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«Юго-Западный государственный университет»
(ЮЗГУ)

Кафедра иностранных языков

УТВЕРЖДАЮ
Проректор по учебной работе
_____О. Г. Локтионова
«30» 08 _____2021г.

COMPUTER AND IT TECHNOLOGIES: HISTORY AND DEVELOPMENT

(PART II)

Методические указания для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» для студентов специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03

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Computer and IT Technologies: History and Development (Part II): методические указания для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» для студентов специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03 / Юго-Зап. гос. ун-т; сост.: В. В. Махова. – Курск, 2021. – 47 с.: – Библиогр.: с. 47.

Цель методических указаний сформировать у студентов базовый тезаурус и начальные навыки работы с профессионально-ориентированными текстами. Методические указания основаны на оригинальных материалах, задания ориентированы на активное обучение английскому языку и формирование понятийного аппарата по специальности.

Методические указания соответствуют требованиям ФГОС ВО дисциплины «Иностранный язык» по направлениям подготовки 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03.

Методические указания предназначены преподавателям и студентам специальностей 02.03.03, 09.03.01, 09.03.02, 09.03.03, 09.03.04, 10.03.01, 11.03.02, 11.03.03, 12.03.04, 10.05.02, 30.05.03 очной и заочной форм обучения для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» (английский).

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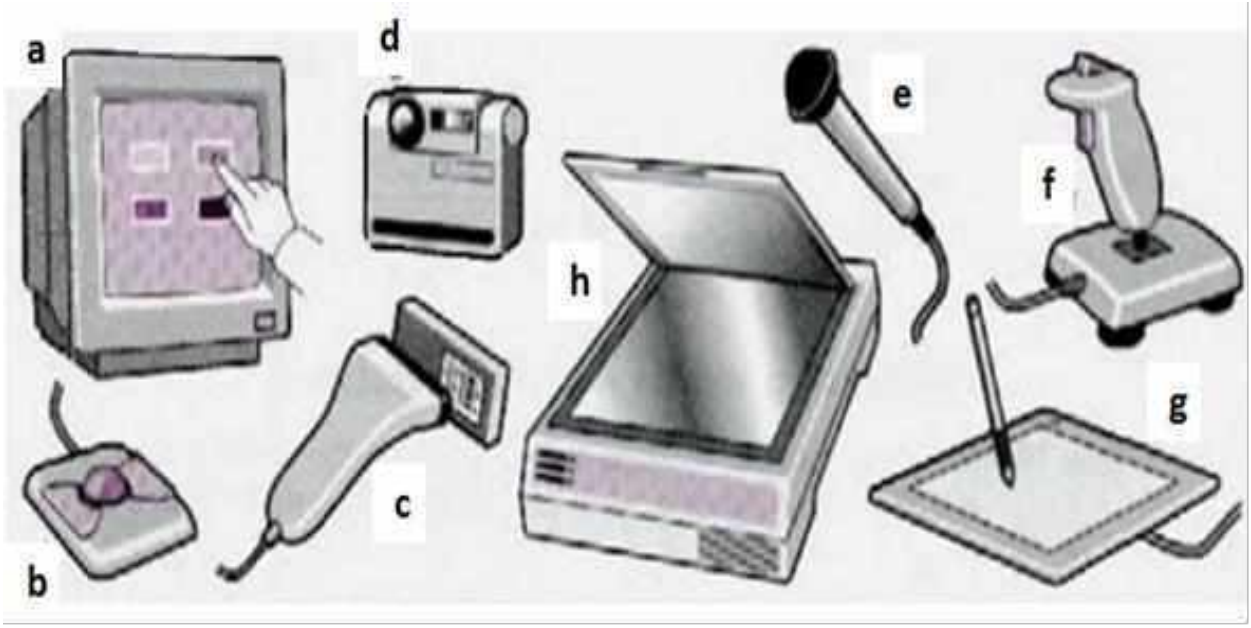
UNIT I. KEYBOARD AND MOUSE

I. Can you say what an input device is?

What are the most common input devices?

II. Match these pictures of input devices with their names.

joystick	barcode reader	graphic tablet	digital camera
tracker ball	scanner	touchscreen	microphone



III. Mulch each device 1-7 with its use a-g

	Device		Use
1	joystick	**a**	draw pictures on to a computer screen
2	lightpen	**b**	copy documents
3	scanner	**c**	input sound
4	digital camera	**d**	input text
5	mouse	**e**	select from a menu
6	keyboard	**f**	move the cursor rapidly
7	microphone	**g**	produce photos without film

IV. Look at the HELP box and then use the example below to write similar description of the devices from Exercise I.

HELP box
Describing function

There are several ways of describing function:

- ✓ ***for* + *-mg***
  for controlling
- ✓ ***relative pronoun* + *verb***
  which control
- ✓ **you can use____ to**
- ✓ ***relative pronoun* + *is used* + *to* + *infinitive***
  which/that is used to control
- ✓ **used + *to* + infinitive**
  used to control
- ✓ **using___ you can**
- ✓ **you can use____ to**

E.g. Joystick: *Joystick is an input device for playing games.*

V. Now read the definition of input devices and decide if you were right when doing exercises I − III.

Input devices are the pieces of hardware which allow us to enter information into the computer. The most common are the keyboard and the mouse. We can also interact with a computer by using one of these: a lightpen, a scanner, a trackball, a graphics tablet, a joystick or a voice recognition device.

VI. Each text describes one of these devices: *tracker ball, joystick, lightpen, scanner*. **Identify the device each text describes. Write your answers in this table. Then compare your answers with other students.**

Text	Device
1.	
2.	
3.	
4.	

1. A _____ is another input device you can connect to a computer system. The _____ is able to move in eight directions. _____s are mostly used in computer games to control the way a picture on the screen moves. Sometimes two _____s are connected to a computer so two people can play the game at the same time.

2. A _____ works in exactly the same way as a mouse, except that the ball is on top. The user rolls the ball around with his/her hand to operate it. If you use a _____ you don't need any extra space on your desk to move it around (like you do with a mouse). _____s are often used on small portable computers and on some video game machines.

3. A _____ can be used to draw pictures directly onto a computer screen or to read the pattern on a barcode. A _____ that can read barcodes detects the difference between the light reflected from a black barcode line and its lighter background.

4. Using a _____ you can input printed drawings, photographs, or texts directly into a computer. A _____ works like a photocopier - a light is shone on the material and the_____ detects the reflected light. You can use a _____ with optical character recognition (OCR) software to input the scanned text into a word processing package.

VII. Look at the picture of a PC-compatible keyboard and identify these groups of keys.

1. **Alphanumeric keys**: arranged in the same order as a typewriter.
2. **Function keys**: used by various programs to instruct the PC to perform specific tasks, such as *Save*, *Copy*, *Cut*, *Paste*, *Help*, etc.
3. **Numeric keypad**: set of numeric or editing keys. The *Num Lock* key is used to switch from numbers to editing functions.
4. **Editing keys**: cursor and other keys usually used within word processors to page up and down in a long document or to edit text (using *Insert* or *Delete* keys).
5. **Special keys**: used to issue commands or to produce alternative characters in key combinations, for example, the *Alt* key.

A PC- compatible keyboard

VIII. Match these descriptions with the names of keys on the right. Then find them on the keyboard.

1. A long key at the bottom of the keyboard. Each time it is pressed, it produces a blank space. (= .....) **arrow keys**
2. It moves the cursor to the beginning of a new line. It is also used to confirm commands. (= .....) **return**
3. It stops a program without losing the information from the main memory. Sometimes its use depends on the applications. (= .....) **caps lock**
4. It works in combination with other keys to produce special characters or specific actions. (= .....) **shift**
5. It removes the character on the left of the cursor or any selected text. (= .....) **tab**
6. It produces UPPER-CASE characters (or the upper-case character of the key). (= .....) **escape**
7. It produces uppercase letters, but it does not affect numbers and symbols. (= .....) **space bar**
8. It moves the cursor horizontally to the right for a fixed number of spaces (in tabulations and data fields). (= .....) **backspace**
9. They are used to move the cursor, as an alternative to the mouse. (= .....) **alt**

HELP box

Language work: Present simple

Study these statements about keys.

↓ This key *moves* the cursor down.

Print Scree This key *copies* the screen display.

F2 This key *doesn't have* a fixed function.

The verbs in *italics* are in the **Present simple.** We use the Present simple to describe things which are always true.

IX. Look at the statements (1-7) and correct the ones which are wrong.

E.g. *This key moves the cursor down.*

It doesn't move the cursor down, it moves the cursor up.

If you are not sure, ask another student: *What does this key do?*

→ 1. This key moves the cursor down.

← 2. This key moves the cursor to the right.

Del 3. This key inserts a character.

Print Screen 4. This key moves the document to the end.

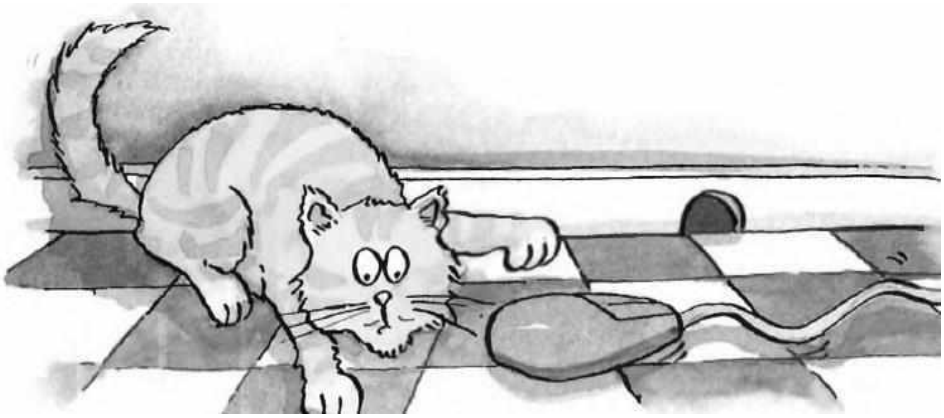
Page down 5. This key moves the screen up.

Home 6. This key doesn't have a fixed function.

Caps Lock 7. This key gives you all lower case letters.

X. Try to answer these questions.

1. How is the mouse connected to the computer?
2. What does the mouse pointer look like on the screen?
3. What are the functions of the mouse buttons?
4. What are the advantages of a computer mouse over a keyboard?



XI. Read the text to check your answers or to find the right answers.

Point and click!

Typically, a mouse is a palm-sized device, slightly smaller than a pack of cards. On top of the mouse there are one or more buttons for communicating with the computer. A 'tail' or wire extends from the mouse to a connection on the back of the computer.

The mouse is designed to slide around on your desktop. As it moves, it moves an image on the screen called a **pointer** or **mouse cursor**. The pointer usually looks like an arrow or 1-bar and it mimics the movements of the mouse on your desktop.

What makes the mouse especially useful is that it is a very quick way to move around on a screen. Move the desktop mouse half an inch and the screen cursor will leap four inches. Making the same movements with the arrow keys takes much longer. The mouse also issues instructions to the computer very quickly. Point to an available option with the cursor, **click** on the mouse, and the option has been chosen.

Mice are so widely used in graphics applications because they can do things that are difficult, if not impossible, to do with keyboard keys. For example, the way you move an image with a mouse is to put the

pointer on the object you want to move, press the mouse button and **drag** the image from one place on the screen to another. When you have the image where you want it, you release the mouse button and the image stays there. Similarly, the mouse is used to **grab** one corner of the image (say a square) and stretch it into another shape (say a rectangle). Both of these actions are so much more difficult to perform with a keyboard that most graphics programs require a mouse.

The buttons on the mouse are used to select items at which the mouse points. You position the pointer on an object on the screen, for example, on a menu or a tool in a paint program, and then you press the mouse button to 'select' it. Mice are also used to load documents into a program: you put the pointer on the file name and **double-click** on the name − that is, you press a mouse button twice in rapid succession.

XII. Find in the text the definitions to the explanations below (the words in the text are in **bold** but there are extra words)**.**

1. Position the pointer on something, then rapidly press and release the mouse button twice (you do this to load a program, open a document or select text or graphics) − _____ .
2. Position the pointer on something, hold down (he mouse button and move the mouse to the desired position, then release the button (you do this to move an image to a new location on the screen) − _____ .
3. Position the pointer on something, then press and release the mouse button (you do this to place the insertion point, to choose an option, or to close a window) _____ .

INTERESTING FACTS

1. Read the text quickly and say what this text is about.

Every computer works with input − data and instructions that the user feeds into the computer so that it can begin its calculations. To enter data into the earliest computers, operators fed in cards or strips of film with holes punched in them. However, this was a very slow process suitable for inputting only words or numbers. Today computers can handle many different types of input − from text and sounds to radio signals, images, or even a touch. Some forms of input control the computer itself, while others feed data into programs for analysis. But

first, all forms of input data need to be converted into electrical signals that a computer can process.

Herman Hollerith's tabulating machines pioneered many of the principles that would later be adopted for computer input systems. His original device helped to analyze the data of the 1890 US census. The machine used an electrical card-reader to transfer information from punched cards to a series of counters. In this machine, the cards had to be fed in one by one, but later versions of the machine included automatic card-feeders, as well as systems to add and subtract data. Hollerith's Tabulating Machine Company later became the computer giant IBM.

The QWERTY keyboard is the most common input device. Modern keyboards developed from the ones for typewriters. The keys in keyboards are not arranged in alphabetical order because, in the first typewriters, the mechanical keys easily jammed if those that were next to each other were typed in quick succession. So, the keys were arranged so that letters that are often used together are far apart. 'QWERTY' spells out the letters that appear first in the sequence of keys.

Touchscreen technology allows users to interact physically with what is shown on a screen. Inside the touchscreens of many computers and cell phones – such as iPhones − is a glass layer coated with a grid of threads that conduct electricity. This grid generates an electrical field. When fingers touch the screen, the electrical field changes near the points of contact. The grid is connected to sensitive detectors that pinpoint the locations of these changes, creating a 'map' of the touch input − the phone's computer uses this as its input data.

Computers recognize human speech by comparing it with data stored in a database. Spoken words have distinctive patterns of loudness and pitch, and a computer uses these patterns to identify words from their sounds. The computer can then convert this audio input into text that is displayed on the screen or a command to start an application.

The computer mouse was invented in 1 9 6 3 – the first mouse had wheels to move over a surface. Early models used a rubber ball beneath the device to track the movement of the mouse. A modern one uses optical sensors to detect movement, which is then translated into input signals. The mouse made it easy for users to navigate across the screen and select different items.

2. **Read the text again, find key words. Entitle the text. Make a graph of the text.**
3. **Retell the text using the graph.**

TEST YOURSELF

1. **In pairs using the notes about input devices guess what they are.**

1) ……
- scans text and pictures
- sends digitized image to computer

2) ……
- allows you to control computer vocally
- spoken commands do what is normally done with keyboard/mouse

3) ……
- stationary device
- controls the cursor and selects is items on the screen
- works like upside-down mouse
- ball on top turned round with fingers

4) ……
- graphics tool
- lets you interact with computer
- you move pressure-stylus across the surface of a tablet
- creates graphics

5) Fill in the gaps with suitable words. There are extra words.

pointer	on	optical	roll	scroll up	scroll down	touchpad
left button	right button	joystick	single	double	scroll wheel	
hold down	repetitive	strain	injury			

1) _____ to see pages above.

2) To select text, _____ the left button, and move the mouse pointer.

3) With a laptop computer, plug in a mouse, or use the _____ in front of the keyboard.

4) To play some games, you need to use a _____ instead of a mouse.

5) To move up and down a page, you can _____ the mouse wheel.

6) This mouse doesn't have a ball. It’s an _____ mouse.

7) One click of a mouse button is called a _____ click.

8) Two clicks of a mouse button are called a _____ click.

6) With the help of this table write a brief description of a keyboard. The first paragraph is done for you.

Section	Location	Main keys	Main function
Main keyboard	centre	each letter, digits 0-9, punctuation, common symbols	input all kinds of data
Function keys	top	F1-F12	not fixed, can program them
Editing keys	right	cursor keys, insert, delete	control cursor
Numeric keypad	far right	digits 0-9, mathematical operations	input numerical data

Most keyboards have four sections. The main keyboard has keys for each letter and the digits 0 to 9. It also has keys for punctuation and other common symbols. It is used for inputting all kinds of data.

UNIT II. PRINTERS AND SCANNERS: MOUTH AND EYES OF YOUR COMPUTER

I. Think about a typical workstation. Match the items 1−7 to the guidelines (a-g).

1) keyboard
2) monitor screen
3) lamp
4) copyholder
5) chair
6) footrest
7) printer

a) This should be adjustable and provide good back support.
b) This should be more than a metre away from you and as quiet as possible.
c) Keep this level with your eyes. Don't have it level with the desk. Make sure it is flicker-free, and that you can read everything easily. Avoid any glare from the window.
d) Use this if your feet do not rest flat on the floor.
e) Make sure, this lights your work and not the screen.
f) Don't get a stiff neck. Use this when you enter a lot of data.
g) Keep this directly in front of you and within easy reach.

II. Work in pairs. You are going to fill the table about three types of printers asking the questions

What's the print quality like? *How noisy is it?*
How fast is it? *Is it expensive?*
Does it cost a lot to run?

Then compare it with other students.

Type	Print quality	Speed	Running costs	Noise level	Price	Colour
Dot-matrix	low		cheap			no
Inkjet		relatively slow			a bit more	
Laser			expensive	quiet		

HELP box
Language work: Giving Advice

You can advise people in different ways. Study these examples.

Advising people to do something:
Why don't you buy *an inkjet?*
(I think) you should buy *a laser.*

Advising people not to do something:
Don't buy *a dot-matrix.*
You shouldn't buy *a laser.*

To make your **advice** more effective, add a **reason**.

advice	reason
Why don't you buy an inkjet?	*They're very quiet.*
(I think) you should buy a laser.	*The print quality is excellent.*
Don't buy a dot matrix.	*They're very noisy.*
You shouldn't buy a laser.	*They're very expensive.*

We use **too** make our advice stronger, almost a warning. Study these examples.

You should adjust your monitor, it's ***too*** *bright.*
You should move your printer. It's ***too*** *close.*

III. Advise the user of this workstation on improvements she should make. Use the prompts.

Ex. *I think you should use a chair with back support. It's more comfortable.*

~~*chair*~~

lamp

monitor

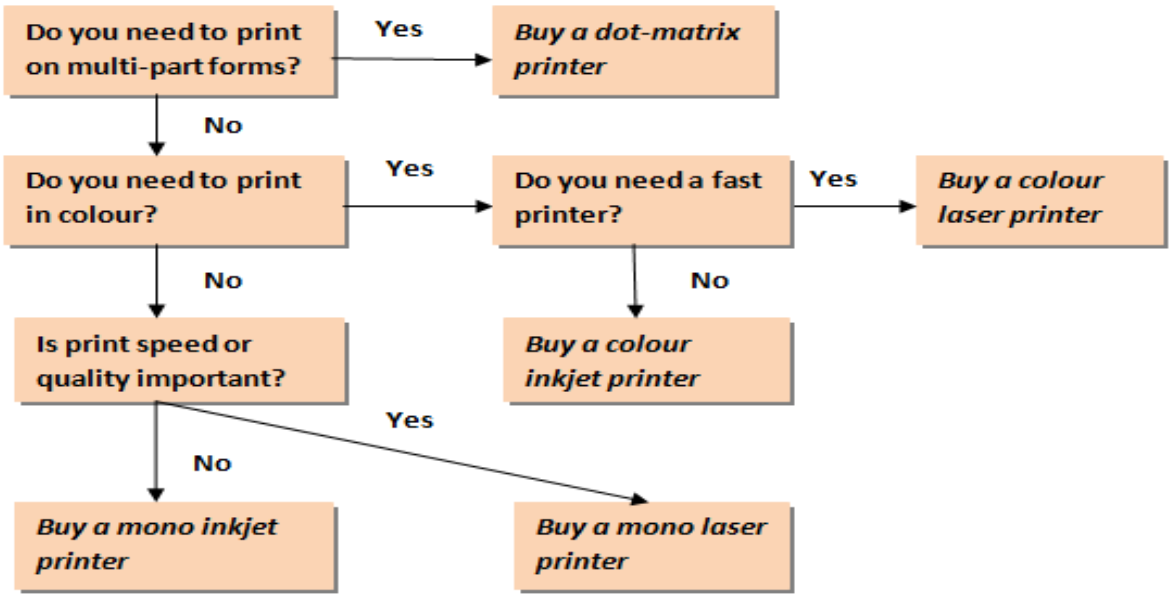
keyboard

printer

book

IV. Problem solving. Work in pairs. Study this flowchart for choosing a printer. Decide which the best kind of printer for these users is.

Someone who needs to: 1) print forms with two parts, 2) print high quality black and while copies, 3) print a lot of colour photos in a short time, 3) print a few copies − colour and speed are not important, 4) print a few pages in colour.



V. Writing. Fill in the gaps with the words from the box in this comparison of printers.

a) much b) cost c) slow d) cheapest e) faster f) but g) cheap h) expensive i) types j) more k) better l) noisy m) best n) less

There are three different types of printer: dot matrix, inkjet, and laser.

Dot-matrix printers are the [1]_____ kind of printer, [2]_____ their print quality is low and they are slow and [3]_____ . They are [4]_____ to run.

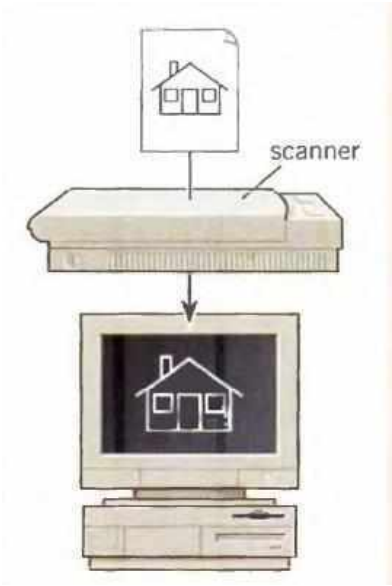
Inkjets are [5]_____ expensive, but you get [6]_____ quality and quieter operation. However, they are relatively [7]_____ and also [8]_____ to run. They are a good choice for colour.

Laser printers give the [9]_____ quality of output. They print [10]_____ than either of the other two [11] _____ of printer and they cost [12]_____ to run than an Inkjet. Unfortunately, they [13] _____ almost twice as [14] _____ as an inkjet.

VI. Answer the questions.

1. What is a scanner? Give a definition in your own words.
2. How does a colour scanner work?

VII. Use the information in the text and the illustration to check your answers. What do you think are the benefits of using scanners in business?



What does a scanner do?

A scanner converts text or pictures into electronic codes that can he manipulated by the computer.

In a flatbed scanner, the paper with the image is placed face down on a glass screen similar to a photocopier. Beneath the glass are the lighting and measurement devices. Once the scanner is activated, it reads the image as a series of dots and then generates a digitized image that is sent to the computer and stored as a file The manufacturer usually includes software which offers different ways of treating the scanned image

A colour scanner operates by using three rotating lamps, each of which has a different coloured filter: red, green and blue. The resulting three separate images are combined into one by appropriate software.

A scanner sees images and translates them into a form that can be understood by the computer.

VIII. Can you explain the difference between a fact and an opinion? Read the advertisements below and underline what you think are facts and circle the opinions.

HELP box

dpi: dots per inch
9''x15'': scanning area measured in inches
JPEG: Joint Photographic Experts' Group – a standard format in image compression. With JPEG, your images can be compressed to 1/50th of normal size, resulting in a substantial saving of disk space and time

Facts are 'real' objective information.

Opinions usually include emotive words, positive, negative phrases and subjective (persuasive) statements.

COLOUR SCAN XR from Sunrise

The ColourScan XR from Sunrise is a flatbed scanner with 600 dpi of resolution and 9" x 15 of scanning area.

Think of the possibilities.

You can enter data and graphic images directly into your applications – word processors or databases. You can get crisp, clean scans for colour compositions, video and animation work.

It comes complete with its own image-capture software which allows for colour and grey retouching. And it's easy to use.

What more could you want for only £616? It couldn't be cheaper.

In the field of flatbeds, the ColourScan XR is a clear winner.

!!! ColourScan XR !!!

ScanPress 800

The ScanPress 800 is a self-calibrating, flatbed scanner with 800 dpi of resolution You can scan from black and white to 24 bit colour. The package includes a hardware accelerator for JPEG compression and decompression.

JPEG technology saves disk space by compressing images up to 50 to 1.

In creating ScanPress 800, the manufacturers have chosen the highest technology to give you the best scans with the least effort. It produces images with high colour definition and sharpness. And it comes with OCR software and Adobe Photoshop, so you can manipulate all the images you capture.

This is a fantastic machine you will love working with. And at only £ 1,037 it is an excellent investment.

IX. Fill in the table using information from the text.

	ColourScan XR	***ScanPress 800***
Facts	*flatbed scanner*	
Opinions		*The highest technology*

In small groups, compare your answers and decide:

1. Which text has got more persuasive language?
2. Which text is more factual or objective?

HELP box

Common **adjectival suffixes** are:

-ing, -y, -able, *-ible*, *-ive. -al, -ed. -ful*

Common **noun suffixes** are:

-er, -or, -ion, -tion, -ation , -ment, -ness, -ity. –ant, -logy

X. Put the words in the box into the correct column below.

computer	self-calibrating	easy	resolution	sharpness
information	printed	personal	capable	compression
technology	calculator	useful	assistant	expensive
possibility	reducible	investment		

Adjectives	**Nouns**

XI. Some of the adjectives have been left out of this persuasive advertisement. Read it and complete it with words from the box.

stunning	affordable	wide	excellent	complete	easy-to-use

The GT-7000 provides amazing quality with powerful, [1]..... software and hardware at a very [2].....price.
Using a combination of EPSON Advanced Scanning Technologies, the GT-7000 provides [3]…… quality whether scanning text documents, photos or film.
The EPSON START Button takes the complexity out of scanning. Simply press this button once and your photo or document is scanned and inserted into the software package of your choice ready for editing, printing or publishing.
Included with the GT-7000 is a [4]…… range of bonus software to help with home and business scanning, printing and publishing, allowing you to create [5].....posters, letters, flyers and Web pages.
The GT-7000 is also available as the GT-7000 Photo scanner [6] ..... with advanced film adapter unit.

INTERESTING FACTS

1. Read the text quickly and say what this text is about.

Types of printers

Printing is the final stage in creating a document. That is the purpose of the printers joined to your computing equipment. *Since* the results you can obtain with different types of printers will vary substantially, here is a guide to help you decide which one is most suitable for your needs.
To begin with, it must be taken into account that printers vary in cost, speed, print quality and other factors such as noise or compatibility. In fact, printing technology is evolving so quickly that there is always a printer for every application or personal requirement.
Dot-matrix printers use pins to print the dots required to shape a character. They print text and graphics and nowadays some of them can print up to 450 characters per second (cps); *however,* they produce relatively low resolution output − 72 or 144 dots per inch. This level of quality, *while* suitable for preliminary drafts, is not recommended for

reports or books that have a wide audience. They are slower than laser printers *but* much cheaper.

One common type of non-impact printer is an **ink-jet** printer. It operates by projecting small ink droplets onto paper to form the required image. This type of printer is quite fast, silent *and* not so expensive as a laser printer. *Nevertheless* you can expect high quality results *because* there are some ink-jet printers on the market with a resolution of 720 dpi.

Bubble-jet printers work the same way.

Laser printers produce output at great speed and with a very high resolution of 600/1.200 dpi. They scan the image with a laser beam and transfer it to paper with a special ink powder. They are constantly being improved. In terms of speed and image quality they are preferred by experts for different reasons: they have a wider range of scalable fonts, they can emulate different language systems, they can produce graphics, and they have many other advantages. It goes without saying that they are still expensive.

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

Photosetters can be regarded as an attractive alternative. They do not print on regular paper, *but* on photographic paper or microfilm. They can produce output with a resolution of over 2,000 dots per inch. *In addition*, they are extremely fast. *Although* they produce the highest qualty output, they have one important drawback: they are the most expensive.

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

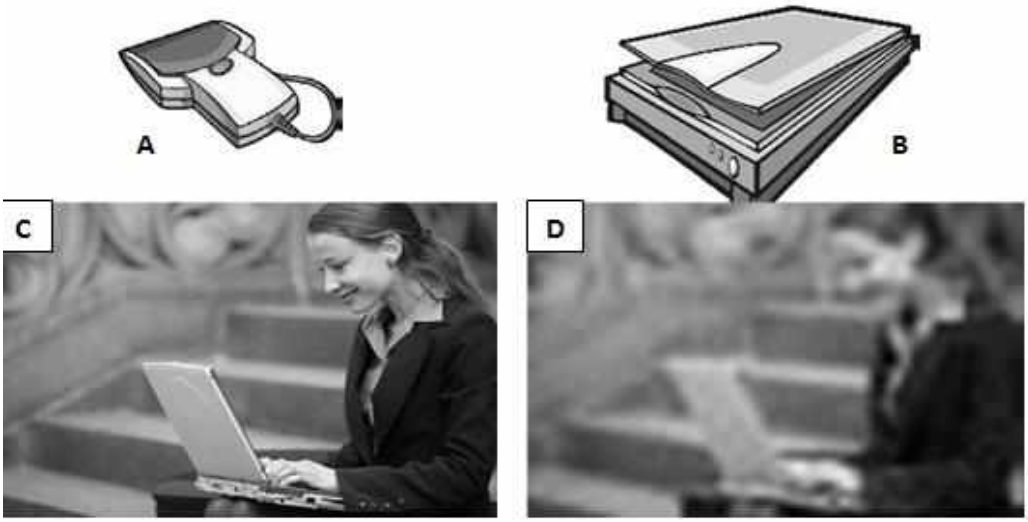
2. **Read the text again, find key words, and then make a graph of the text.**
3. **Study the words in *italics*. What are they used for? Using the graph and the words in *italics* discuss the key points of the text.**

TEST YOURSELF

1. Fill in the gaps in the sentences with suitable words.

adjust	all-in-one	at	preview (or prescan)	brightness	
connected	contrast	file format	flatbed	handheld	high
image editing	low	OCR software	original	click	text	dpi

1) Make sure the scanner is _____ to the computer.
2) Lift the lid and put the _____ on the scanner glass.
3) For high image quality, scan _____ 300 _____ or higher.
4) The scanning software will automatically do a _____.
5) If the image is too dark or too light, you can _____ the _____ and _____.
6) _____ 'scan'.
7) If you scanned _____, it can be 'read' by _____.
8) If you want to save the image, choose a _____. JPEG is a good choice for photos.
9) The scanned image can be manipulated using _____ software.
10) An _____ printer/scanner can print, scan and copy.
11) Picture A is a _____ scanner.
12) Picture B is a _____ scanner.
13) Picture C is a _____ resolution photograph.
14) Picture D is a _____ resolution photograph.



2. **Choose the best adjective.**

1) Oh dear. I pressed the _____ button.
   a) incorrect **b)** wrong **c)** false
2) I can't use my mobile phone. The battery's _____.
   a) over **b)** flat **c)** exhausted
3) The battery isn't completely flat, but it's very _____.
   a) down **b)** short **c)** low
4) My video camera is very _____.
   a) easy to use **b)** uncomplicated **c)** obvious
5) My new computer has a very _____ processor.
   a) quick **b)** high speed **c)** fast
6) The X19 notebook computer features a very _____ design.
   a) compact **b)** little **c)** small
7) Keeping files on paper is _____ solution.
   a) an old-tech **b)** a past-tech **c)** a low-tech
8) Keeping files on a computer database is a _____ solution.
   a) new-tech **b)** now-tech **c)** high-tech
9) My new PDA is the _____ model.
   a) latest **b)** newest **c)** most modern
10) In our office, we've set up a _____ network.
   a) wire-free **b)** no wires **c)** wireless
11) A call from New York to Tokyo is _____ distance.
   a) far **b)** long **c)** faraway
12) I don't think this printer is _____ with my computer.
   a) compatible **b)** connectable **c)** suitable
13) My laptop is only 3 centimetres _____.
   a) thick **b)** tall **c)** wide
14) The screen on my laptop isn't very _____.
   a) light **b)** white **c)** bright
15) In three or four years, my new computer will probably be _____.
   a) old fashioned **b)** behind the times **c)** obsolete
16) When you connect this to your computer, it will work immediately. It's _____.
   a) plug and go **b)** plug and play **c)** plug and use

3. Which type of printer is each phrase about?

	inkjet printer	laser printer
1) cheaper to buy	V	
2) cheaper to run		
3) faster printing speed		
4) takes up more space		
5) uses liquid ink		
6) uses toner		
7) more reliable		
8) cartridges need changing more often		

UNIT III. VIEWING THE OUTPUT

I. Read and think.

We interact with computers by entering instructions and data into them. After this information has been processed internally, we can see the results on the visual display unit or VDU. To obtain a permanent copy of these results, we can use plotters, printers or video recorders. In this interactive process with the computer, the screen plays an important part.

Describe the screen of your computer to another student. Use these questions to help you.

- Is it a monochrome or a colour monitor?
- What size is it?
- Does it produce a high quality image?

II. Read about monitors' specifications and decide whether the statements below are true or false. Give the reasons.

£ 439

- **17-inch (43.2cm) Trinitron monitor**
- **0.25mm aperture grill pitch**
- **Maximum resolution: 1280 x 1024, 86H7**
- **TCO-95, MPR-II.TUV Ergonomics approved**
- **Power-Saver TM**
- **On-screen menu**

Price

The price mainly depends on the screen size. Common monitor sizes are 14-inch, 15-inch, 17-inch, and 21-inch.The price also depends on aperture grill pitch, resolution, and the number of controls.

Screen size

The size of the screen is the diagonal distance from one corner to another. The actual area for images is smaller than this.

Aperture grill pitch

This controls the space between the dots which make up the image, the less space between the dots, the better the display.

Most monitors offer 0.28mm dot pitch but some go as high as 0.31mm or as low as 0.25mm.

Maximum resolution

The quality of the display depends on the number of dots which make up the image. The more dots, the better the display.

Refresh rate

The monitor refreshes the image on the screen all the time. The faster this happens, the less the screen flickers. You should have a refresh rate of at least 72Hz.

Safety standards

These are international standards to control harmful signals.

Power-saving feature

The power the monitor uses automatically reduces when it is not in use.

On-screen menu

Digital controls on the screen allow you to adjust the image.

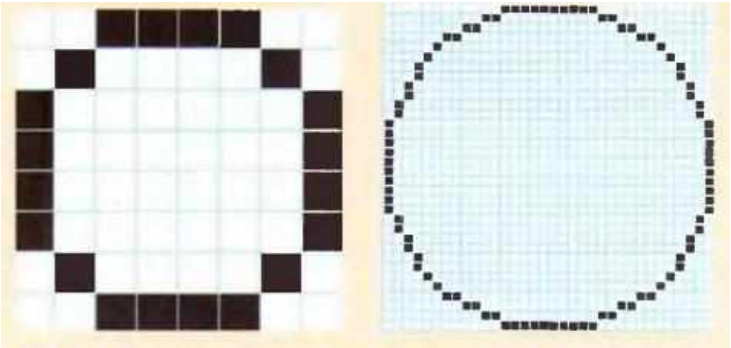
Statements	True	False
1. Twenty-two inches is a common monitor size.		
2. A dot pitch of 0.31mm is better than one of 0.25mm.		
3. A maximum resolution of 1600 x1200 is better than 1280 x1024.		
4. A refresh rate of 0,85 Hz is better than one of 75Hz.		
5. A 17-inch monitor is 17 inches wide.		
6. You can change the picture using controls on the screen.		
7. The price of a monitor depends only on the size.		
8. The monitor uses less power because of the Power Saver feature.		

III. Read the text and try to guess the meaning of the words in the box below.

dot	pixel	display	resolution	cathode ray tube
electron beam	scan (verb)	hertz	refresh rate	
flicker	bit-mapped	visualize		

The monitor

The characters and pictures that we see on the screen are made up of dots, also called picture elements (pixels). The total number of pixels in which the display is divided both horizontally and vertically is known as the **resolution**. If the number of pixels is very large, we obtain a high resolution display and therefore a sharp image. If the number of pixels is small, a low resolution is produced.



Low resolution display *High resolution display*

Typical resolutions are 640x480 or 1,024 x768 pixels. The diagrams on the previous page show how pixel density affects the image: a larger number of pixels gives a much clearer image.

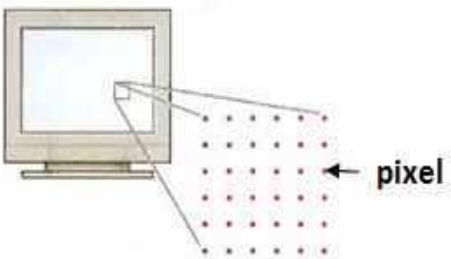
The **cathode ray tube** (CRT) of the monitor is very similar to that of a TV set. Inside the tube there is an electron beam which scans the screen and turns on or off the pixels that make up the image. The beam begins in the top left corner, and scans the screen from left to right in a continuous sequence, similar to the movement of our eves when we read, but much faster. This sequence is repeated 50, 60 or 75 times per second, depending on the system. If the rate of this repetition is low, we can perceive a flicking, unsteady screen, which can cause eye fatigue. However, a fast-moving 75 Hz 'refresh rate' eliminates this annoying flicker.

What we see on the screen is created and stored in an area of RAM, so that there is a memory cell allocated to each pixel. This type of display is called **bit-mapped**. On monochrome monitors, bits 0 are visualized as white dots, and bits 1 as black dots.

On colour displays, there are three electron guns at the back of the monitor's tube. Each electron gun shoots out a beam of electrons: there is one beam for each of the three primary colours: red, green and blue. These electrons strike the inside of the screen which is coated with substances called phosphors that glow when struck by electrons. Three different phosphor materials are used − one each for red, green and blue. To create different colours, the intensity of each of the three electron beams is varied.

The monitor is controlled by a separate circuit board, known as the display adaptor, which plugs into the motherboard of the computer. Different boards drive different types of displays. For example, the **VGA** (video graphics array) card hits become a standard for colour monitors.

Portable computers use a **flat liquid-**crystal display (LCD) instead of a picture tube. An LCD uses a grid of crystals and polarizing filters to show the image. The crystals block the light in different amounts to generate the dots in the image.



Each dot on the screen is pixel

IV. Read the text again and answer these questions.

1. According to the writer, what is the importance of 'pixel resolution'?
2. Which unit of frequency is used to measure the refresh rate of a monitor?
3. In the writer's opinion, why can a low refresh rate produce eye fatigue?
4. What substance is hit by electrons in a monitor?
5. What is the standard display system for many PCs?
6. What does 'LCD' stand for? What type of computers use LCD displays?

V. Tables often include abbreviations and technical words that are not easy to understand. Look at this table and the explanation of Monitor A's specifications. Then write a description of monitor B using the information in the table and the example.

	CRT size	*CRT face*	*Pixel res.*	*Visual display*	*Refresh rate*	*Tilt-and-swivel*	*Other features*
Monitor A Superview	16"	Flat	870 x 640	256 shades of grey	60Hz	V	Anti-glare filter
Monitor B Paintview	19"	Flat	1,024 x 768	32,000 colours	75Hz	V	video card

The specifications of Superview (Monitor A) may be explained like this:

1. This monochrome monitor has a 16-inch screen.
2. This display system has a resolution of 870x640 pixels that gives you enough quality for graphics.
3. It offers 256 shades of grey.
4. It has a 60 hertz refresh rate. (This is quite low, so it will probably produce a flickering, unsteady image.)
5. A tilt-and-swivel stand is used to move the monitor up, down and around so that the angle can be adjusted for each user.
6. The anti-glare filter helps eliminate eye fatigue and electromagnetic radiation.

HELP box
Language work: Instructions and advice

Imperatives

Position *your keyboard at the same height as your elbows.*
Don't use *a monitor that is fuzzy or distorts the image.*

Should/ought to

You ***should*** *position your keyboard at the same height as your elbows. = You* ***ought*** *to ...*
You ***shouldn't*** *use a monitor that is fuzzy or distorts the image = You* ***ought not (oughtn't)***

VI. Look at the HELP box and then rewrite the sentences below about what you should do to protect your eyes. Use modal auxiliary verbs in your sentences.

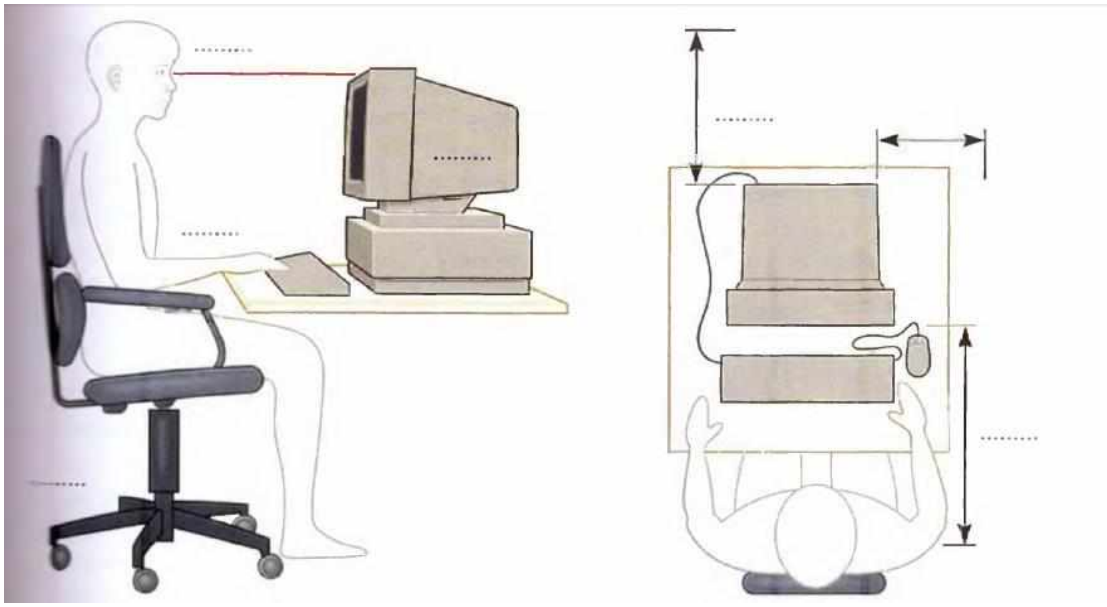
1. Do not stare at the screen for long periods of time.

2. Avoid placing the monitor so that it reflects a source of bright light, such as a window.

3. Keep the screen clean to prevent distorting shadows.

4. If you work in an office with a large number of computers, don't sit too close to the sides or backs of the monitors.

5. Buy a protective filter that cuts down the ELF (extremely low frequency) emissions.



VII. Match the terms in the box with the explanations below.

a) disability
b) Braille
c) port
d) interface
e) speech synthesizer
f) Morse code

1) a system of writing and reading (using raised dots) for blind people, to enable them to read by touch	
2) a socket to connect I/O devices	
3) incapacity	
4) a system of dots and dashes, or short and long sounds, representing letters of the alphabet and numbers	
5) a hardware device used in conjunction with a screen reader program to convert screen contents into spoken words	
6) channels and control circuits which allow different parts of a computer to communicate with one another. It also refers to the pan of the system that allows a user to interact with programs.	

VIII. Read the text below and find:

1) two examples of speech synthesis systems
2) the kind of software which is recommended for someone with partial vision
3) the speed of the Braille printer
4) the ways adaptive switches can be activated
5) the function of voice recognition devices
6) how the blind interact with the machine.

Computers for the disabled

Sal has all the necessary qualities for becoming a good telemarketer.* He's bright outgoing and persistent. He is also blind. Phyllis wants to hire him, but she has some concerns. How will he be able to use the company's database if he can't see the monitor? How will he read office correspondence? And more important, what will it cost the company to adapt the workplace to accommodate him?

Phyllis *must* accommodate him, since her company is in the US, and therefore subject to the Americans with Disabilities Act or ADA.

But she needn't worry. The latest adaptive technology for personal computers provides a cost-effective way to allow Sal and workers with other disabilities to do their job with independence.

The first task in adding adaptive technology to a computer is to determine the specific needs of the disabled worker in question. To work effectively, most blind users need to have their computers adapted with technologies such as speech synthesis, magnification, Braille and OCR. One example of a speech-synthesis system is VertPro from TeleSensory. This product can read MS-DOS-based word processors, databases, spreadsheets, and other text-based software. Window Bridge from Syntha-Voice can verbalize both MS-DOS and Windows-based applications.

For someone with limited but usable vision, a software magnification package may be appropriate. Magnification software can enlarge text appearing on the screen by up to 16 times.

For Braille output, the Juliet printer from Enabling Technologies interfaces to any standard serial or parallel port. This printer can emboss Braille on both sides of a page at a speed of 40 characters per second. The Reading Edge OCR from Xerox Imaging Systems and the Arkenstone Open Book Unbound from Arkenstone can read printed material to blind people and send the text to a PC.

To adapt equipment for motor-impaired workers unable to type on a standard keyboard, you can employ adapted keyboards, head pointers and Morse code systems.

The user can also have an external adaptive switch to select menu choices or virtual keys from an on-screen keyboard. Adaptive switches come in a variety of forms that can be activated by eye movements, breath control or any other reliable muscle movement.

Another way of controlling computers is via a Morse code system. Such a system consists of adaptive switches and software for people who can't type on a full keyboard but have the ability to physically push at least one key.

Voice-recognition systems permit people to issue verbal commands to a computer to perform data entry.

HELP box
Language work: Noun phrase

In describing a noun phrase, we can distinguish two components:

- **the head**
- **the modifier** − notably adjectives and nouns.

Thus:

modifier head
− *compatible computer*
− *machine code*

We have the following range of **modifiers**:

- ✓ **adjectives**
  *I like this **portable** computer.*
  − a computer which is portable
- ✓ **participles**
  *I like this **drawing** and **painting** program.*
  − a program that draws and paints
  I like this pocket-sized computer.
  − a computer that fits into your pocket
- ✓ **'s genitive**
  I like the director's computer.
  − the computer which belongs to the director
- ✓ **nouns**
  I like this colour scanner.
  − a scanner which works in colour

IX. Look at the HELP box and then the noun phrases 1 to 7. Decide what type of modifier(s) is/are placed before the 'head' in each case.

Types of modifiers

a) adjective
b) participle
c) 's genitive
d) noun

1) disabled worker
2) rehabilitation engineer
3) employee's abilities
4) external adaptive switch
5) windows-based applications
6) pointing device
7) speech synthesizer

X. Explain the following noun phrases.

Examples memory chips − *chips of memory*
disk controller − *a device which controls the disk drive*

1) screen reader
2) printing devices
3) company's database
4) adapted keyboards
5) magnification program
6) eye movements

XI. Write a letter to an expert asking for information about computers for the disabled.

- Begin by saying why you're writing:
  I am writing to…
- Ask for information about specific I/O equipment for deaf, blind and motor-disabled workers:
  I would like to know …
- Ask for a free handbook about how to add adaptive technology to personal computers:
  I would be very grateful if…
- End the letter appropriately:
  I look forward to hearing from you soon.
  Yours sincerely.

PROBLEM-SOLVING

XII. Give recommendations to your friend who is going to buy a new monitor.

INTERESTING FACTS

1. Read the text. What is the text about?

Computers need output devices to relay the results of their calculations to their users.

The printer is one of the earliest types. Printers were invented before computer screens and are still widely used. Charles Babbage invented the first computer printer more than a century ago. Today,

many kinds are available, each specialized for a particular use. Some inkjet printers are designed to print images that are detailed, sharp, and brightly coloured. But they are quite slow and use a lot of ink. Laser printers are much faster but more expensive. Some devices combine printing, photocopying, and scanning functions in a single unit. Printers and other devices, such as image scanners and speakers, are known as peripherals.

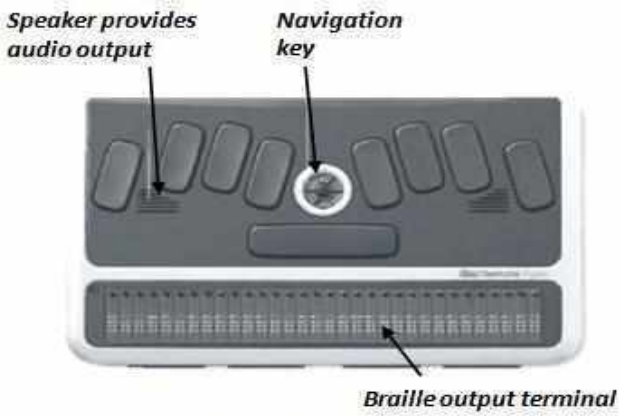
Display screens have developed from primitive, bulky, monochrome displays, to today's full-colour flat-screen versions. Most computer screens in use today are liquid crystal displays (LCDs). The optical properties of liquid crystals can be controlled by electrical signals. LCDs contain thousands of tiny areas, called pixels. Every pixel is further divided into three sub-pixels. Each sub-pixel is covered with a red, green, or blue filter. When an electrical signal carrying picture data (a stream of numbers) is sent to a particular pixel, the liquid crystal changes to allow light to shine through a filter. The values in the data control the sub-pixels – in this case, the signal activates the green sub-pixels alone, producing the green colour of the leaf.

Projectors convert the flickering patterns of light that make up the output on a display screen into beams of light that can be projected onto any surface, such as a wall. There are many types of computer projectors, but most of them are based on LCD technology. Projectors are brighter than computer display screens and have a lens to focus the images sharply.

When a computer sends data to a headphone, it must first be converted from a digital form (in the form of binary code) to a varying pattern of electrical signals, which mimics that of a sound wave. In the headphone, the electrical pattern makes a metal plate, called a diaphragm, vibrate, and these vibrations travel through the air to the user's ear in the form of sound.

The BrailleNote Apex is an example of an output device for people who are visually impaired but can read an alphabet called Braille. This alphabet consists of patterns of bumps, each pattern being a different character. Readers trace their fingers over these bumps to recognize the characters. Rods inside the display terminal of this Braille device press up against the soft surface to create Braille characters. However, rather than being permanent like those in a printed book, the patterns change

rapidly, providing the user with a flow of text, much like a computer screen. Eight thumb-sized buttons allow the user to access menus and files. This Braille device can also provide sound via speakers, offering another type of output to the user.



BrailleNote Apex

A computer often uses sockets termed universal serial bus (USB) to move or copy data to and from printers and other output devices. In addition to transferring data, a computer can use these sockets to power devices. These can be small reading lights, cooling fans, or even novelty devices, such as tea warmer. However, since USBs supply only 2.5 watts of power (an electric kettle uses 1,000 times more power), the warming effect is small.

Today, computers are used for many purposes and many more kinds of output device are available. Output data starts as electrical signals transmitted via wires or radio waves to these devices, which convert the signals into their different final forms.

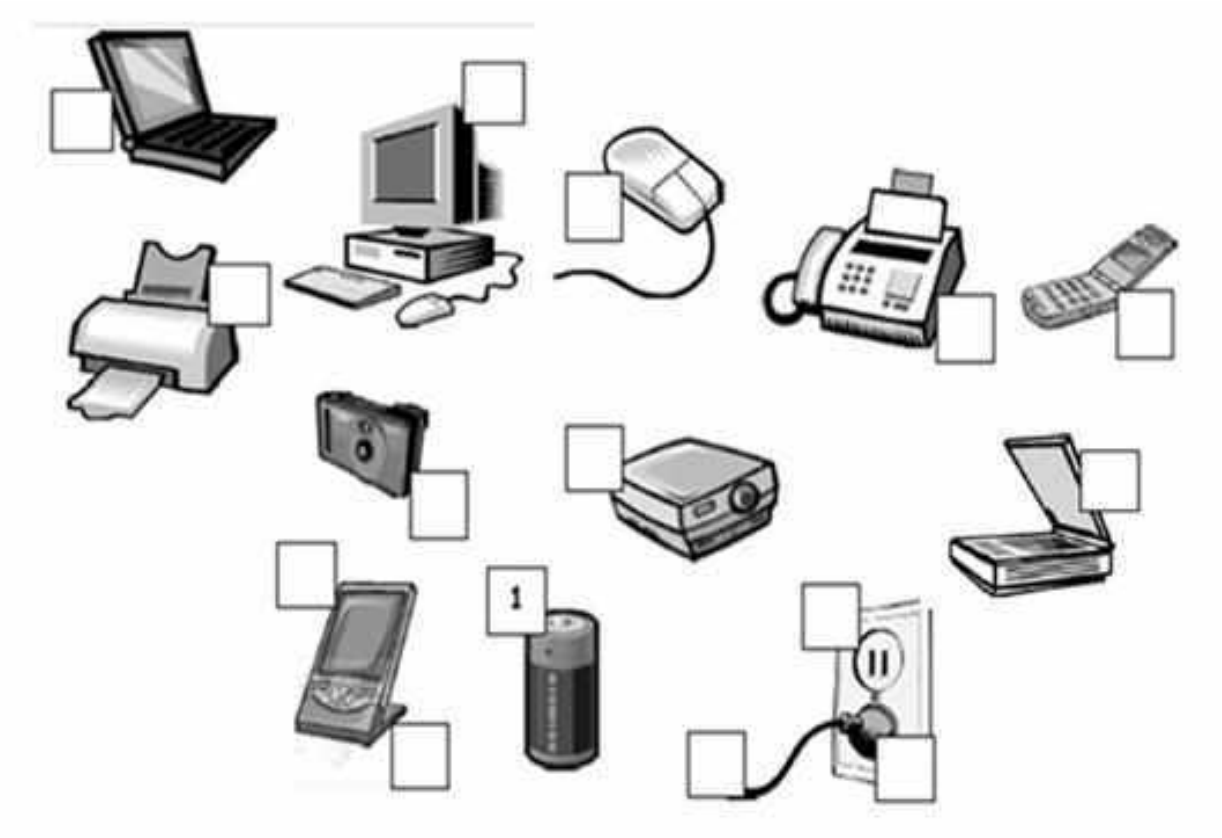
2. **Read the text again, find key words, and then make a graph of the text. Entitle the text.**

3. **Retell the text using the graph.**

TEST YOURSELF

1. **Find the suitable words and match them to the pictures.**

1) battery	**6)** fax machine	**11)** plug
2) cable	**7)** laptop computer (or notebook)	**12)** printer
3) desktop computer	**8)** mobile phone	**13)** projector
4) digital camera	**9)** mouse	**14)** scanner
5) docking station	**10)** PDA (Personal Digital Assistant)	**15)** socket



UNIT IV. STORAGE DISKS AND OTHER STORAGE DEVICES

I. What kinds of storage devices do you know? Make a list and compare with your partner.

II. Study these rules for CD-ROM and floppy disk care. Tick (∨) the things to do and cross (x) the things not to do. Then compare your choice with a partner.

1. ☐ Hold a CD-ROM by the edges.
2. ☐ Keep the optical/silver side of a CD-ROM clean.
3. ☐ Smoke when you use your CD-ROM drive.
4. ☐ Put floppy disks near a magnet.
5. ☐ Keep disks away from the sun and excessive heat.
6. ☐ Write the contents on the label on your floppy disk.
7. ☐ Put extra labels on floppy disks.
8. ☐ Remove by force a disk stuck in the drive.
9. ☐ Remove a disk when the drive light is on.

III. Work in pairs. Read the texts and complete the sections of the table.

Medium	Advantages	Disadvantages
Floppy disk		
Fixed hard disk		
Removable hard disk		
CD-ROM disk		
Magneto-optical disk		
Magnetic tape		

1. Most computers use floppy disks. Floppies conform to a standard and you can use them to carry data from one place to another. They are also very cheap, but they are slow and have a limited capacity.
2. Almost all desktop computers have hard disks. They are fast and can store much greater amounts of data than floppies, but they are fixed inside the computer and you cannot use them to transfer data.
3. You can move data from place to place using removable hard disks. They are almost as fast as fixed hard disks and also have high capacities, but they are relatively expensive. They do not all conform to one standard and they are not very common.
4. CD-ROM disks are very common and conform to a standard. They are removable and can hold large amounts of data. They are also cheap to make. However, they are usually read only. You cannot change the information on them. They are also slow compared to hard disks.
5. Magneto-optical disks are like CD-ROMs, but you can write data on to them. They are removable, have large capacities, and last for a long time, but they are expensive and do not all conform to one standard. For this reason they are not very common.

6. Magnetic tape is a cheap medium. You can use it to store very large amounts of data, but it does not allow random access. Every time you read or write a piece of data, you start at the beginning of the tape, tape drives are slow. Therefore, it is only suitable for doing backups.

IV. Using the table in exercise III test your partner.

Example questions

What are the advantages of floppy disks?
What are the disadvantages of magnetic tape?
Do CD-ROMs conform to a standard?

HELP box
Language work: Linking words

Study this example.

*Magnetic tape is cheap, **but** it is very slow **because** tape drives are slow, **so** we use it only for backups.*

We use **but** to show a contrast, **because** to show that the next idea is a reason, and **so** to show a result.

Other words and phrases used in this way are: **however** (contrast), **therefore** (result), and **for this reason** (result).

*Magnetic tape is cheap. **However**, it is slow to use.*
*Magnetic tape is slow. **Therefore**, we use it only for backups.*
*Magnetic tape is slow. **For this reason**, we use it only for backups.*

V. Fill in the gaps in this summary of storage devices using the correct word from this list.

but	however	because	so	therefore	for this reason

Floppies are very cheap. [1] _____ they are slow and have a limited capacity. Hard disks are last and can store large amounts of data [2] _____ they are fixed inside the computer. [3] _____ you can't use them to transfer data. You can transfer data with removable hard disks, [4] _____ they are expensive. CD-ROM disks can hold quite large amounts of data. [5] _____, they are usually read-only [6] _____ you cannot change the information on them. Magneto-optical disks are like CD-ROMs [7] _____ you can write data on to them. They are removable and have large capacities. [8] _____ they are expensive

and do not conform to a standard. [9] _____ they are not very common. Magnetic tape is cheap and has a large capacity. [10] _____ it does not allow random access and drives are slow. [11] _____ it is only suitable for backups.

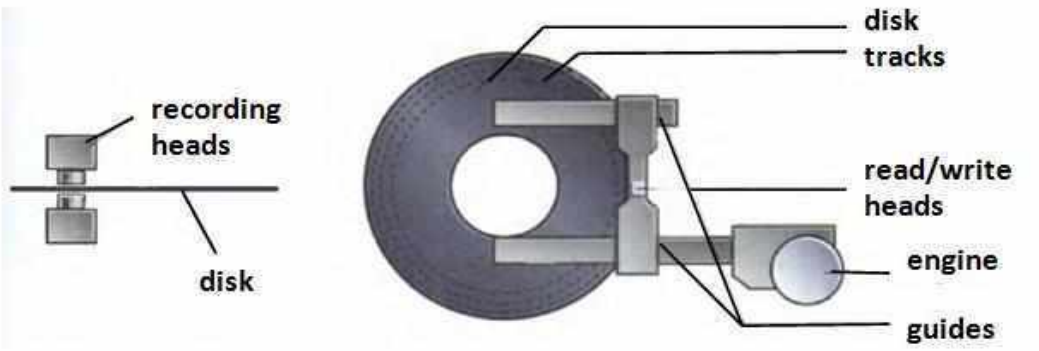
VI. Read the text and study the diagrams.

Technical details

Information stored in the RAM is lost when the computer is turned off. Because of this, data and applications are stored in either hard or floppy disks which provide a more permanent backing store.

Floppy disks are so called because they consist of flexible plastic material which has a magnetizable surface. They are available in two sizes: 5.25-inch disks are used in old computers, 3.5-inch disks are the most popular today.

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



Disk drive the electronic mechanism that accepts, reads and writes data on a disk

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

VII. Match the words and expressions on the left with the explanations on the right.

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

VIII. From the noun magnet we can form other words. Decide which part of speech each word is. Then use the correct words to complete these sentences.

1) magnetic 2) magnetically 3) magnetism 4) magnetize 5) magnetizable 6) magnetized 7) magnetizing

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

Fill in the gaps with the correct word

1) recorder 2) recording 3) recorded

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

INTERESTING FACTS

1. Read the text. What is the text about?

In the early years of computing, almost every machine was faster and more powerful than those that existed before. By the 1960s, people were building computers of many kinds, with characteristics that various

users wanted cheapness, compactness reliability, or high speed. From then on, the computers that were designed for the highest possible speeds became known as supercomputers. The phrase 'super computing' was coined long before the first electronic computers were made: it was first used in 1929 by the *New York World* newspaper to describe tabulating machines made by IBM for Columbia University.

While ordinary CPUs process numbers one by one, supercomputers process data much faster by chopping up a big task into chunks of data to be processed at the same time. They usually do this in one of two ways − vector processing or distributed memory processing. Vector processors run their program on many chunks of data at once, applying each step of the program in sequence. In distributed memory processing, several PC-like machines called nodes work together on the same task, each node running a complete program on a larger chunk of data. They are coordinated via high-speed connections so that together they complete the whole task. Today, most supercomputers use distributed memory, whereas ultra-fast graphics chips use vector processing.

Unlike home computers, most supercomputers today are specially built for specific customers and are often designed to perform one particular task. These tasks almost always involve a great deal of number crunching-running complex mathematical calculations on enormous sets of data. Supercomputer speeds are measured in floating point operations per second (FLOPS). A floating point operation is a simple problem with decimals. Today's supercomputers have speeds of several petaFLOPS – one petaFLOP is 1 quadrillion FLOPS.

Engineers use supercomputers to design efficient cars. The computers predict how the shapes of the cars will affect the drag caused by the air that flows over them when they move. This helps engineers to understand how to reduce drag as much as possible, in order to cut fuel consumption.

2. Read the text again, find key words, and then make a graph of the text. Entitle the text.

3. Retell the text using the graph.

TEST YOURSELF

1. **Processor and memory. Fill in the gaps in the text with the words below.**

chips	dual core	megabytes	megahertz
motherboard	processor	speed	upgraded

The 'brain' of a computer is the [1]_____. Most of these are made by Intel and AMD, and are sometimes referred to as [2]'_____'. The fastest processors are [3]_____, which means that there are two processors working together. The [4] _____ of a processor is measured in [5]_____, which is usually written as MHz.

A computer's memory is measured in [6]_____. If a computer has 1,024 megabytes of memory, and the memory type is SDRAM, this is written as 1,024 MB SDRAM, and is pronounced 'a thousand and twenty-four megabytes ess-dee-dram'.

The processor and memory modules are located on the [7]_____. Changing a computer's processor is not generally practical, but the memory can usually be [8]_____.

2. **Power. Fill in the gaps in the text with the words below.**

disconnect	fan	mains electricity	overheating	shock
spikes	supply	surge protector	transformer	

1. Laptops are powered by batteries or _____.
2. Mains electricity is converted to lower voltage by a _____.
3. A _____ protects electronic equipment from damage caused by power _____.
4. If you remove the cover from a computer, make sure you _____ the electricity _____. Otherwise, you may get an electric _____.
5. The computer is cooled by a _____. This prevents the processor from _____.

UNIT V. HARD DRIVES

I. Try to answer these questions.

1. What is the main function of a hard disk?
2. Which unit is used to measure hard disk capacity?
3. Can you think of one advantage that hard disks have over floppies?

II. Read the text quickly to find out if you were right in Task 1.Read the text again and make a list of the technical aspects that you should consider when buying a hard disk.

When buying a hard disk ...

Hard disks have important advantages over floppy disks: they spin at a higher speed, so you can store and retrieve information much faster than with floppies. They can also hold vast amounts of information, from 500 MB up to several gigabytes. Apart from this, both types of disks work in the same way. To directly access the necessary information, the read/write heads of rigid disks seek the required tracks and sectors, and then transfer the information to the main memory of the computer or to another form of storage, all of which is done in a few milliseconds (ms).

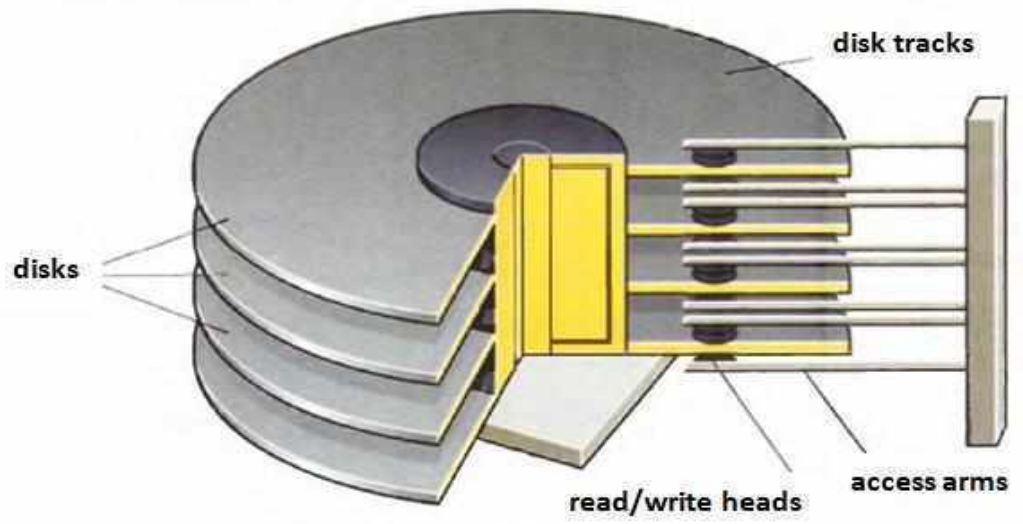
Bearing in mind that you always need disk storage, it is good sense to ask yourself some vital questions: What size capacity do I need? What speed can I use? What kind of storage device is the most suitable for my requirements? If you only use word-processing programs, you will need less storage capacity than if you use CAD (computer-aided design), sound and animation programs. For most users, 2 GB on the hard disk is enough.

Now let s turn our attention to speed. Access times vary from 8 ms to 20 ms. ‘Access time’ − or seek time − is the time it takes your read/write heads to find any particular record. You have to distinguish clearly between seek time (e.g. 20 ms) and ‘data transfer rate’ (the average speed required to transmit data from a 30 disk system to the RAM, e.g. at 20 megabits per second). Remember that the transfer rate also depends on the power of your computer.

When buying a hard disk you should consider the kinds of drive mechanisms and products available. There are ‘internal’ and ‘external’

drives which are both fixed hard drives, i.e. rigid disks sealed into the drive unit, either within or attached to the computer. A third type of hard drive, known as 'removable', allows information to be recorded on 'cartridges', which can be removed and stored off-line for security purposes. Popular removable hard disks include Jaz and Zip drives. A Jaz cartridge can store up to 2 GB of data, whereas a Zip drive can store up to 250 MB of data.

Finally, a few words about 'optical' technology: CD-ROMS (Compact Disk-Read Only Memory) and CD-Recordable drives have become a reality. However, magnetic hard disks are still preferred for personal data storage whereas optical discs are used for recording large amounts of information such as dictionary or encyclopedia.

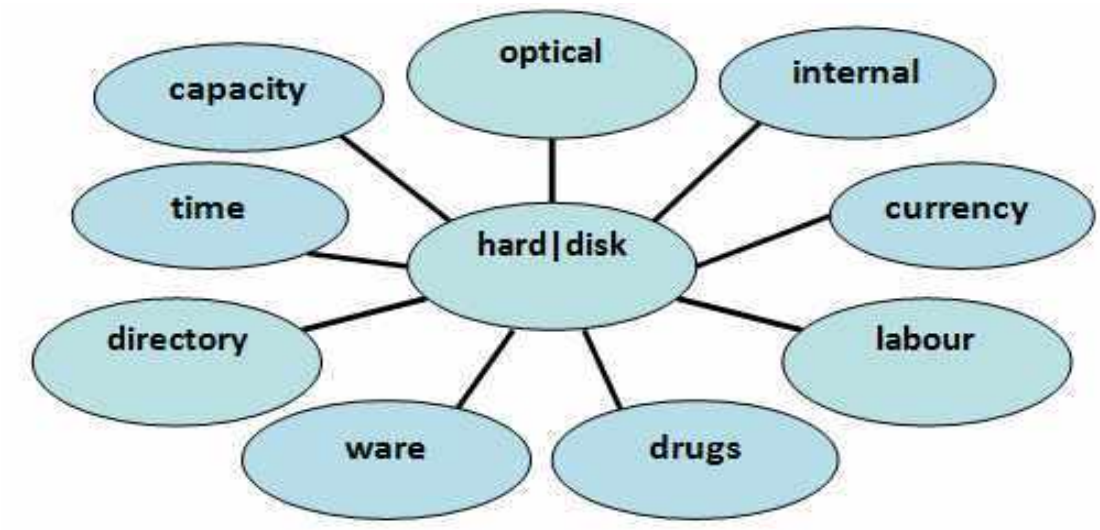


A hard disk can hold large amounts of information because it uses multiple disks, or platters stacked on top of one another

III. Read these sentences and decide if they are true (T) or false (F).

1. Hard disks use rigid rotating disks. ☐
2. Seek time refers to the average time required for the recording heads to move and access data. ☐
3. If you use multimedia applications, you need the same storage capacity as required for word processors. ☐
4. 'Access time' and 'data transfer rate' mean the same. ☐
5. Optical disks are magnetic. ☐
6. Each Jaz cartridge can hold up to 1,000 MB of data. ☐
7. CD-ROM disks are used for storage of massive amounts of information. ☐

IV. Vocabulary. The phrase *hard disk* consists of the adjective *hard* and the noun *disk.* Make other phrases or words by combining *hard* and *disk* with these words. Give the meaning of each phrase or word in your own language. (Use a dictionary if necessary.)



V. Complete the advertisement for the MegaMind hard disk with the words in the box.

megabytes	drive	compatible	highest	time
protection	secure	write	multimedia	

MegaMind XT

Today's personal computers are very powerful, but to handle large applications like databases, (1) ..... DTP publishing and CAD, you need to have more than 200 (2) ..... in your hard disk. That's where MegaMind XT comes in: a reliable hard (3) ..... with 6 gigabytes of capacity; 8ms average seek (4) ..... and 13 mbits/sec average data transfer rate; and a 3.5" drive unit with a five-year warranty.

You also receive software utilities that let you easily manage and (5) ..... your data. Our software provides formatting, partitions, disk optimization and password (6) ..... .

MegaMind XT is (7) ..... with IBM PCs as well as Macintosh computers. As with every MegaMind product − hard disk or optical, 1GB to 6 GB − the XT gives you the (8) ..... performance. So call us today on (0181) 796 0402. Or (9) ..... to MegaMind, PO Box 673, London, N22 1XB.

INTERESTING FACTS

1. **What are the advantages and disadvantages of optical disks? Read the text to check your answer.**

Optical disks and drives

Optical disks can store information at much higher densities than magnetic disks. Thus, they are ideal for multimedia applications where images, animation and sound occupy a lot of disk space. Besides, they are not affected by magnetic fields. This means that they are secure and stable, e.g. they can be transported through airport metal detectors without damaging the data. However, optical drives are slower than hard drives. While there are hard drives with an average access time of 8ms, most CD-ROM drives have an access time of 150 to 200 ms.

There are various types of optical drives:

•CD-ROM systems offer everything, from shareware programs to dictionaries and encyclopedias, from multimedia databases to 3-D games. A lot of institutions have discovered that CD-ROM is the most economical way of sharing information. In fact, one CD-ROM disk (650 MB) can replace 300,000 pages of text (about 500 floppies), which represents a lot of savings in distributing materials and corporate databases. In addition, CD-ROM drives can play music CDs while you work. Yet CD-ROM technology has one disadvantage: you cannot write anything onto a CD-ROM disk. You can only ‘read' it, like a book.

• CD-Recorders come in two different forms: CD-R and CD-RW CD-R machines record on CD-R (write-once) disks, allowing you to create and duplicate CDs. They are used to back up hard disks or to distribute and archive information. In fact, these systems are the modern version of old WORM (write once, read many) disks. CD-RW machines hold CD-RW (rewritable) disks that you can erase and re-use, just as you would do with a hard disk.

• The future of optical storage is called DVD (digital versatile disk). A DVD-ROM can hold 17 GB, about 25 times an ordinary CD-ROM. For this reason, it can store a large amount of multimedia software and complete Hollywood movies in different languages. They can also play music CDs and CD-ROMs. However, DVD-ROMs are

‘read-only’ devices. To avoid this limitation, companies also produce DVD rewritable drives.

• Magneto-optical (MO) drives use both a laser and an electromagnet to record information. Consequently; MO disks are rewritable, i. e. they can be written to, erased, and then written again. They usually come in two formats: (i) 5.25" cartridges can hold more than 2 GB, (ii) 3,5" floptical disks have a capacity of 230 to 640 MB. They are ideal for back-up and portable mass storage.

2. Read the text again and summarize in the table the most relevant information. Then retell using the table.

Storage devices	Technical specification	Use
CD-ROM		
CD-Recorder		
DVD		
Magneto-optical		

TEST YOURSELF

1. Data storage. Fill in the gaps in the text with the words below.

burn capacity card drawer eject free space hard drive stick

1) The data and applications on your computer are stored on the _____ .
2) To run this application you need at least 50MB of _____ on your hard drive.
3) My computer’s hard drive has a _____ of 120GB.
4) Do you like this CD? I can _____ you a copy if you want.
5) The opposite of ‘insert the DVD’ is ‘_____ the DVD’.
6) I can’t eject the CD. I think the _____’s stuck.
7) Digital cameras usually store pictures on a memory _____ or a memory _____.

2. Which do you think is the best solution for each problem? (More than one solution is possible for some of problems.)

1. *I want to make a copy of a music CD.*

2. *I want to store some files. I may need to update them in the future.*

3. *I want to back up data from my computer. I want to update it every day.*

4. *My computer's having problems with reading and writing CDs.*

5. *I want to add 100MB of extra storage to my computer.*

6. I want to send a copy of a small file to a friend. He has an old computer.

7. *My computer's running slowly.*

a. *You need an* ***external hard drive****.*

b. *Use a* ***CD-R****.*

c. *Try a* ***USB flash drive****.*

d. *Perhaps you need a new internal CD*

e. *Put them on a* ***CD-RW****.*

f. *Perhaps you need to* ***defragment*** *the hard drive.*

g. *You could put it on a* ***floppy disk****.*

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