



# The computer

By the end of this unit you should be able to:

- Define the computer
- Identify types of computers
- Discuss the advantages and disadvantages of computer usage

## Unit at a glance

- A **computer** is defined as an electronic machine or device that accepts and processes data to produce information.
- A **computer system** consists of hardware, software, procedures, data and people.
- Computers are classified according to size and the number of users they can support. Classes of computers include:
  - Mainframes.
  - Minicomputers.
  - Microcomputers, including laptops, desktops, palmtops and other devices.
- Advantages of computer usage include speed, accuracy, storage and reliability.

Can you imagine a world without computers? Many persons now consider them an essential part of their lives. Computers have transformed the way businesses operate and they are used, for example, in document preparation and data storage as well as in the preparation of business plans, financial calculations and communications among employees. Computers are in many homes and several household devices, e.g. microwave ovens, DVD players and washing machines, are now computer controlled.

The main reasons for the ever wider use of computers are their speed, accuracy, reliability and versatility. A computer can carry out calculations in a fraction of the time it takes the average person; it never gets tired or bored and can be programmed to perform a wide variety of tasks. A computer is accurate. It will do exactly the task it was instructed to do as many times as it was instructed. However, the use of computers has created new challenges: some persons may lose their jobs or need to learn new skills when computers are introduced in the workplace. Some businesses cannot operate if the computer system breaks down or there is a power outage.

## Definition of the computer

A computer may be defined as an electronic device that accepts data as input, processes the data into information, stores and allows the retrieval of the processed data, and outputs those results in a form that is usable by humans or other computers.

The computer performs four basic operations:

- It accepts data (input).
- It manipulates the data (processing).
- It produces information or results (output).
- It stores the data and results (storage).

These operations are executed under the direction of stored programs. A program is a sequential set of instructions that enable the computer to perform a specific task.

## A typical computer

The names and purposes of the devices that make up a typical computer are as follows.

### The computer case

The **computer case** is also called the **systems unit**. It contains the most important part of the system, the **central processing unit** (also called the CPU) or 'brain' of the computer. You cannot see the CPU unless you open the systems unit. The systems unit also contains other parts, many of which can be seen only when the case is opened. The floppy disk drive and compact disk (CD) drive may be seen from the outside. Some cases lie flat on the desk, usually under the monitor. Others, called tower cases, stand upright, either on the desk or on the floor.

### The monitor

The **monitor** is a device that displays text and images generated by the computer. It is sometimes called a visual display unit or VDU. The screen is the display area of the monitor. At the front of the monitor, below the screen, you will most likely find buttons to control the size, brightness and contrast of the on-screen display.

### The keyboard

You use the **keyboard** to enter information and instructions into a computer by pressing various labelled keys. Most keyboards have 101 keys. **Multimedia** keyboards have additional keys that control sound, visual display, Internet connections, and so on. Keyboards were designed to be similar to typewriters and have a similar layout.

### The mouse

The **mouse** is a handheld device that allows you to make selections and move items on the computer's screen by clicking on different parts. You will probably guess that it got its name because it resembles that small animal.

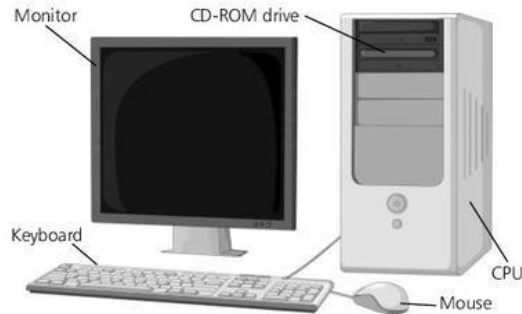


Figure 1.1 Parts of a typical microcomputer

### DID YOU KNOW?

The first computers invented did not have any mouse, monitor or keyboard. Input and output were done using cards with holes punched in them.

## My glossary

From here on you will be required to create a glossary of the terms used in the textbook. Copy the terms and write definitions for each in your notebook.

Central processing unit	Multimedia keyboard
Computer	Program
Keyboard	Screen
Monitor	Systems unit
Mouse	Visual display unit

## To do

Discuss three benefits and three challenges with using computers in business situations.

## Types of computers

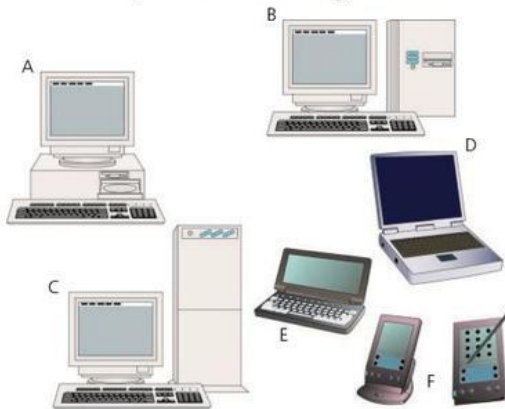
Computer systems may be classified according to size. The four basic classes are microcomputers, minicomputers, mainframe computers and supercomputers.

As workstations increase in capacity and mainframes decrease in size, the differences between the classes of computers have become less significant.



## Microcomputers

**Microcomputers**, also called **personal computers (PCs)** are designed to be used by one person. There are many different sizes of personal computers. New smaller units are often more powerful than larger ones.



**Figure 1.2** *Microcomputers: A desktop, B mini-tower, C tower, D laptop/notebook, E palmtop and F personal digital assistants (PDAs)*

- A **palmtop** was an early hand-sized computer. They have mostly been superseded by tablet computers, which are more powerful and offer many more features.
- A **personal digital assistant (PDA)** is a small handheld device about the size of a pocket calculator. A PDA is used for managing schedules and storing contact information. Mobile smartphones now offer the features of a PDA plus many more, including email, Internet, audio recording, photographs and video.
- A **laptop** or **notebook** combines the screen, keyboard, pointing device, processor, memory and hard drive in a lightweight battery-powered case often no larger than an average textbook. Persons who need to take work home, or who travel in their work or have limited workspace often choose to use laptops.
- A **desktop** is a personal computer (PC) that is designed to be set up in a permanent location. This type of computer is most commonly found in homes, schools and offices.

- A **workstation** is a desktop computer, but with a more powerful processor, extra memory and greater capabilities. Workstations are used by millions of office workers all over the world. They are used for software development and engineering design, and are popular with users such as scientists, engineers and movie animators, who require most of the features of a PC but need the power of a larger computer.
- A PC may also be used as a **server**. A server is a computer that is designed to control a computer network. They are therefore constructed with powerful processors, extensive memory and large storage capacity.

## Minicomputers

**Minicomputers**, sometimes called **mid-range computers**, are more powerful than microcomputers and can support a number of users performing different tasks. They were originally developed to perform specific tasks such as engineering calculations.



**Figure 1.3** *Minicomputer*

## Mainframe computers

**Mainframe computers** are large systems that can handle numerous users, store large amounts of data and process transactions at a very high rate. They are used in large organisations where many people must access the same data, often simultaneously. Each user accesses the mainframe through a **terminal** that consists of a monitor and at least one input device. Mainframes usually



Figure 1.4 Mainframe computer

require a specialised environment including separate air conditioning and electrical power.

### Supercomputers

**Supercomputers** are the largest, most powerful category of computers and consequently the most expensive. These systems are able to process hundreds of millions of instructions per second. They are used for jobs requiring long, complex calculations, for example navigation satellites, weather forecasting and genetic engineering.



Figure 1.5 Supercomputer

### To do

- 1 Identify the main properties of each class of computer.
- 2 State at least one situation in which each type of personal computer is used.

### My glossary

Write definitions of the following terms.

Mainframe	Personal digital assistant
Microcomputer	Server
Mid-range computer	Terminal
Personal computer	Workstation



Figure 1.6 Components of a computer system

## Components of a computer system

A computer system is a combination of hardware, software, procedures, data and people that create a functional unit (Figure 1.6).

### Hardware

The term **hardware** refers to all the tangible parts of the computer, that is, all the parts that you can see or touch. These include the computer case, monitor, mouse, keyboard and disk drives.

### Software

The computer must have organised sets of instructions or **programs** to make it work. Programs are also called **software**. You cannot see or touch software. You can only see and touch the packaging in which it comes.

### People

**People** are the users of the computer. Although some computers operate without a human manipulating them, people are still the users of the output of the computer. Additionally, it is people who design, build, program and maintain the computer system.

### Data

**Data** consists of raw facts such as numbers, letters, special characters or symbols. These convey little meaning individually. However,



when they are combined and processed they appear in context and convey meaning to people.

Data is organised into **files** within the computer. Each file is a set of data that has been given a name. This course is designed to teach you how to create **documents**. A document file is created, modified and used by people. A document usually contains **text** or words and figures, but may also include graphs, pictures, sounds or video.

Computers manipulate and store data in the form of coded electrical impulses called **bits**. A bit is an on or off signal which passes through the computer's circuitry, with the number 1 representing on and the number 0 representing off. Every piece of software or data can be broken down into a series of on or off signals (also called its binary code).

A **byte** is the group of zeros and ones that represent one **character** such as a letter, number or symbol. A byte is made up of 8 **bits**.

- Approximately a thousand bytes is a kilobyte (KB).
- Approximately a million bytes is a megabyte (MB).
- Approximately a billion bytes is a gigabyte (GB).

## Procedures

**Procedures** are the instructions that tell a user how to operate and use the information system.

When you bring together hardware, software, data, procedures and users, you get a complete computer system.

## To do

- 1 Write down a definition of a computer.
- 2 Identify the five components of a computer system.
- 3 Differentiate between hardware and software.

## My glossary

Write definitions of the following terms.

Bit	File
Byte	Hardware
Character	Software
Data	Text
Document	

## Classifying devices

Hardware devices may be classified as being input, output, processing or storage. A few devices can perform more than one function.

### Input devices

Some of the devices allow you to send messages into the computer system. These are called input devices. Input devices include the keyboard and the mouse.

### Output devices

Some devices allow messages to be sent out of the system, either directly to the user or to another computer. These are the **output devices**. Output devices include the monitor, printer and speakers.

### Storage devices

Some devices are used to store information even after the computer is turned off. These **storage devices** include a hard-disk drive (also called hard drive), floppy-disk drive and recordable CD drive. The storage devices are usually located within the systems unit or computer case. However, some storage devices may be located outside the systems unit.

### Processing devices

The 'brain' of the computer is called the **central processing unit** or processor or CPU. It processes or works on the information in the computer. The CPU consists of three interrelated parts:

- The **arithmetic logic unit** that performs all of the calculations necessary for the computer to operate.
- The **control unit** which directs the flow of data through the CPU and to and from the other devices.
- The **memory unit** that holds all of the data and instructions that the computer uses to operate.

The memory unit consists of two types of memory:

- **Read-only memory (ROM)** that is permanent and is not normally changed by the user.
- **Random access memory (RAM)** that can be changed instantly. RAM is erased whenever the computer is switched off.

### Peripheral devices

Input, output and storage devices are also

called **peripheral devices**. Peripheral devices are all connected to the computer's central processing unit.

### To do

- 1 Explain the term 'peripheral devices'.
- 2 Explain the way in which data is represented in the computer.

### My glossary

Write definitions of the following terms.

Input	Storage
Output	RAM
Peripheral device	ROM
Processing	

## Examination-type questions

- 1
  - a Define a computer. (1 mark)
  - b State the five components of a computer system. (5 marks)
  - c List four advantages of using a computer. (4 marks)
  - d Define each of the following:
    - (i) Microcomputer (2 marks)
    - (ii) Minicomputer (2 marks)
    - (iii) Mainframe (2 marks)
  - e Explain the difference between input and output. (2 marks)
  - f Explain how data is represented in the computer. (2 marks)
- 2 Khelly is starting up a hairdressing salon and wants to invest in the best possible computer for her business. She is not sure what she should buy, so she has come to you for help. She shows you the picture shown in Figure 1.7.
  - a (i) Name the parts of the computer labelled A to D in Figure 1.7. (4 marks)



Figure 1.7

- a (ii) What are three devices that are contained within the systems unit? (3 marks)
- b (i) What do the letters CPU mean? (1 mark)
- (ii) What are the components of the CPU? (3 marks)
- (iii) What is the role of the CPU? (3 marks)
- c Khelly does not know about the different types of personal computers she can purchase. Describe three PCs she can obtain instead of a desktop. (6 marks)