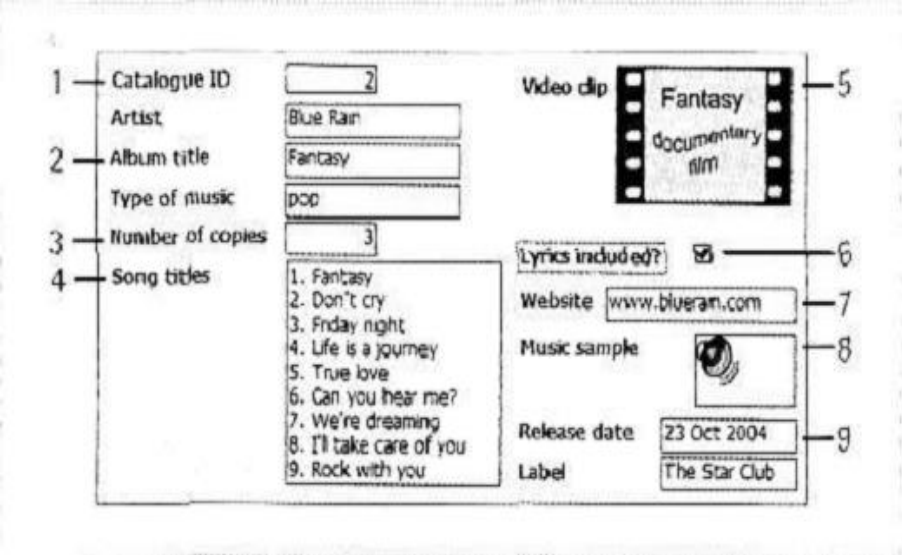
Teacher ID	Name	Surname	Address	Subject
106	James	Pullin	9 The Green	Maths
107	Liz	White	5 London Road	English
108	Karen	Southwell	8 Granary Street	ICT

Relationship between tables: the key field has the same value in both tables

A (1) ……..…….. program allows the user to store, change and retrieve information. A database file is a collection of records. Each (2) ……..……..

contains a set of fields. Each (3)…….. holds a separate piece of information; for example, a student file contains a list of records, each of which consist of several fields which give their name, address, birthday, etc.
In a (4)…… database, information is stored in tables that have a connection or link with one another (see tables above).
A database lets you create an (5)……., a list of records ordered according to the content of certain fields; this helps you search and (6)……. records into numerical or alphabetical order very fast. It also has a (7)……..function which allows you to extract information that meets certain criteria.

13.3 Look at this form of a music collection. Label the data types with words from B opposite.



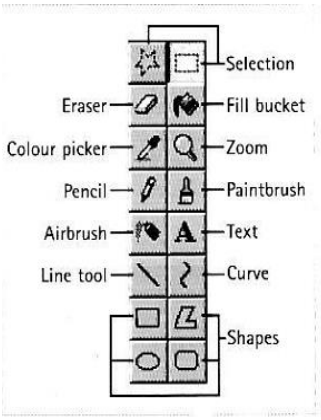
Form designed with Microsoft Access, a typical database program

You and computers

Which data fields would you include in these database?
1 the patients of a hospital
2 a library catalogue

14 Graphics and design

A Types of graphics software



Windows Paint Toolbox

Computer graphics are pictures created, changed or processed by computers. There are two categories.

1 Bitmapped graphics represent images as bitmaps; they are stored as pixels and can become a bit distorted when they are manipulated. The density of dots, known as the resolution and expressed in dots per inch, determines bow sharp the image is.

2 Vector graphics represent images as mathematical formulae, so they can be changed or scaled without losing quality. They are ideal for high-resolution output.

There are different types of graphics software.

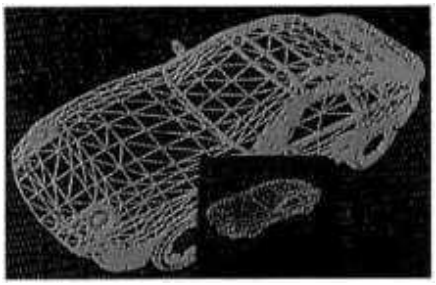
- Image manipulation programs let you edit your favourite images. For example, you can scan a picture into your PC or transfer a photo from your camera and then add different effects, or filters.

- 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.


The *original photo* has been processed with Adobe Photoshop using effects filters

- 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.


3D wireframe drawing

- 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 mathematical 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'.

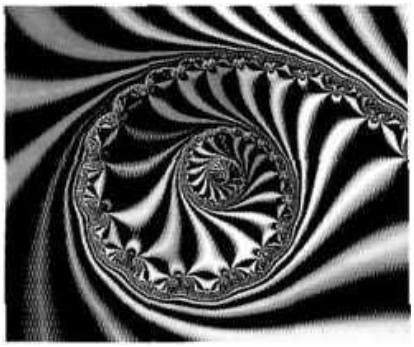
- Geographic information systems (CIS) allow cartographers to create detailed maps.

a. Read A opposite and decide which type of graphics software is best for these users.

1 a person who wants to edit photos at home
2 an economist who wants to present statistics in a form that can he 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
8 a mathematician who wants to make fractal shapes of natural phenomena

b. Complete the sentences with words from the box.

wireframe	bitmap	fractals
filters	clip-art	rendering


Example of a fractal

2 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.
3 In painting programs and image editors,.....are specialeffects that can be applied to a picture, including drop shadows, textures, distortions, etc.

4 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.
5 .....adds textures to each surface, and generates realistic reflections, shadows and highlights.
6 Most illustration packages come with a bundle of resources that include ready-made .....images and a selection of fonts.
7 .....are geometrical patterns that are repeated at a small scale to generate irregular shapes, some of which are similar to objects in nature.

a. Look at the Windows Paint toolbox opposite and find the tools that match these definitions.

1 This is like a magnifying glass which changes your view of a drawing.
2 This brush lets you paint in different shapes and patterns.
3 This is used to draw curves in different thicknesses.
4 This rubs out the part of the picture you drag it over.
5 This tool lets you pick a colour from an area of an image, instead of choosing the colour from the colour palette.
6 *This tool is used to fill a shape with a colour of your choice.*
7 This makes straight lines.
8 This basic tool is used to draw freehand, i.e. to draw free-form shapes.
9 This group of tools is used for drawing shapes: rectangles, ellipses and polygons.
10 This produces individual pixels of colour in a spray pattern.
11 These tools let you make rectangular or freehand selections around the things you want to select.
12 This is used to type text.

You and computers

1 Write about two possible applications of using computer graphics in business.
2 Can you think of one advantage of using computer graphics in the car industry?
3 You probably have a paint program at home; describe what you do with it.

15 Multimedia

A multimedia system

Multimedia refers to the technologies and applications that integrate different media: text, graphics, sound, video and animation.
Its power resides in interactivity, hypertext and hypermedia. Multimedia software is usually **interactive**, so you can choose what you want to watch, listen to or write. Hypertext means that you can click on a word and jump to another screen with more information; hypermedia is similar, bur works with sounds and images (e.g. the Web).

An IT student says:

'I use multimedia for my extracurricular activities I download music from the Net and burn music onto CDs - I copy songs onto CDs. I talk with my friends on the Messenger. I also retouch digital pictures and edit video clips. To run multimedia software you need a fast CPU. expandable PAM and a large hard disk But what marks a computer out as a multimedia PC is its audio and video capabilities: a sound card, a microphone, a decent pair of speakers, a high-quality monitor and a DVD writer; and its performance depends on all these components working in harmony.'

B Recognizing file formats

To identify the type of file, an extension is added to the filename when it is saved on disk.

 Common text extensions: **.pdf** (portable document format) .doc (MS *Word* document) **.rtf** (rich text format) **.htm** or **.html** (hypertext markup language for Web files)	 **Video** refers to recording, editing and displaying moving images. Common formats: **.avi** (audio video interleave) **.mov** *(QuickTime* movie) **.mpg** (mpeg - moving picture experts group)	 You can hear sound such as songs, movie soundtracks and speeches. Common **audio** formats: **.wav** *(Windows* wave audio format) **.ra** (*RealAudio* file) **.mp3** (compressed music files)
 **Graphics** include charts, photos, drawings, buttons, etc. **.gif**(graphics interchange format)	 **Animations** are made up of a series of independent pictures put together in sequence to look like moving pictures.	 Files **compressed** with *Winzip* have a .zip extension. A popular format used to compress and distribute

.jpg (jpeg – joint photographic experts group) **.tif** (tagged image file)	Common formats: .gif for animated gifs swf for *Flash* files	movies or DVDs or over the Net is **DivX**, a digital video codec (COmpress, DECompress).

C Applications

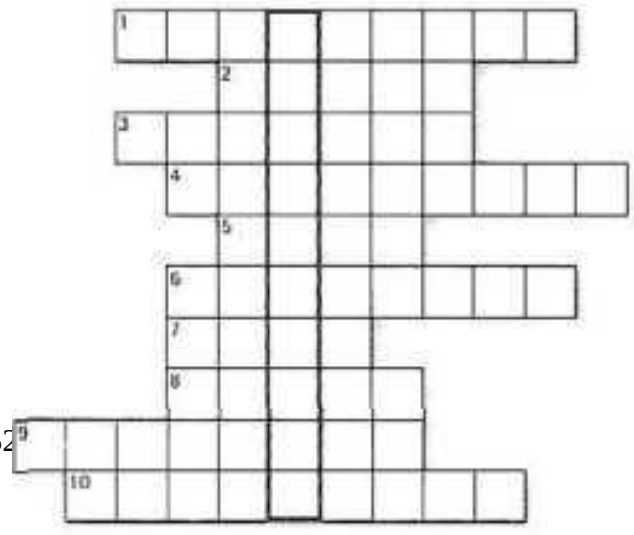
- In public places (e.g. museums and stations), there are in formation kiosks that use multimedia.
- In education, it is used in presentations and computer-based training courses.
- On the Web, audio and video are integrated into web pages. For example, RealPlayer supports streaming, which lets you play sound (e.g. from radio stations) and video files as a continuous stream while they are downloading.
- In virtual reality, users interact with a simulated world: doctors train using virtual surgery; pilots use flight simulators to do their training; people visit virtual exhibitions, etc.
- You can play games on a computer or video games on a dedicated machine, called a video console, which you connect to a TV set. You can also play games on the Net; some websites have a multiplayer facility that enables lots of people to play the same game at the same time.

15.1 Look at A and B opposite and find the following.

1 the type of text that contains links to other texts
2 the expression that means 'to record music onto a CD'
3 a system that combines hypertext and multimedia
4 the most common extensions for graphics files
5 the most common text formats
6 three popular video formats
7 three common file formats for storing audio data

15.2 Solve the clues and complete the puzzle with words from the opposite page.

1 A series of still images shown in sequence.
2 ..... files are processed by sound software.
3 In medicine, doctors use virtual ..... systems to simulate particular situations.
4 The suffix placed after a dot at the end of a filename.



5 A format used to compress and transmit movies over the Web.
6 People use special programs to ..... and decompress files so that they occupy less disk space.
7 A video format developed by the Moving Picture Experts Group. A system of filming, processing and showing moving pictures.
8 .gif stands for ..... interchange format.
9 The technique which allows you to play music and watch video before the entire file has downloaded.

Down: The combination of moving and still images, sound, music and words

15.3 Complete the article with the words from the box.

graphics	interactive	video games	consoles	multiplayer

Video Games

There are games you play on video (1)..... such as Nintendo, Sega, and the PlayStation. And there are games you play on a computer, either alone or at multiplayer online sites such as Microsoft's Internet Gaming Zone and Battle.net.
(2) have been made into films, such as *Mortal Kombat* 1 and *2*, and film stars now sometimes appear in video games. The (3) in many games have taken on such a high degree of realism that they almost seem like film. The *X-Files* game was practically an (4) movie, full of actors from the show and sections of dialogue and video. Some people claim that the *Blade Runner video* game was better than the movie - not only were the sets incredible but you also got to control the action and the ending.
(5) online gaming is the next wave in the video game world. It provides a better gaming experience, simply because people are more creative and more challenging adversaries than computers. Thousands of people can play simultaneously all over the world.
Video Games

You and computers

1 Have you ever used a multimedia encyclopedia? If so, note down three important features about it.
2 Write one advantage of using multimedia in a presentation.
3 Do you like video and computer games? Make a list of pros and cons.

16 Computers and work

A Audio files on the Web

I enjoy **podcasting**: I publish my own radio programmes as **podcasts**. Audio files which I make available over the Internet for playback on peoples computers. Also. I subscribe to other peoples podcasts so that I can hear their radio programmes.

My son downloads and listens to MP3 files he finds on **fileshare sites**, where you search and download music from other peoples computers using software such as Kazaa or eMule.

I've just started a new **audioblog**. Its a bloc, an Internet journal, which includes audio clips.

I ask my students to listen to **audio books** and get information from **audio lectures** a **spoken tutorials** on the Web.

I can listen to real-world or online radio stations with **Internet radio** everywhere in the world.

All the people above describe different types of **webcasts**, broadcasts or the Web. These require either suitable audio player software (e.g. WinAmp or iTunes) that allows **streaming** a technique that means you can listen to an audio rile while it's being downloaded; or a **plug-in** (e.g. RealPlayer or Windows Media Player), a program that interacts with your web browser to play audio files through the browser interface.

B Digital audio players

The different types of digital audio players are often referred to as **MP3 players**.

An iPod Nano enables you to store lots of music in a very small device

MP3 is short for **MPEG audio layer 3**, a type of compression used to reduce large files, such as songs, to manageable sizes. They come in different formats. Broadly speaking, **hard drive** versions, which include **iPods**, store greater amounts of music. **Built-in** or **flash memory**, which is more common in mini-MP3 players, holds fewer songs, but as there are no moving parts there are no problems with skipping. You have to upload the music from a CD onto a computer, rip a CI), or else download it from the Internet and then transfer it to the player.

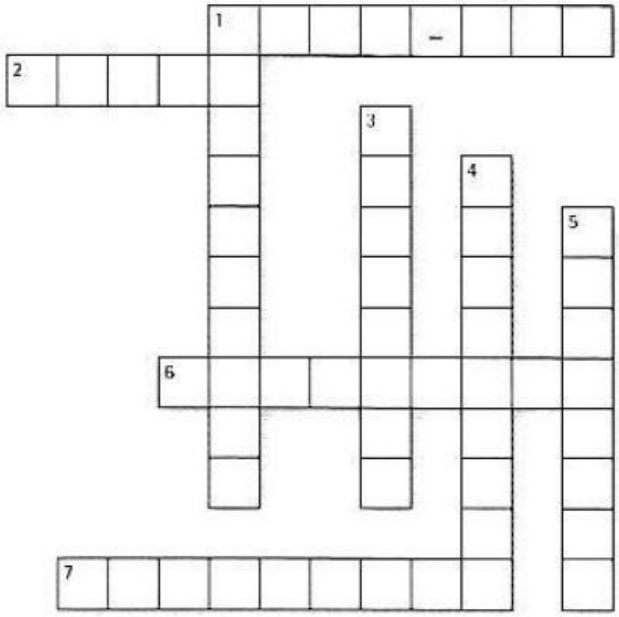
With a suitable **ID3 editor** or jukebox program you can create **ID3 tags**, a set of data added to MP3 files, to organize your MP3 collection with information about the artists, albums, songs, etc.

C Other audio applications

DAWs enable the creation of digital music

Other audio applications
1 Music can be composed, mixed, recorded and played back using **MIDI**, **musical instrument digital interface**, a standard protocol that enables computers and synthesizers to communicate with each other exchanging musical information. **DAWs, digital audio workstations,** record, edit and play back digital music.
2 The human voice can be decoded by a computer with suitable **speech recognition** software, allowing continuous speech dictation. This technology also enables spoken commands to control the computer.
3 Computers can produce sounds similar to a human voice with **speech synthesis** technologies, also called **text-to-speech** systems.

16.1 Solve the clues and complete the puzzle with words from A opposite.



Across
1 Auxiliary programs used play multimedia files.
2 Students may be interested in this type of book and lecture.
6 The type of site where you can find and exchange music files.
7 An online journal with sound.
Down
1 The technology needed to publish radio programmes on the Web.
3 A podcast and a spoken tutorial are different types of.....
4 This technique allows you to listen to live online radio programmes.
5 .....radio includes both traditional and online radio stations.

16.2 Complete this text about digital audio players with words from R opposite.

Before buying your digital audio player, or (1).....as they are usually known, you should take certain things into account.
First, size. Most (2).....models tend to be bigger and heavier. On the other hand, if you buy a lighter version with flash 3)..... you won't be able to store so many songs, but the batteries will last longer and you'll be able to take to on your morning run as there won't be any problems with skipping.
(4).....used to come in hard drive versions only, but the latest Nano model has (5).....memory.
Whatever you choose, you'll have to download the music files from the Web or (6).....your CDs and then compress the songs into the (7)..... format.
Finally, to make your playlists it's a good idea to install an (8)..... editor program that creates (9).....with the name of the song, artist, etc.

16.3 Which audio application in C opposite are these people interested in?

1 I was fed up with typing long documents or dictating them to someone else. Now I just have to speak to my computer.
2 I enjoy manipulating the sounds I create with a synthesizer.
3 I'm a teacher in a school for the visually impaired. My pupils find this new technology very helpful.
4 I need this device to create digital music.

You and computers

Access the Professional English in Use ICT website at www.cambridge.org/eit/iet. Then do the activity. Create your own podcast.

17 Programming

A PROGRAMMING LANGUAGES

Programming is the process of writing a program using a computer language. A program is a set of instructions which a computer uses to do a specific task (e.g. a solution to a Maths problem).

The only language a PC can directly execute is machine code, which consists of 1s and Os. This language is difficult to write, so we use symbolic languages that are easier to understand. For example, assembly languages use abbreviations such as ADD, SUB, MPY to represent instructions. The program is then translated into machine code by software called an assembler.

Machine code and assembly languages are called low-level languages because they are closer to the hardware.

High-level languages, however, are closer to human languages; they use forms resembling English, which makes programming easier. The program is translated into machine code by software called a compiler. Some examples are:

- FORTRAN - used for scientific and mathematical applications
- COBOL - popular for business applications
- BASIC - used as a teaching language; Visual BASIC is now used to create Windows applications
- C - used to write system software, graphics and commercial programs
- Java -designed to run on the Web; Java applets are small programs that run automatically on web pages and let you watch animated characters, and play music and games.

The languages used to create Web documents are called markup languages; they use instructions (markups) to format and link text files. Examples are:

- HTML - the code used to create Web pages
- VoiceXML - it makes Internet content accessible via speech recognition and phone. Instead of using a web browser on a PC, you use a telephone to access voice-equipped websites. You just dial the phone number of the website and then give spoken instructions, commands, and get the required information.

17.1 Match the definitions with the highlighted terms from the text. Some extra terms are given.

1. Basic language which consists of binary codes

_____

2. Programming languages such as C, Java or Visual BASIC

_____

3. Writing computer programs

_____

4. Low-level languages translated into machine code by an assembler

_____

5. Software which converts a source program into machine code

_____

6. Languages used to create and format documents for the Web

_____

7. Small self-contained programs written in Java

_____

17.2 Complete the article about some programming steps with the words from the box.

a. Compiled	**b.** successive	**c.** documentation	**d.** run	**e.** flowchart
f. debugging	**g.** improved	**h.** define	**i.** maintenance	**j.** updated

Steps in writing a program

To write a program, software developers usually follow these steps.

- First they try to understand the problem and **1** _____ the purpose of the program. They design a **2** _____, a diagram which shows the **3** _____ logical steps of the program.

- Next they write the instructions in a high-level language (Pascal, C, etc.). This is called coding. The program is then compiled.

- When the program is written, they test it: they **4** _____ the program to see if it works and use special tools to detect bugs, or errors. Any errors arc corrected until it runs smoothly. This is called **5** _____, or bug fixing.

- Finally, software companies write a detailed description of how the program works, called program **6** _____. They also have a maintenance program. They get reports from users about any errors found in the program. After it has been _____, it is published as an **8** _____ version.

17.3 Match the words (1-5) with the definitions (a-e).

1. flowchart	**a.** Program instructions written in a particular computer language
2. source code	**b.** The techniques of detecting and correcting errors (or bugs) which may occur in programs
3. compiler	**c.** A diagram representing the successive logical steps of the program
4. machine code	**d.** A special program which converts the source program into machine code - the only language understood by the processor
5. debugging	**e.** The basic instructions understood by computers; it consists of 1 s and Os (binary code)

1.	**2.**	**3.**	**4.**	**5.**

17.4 Put the steps of programming into the correct order.

	a. Write instructions in a programming language **b.** Prepare documentation
	c. Understand the problem and plan a solution **d.** Make a flowchart of the program
	e. Compile the program (to turn it into machine code) **f.** Test and debug the program

You and computers

Access the Professional English in Use ICT website at www.cambridge.org/eit/iet. Then do the activity Computer languages.

18 Computers and work

A Jobs in computing

Most ICT-related jobs have developed to meet the need to analyze, design, develop, manage or support computer software, hardware or networks.
All the people involved in the different stages of development of a computer project, i.e. analysts, programmers, support specialists, etc. are controlled by a **project manager.**

ANALYZE

A **database analyst** is in charge of the research and development of databases;
network analysts study the network requirements and recommend the most suitable type of network;
systems analysts decide what ICT system will cater for the requirements of a specific institution.

DESIGN AND DEVELOP

Web designers, also called **webmasters**, create and maintain web pages and web applications for websites.

Software engineers, either application programmers or systems programmers, plan, design, and test computer programs.

Hardware engineers design and develop ICT devices.

Security specialists specialize in the design of software and hardware to protect information from ma ware: viruses, spyware, etc.

MANAGE

Network or **computer systems administrators** install and maintain networks.

Database administrators manage the accuracy and efficiency of databases.

SUPPORT

Computer operators control computer data processing.

Help desk technicians are in charge of troubleshooting, the solution of technical problems.

A computer operator is in charge of computer data input and processing

Computer training instructors or **trainers** teach people how to use hardware and software.

Technical writers write the instructions for ICT systems.

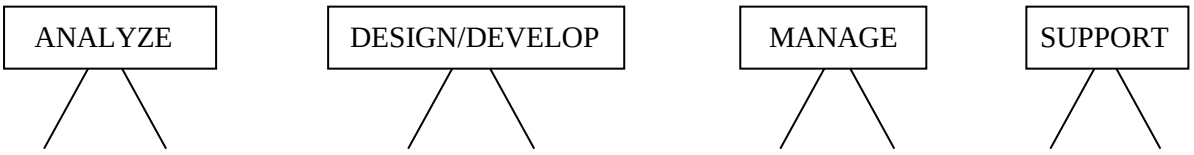
B Computers and jobs: new ways, new profiles

With the development of ICT, there has been a change in the way lots of jobs are done.

1) I've become a **teleworker**, a person who can work at home, thanks to **teleworking** or **telecommuting**, so I can work away from my official workplace. High-speed communications have made it possible.
2) I'm training to work as an **online teacher**. I want to be a specialist in e-leaming, distance education via the Internet.
3) I started my career as a typesetter. Now I work as a **desktop publisher**. I create documents with DTP software.
4) I like this new aspect of my job: I practise **telemedicine** - it's like having a long-distance surgery. 'Real-time data transmissions and virtual operations enable me to cure people who are far away.
5) ICT has made my job much better and easier. Now I like to call myself a **computer animator**, with my computer I create cartoons I could' t think of before.

18.1 Classify these jobs under the heading that best describes their function. They all appear in A opposite.

software engineer
trainer
hardware engineer
help desk technician
network analyst
network administrator
database administrator
systems analyst



a…….. b…….. c……. d……. e……. f…… g…… h……

18.2 Draw lines between the columns to make true sentences about jobs in A opposite

A technical	specialist	writes documentation of a program or
A project	manager	device.
A web		plans and keeps websites updated.
A security		designs applications against viruses
	controls all the operations and	
designer	people in a	
writer	project.	

18.3 What jobs in A opposite are being offered in these advertisements?

We are seeking a person to operate peripheral computer equipment, and perform report distribution duties and backup procedures on our servers.

Major Responsibilities

- Operating printers and unloading reports from the printer and distributing them through the internal mail system
- Performing backups on various operating systems
- Analysing and troubleshooting problems in the Data Centre reported by Help Desks or IT support associates

The successful candidate will be responsible for maintaining logical and physical database models as well as managing the database.

Job Requirements

- Bachelor's degree in Computer Science, a related field or equivalent experience
- Analytical skills and a proficiency in developing structured logic

18.4 Complete the text with words From B opposite.

The use of ICT has caused the development of new ways of working. People no longer need to be stuck in an office. Laptops, the Internet and wireless technologies allow (1).....What's more, there are more and more people who have decided to become (2).....and so have no need to travel to work at all. The Internet has also enabled doctors to practise (3).....and educators to work as (4).....ICT technologies have introduced changes in the artistic world, too. Cartoons are now made by (5).....and (6).....produce materials ready for publication.

You and computers

1 How have computers changed the way you work or study?

2 Make a list of the advantages and disadvantages that teleworking might have for you.

19 ICT systems

A ICT systems: components and functions

ICT systems are much more than computers. An ICT system involves the use of computers or other types of hardware to meet a specific need. A LAN, local area are network, can be an example of an ICT system, but interactive television and the database of a library are types of systems too.

ICT systems have these components:

- **software**, instructions and data
- **hardware**, computers and other devices
- **personnel,** people who use, design, control or benefit from the system.

The components perform these basic functions:

- **input**, the data is collected and entered
- **processing**, data is changed or manipulated
- **output**, the results are shown
- **communication** and **feedback**, the results are sent out and new data is collected and entered in the system
- **memory** or storage of data.

B Types of systems

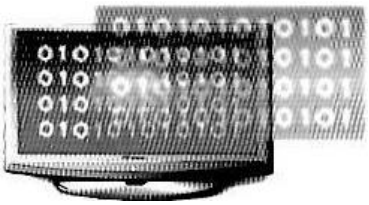
ICT systems are classified according to their aim.

- 'In our hospital we have set up an **information system** to manage data and information about our patients.'
- 'My house is an example of a **control system**. Its main aim is to control the different devices, e.g. switches that turn lights on and off as a security measure, sensors that detect smoke and set off the alarms, etc.'
- 'The Internet is a good example of a **communication system**; other examples are a mobile phone network or digital television. This type of system is designed for sending data between different devices.'

C Types of devices and services

At present most of the devices used in ICT systems are multi-purpose: mobile phones can be used as digital cameras or agendas, printers are also scanners and faxes. Not only is there media integration in the hardware, but also in the services offered by these telecommunication systems.

Call centres are one example of computer telephony integration where companies use databases and telephones for telemarketing.



Digital television uses digital technology to increase the number of channels and their quality of image. It also enables viewers to interact with the content and provide feedback to the programmer via telephone line, cable or satellite.

Radio has also adopted the digital

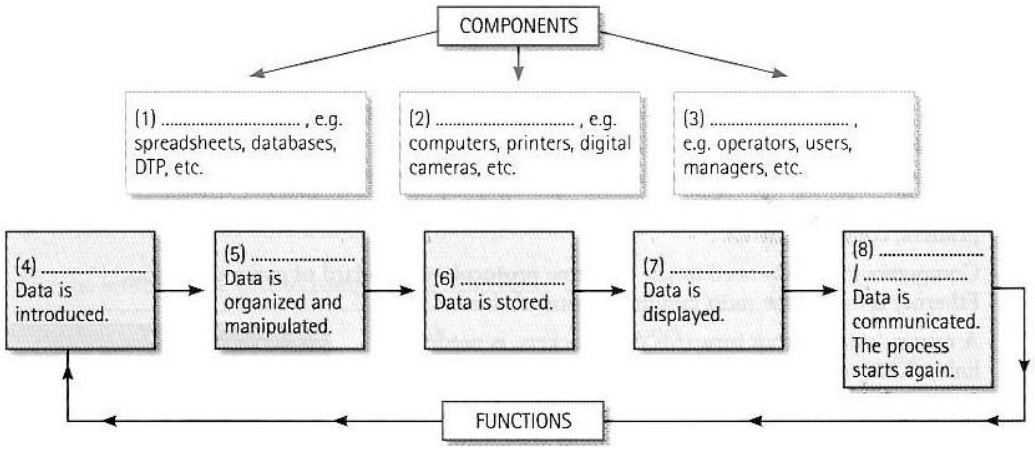
technology **DAB, Digital Audio Broadcasting.** Most digital radio stations are broadcast together with television signals.

Teletext is a text-based information service provided by television companies. It uses part of the TV signal and is visible on sets with suitable decoders.

Faxes or **telefaxes** use telecommunication technology to send copies of documents through telephone lines.

The **Internet**, a global network of computers, enables users to exchange files, send emails and surf the Web to find information, take part in e-commerce, etc.

19.1 Fill in the diagram of components and functions of ICT systems with words from A opposite:



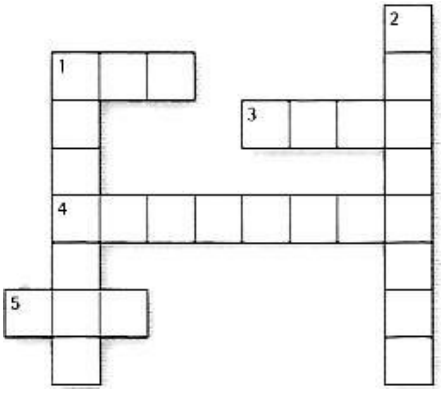
19.2 How would you define the following systems? Use the words in B opposite.

1 the registration system of a university
2 a robot at a car assembly line
3 an unnamed spaceship
4 a radio network
5 the *CIA World Factbook*
6 a video conferencing system

19.3 Solve the clues and complete the puzzle with words from C opposite.

Across

1 A new radio communication system.
3 A system that integrates telephones and computer is a …….. centre.
4 A global system of networks of integrated services.
5 A device used to send and receive exact copies of documents.

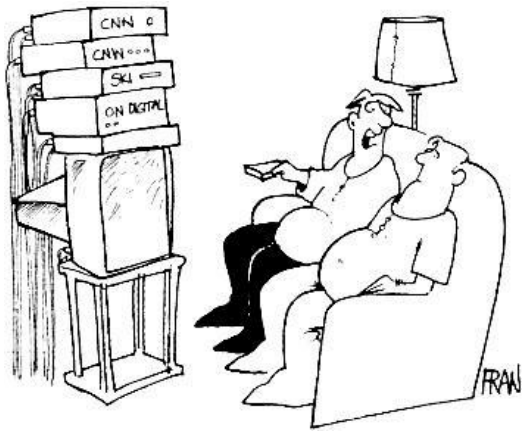


Down

1 Similar to interactive TV.
2 Written information you get on your TV screen.

You and computers

Make a list of the ICT systems you use at work or at home. What is their purpose? What are their components?



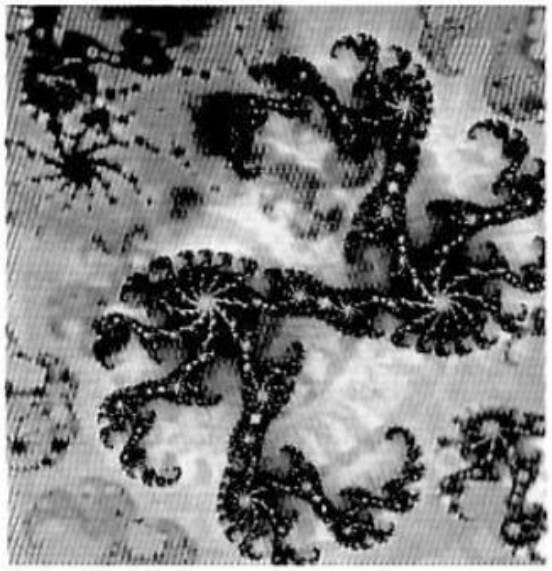
20 Networks

A LANs (Local Area Networks)

Networking allows two or more computer systems to exchange information and share resources and peripherals.

LANs are usually placed in the same building. They can be built with two main types of architecture: **peer-to-peer**, where the two computers have the same capabilities, or **client-server**, where one computer acts as the **server** containing the main hard disk and controlling the other **workstations** or **nodes**, all the devices linked in the network (e.g. printers, computers, etc.).
Computers in a LAN need to use the same **protocol**, or standard of communication. Ethernet is one of the most common protocols for LANs.

A **router**, a device that forwards data packets, is needed to link a LAN to another network, e.g. to the Net.



Networks

Most networks are linked with cables or wires but new **Wi-Fi**, **wireless fidelity**, technologies allow the creation of **WLAN**s, where cables or wires are replaced by radio waves.

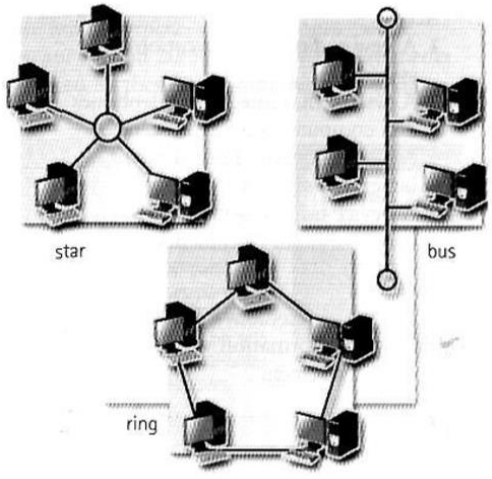
To build a WLAN you need **access points**, radio-based receiver-transmitters that are connected to the wired LAN, and **wireless adapters** installed in your computer to link it to the network.

Hotspots are WLANs available for public use in places like airports and hotels, but sometimes the service is also available outdoors (e.g. university campuses, squares, etc.).

B Network topology

Topology refers to the shape of a network.

- **Star**: there is a central device to which all the workstations are directly connected. This central position can be occupied by a server, or a **hub**, a connection point of the elements



The three basic network topologies

of a network that redistributes the data.

- **Bus**: every workstation is connected to a main cable called a bus.
- **Ring**: the workstations are connected to one another in a closed loop configuration.

  There are also mixed topologies like the **tree**, a group of stars connected to a central bus.

C WANs (Wide Area Networks)

WANs have no geographical limit and may connect computers or LANs on opposite sides of the world. They are usually linked through telephone lines, fibre-optic cables or satellites. The main transmission paths within a WAN are high-speed lines called **backbones**.

Wireless WANs use mobile telephone networks. The largest WAN in existence is the Internet.

20.1 Read the information opposite and correct the following statements.

1 LANs link computers and other devices that are placed far apart.
2 In a client-server architecture, all the workstations have the same capabilities.
3 The word protocol refers to the shape of the network.
4 Routers are used to link two computers.
5 Access points don't need to be connected to a wired I.AN.
6 Wireless adapters are optional when you are using a WLAN.
7 Hotspots can only be found inside a building.
8 The Internet is an example of a LAN.
9 Wireless WANs use fibre and cable as linking devices.

20.2 Use the words in the box to complete the sentences.

LAN	nodes	hub	backbones
WLAN	peer-to-peer	server	

1 All the PCs on a.....are connected to one....., which is a powerful PC with a large hard disk that can be shared by everyone.
2 The style of.....networking permits each user to share resources such as printers.
3 The star is a topology for a computer network in which one computer occupies the central part and the remaining.....are linked solely to it.

4 At present Wi-Fi systems transmit data at much more than 100 times the rate of a dial-up modem, making it an ideal technology for linking computers to one another and to the Net in a.....
5 All of the fibre-optic .....of the United States, Canada and Latin America cross Panama.
6 A.....joins multiple computers (or other network devices) together to form a single network segment, where all computers can communicate directly with each other.

20.3 Read these descriptions of different physical topologies of communication networks and match them with the terms in B opposite.

1 All the devices are connected to a central station.
2 In this type of network there is a cable ro which all the computers and peripherals are connected.
3 Two or more star networks connected together; the central computers are connected to a main bus.
4 Alt devices (computers, printers, etc.) are connected to one another forming a continuous loop.

20.4 A network administrator has set up a new network in a school. Which topology has she chosen?

We have decided to install computers in all the departments but we haven't spent a lot of money on them. Actually, only the one in the staff room is really powerful (and expensive!). They all have common access to the Net and share a laser printer. The teachers in this school have built up a general file of resources kept in the main computer to which all the others in the network have access.

"When I was a student, wireless data transmission meant passing notes in class."

You and computers

Write a list of the advantages and disadvantages of using networks.

ACRONYMS AND ABBREVIATIONS

ADSL Asymmetric Digital Subscriber Line
Al Artificial Intelligence
AIM AOL Instant Messenger
ALU Arithmetic Logic Unit
AMD Advanced Micro Devices
ASCII American Standard Code for Information Interchange
AT&T American Telephone & Telegraph company
ATA Analogue Telephone Adaptor
ATM Automated Teller Machine
AVI Audio Video Interface
BASIC Beginner's All-purpose Symbolic Instruction Code
BBS Bulletin Board System
Bcc: Blind
BIOS Basic Input/Output System carbon (or courtesy) copy
bit binary digit
bps bits per second
CAD Computer-Aided Design
Cc: Carbon (or courtesy) copy
CCD Charge-Coupled Devices
CD Compact Disc
cd/m2 Candela per square metre
CD-R Compact Disc-Recordable
CD-ROM Compact Disc-Read Only Memory
CD-RW Compact Disc-Rewritable
CERN Conseil Europeen pour la Recherche Nucleaire
COBOL COmmon Business- Oriented Language
CPU Central Processing Unit
CRT Cathode RayTube
CSS Cascading Style Sheets
CTP Computer To Plate
CU Control Unit
DAB Digital Audio Broadcasting
DAW Digital Audio Workstation
DBMS Database Management System
DDR Double Data Rate (RAM)
DIMM Dual In-line Memory Module
DLP Digital-Light processing
DMB Digital Multimedia Broadcasting
DNS Domain Name System
dpi dots per inch
DTP Desktop Publishing
DTTV Digital Terrestrial television
DVB-H Digital Video Broadcast-Handheld

DVD-/+RW Digital Versatile Disc- Rewritable
DVD Digital Versatile Disc or Digital Video Disc
DVD-R Digital Versatile Disc- Recordable
DVD-ROM Digital Versatile Disc-Read Only Memory
DVI Digital Video Interface
EEPROM Electrically Erasable Programmable ROM
EPS Encapsulated PostScript
FAQ Frequently Asked Questions
FORTRAN FORmulaTRANslation
FTP File Transfer Protocol
GB Gigabyte (1,024 megabytes)
GHz Gigahertz
GIF Graphic Interchange Format
GIS Geographic Information System
GNU Gnu's Not UNIX
GPS Global Positioning System
GSM Global System for Mobile communication
GUI Graphical User Interface
HDD Hard Disk Drive
HD-DVD High Definition-Digital Versatile Disk
HDTV High-definition Television
HP Hewlett-Packard
HTML Hypertext Markup Language
HTTP Hypertext Transfer Protocol
Hz Hertz
I/O Input/Output
IBM International Business Machines
ICQ I Seek You
ICT Information and Communications Technologies
IM Instant Messaging
IP Internet Protocol
IR Instruction Register
IrDA Infrared Data Association
ISP Internet Service Provider
IT Information technology
JPG (or JPEG) Joint Photographic Experts Group
k 1 kilo, used to denote a thousand; 2 1,024 bytes
KB kilobyte (1,024 bytes)
LAN Local Area Network
Laser Light Amplification by Stimulated Emission of Radiation
LCD Liquid-Crystal Display
LISP LISt Processing
.mov QuickTime movie
Mac Macintosh computer
MAN Metropolitan Area Network

MB Megabyte (1,024 kilobytes)
MHz Megahertz
MIDI Musical Instrument Digital Interface
MIPS Million Instructions Per Second
MMS Multimedia messages
Modem MOdulator/DEModulator
MP3 MPEG-1 Layer-3 Audio
MPEG Moving Pictures Experts Group
ms millisecond
NIC Network Interface Card
NUI Network User Identifier
OCR Optical Character Recognition
OLE Microsoft's Object Linking and Embedding standard
OLED Organic Light-Emitting Diodes (display)
OOP Object Oriented Programming
OS Operating System
.pdf portable document format
PAN Personal Area Network
PC 1 Personal Computer; 2 Program Counter
PCL Printer Control Language
PDA Personal Digital Assistant
PDL Page Description Language
PGP Pretty Good Privacy
PIN Personal Identification Number
pixel picture element
png portable network graphic
ppm pages per minute
PPP Point to Point Protocol
.ra RealAudio file
RAM Random Access Memory
RGB Red, Green, Blue
RFID Radio-Frequency identification
RIM Research In Motion
RIP Raster Image Processor
RISC Reduced Instruction Set Computer
ROM Read Only Memory
rpm revolutions per minute
RSI repetitive strain injury
RSS Really Simple Syndication or Rich Site Summary
SDRAM Synchronous Dynamic Random Access Memory
SIM (card) Subscriber Identity Module
SMS Short Message Service
SMTP Simple Mail Transfer Protocol
SQL Structured Query Language
SSL Secure Sockets Layer

SXGA Super XGA (Extended Graphics Array)
TAN Transaction Authorization Number
TB Terabyte (1,024 gigabytes)
TCP/IP Transmission Control Protocol / Internet Protocol
TFT Thin Film Transistor (display)
TIFF Tagged Image File Format
UMTS Universal Mobile Telecommunications System
URL Uniform Resource Locator
USB Universal Serial Bus
VAT Value Added Tax
VCR Videocassette Recorder
VDU Visual Display Unit
VGA Video Graphics Adapter/Array
VoiceXML Voice Extensible Markup Language
VoIP Voice over Internet Protocol
VRML Virtual Reality Modelling (or Markup) Language
.wav Windows wave audio file
W3 See **Web** in Glossary
WAI Web Accessibility Initiative
WAN Wide Area Network
WAP 1 wireless access point; 2 Wireless Application Protocol
Wi-Fi Wireless Fidelity
WiMAX Worldwide Interoperability for Microwave Access
WIMP Window, Icon, Menu (or mouse) and Pointer WPWord Processing
WWW World Wide Web
WYSIWYG What You See Is What You Get
XGA Extended Graphics Array
XML Extensible Markup Language
WXGA Wide XGA (Extended Graphics Array)

ENGLISH UKRAINIAN VOCABULARY

UNIT 1	
technological dependence	технологічна залежність
electronic waste	електронне сміття
computer addiction	залежність від комп’ютера
cybercrime	кіберзлочин
loss of privacy	втрата конфіденційності
to send emails	надсилати електронного листа
to publish e-books	публікувати електронні книжки
to design an online newspaper	створювати онлайн-газету
to store information	зберігати інформацію
to retouch photos	ретушувати фото
to surf the Web	займатися веб-серфінгом
to download files	завантажувати файли
UNIT 2	
hardware	апаратне забезпечення
software	програмне забезпечення
CPU	центральний процесор
RAM	оперативна пам’ять
ROM	постійна пам'ять
input device	пристрій вводу
output device	вивідний пристрій
peripheral	периферійний прилад
storage device	накопичувач
UNIT 3	
mainframe	електронна обчислювальна машина (ЕОМ)
desktop PC	настільний ПК
laptop	портативний комп'ютер
notebook PC	ноутбук
USB (Universal Serial Bus) ports	універсальні послідовні порти
battery packs	акумулятори
tablet PC	планшетний ПК
personal digital assistant (PDA)	персональний цифровий помічник
stylus	перо (приладу)
touch screen	сенсорний екран
handwriting recognition	розпізнавання рукописних символів

voice recognition	розпізнавання голосу
wireless	бездротовий
wearable computer	ношений комп'ютер

UNIT 4

alphanumeric keys	алфавітно-цифрові клавіші
numeric keypad	цифрова клавіатура
function keys	функціональні клавіші
cursor keys	клавіші-стрілки
dedicated keys	поєднання клавіш
voice-recognition system	система розпізнавання голосу
voice commands	голосові команди

UNIT 5

flatbed scanner	планшетний сканер
photocopier	копіювальний апарат
film scanner	плівковий сканер
hand-held scanner	ручний сканер
barcode	штрих-код
resolution	роздільна здатність
pen scanner	ручка сканер
film	кіноплівка
digital camera	цифрова камера

UNIT 6

acetate	ацетат
spooler	диспетчер черги
dot-matrix	матричний
ribbon	стрічка
impact printing	щільний друк
receipts	надходження
invoices	рахунки-фактури
ink-jet	струменевий
powder	порошок

UNIT 7

visual display unit	візуальний дисплей
sharpness of images	різкість зображення
Brightness	яскравість
flicker	мерехтіння

fatigue	втома
discharge	розряд
angles	кути
CRT displays	кінескопні дисплеї
LCD displays	РК - дисплеї
TFT	технологія тонкоплівкових транзисторів
phosphors	люмінофори
LCD screen	ПК- екран
pixel	піксель
dot pitch	крок точки
refresh rate	частоту поновлення
frequency	частота
electron beam	електронний пучком
specs	характеристики
contrast ratio	контрастність
built-in TV tuner	вбудований ТВ –тюнер
the Picture-in-Picture function	функція картинка -в –картинці
digital images	цифрові зображення
resolution	роздільність
sound capabilities	звукові можливості

UNIT 8	
electrical circuit	електричний ланцюг
unit	блок, пристрій
executes	виконує
measure	виміювати
front side bus	зовнішня шина
expansion slots	слоти розширення
provide	забезпечувати
extra	додаткові
capabilities	можливості
transfers	передавати
RAM (random access memory)	ОЗП (оперативний запам’ятовуючий пристрій)
temporary	тимчасово
volatile	нестабільно
ROM (read only memory)	ПЗП (постійний запам’ятовуючий пристрій)
permanent	постійний
amount	кількість, об’єм
detect	виявити

current	струм
eight-digit code	восьмизначний код
character	символ
capacity	потужність, здатність, об’єм
able	здатен
UNIT 9	
hard drive	жорсткий диск
drive	привід
magnetic device	магнітний пристрій
internal hard drive	внутрішній жорсткий диск
segment	сектор
concentric circles	концентричні кола
heads	головки
the track	рейки
access time	час доступу
transfer rate	швидкістю передачі
portable hard drive	портативний жорсткий диск
Optical storage	оптичні накопичувачі
format	формат
flash memory	флеш-пам'ять
solid state drive	твердотільний жорсткий диск
PDA	КПК
data	дані
memory card	карта пам'яті
volatile	енергонезалежний
headphone	навушники
sound	аудіо
laser	лазер
backup	резервна копія
formatting	форматування
UNIT 10	
repetitive strain injury	повторюване розтягнення
eye strain	напруження очей
fatigue of the eyes	втома очей
Cathode Ray Tube	електронно-променева трубка
adjustable chair	регульований стілець
ergonomics	ергономіка
electronic rubbish	електронне сміття
recycle	переробляти

e-waste	електронне сміття
internet addiction	інтернет-залежність
UNIT 11	
software	програмне забезпечення
application	додаток
multitasking	мультизадачність
user-friendly	легкий для сприйняття
drop-down menu	спливаюче меню
folders	папки
desktop	робочий стіл
GUI	графічний користувацький інтерфейс
software	програмне забезпечення
application	додаток

UNIT 12	
cut and paste	вирізати і вставляти
font specifications	характеристики шрифту
headers, footers	колонтитули
Spell checker	перевірка орфографії
Thesaurus	словник синонімів

UNIT 13	
spreadsheet	таблиця
to manage	управляти
worksheet	робочий лист
row	рядок
column	колонка
cell	клітинка
equation	рівняння
value	значення
percentages	відсотки
discount	знижка
to carried	здійснювати
to alignment	вирівнювати
borders	кордон
essentially	по суті
record-keeping	ведення обліку

single record	один запис
relevant information	релевантна інформація
to hold	тримати
OLE Object (object linking and embedding)	об'єкт OLE (зв'язування і впровадження об'єктів)
hyperlink	гіперпосилання
relational databases	реляційні бази даніх
to join	приєднатися
common	загальний
extracting information	вилучення інформації
query	запит

UNIT 14

graphic	графіка
to process	обробляти
bitmapped graphics	Растрова графіка
bitmap	Бітове(растрове) відображення графічного об’єкта, бітова карта
density	густина,концентрація
resolution	роздільна здатність
inch	дюйм
sharp	різкий,чіткий
vector graphics	векторна графіка
to represent	представляти
graphics software	графічне програмне забеспечення
to scale	масштабувати
to edit	редагувати
to scan	сканувати
to transfer	переносити, переміщувати
facilities	можливості
freehand drawing	малювання від руки
pattern	шаблон
pie chart	секторна діаграма
bar chart	гістограма,стовпчаста діаграма
line graph	лінійний графік
spreadsheet	електронна таблиця
database	база даних
computer-aided design(CAD)	система автоматизованого проектування
wireframe	каркас
edge	ребро,контур
surface	поверхня
to render	візуалізувати,формувати зображення

desktop publishing(DTP)	верстка друкованих видань
page layout program	програма компонування сторінок
clip art	ілюстрована вставка,графічний фрагмент, заготовка
to arrange	розміщувати,впорядковувати
applet	додаток,прикладна програма
sequence	послідовність
frame	кадр
geographic information system(GIS)	геоінформаційна система
UNIT 16	
podcasting	широкомовлення
podcast	цифровий медіа-файл, який розповсюджується інтернетом для відтворення на портативних медіа-програвачах чи на ПК
fileshare sites	сайти файлообмінники
audioblog	аудіо блог
audio books	аудіокниги
audio lectures	аудіо лекції
spoken tutorials	розмовні заняття
Internet radio	Інтернет-радіо
webcasts	веб-трансляції
streaming	потокова передача або прийом даних
plug-in	плагін програмного забезпечення
MP3 players	MP3-плеєри
MPEG audio layer 3	кодек третього рівня, розроблений командою MPEG, ліцензований формат файлу для зберігання аудіоінформації.
hard drive	жорсткий диск
iPods	торгова марка серії портативних медіапрогравачів компанії Apple
Built-in/flash memory	вбудована/зовнішня пам'ять
ID3 editor	редактор ID3
ID3 tags	ID3-теги
MIDI (musical instrument digital interface)	MIDI (цифровий інтерфейс музичних інструментів)
DAW (digital audio workstation)	електронний інструмент для запису, редагування і створення аудіо-файли.
speech recognition	розпізнавання мови
speech synthesis/text-to-speech	синтез мови/ перетворення тексту в мову

UNIT 17	
podcasts	подкасти
audioblog	аудіо блог
audio books	аудіокниги
audio lectures	аудіо лекції
spoken tutorials	розмовні заняття
internet radio	інтернет-радіо
webcasts	веб-трансляції
smooth streaming	гладкий потік
mp3 players	MP3-плеєри
hard drive	жорсткий диск
ID3 editor	редактор ID3
ID3 tags	ID3-теги
MIDI(musical instrument digital interface)	цифровий інтерфейс музичних інструментів
digital audio workstations	цифрові аудіо робочі станції
speech recognition	розпізнавання мови
speech synthesis	синтез мови
text-to-speech	перетворення тексту в мову
UNIT 18	
project manager	керівник проекту
database analyst	адміністратор баз даних
network analysts	мережеві аналітики
systems analysts	системні аналітики
web designers	веб-дизайнери
webmasters	веб-майстри
software engineers	розробники програмного забезпечення
hardware engineers	апаратні інженери
security specialists	фахівці безпеки
network	мережа
computer systems administrators	адміністратори комп'ютерних систем
database administrators	адміністратори баз даних
computer operators	комп'ютерні оператори
help desk technicians	служба технічної підтримки
computer training instructors	Інструктори комп'ютерного навчання
trainers	тренери
technical writers	технічні письменники
teleworker	телепрацівник
telecommuting	дистанційна робота

major Responsibilities	головні обов'язки
job Requirements	вимоги роботи
online teacher	онлайн вчитель
desktop publisher	макетчик
telemedicine	телемедицина
computer animator	комп'ютер аніматор

UNIT 20

networking	мережеве з'єднання
LAN	локальна мережа
peer-to-peer	рівний-рівному
client-server	клієнт-сервер
server	сервер
workstation	робоча точка
node	вузол
protocol	протокол
router	маршрутизатор
Wi-Fi (wireless fidelity)	бездротовий зв'язок
WLAN	бездротова локальна мережа
access point	точка доступу
wireless adapter	бездротовий адаптер
hotspot	гаряча точка
star	зірка (тип з'єднання)
hub	центр з'єднання
bus	шина (тип з'єднання)
ring	кільце (тип з'єднання)
tree	дерево (структура даних або з'єднання)
WAN	глобальна мережа
backbone	основа
wireless WAN	бездротова глобальна мережа

Literature

Навчальна література

1. English for Computer Science Students: Учебное пособие / Сост. Т.В.Смирнова, М.В.Юдельсон; Науч. ред. Н.А.Дударева. – 5-е изд. – М.: Флінта: Наука, 2004. – 128 с.
2. Eric H. Glendinning, John McEvan Oxford English for Information Technology. – 2nd edition. – Oxford University Press, 2011. – 224p.
3. Gareth Williams. Student Handbook for Information and Communication Technology for KS3, KS4 and GCSE. – Fifth edition. – Cambridge: Pearson Publishing, 2011. – 122 p.
4. Gledinning E.H., McEwans J. Basic English for Computing. Oxford University Press, 2009. -166 p.
5. Norton P. Introduction to Computers. – New York: McGraw-Hill Companies; 4th edition, 2010. - 197 p.
6. Quirk R.. Grammar of English. Oxford University Press, 2009. - 178 p.
7. Santiago Remacha Esteras, Elena Marko Farbe. Professional English in Use ICT. - 4-th edition. – Cambridge University Press, 2008. - 168 p.
8. Murphy R. English Grammar in Use. – Cambridge University Press, 2008. – 350 p.
9. Swan M. & Walter K. How English Works. A grammar practice book. – Oxford University Press, 1997. – 360с.

Допоміжна література

1. Англо-русский словарь по вычислительной технике / Сост. Блехман М.С., Гуткин М.Л., Зайчика Б.И., Макарова А.В., Фаградянца И.В. // Под ред. Л.М. Гуткина. – М., ЭТС, 2009.
2. Англо-русский словарь сокращений по компьютерным технологиям / Сост. Фадеев С.В.– М., Руссо, 2012.
3. Англо-русский словарь сокращений по телекоммуникациям / Сост. Александров А.В. – М., Руссо, 2012.
4. Борковський А.Б. Англо-русский словар по программированию и информатике (с толкованиями). – М.: Рус. яз., 1987. – 335 с.
5. Борковський А.Б., Зайчик Б.И., Боровиков Л.И. Словар по программированию (английский, русский, немецкий, французский). Ок. 5000 терминов. – М.: Рус. яз., 1991. – 286 с.
6. Универсальный словарь компьютерной терминологии / Сост. Качахидзе Л.Н. – М., Дрофа, 2008.

Contents