MODULE : 2

Monitor

Monitor is the most important output device of a computer. It is also known as Visual Display Unit (VDU). It is the device used by the computer to display information. In earlier days only monochrome monitors that could display text and images in black and white were available. But today, colour monitors are widely used. Smaller and lighter monitors that use technologies like Liquid Crystal Display (LCD) are also becoming popular. Less electricity consumption and less harm to the eye are some of its characteristic features.

Cathode Ray Tube (CRT)

The CRT monitor creates a picture out of many rows or lines of tiny coloured dots. The CRT monitor comes in 15-inch to 21-inch sizes (38-53 cm) and larger though the actual viewing screen is about 1 inch (2.5 cm) smaller than the rated size.

The specification regarding CRT monitor is ‘dot pitch’ which relates to the tightness or sharpness of the picture. CRT technology was widely used in the late 1990s – early 2000s.

Demerits of CRT include radiation, emission, high power consumption, weight and bulk.

LCD (Liquid Crystal Display)

A Liquid Crystal Display is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals. They are used in computer monitors, television, instrument panels, aircraft cockpit display, signage etc....They are common in consumer devices such as video player, gaming devices, clocks and watches. Most laptops and net books use LCD screen. LCDs have displaced CRT (Cathode Ray Tube) in most applications. They are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery powered electronic equipment.

OLED (Organic Light Emitting Display)

Previously only CRT monitors were available. Size mattered. CRTs were large and bulky. Today, LCD monitors came into prominence. They are a lot thinner but priced higher.

The name gives us a good idea of how it works Organic Light Emitting Display. The basis of OLED was discovered in 1985. A Kodak researcher by a name of Ching Tang noticed that if you put an electrical current through an organic material, it glowed green. This is where the idea behind OLED came from.

There is one major problem hindering all OLED displays. The organic material that is used decreases its life.

Central Processing Unit (CPU).

The CPU is the brain of the computer. It is sometimes referred to as the Central processor. In terms of computing power, the CPU is the most important element of a computer system. It is linked to main memory, peripheral equipment, which includes input and output devices, and the storage units. It selects instructions from the main memory in proper

sequence and sends them to the instruction-decoding unit, which interprets them so as to activate functions of the system at appropriate moments. The control unit integrates computer operations.

CPUs require one or more printed circuit boards. On personal computers and small workstations, the CPU is housed in a single chip called a microprocessor. Since the 1970s the microprocessor class of CPUs has almost completely over taken all other CPU implementations.

Two typical components of a CPU are the following.

- The Arithmetic Logic Unit (ALU), which performs arithmetic and logical operations.
- The Control Unit (CU), which extracts instruction from memory, decodes and executes them, calling on the ALU when necessary.

Mouse

A mouse is a small object you can roll along a hard, flat surface. Its name is derived from its shape, which looks a bit like a mouse, its connecting wire that one can imagine to be the mouse's tail, and the fact that one must make it scurry along a surface. It is a device that controls the movement of the cursor or pointer on a display screen. As you move the mouse, the pointer on the display screen moves in the same direction. Mouse contain at least one button and sometimes as many as three, which have different functions depending on what program is running Some newer mouse also include a *scroll wheel* for scrolling through long documents.
There are three basic types of mouse:

- **Mechanical:** Has a rubber or metal ball on its underside that can roll in all directions. Mechanical sensors within the mouse detect the direction the ball is rolling and move the screen pointer accordingly.

- **Optomechanical:** Same as a mechanical mouse, but uses optical sensors to detect motion of the ball.

- **Optical:** Uses a laser to detect the mouse’s movement. You must move the mouse along a special mat with a grid so that the optical mechanism has a frame of reference. Optical mouse have no mechanical moving parts. They respond more quickly and precisely than mechanical and opto-mechanical mice, but they are also more expensive.

Keyboard

The computer keyboard is the basic device through which you input information into the system. Though many other forms of inputting devices have come out in the market today, there is nothing equivalent to the keyboard.

There are many tasks that you can accomplish using the keyboard. You can use it to type out your documents, access menus, manipulate your system and much more. The keyboard also includes shortcut keys that enable you to carry out certain tasks more easily and quickly using just the keyboard. Usually a keyboard has between 80 and 110 keys. The difference in the keys setup is based on many factors such as board's manufacture, the operating system they are made from, whether they are part of a PC system or they are part of a laptop or hand-held device.

When you press any key on the keyboard you actually turn on a switch. This sends the message to the processor that a particular key has been pressed and you see the output on your screen. If you were to hold a key down continuously for some time, it is considered to be a repetitive pressing of that key and so you see that output on the screen.

Processor types

Processors execute the instructions of a computer program. Processors have rapidly evolved in terms of computing speed and processing of data. Previously, processors were made for a particular application. Nowadays mass-produced processors are available for one or many purposes. Integrated Circuit (IC) has allowed increasingly complex processors to be designed and manufactured. They are present in various digital devices in modern life far beyond the limited application of dedicated computing machines. Modern microprocessors appear in everything from automobiles to cell phones and children's toys.

Intel is the world's largest suppliers of microprocessors. The Intel® Pentium® processor with Intel® dual-core technology is the latest processor from the Intel family. It delivers great desktop performance, low power enhancements, and multitasking for everyday computing (updated on 3.Aug.2010)

AMD is the second-largest global supplier of microprocessors. It is also one of the largest suppliers of graphics processing units.

AMD processors include the dual core Opteron and Phenom and Thuban. These processors are competitive in terms of price and performance when compared to Intel.

Ports

A port is an outlet on an equipment to which a plug or cable can be connected. ***I/O ports***(Input/Output ports) are the interfaces to communicate with external devices such as printers, modems, joysticks, and terminals. Inputs are the received signals and outputs are the sent signals.
They are distinguished by their connectors, which have different shapes and numbers of contact pins, and also by the devices that may be connected to them. A variety of protocols are used with them which specify the control and data signals the port uses, and how they are to be interpreted.

Computer ports in common use are of shapes such as round (PS/2, etc.), rectangular (FireWire, etc.), square (Telephone plug), trapezoidal (D-Sub), etc, which is to standardize its physical properties and function.

Ports can be divided into two groups based on the signal transfer:

- Serial ports send and receive one bit at a time via a single wire pair.
- Parallel ports send multiple bits at the same time over several sets of wires.

USB

A Universal Serial Bus (USB) connector allows high-speed, easy connection of peripherals to a PC. Portable computing devices such as handhelds, cell phones and digital cameras that connect to the PC as a USB peripheral benefit from having additional capability to connect to other USB devices directly. For instance, users can perform functions such as sending photos from a digital camera to a printer, PDA, cell phone, or sending music files from an MP3 player to another portable player, PDA or cell phone.

Wireless USB is the new wireless extension to USB that combines the speed and security of wired technology with the ease-of-use of wireless technology. Wireless connectivity has enabled a mobile lifestyle filled with conveniences for mobile computing users. USB is intended to replace many varieties of serial and parallel ports.

Input-Output devices

Input devices

Any hardware device that can send data to a computer is known as an Input device. Keyboard, digital camera, joystick, barcode reader, microphone, webcam, scanner are all examples of Input devices.

Output devices

In order to get information out of a computer, we need to use Output devices. Monitors, printers, headphones, sound cards, video cards, projectors are all examples of Output devices.

Printers

A printer is a device that accepts text and graphic output from a computer and transfers the information to paper, usually to standard size sheets of paper. Printers are usually sold with computers, but more frequently are purchased separately. Printers vary in size, speed, sophistication, and cost. In general, more expensive printers are used for higher-resolution colour printing. Printers can be classified as

- *impact*
- *non-impact*

Impact

Impact printers are similar to an automatic typewriter, with a key striking an inked impression on paper for each printed character. The *Dot-Matrix Printer* (DMP) is a popular low-cost personal computer printer. It is an impact printer that strikes the paper one line at a time. It is still found in ATMs, small Point of Sale (POS) printers.

Non-impact

The best-known non-impact printer is the *inkjet* printer. The inkjet sprays ink from an ink cartridge at very close range to the paper as it rolls by.

Laser printers are also non-impact. The laser printer uses a laser beam reflected from a mirror to attract ink (called *toner*) to selected paper areas as the sheet rolls over a drum.

The four printer qualities of most interest are:

- **Colour:** Colour is important for users who need to print pages for presentations or maps and other pages where color is part of the information. Color printers are more expensive to operate since they use two ink cartridges (one color and one black ink) that need to be replaced after a certain number of pages.

- **Resolution:** Printer resolution (the sharpness of text and images on paper) is usually measured in dots per inch (dpi). Most inexpensive printers provide sufficient resolution for most purposes at 600 dpi.

- **Speed:** If you do much printing, the speed of the printer becomes important. Inexpensive printers print only about 3 to 6 sheets per minute. Color printing is slower. More expensive printers are much faster.

- **Memory:** Most printers come with a small amount of memory (for example, one megabyte) that can be expanded by the user. Having more than the minimum amount of memory is helpful and faster when printing out pages with large images or tables.

DIFFERENT TYPES OF PRINTERS…….

- *DOT MATRIX PRINTERS*

They are common and cheapest. They are aptly named Dot Matrix printers because; they can only print in the form of dots.

INKJET PRINTERS

It is also known as ‘BUBBLE JET PRINTERS’. They are similar to dot-matrix printers because, except that the print head consist of ink nozzles rather than pins. Their mode of operation is such that they spray tiny inkjets on the paper in a dot matrix pattern. The quality is superior to the Dot-matrix because the head consists of many nozzles and the dots are overlapped when the ink is dispersed from the ink cartridge.

LASER PRINTER

It is a high speed printer, uses laser technology. Laser recreates the image on a negatively charged drum, which attacks positively charged ink to the area image.

THERMAL PRINTER

It uses heated pins to print images. On sensitive paper the pins are electrically heated and brought in to contact with concerned paper. When it is heated the coating on the paper discolors.

Scanner

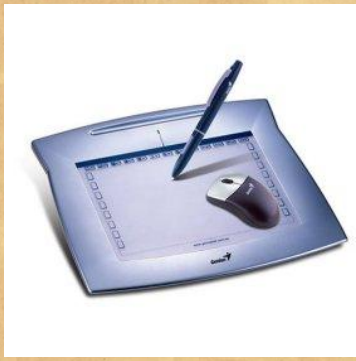
A scanner is device that can capture images from photographic prints, posters, magazine paper sources for editing and display. Scanners are generally classifies into 3 types - hold in, feed in and flatbed. Very high resolution scanners are used for scanning for high-resolution printing, but lower resolution scanners are enough capturing images for computer display. Scanners usually come with software, such as Adobe Photoshop. This program lets you resize and otherwise modify a captured image.

Graphic devices

Graphic devices output information on your monitor using the dots found on your computer monitor. These dots are known as pixels. These pixels emit light when they are struck by a beam of electrons and switched on. At any one instant, the computer hardware can switch some pixels on fully so that they emit light, skip over others so that they remain dark, and prompt still others to emit an intermediate measure of light. In this way the representation of a picture can be displayed on a graphic device using every pixel as a separate component in the image.

Human beings are receptive to high quality graphical displays and hence the quest to develop high resolution monitors. Consumer-oriented graphic devices include games consoles, conventional computers, hand-held personal digital assistants (PDAs), and mobile phones.

Graphics tablet



A graphics tablet is a computer input device that allows one to hand-draw images and graphics, similar to the way one draws images with a pencil and paper. It is also referred to as a digitizing tablet, digitizer tablet, graphics pad, pen tablet, or drawing tablet. A tablet is an alternate type of input device that can be used in place of, or in conjunction with, a mouse, trackball, or other pointing device. The tablet consists of two parts, a flat surface for drawing, and a pen, stylus, or puck that is programmed to work with the tablet. Usually, you also get a pen holder, and some tablets even come with a cordless mouse that works on the tablet surface. Even non-artists may choose to use a tablet because it offers a more ergonomic method of input that can reduce the likelihood of developing repetitive strain injury.

Thumb drives

A thumb drive is a portable memory storage device. It is capable of holding memory without a power supply. It fits into any USB port on the computer. This device is small, as a size of human thumb. Hence, it got its name and it's a very stable storage device. One of the drawbacks of thumb drive is that it lacks compatibility with Windows 98. Its main use is that they are stable, versatile, durable and portable data storage device. It is ideal for any computer user who wants safe, long term storage for a low price. Most thumb drives have millions of re-writeable cycles and can store data for 10 years before replacement.

Modem

Modem is both an output and input device. Its full form is modulation and demodulation. It is an electronic device which helps the user to connect with the internet. The role of modem in a computer is to convert the analog signals to digital signals which a computer recognizes.

Digital Camera

It is a battery powered electronic device which is used for recording and storing photographs in digital mode. It can be stored in a computer and later may be used to enhance or otherwise modified accordingly to the wish of the user. It stores the photographed image electronically, rather than on film.

<u>Uses and limitations</u>

The uses of digital cameras are mainly for capturing vivid and clearer pictures. Since it does not involve chemical and mechanical processes as in old cameras, it allows the user to take more pictures. The only drawback of digital camera is its dependence on computers to manipulate it which makes it difficult for the computer illiterate user.

Digital Camera Basics

If we need to share a photo with our friend through e-mail, you need the image to be represented in the language, which the computer understands. That is, bits and bytes. Essentially, a digital image is just a long string of '1's and '0's that represent all the tiny coloured dots or pixels that collectively make up the image.
In its basic level, both conventional cameras and digital cameras have a series of lenses that focus light to create an image of a scene. But instead of focusing this light into a piece of film, it focuses it into a semi conductor device that records light electrically. Later, the computer breaks this electronic information down into digital data.

Microphones & Speakers

They are two important devices used in computers, audio systems etc. They can record and reproduce sound signals. Microphone is an input device and speakers are output devices.

Microphones

They are widely used in internet chatting and other communicational activities. Nowadays, microphones attached to headphones are widely being used by net savvy users. Dynamic Microphones can also be used for much advanced and specified purposes like sound mixing through computer and also for vocal recording.

Speakers

Speakers are used as a sound output device in computers. Two channel speakers (Left/Right channel speakers) are commonly used for stereophonic sound output.

Headphones are used for more personal use. The output level of headphones will be much lesser than speakers but the user will have a better experience.. High definition speakers and headphones that cancel outside noise have gained prominence. They are also capable of delivering a less distorted sound with a powerful output. 4/5/7 channel speakers are used for more advanced sound output. Placing them strategically around the room of your house gives a theatrical effect with a 'surround sound' effect.

Bluetooth devices

Bluetooth is a new developed technology in our fast moving life. We are getting familiar with this Bluetooth by the mobile phone which is now a part of our life.

Bluetooth is an open wireless technology standard. With high levels of security from fixed and mobile devices we can exchange data over short distances creating personal area networks (PANs). Bluetooth uses short length radio waves. It was invented by telecoms vendor Ericsson in 1994 by JAAP HEARTSEN and SUEN MATTISSON and conceived as a wireless alternative. It can connect several devices, overcoming problems of synchronization. Bluetooth unites different communication protocols into one universal standard.

Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, Global Positioning System (GPS) receivers, digital cameras, and video game consoles.

Bluetooth devices include mobile telephones, the Wii, PlayStation 3, modems and headsets. The technology is useful when transferring information between two or more devices that are near each other. Bluetooth is commonly used to transfer sound data with telephones (i.e., with a Bluetooth headset) or byte data with hand-held computers (transferring files).