Output devices

Monitors

The monitor, screen or visual display unit (VDU) is the most common computer output device. Popular screen sizes are 15 inches (38 cm) and 17 inches (43 cm). Larger monitors make working at a computer easier on the yes and are essential for use in desktop publishing and design work.

Cathode ray tubes

Traditional computer monitors are similar to televisions. They use cathode ray tubes (CRTs) which are large and heavy, but can produce high-quality displays.

Flat panel displays

The screen on notebook computers and flat panel monitors use LCD or TFT displays:
LCD (Liquid Crystal Display)
These use tiny crystals which block the light from passing through them. Colors are obtained by using a combination of special filters.
TFT (Thin film Transistor). This is more advanced type of display, giving full color and a high- quality output. It provides a higher resolution and more contrast than an LCD screen.

Printers

After the monitor, the second most common computer output device is the printer. Printers can be connected to an individual computer or to a network and shared by a number of computers. Printing out work from the computer is referred to as obtaining a hard copy.

Laser printers

Laser printers work in a similar way to photocopiers. They are very popular, particularly where large quantities of mono (black) printing are required. They are quite, fast and economical to run. A 12- page –per-minute printer can be purchased for about £150. Color laser printers are becoming more popular as their prices fall, but ink-jet printers are also a popular choice for color work.

Ink-jet printers

Ink-jet and bubble-jet printers are relatively inexpensive and produce high-quality black and color printing. This makes them a popular choice for home and school use. The printing speed is slower than a laser printer so, for many businesses where large volumes of printing are required, the laser printer is more suitable.

Color printing

For printing in color, ink from three ink tanks, which contain the colors cyan, magenta and yellow, is mixed together to obtain the wide range of colors found in full- color images.

Plotters

The most common type of plotter is the flat-bed plotter. A mechanical arm moves across a sheet of paper and a pen holder slides up and down the arm. Plotters are often used in science and engineering applications for drawing building plans, printed circuit boards, machines and machine parts. They are accurate to hundredths of a millimeter and can be the size of a small classroom.

Sound/voice

Computers can be output both music and speech to speakers. Synthesized speech output, generated from a computer program, can be particularly useful for blind users, where passages of text or figures from a spreadsheet are spoken.
One common example of speech synthesis is used by BT for their directory enquiry service. When you dial 192, the operator searches a computer

database and locates the number. A computer then reads this number out to you by saying, “the number you requires…”

Control applications

Computers are also able to output data to devices that control machines and processes.

Actuators

Mechanical devices that generate movement are called actuators. Computer-controlled actuators can automate the operation of machines and are based on three types of mechanism:

- **Hydraulics**
- **Pneumatics**
- **motors**