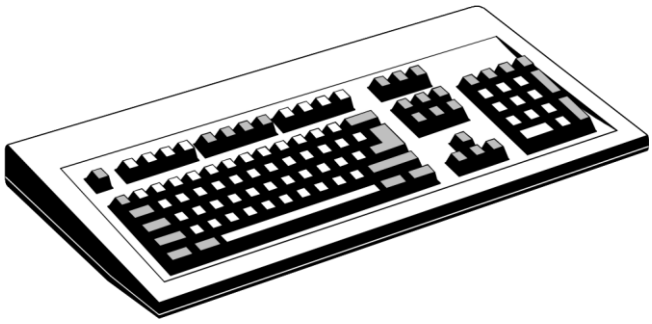
1) Input Devices

Identify some of the main devices for inputting data into a computer such as: mouse, keyboard, trackball, scanner, touchpad, lightpen, joystick, digital camera, microphone.

Any device which allows us to send data or instructions to the computer can be regarded as an input device. We can use any mechanical movement, sound, light, heat or electronic signals to input data and instructions.

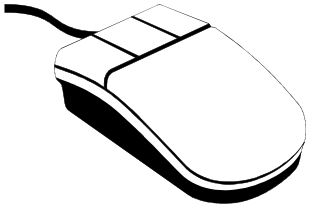
1.1 Keyboard



The most familiar input device is the keyboard. Users type the text directly into the computer.

There are a number of layouts of the keyboard. The most important are the language variations. For example, the US and UK keyboards are quite similar but are very different from the French keyboard.

1.2 Mouse



The mouse is a point and click device. As you move the mouse across a surface, it senses this movement either mechanically or optically. This is translated into the movement of a pointer on the screen. Functions are represented as icons on the screen. When you click on these using a mouse button, the function is executed.

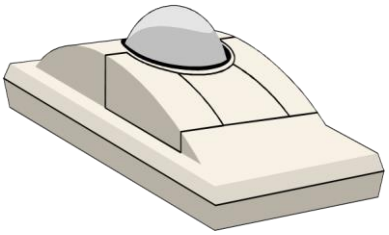
1.3 Touchpad

A touchpad is a device that senses pressure to guide the pointer on the computer screen. It is generally a small square area below the keyboard. As the user moves his/her finger across the touchpad, the pointer moves on the screen. Next to the pad are two buttons used for clicking in exactly the same way as those on a mouse.

1.4 Trackball

A trackball acts as a type of overturned mouse. The ball is on the top side of the object. By rolling the ball you can move the pointer across the screen. Some keyboards have an in-built trackball.

The trackball has been superseded by the touchpad.



1.5 Lightpen

A light pen is a device which is sensitive to variations in patterns on a surface. Light pens act like a miniature scanner and can read text as they are dragged across the printed page. This can be transferred directly to the current open document.

1.6 Bar code reader

A bar code is a pattern of vertical lines in which the spacing and thickness can be used to represent data. A bar code reader is a device that can read and interpret bar codes and input the data into the computer.

1.7 Joystick

A joystick is a device that is familiar for use in games to move objects on the screen. However, it is also used to control the movements in computerised industrial machines such as lathes. It consists of a small vertical lever which can move in any direction. These movements are translated to the computer which in turn uses them to control the movements of machinery.

1.8 Digital camera

Instead of film, a digital camera uses a light sensitive screen at the back of the camera. A small computer inside the camera converts the pattern on the screen into a standard graphics file which can then be transferred to a computer.

1.9 Microphone

A microphone translates speech into an electronic signal. Modern speech recognition software is able to translate this into either commands or data. This enables the user to use a microphone as an alternative to the keyboard.

1.10 Scanner

A scanner is similar to a photocopier, except that instead of producing a paper copy of the document you place on it, you get an electronic copy which appears on your computer screen.

Text recognition software can be used with a scanner. This software is able to recognise the individual letters in the image. Instead of creating a single image of the document, the software inserts actual text into your application which can then be edited.

2) Output Devices

Identify common output devices for displaying the results of processing carried out by a computer, such as: monitors, screens, printers, plotters, speakers. Know where these devices are used.

An output is any device that the computer uses to send the results of processing to the user. The output can be a hard copy (paper), visual or sound.

2.1 Visual Display Unit (VDU)

Virtually all computers use some type of screen as their primary output device. There are two categories of screen: cathode ray tube and LCD.

CRT screens: The cathode ray tube (CRT) type screen is usually called a **monitor** and makes use of the same technology as a television screen. A beam of electronics is fired from an electronic gun at the back of the tube. This strikes the front of the tube which is covered in a phosphorescent material which glows when struck by electrons. Between the electron gun and the screen the beam is modulated by a signal to produce the image you see on the screen.

With CRT type screens, an important measure is the refresh rate. Roughly speaking, this is the number of times the image is refreshed every second. A low refresh rate makes the image appear to flicker. You need a refresh rate of at least 72 Hz (72 times a second) to avoid the appearance of flicker.

Solid state screens: Solid state screens, also known as LCD or Liquid Crystal Displays, make use of tiny transistors to emit light and create an image. Originally, LCD screens were confined to laptops, but they are increasingly used with desktops. They are usually called flat screens when used as separate units with desktops.

Resolution: An important characteristic of all screens is their resolution. Each point of light on the screen is called a **pixel**. The resolution of a screen is the maximum number of pixels that the screen can display. This is given as the number of pixels across (horizontal resolution) by the number of pixels down (vertical resolution). For example, 800 x 600. The greater the resolution the better. Modern screens can display 1024 X 768 or better.

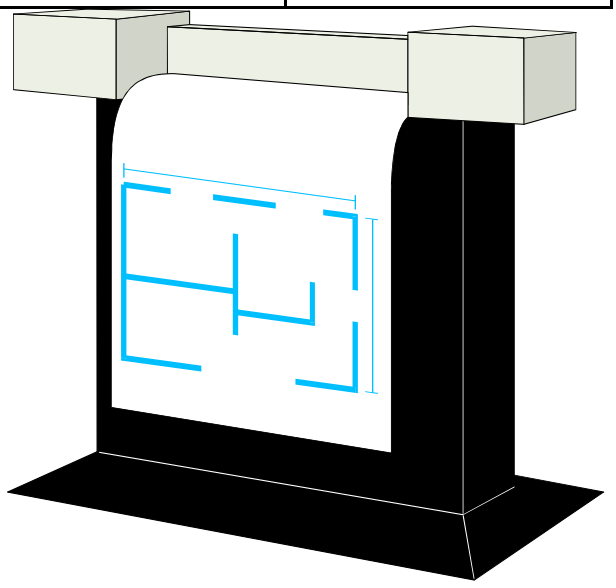
2.2 Printers

Printers produce a hard copy of the output on paper. There are three main types of printer: Dot matrix, Inkjet and Laser. The following table compares the three types.

	Dot matrix	**Inkjet**	**Laser**
Initial cost	Low	Medium	High
Cost per printed page	Low	High	Medium
Speed	Low	Medium	High
High volumes	No	No	Yes
Noise level	High	Low	Low
Print quality	Low	Medium	High
Print graphics	No	Yes	Yes
Print in colour	No	Some	Some
Print source	Ink ribbon	Ink	Toner powder

2.3 Plotters

A plotter consists of a device that can move paper both backwards and forwards. On the top of the device one or more pens are able to move horizontally across the paper. The combined movement of the pens horizontally across the paper and the vertical movement of the paper allows complex continuous diagrams to be drawn.



Some plotters allow different colour pens to be used to create diagrams in multiple colours.

In other types of plotters, the paper lies on a flat bed. The mechanics of the plotter are so designed that the pens can move both across and down the paper to create the diagram.

Plotters are usually used in conjunction with CAD (Computer Assisted Design) programs. These are used in everything from the design of ships and machines to buildings.

2.4 Speakers

Modern computers using the appropriate software can turn text in a document into audible speech. This is known as **speech synthesis**. Other types of software allow music and other sounds to be created and played back.

The line between the computer and a home entertainment system is becoming blurred. Computers are able to play music directly from a CD or play a film from a DVD. You can even fit your computer with a radio or TV card to add these functions.

In all cases, the sound is transmitted through a speaker in the same way it is in a sound system or radio.