Unit 2.4 – Computing Hardware – Input & Output Devices

Candidates should be able to:

a. Understand the need for input and output devices
b. Describe suitable input devices for a range of computer controlled situations
c. Describe suitable output devices for a range of computer controlled situations
d. Discuss input and output devices for users with specific needs.

Why does a computer system need input devices?

Input devices are needed so that data can be entered into a computer system, to be stored or processed. Some input devices are manual, such as a keyboard or mouse, and some are automatic, such as a barcode reader or a webcam. Automatic input devices are generally more reliable and accurate than manual devices because there is less risk of human error.

Why does a computer system need output devices?

Without output devices it would not be possible to get information out of computer systems or use computer systems to control devices. Some output devices such as monitors and speakers are designed to communicate information to humans. Others such as motors are designed to control devices such as automatic cooling fans.

What situations are particular input devices suited to?

Mouse: The mouse is used to control the movement of a pointer on the screen when it is moved horizontally over a flat surface. Buttons on the mouse let you select options from menus and drag objects around the screen etc.

Some types use a ball under the mouse which rotates when it is moved and turns two rods, one for left/right and one for up/down. An optical mouse shines light down onto a surface and detects changes in the reflected light as the mouse is moved. Some models are now wireless.

- Suited to: A graphical user interface where pointing with a screen pointer is combined with selection using buttons to access items / menus / hyperlinks etc.
- **Advantages**: Ideal for use with desktop computers. Usually supplied with a computer so no additional cost. All computer users tend to be familiar with using them.
- **Disadvantages**: They need a flat space close to the computer. The mouse cannot easily be used with laptop, notebook or palmtop computers when not near a flat surface (these need a tracker ball or a touch sensitive pad called a touch pad).

**Keyboard**: The standard QWERTY keyboard is the commonest way to enter text and numerical data into a computer.

Each individual key is a switch, which when pressed, sends a binary code to the computer. For example, pressing the **A** key produces the binary code 01100001 representing the lower case letter **a**. Holding down the shift key at the same time produces the binary code 01000001 representing the upper case letter **A**.

- **Suited to**: Entering text and number data into a computer system.
- **Advantages**: Reliable for data input of text and numbers. Usually supplied with a computer so no additional cost. Specialised keyboards are available.
- **Disadvantages**: Slow to enter data and prone to typographical errors with new users. Slow for accessing menus etc. and difficult to use if you want to move objects around the screen. Difficult for people unable to use keyboards through paralysis or muscular disorder.

**Tracker ball**: A tracker ball is like an upside-down mouse because the user rotates the ball and the main body part stays still. It has buttons for selecting items and menus etc. like a standard mouse.

- **Suited to**: situations were a mouse is needed but desk space is limited or a mouse is difficult to control.
- **Advantages**: Does not need a flat space close to the computer. Can be useful with laptops as they can be built into the computer keyboard or clipped on.
- **Disadvantages**: Not supplied as standard so an additional cost and users have to learn how to use them.
What situations are particular output devices suited to?

Make your own notes to revise from!

Input & Output Devices for users with specific needs

Not all users are able to operate standard IO devices due to different types of physical impairment or disability. A variety of simple, yet ingenious devices exist to enable such users to access computer systems.

**Puff-Suck Switch**

User puffs or sucks down a tube to operate a switch, which is in turn connected to the computer. Specific software running on the computer system can use this input and act on it in a variety of ways.

**Foot Mouse**

Useful for people with little or no use of their upper arms. Can be used to navigate through software programs and select things in the same way as a conventional mouse. Most foot mice consist of two segments, one top control the cursor and the other to click the mouse. Foot mice include straps to hold device in place and will connect to the computer system via a USB port.

**Eye Typer**

Suitable for users who are unable to operate hand and foot operated mice.

A camera is mounted onto the computer monitor / screen and is set to focus on the user’s eye. The camera determines where the user is looking and monitors movements made by the eye. Mouse clicks can be done with a slow eye blink.

**Braille Keyboards, Displays & Printers**

Used by visually impaired users. Braille consists of a series of raised dots that can be read by touch. Each character has a different pattern of dots.

- *Braille keyboards* allow user to type and enter text or instructions for the computer in Braille.
- *Braille displays* connect to the computer, read the screen text and present it to the user via a refreshable Braille display.
- *Braille Printers* work by embossing raised Braille dots onto Braille paper. Pins are pressed into one side of the paper on order to create raised dots on the other side.