UNIT 2
INPUT/OUTPUT DEVICES

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UNIT OBJECTIVES

In this lesson, you will learn how to:

- Describe input and output devices.
- Identify important keys on a keyboard and explain their functions.
- Distinguish between facts and opinions in advertisements about peripherals (e.g. scanners).
- Understand technical specifications given about monitors.
- Use different grammatical forms to give instructions, advice or warnings.
- Compare different types of printers, and choose one for yourself.
- Understand what sort of input/output devices are used by disabled people.
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.

Look at the illustrations and see if you can name them.
III. About the keyboard

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

- **Alphanumeric keys**: arranged in the same order as a typewriter.

- **Function keys**: used by various programs to instruct the PC to perform specific tasks such as Save, Copy, Cut, Paste, Help, etc.

- **Numeric keypad**: set of numeric or editing keys. The Num Lock key is used to switch from numbers to editing functions.

- **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)

- **Special keys**: used is to issue commands or to produce alternative characters in key combinations, for example, the Alt key
C. Computer system may have different keyboard options. Here is an example. If we enter the Key Caps menu on a Macintosh in Courier and then press the Option key, we obtain the following symbols on the screen.

Identify these symbols on the keyboard

1. slash
2. not equal to
3. plus and minus
4. Trademark
5. yen sign
6. copyright
7. number
8. registered trademark
IV. READING

A. 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?

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

The mouse!

The computer mouse is a hand-operated device that lets you control more easily the location of the pointer on your screen. You can make selections and choices with the mouse button.

The mouse contains a rubber-coated ball that rests on the surface of your working area or a mousemat. When the mouse is moved on that surface, the ball rolls.

The ball’s movements up and down, and left and right, turn the two axles inside the mouse. As they turn, detectors register the changing position. A small integrated circuit inside the mouse sends signals to the operating system, which instructs it to move the pointer on your screen.
V. Language work: Describing function

We can describe the function of an item in a number of way. Study these examples.

**Using the Present Simple**

1. ROM holds instructions which are needed to start up the computer.

**Used to-infinitive, Used for + ‘ing’ form**

2. ROM is use to hold instructions which are needed to start up the computer

3. ROM is used for holding instructions which are needed to start up the computer

**Emphasizing the function**

4. The function of ROM is to hold instructions which are needed to start up the computer
I. Scanners: The eyes of your computer

Use the information in the text and the illustration to answer these questions.

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

A scanner ‘sees’ images and translates them into a form that can be understood by the computer.
What does a scanner do?

A scanner converts texts or pictures into electronic codes that can be 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 color scanner operates by using three rotating lamps, each of which has a different colored filter: red, green, and blue. The resulting three separate images are combined into one by appropriate software.

What do you think are the benefits of using scanners in business?
II. Fact an opinions

A. Read the advertisements on the following page and underline what you think are facts and circle the opinions. Then write them in the table below.

Facts are ‘real’ objective information. Opinions usually include emotive words, positive/negative phrases, and subjective (persuasive) statements.

Note:

- **dpi**: dots per inch
- **9” x 15”**: 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.
<table>
<thead>
<tr>
<th></th>
<th>ColorScan XR</th>
<th>ScanPress 800</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facts</strong></td>
<td>Flatbed scanner</td>
<td>Self-calibrating flatbed scanner</td>
</tr>
<tr>
<td></td>
<td>600 dpi of resolution</td>
<td></td>
</tr>
<tr>
<td><strong>Opinions</strong></td>
<td>You can get crisp, clean scans</td>
<td>The highest technology</td>
</tr>
</tbody>
</table>
ColorScan XR

from Sunrise

The ColorScan XR from Sunrise is a flatbed scanner with 600dpi 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 color compositions, video, and animation work.

It comes complete with its own image-capture software which allows for color 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 ColorScan XR is a clear winner.

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 color. 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 color definition and sharpness. And it comes with OCR software and Adobe Photoshop, so you can manipulate all the images you capture.

This is fantastic machine you will love working with. And at only £1,037 it is an excellent investment.
B. In small groups, compare your answer and decide:

1. Which text has got more persuasive language?
2. Which text is more factual or objective/
III. Language work: Making comparisons

A. Formation

The regular comparative and superlative forms of descriptive words (adjectives and adverbs) are shown below:

1. Words of one syllable add the ending -er and -est

Examples:

<table>
<thead>
<tr>
<th></th>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adjectives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>New</td>
<td>Newer</td>
<td>Newest</td>
</tr>
<tr>
<td>Old</td>
<td>Old</td>
<td>Older</td>
<td>Oldest</td>
</tr>
<tr>
<td>Big</td>
<td>Big</td>
<td>Bigger</td>
<td>Biggest</td>
</tr>
<tr>
<td><strong>Adverbs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soon</td>
<td>Soon</td>
<td>Sooner</td>
<td>Soonest</td>
</tr>
<tr>
<td>Late</td>
<td>Late</td>
<td>Latest</td>
<td></td>
</tr>
</tbody>
</table>
2. Words of three or more syllable are preceded by *more* and *most*.

Examples:

<table>
<thead>
<tr>
<th></th>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adjectives</strong></td>
<td>Interesting</td>
<td>More interesting</td>
<td>Most interesting</td>
</tr>
<tr>
<td></td>
<td>Convenient</td>
<td>More convenient</td>
<td>Most convenient</td>
</tr>
<tr>
<td><strong>Adverbs</strong></td>
<td>Easily</td>
<td>More easily</td>
<td>Most easily</td>
</tr>
<tr>
<td></td>
<td>Carefully</td>
<td>More carefully</td>
<td>Most carefully</td>
</tr>
</tbody>
</table>
3. Adjectives with two syllables may be like 1 or 2 above in that they will add the ending *-er* and *-est* if they end in *-y* or *-ly*, *-ow*, and *-er*.

Examples:

<table>
<thead>
<tr>
<th></th>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td>-y</td>
<td>Tiny</td>
<td>Tinier</td>
<td>Tiniest</td>
</tr>
<tr>
<td></td>
<td>Speedy</td>
<td>Speedier</td>
<td>Speediest</td>
</tr>
<tr>
<td>-ly</td>
<td>Early</td>
<td>Earlier</td>
<td>Earliest</td>
</tr>
<tr>
<td></td>
<td>Friendly</td>
<td>Friendlier</td>
<td>Friendliest</td>
</tr>
<tr>
<td>-ow</td>
<td>Shallow</td>
<td>Shallower</td>
<td>Shallowest</td>
</tr>
<tr>
<td>-er</td>
<td>Clever</td>
<td>Cleverer</td>
<td>Cleverest</td>
</tr>
</tbody>
</table>
4. Most of the remaining two-syllable adjectives take more and most in front of them

Examples:

<table>
<thead>
<tr>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Careful</td>
<td>More careful</td>
<td>Most careful</td>
</tr>
<tr>
<td>Boring</td>
<td>More boring</td>
<td>Most boring</td>
</tr>
<tr>
<td>Awful</td>
<td>More awful</td>
<td>Most awful</td>
</tr>
</tbody>
</table>
5. Some common two-syllable adjectives can have either type of formation

Examples:

<table>
<thead>
<tr>
<th></th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common</td>
<td>Commoner/More common</td>
<td>Commonest/Most common</td>
</tr>
<tr>
<td>Gentle</td>
<td>Gentler/More gentle</td>
<td>Gentlest/Most gentle</td>
</tr>
<tr>
<td>Quiet</td>
<td>Quieter/More quiet</td>
<td>Quietest/Most quiet</td>
</tr>
</tbody>
</table>
6. Two-syllable adverbs ending in -ly take more and most

Examples:

<table>
<thead>
<tr>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td>quickly</td>
<td>More quickly</td>
<td>Most quickly</td>
</tr>
<tr>
<td>Slowly</td>
<td>More slowly</td>
<td>Most slowly</td>
</tr>
</tbody>
</table>

7. A small number of adjectives and adverbs have an irregular comparative and superlative form

Examples:

<table>
<thead>
<tr>
<th>Adjectives</th>
<th>Absolute</th>
<th>Comparative</th>
<th>Superlative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjectives</td>
<td>Bad</td>
<td>Worse</td>
<td>Worst</td>
</tr>
<tr>
<td></td>
<td>Far</td>
<td>Further/farther</td>
<td>Furthest/farthest</td>
</tr>
<tr>
<td>Adverbs</td>
<td>Good</td>
<td>Better</td>
<td>Best</td>
</tr>
<tr>
<td></td>
<td>Many</td>
<td>More</td>
<td>Most</td>
</tr>
<tr>
<td></td>
<td>Badly</td>
<td>Worse</td>
<td>Worst</td>
</tr>
<tr>
<td></td>
<td>Much</td>
<td>More</td>
<td>Most</td>
</tr>
<tr>
<td></td>
<td>Little</td>
<td>Less</td>
<td>least</td>
</tr>
</tbody>
</table>
B. Use in sentences

Comparison may show equivalence, non-equivalence, the highest degree of something, and parallel increase

1. Equivalence: the following words and constructions are used to show that things or people are similar in some way

<table>
<thead>
<tr>
<th>As...as</th>
<th>The same</th>
<th>Similar/ly</th>
<th>Either</th>
</tr>
</thead>
<tbody>
<tr>
<td>As many... as</td>
<td>Are similar</td>
<td>Equal/ly</td>
<td>All</td>
</tr>
<tr>
<td>As much... as</td>
<td>Equal to</td>
<td>Compared to/with</td>
<td>Both</td>
</tr>
<tr>
<td>Similar to</td>
<td>Is like</td>
<td>Each</td>
<td>alike</td>
</tr>
</tbody>
</table>

Examples:
Here, the term ‘processor’ is **equivalent** to the central processing unit
Laptops are **as** powerful **as** microcomputers
1. **Non-Equivalence:** the following words and constructions are used to compare or contrast things or people that are separate from each other

<table>
<thead>
<tr>
<th>Not as...as</th>
<th>Greater than</th>
<th>Unequal (ly)</th>
<th>Less...than</th>
</tr>
</thead>
<tbody>
<tr>
<td>...-er than</td>
<td>Not as many...as</td>
<td>Unlike</td>
<td>Not equal to</td>
</tr>
<tr>
<td>More... than</td>
<td>Not as much...as</td>
<td>Not the same as</td>
<td>Fewer...than</td>
</tr>
</tbody>
</table>

**Examples:**
1. A mainframe *is larger* and *more* expensive than a microcomputer.
2. Learning to use a computer is *not as* difficult *as* learning to program.
4. Parallel increase: the following words and constructions are used to show parallel increase (two comparatives)

| The...-er, the more... | The more..., the...-er | The...-er, the less... |

Examples:
The more memory your computer has, the more data it can store
The bigger your computer system is, the less time you spend waiting
The more training you give to your employees, the better the will perform
Describe the screen of our computer to another student. Use these questions to help you

- What size is it?
- Does it produce a high quality image?
- Which is the common size of a monitor?
II. Reading

A. Read the text and try to guess the meaning of any new words in the box below. Refer to the Glossary if necessary.

<table>
<thead>
<tr>
<th>dot pixel</th>
<th>display</th>
<th>resolution</th>
<th>scan (verb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hertz</td>
<td>flicker</td>
<td>bit-mapped</td>
<td>visualize</td>
</tr>
</tbody>
</table>

B. 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. Is a dot pitch of 0.31 mm is better than one of 0.25mm? Why?
5. Does the price of a monitor depend only on the size?
6. Is a maximum resolution of 1600x1200 better than 1280x1024? Why?
III. WRITING
A. 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:

<table>
<thead>
<tr>
<th>CRT size</th>
<th>CRT face</th>
<th>Pixel res.</th>
<th>Visual display</th>
<th>Refresh rate</th>
<th>Tilt-and-swivel</th>
<th>Other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor A Superview</td>
<td>16”</td>
<td>flat</td>
<td>870 x 640</td>
<td>256 shades of grey</td>
<td>60 Hz</td>
<td>√</td>
</tr>
<tr>
<td>Monitor B Paintview</td>
<td>19”</td>
<td>flat</td>
<td>1,024 x 768</td>
<td>32,000 colors</td>
<td>75 Hz</td>
<td>√</td>
</tr>
</tbody>
</table>
The specifications of Superview (Monitor A) may be explained like this:

1. This monochrome monitor has a 16-inch screen.
2. This displays system has a resolution of 870 x 640 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.

B. Use this example to help you describe Monitor B
IV. Language work: Instructions and advice

Study these ways of giving instructions and advice and then rewrite the sentences below about what you should do to protect your eyes. Use modal auxiliary verbs in yours sentences.

- **Using imperatives**
  - Position your keyboard at the same height as your elbows
  - Don’t use a monitor that fuzzy or distorts the image

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

1. Do not state at the screen for along periods of time
2. Avoid placing the monitor so that it reflects a source og 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 computer, 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
TOPIC 2.4: CHOOSING A PRINTER

I. READING
A. How many kinds of printers can you think of? Make a list.
B. Read the text below and label these types of printer.

1. The resolution depends on the number of pins (9 or 24)
2. The quality (resolution) of the images ranges from 180 to 720 dots per inch (dpi)
3. Provides high quality output – a resolution of 600/1200 (dpi)
4. Provides the highest resolution – more than 2,000 dpi.
5. Provides high quality for linework (like lines and curves)
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.

**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 600/1200 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.
C. Read the text again and complete this table with the most relevant information. Then compare your notes with a partner

<table>
<thead>
<tr>
<th>Type of printer</th>
<th>Technical specifications and other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dot-matrix</td>
<td></td>
</tr>
<tr>
<td>Ink-jet</td>
<td></td>
</tr>
<tr>
<td>Laser</td>
<td></td>
</tr>
</tbody>
</table>
III. Scan reading: Quiz

Read the advertisements for printers below, and then with your partner, answer the questions. See who in your group/class can finish first.

1. How many laser printers are advertised here?
2. Is there a printer that operates by spraying ink droplets onto paper?
3. Which laser printer offers the highest resolution or output quality?
4. Which printer is the most expensive?
5. Which one would you recommend to a friend who does not have much money?
6. Which one has more internal fonts?
7. A printer language is software that tells printers how to print a document. Can you find two types of laser printer languages?
8. What connectivity features are offered by the Turbo Laser Writer QR?
9. A very common feature in advertisements is the use of abbreviations. Find the abbreviations for these expressions: dots per inch, characters per second, pages per minute, small computer system interface, and liquid-crystal display.
**Turbo LaserWriter QR**

Workgroup laser printer. 15 pages per minute. 600 dpi for graphics. 36 MB of RAM. Includes Adobe PostScript and Hewlett Packard PCS printer languages. 75 resident fonts. Connectivity: one bi-directional parallel port, one LocalTalk port, and one Ethernet port for networks. 12 month warranty.

£1,150

**Stylus Printer**


£179

**Dot-matrix**
## TOPIC 2.4: CHOOSING A PRINTER

<table>
<thead>
<tr>
<th>Color PostScript Printer</th>
<th>Crystal Laser Printer II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color printer. 40 Adobe PostScript fonts. 36 MB RAM with a SCSI interface for an optional 20 MB hard disk. Parallel, serial and AppleTalk interfaces. HP plotter emulation. Thermal printing system. 30-day money-back guarantee and 1 year’s on-site parts and labor.</td>
<td>14 pages per minute. 6 MB. Two 200 sheet selectable input trays. LCD display. 80 internal scalable fonts. A resolution of 1,200dpi. Comes with PostScript language and PCL (printer control language). Telephone hotline support.</td>
</tr>
<tr>
<td>£2,249</td>
<td>£999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLOR INK JET</th>
<th>Micro Laser XT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color:</strong> Up to 18 ppm</td>
<td><strong>Personal laser printer, 5 pages per minute.</strong></td>
</tr>
<tr>
<td><strong>Resolution:</strong> Up to 4800 x 1200 optimized dpi on premium photo paper</td>
<td><strong>4 MB RAM expandable to 64 MB. Parallel interface. 200 sheet input tray. 35 resident fonts. One-year on-site maintenance. Prints on a wide range of materials and sizes.</strong></td>
</tr>
<tr>
<td><strong>Paper input capacity:</strong> Up to 150 sheets</td>
<td></td>
</tr>
<tr>
<td><strong>Duplex printing:</strong> Automatic (optional) Reliable color printer with cost-effective features for the home or office on a budget</td>
<td></td>
</tr>
</tbody>
</table>

£649
IV. LANGUAGE WORK: REVISION OF A COMPARISON

A. Study the sentences below and do the following:

Draw a circle around comparatives and a rectangle around superlatives

Identify two special cases

1. Dot-matrix printers are cheaper than laser printers
2. A photosetter is the fastest output device
3. A thermal wax printer is more expensive than a monochrome laser printer
4. The Micro Laser XT is the most reliable of all
5. Personal laser printer is cost less than ordinary laser printers. They also weigh less and require less space
6. My printer has more resident font than yours
7. This printer offers laser quality at a lower price
8. Monochrome printer operate faster than color ones
9. Dot-matrix printers are too slow
10. Dot-matrix printers are not quick enough
B. Write your own comparison of printer types

V. Describing your ideal printer
Describe to your partner the characteristics of the printer you would like to use. Give reasons. (Does your ideal printer look like the one below?)
I . Adaptive technology

Working in pairs or small groups, look at the pictures and discuss these questions. Use the phrases in the box to help you.

1. What sort of difficulties do you think are experienced by computer users with limitations of vision or mobility?
2. What types of devices could be helpful to blind users?
3. How can a person with mobility limitations communicate with a computer?
4. Think of possible tools or solutions
Key words

blind person
magnification software
Braille printer
adaptive switch
motor-impaired person
adapted keyboard
on-screen keyboard
voice recognition system
screen-pointing device
speech synthesis system
optical head pointer

adapted keyboard
on-screen keyboard
voice recognition system
screen-pointing device
speech synthesis system
optical head pointer
II. Reading

A. 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 Juliet Braille printer.
4. the ways adaptive switches can be activated.
5. the function of voice recognition devices.
6. the devices used by the disabled person at the Center for the Handicapped in Seattle.
7. how the blind student interacts with the machine.
III. Writing

Write a letter to Mike Hartley - the director of the Adaptive Technology Project for the Blind in Washington, DC. - asking for information about computers for the disabled. Make sure you include the following points.

- Begin by saying why you’re writing: *I’m 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
IV. Language work: Compound nouns

A. Formation and use

The language of computing in English contains an ever-increasing number of compound nouns, that is, a group of two or more nouns which act as a single noun. Examples:

- memory capacity
- an address bus
- an arithmetic unit
- information systems
- a bar code scanner
- a computer keyboard

It is important to be able to recognize how such compounds are formed in order to understand what they mean.

The exact relationship between the words depends on the particular expression, but all these expressions have one thing in common: the last word in the chain says what the thing is, while the preceding word or group of words describes the thing. So when we read compound nouns, we have to start with the last word and work backwards.

Examples:

An **address bus** is a bus dedicated to address information.

The **memory capacity** of a computer is the capacity of its memory.

A large number of possible meanings can be expressed by compound nouns. For instance, the first noun or group of nouns can tell us what the second noun is made of, what it is for, or what it is part of.
1 **Material:** the first noun tells us what the second noun consists of.
Example:
- a silicon chip (a chip made of silicon)
- a ferrite ring (a ring made of ferrite)

2 **Function:** the first noun tells us what the second noun is for.
Example:
- an address bus (a bus dedicated to address information)
- an arithmetic unit (a unit which performs arithmetic functions)

3 **Part:** the second noun refers to a part of the first noun.
Example:
- a computer keyboard (the keyboard of a computer)
- a monitor screen (the screen of a monitor)
- a program feature (a feature of a program)

4 **Activity or person:** the second noun refers to an activity or person related to the first noun.
Example:
- computer programming (the programming of computers)
- a computer programmer (a person who programs computers)
- systems analysis (the analysis of organizational systems)
- a systems analyst (a person who analyses organizational systems)
Multiple nouns: sometimes a compound noun will join together with one or more other nouns to give an expression that has three or four words. In such cases, it is important to examine the expression very carefully to break it into its constituent parts. The secret, as always, is to read the expression from the back towards the front.

Example:

4 3 2 1

a document-image-processing program (a program which processes images of documents)

Note: some expressions are written separately, while others are joined by hyphens. There are no clear rules for this. Sometimes you will see the same expression written in different ways in different texts.

Example:

document-image-processing program

document image-processing program
document image processing program

However, it is important to be consistent within a single text.
B. Exercises

1. A device that scans bar codes is called a bar code scanner. What name is given to:
   1. a unit that gives a visual display of information on a screen?
   2. a device that reads magnetic cards?
   3. a device that plots graphs?
   4. a device that prints using a laser as the light source?
   5. a unit that holds magnetic disks?
   6. a device that prints using a jet of ink?
   7. the rate of transmission of data?
   8. a package for making presentations using multimedia?
   9. a program which processes data in batches?
  10. the process for the conversion of disks for computers?
2. Using the explanations in Exercise 1 as models, write short simple explanations of the following items:

1. an input device
2. an optical character reader
3. a graphics stylus
4. a document sorter
5. a fibre optics transmission system
6. a sequence control register
7. a liquid crystal display
8. network configuration information
9. a desktop document manager
10. a multimedia editing software package