

Basic Concepts – Notes

I.C.T. - Information Communication Technology.

Computer Science is a science in which we do not learn how to use the computer but how does the computer work or how to make it work the way we want.

Hardware - The term hardware refers to the physical components of your computer such as the system unit, mouse, keyboard, monitor etc.

Software – Software is the collection of instructions that makes the computer work. It is responsible for everything happening in the computer.

I.T. - refers to the use of computers as an aid to creating and maintaining data. IT is related to all aspects of managing and processing information. In large organizations the computer departments are called IT departments.

Main parts of a computer

System Unit – It is the name given to the computer box which contains the most important components. Ex: Hard Disk, Processor, Floppy Drive etc.

Motherboard – It is contained in the system unit and all the components of the computer are somehow connected to the motherboard. Ex: The Hard Disk is attached using special cables (called buses) and the processor is fixed directly to the motherboard.

Processor – It is usually called the CPU (Central Processing Unit). The CPU is the most important microchip in the computer since it is the only chip which is able to process data. It also determines the speed of the computer. Computer speed is measured in (Mhz – Amount of instructions performed/executed per second).

Memory – The main memory of the computer is called RAM (Random Access Memory). When the computer is working all the programs and documents being used are saved temporarily in RAM. RAM is very fast but without electricity it loses all the information (volatile).

USB – The Universal Serial Bus allows us to plug in/out devices and use them directly without switching off or restarting the computer. Nowadays most scanners, printers, web-cams and other external devices support a USB connection.

Firewire - FireWire is a fast peripheral interconnect standard capable of transfer speeds up to 400 Mbs. It is used for multimedia peripherals such as DV (Digital Video) cameras and other high-speed devices like the latest hard disk drives, CD/DVD burners and printers. It can also bring broadcast quality video footage directly into a computer or digital video editing system.

Input devices – Allow us to give/input information to the computer. Ex: Keyboard

Output devices – allow us to take/output information from the computer. Ex: Monitor

Storage devices – Allow us to save data onto a storage media. Ex: Hard Disk

Peripheral devices – All the devices externally attached to the computer (ex: Keyboard, Mouse etc.)

Input devices:

Mouse – It is a pointing device which is used by GUI (Graphical User Interface) systems.

Keyboard – It is the commonest way of entering information into a computer. There are different types of keyboards but nowadays almost all keyboards use the QWERTY layout. (first 5 keys on top)

Scanners – A scanner allows us to scan printed material and convert it into digital information. Then the picture can be saved on the hard disk and used as any other digital picture. Some scanners also support OCR (Optical Character Recognition) which enables the user to convert the image of some text (usable only in Paint programs) into real text opened by Word processors.

Microphone – Enables us to input & record sounds into our computer. On the Internet the microphone (together with a pair of speakers) can be used to enable a real conversation (like a Telephone) with someone else in another place.

Touch Pads – These are special devices which respond to pressure made by your finger or a special (non-writing) pen. They are commonly found on laptops to replace the mouse. Professional computer artists also use them to be able to draw in the traditional way without the need to use the mouse or the keyboard.

Light Pens – Used with special screens, it is used to point directly on a screen. A Light Pen enables faster selections of menu options. Ex: Fast Food Take Away shops, supermarkets.

Joysticks – In the past Joysticks were required to play games but nowadays since games are more complex they usually require control by the keyboard. Still, special good games are issued with special Joysticks for the gamer to get a more realistic experience with the game. Ex: A car racing game will provide a special vibrating wheel joystick.

Web Cams – The web cam enables us to input (record) digital video and sound into a computer. They are often used on the Internet to enable direct video-conferencing (talking & seeing each other while talking/chatting together).

Output devices:

The VDU - The VDU (Visual Display Unit) is the computer screen used for outputting information in an understandable format for humans.

Flat screen monitors – Recently, these computer monitors which use the LCD technology have become available. These take up a lot less room on a desk and use less energy than the traditional, more bulky monitors.

Video Projectors – These devices can be attached to your computer and are useful for displaying a presentation to a large group of people.

Speakers – Nowadays most computers support multimedia (Pictures & sounds) therefore almost all computers come with the ability to output sounds – using a pair of speakers.

Laser printers – These printers produce high quality output at high speeds. They are called laser printers since they contain a small laser inside. Their printing mechanism is very similar to that of a photocopier. Compared to other printers their price is still expensive, especially colour laser printers. They are usually found in large offices and companies.

Inkjet Printers – They are very quiet in operation and produce good quality printing. They work by spraying an amount of ink onto the paper. Although the printer is very cheap, the ink cartridges are still expensive. These are commonly found at homes or small offices.

Dotmatrix – These printers generate a lot of noise and do not produce a high quality printing. The printer works by firing a number of pins onto a ribbon of ink (like that of a Type-Writer) and then onto the paper. The ink is very cheap but since they are very noisy they are only used for high volume printing in very large organisations.

Plotters – These printers are special printers which need special software. They print by physically drawing out the outlines of the required objects (using a robotic arm with a pen). These are very large in size, expensive and are only used by designers and scientists.

Types of Computers:

Mainframe computer - Mainframe computers are the big, powerful, expensive computers used in the background by most large organizations. The power of the mainframe can be distributed amongst many people accessing the mainframe via their own PC. Mainframes are used only by large companies such as Insurances, Banks, Large Research Institutes, Air Traffic Control systems etc.

PC – The Personal Computer was invented by IBM in 1981. All PCs created from then onwards are in many ways compatible with these original design. Obviously, since then many extensions were added. These days, PCs are mostly found at homes and would be using a version of Windows or Linux.

Mac – The Apple Macintosh(Mac) is a computer but not a PC. It uses a different operating system and different programs. The hardware connected to Mac should be also adapted in some way or another.

Network Computers – when two or more computers are connected to each other we say that the those computers are on a network. In this way the network allows us to share

information between the connected computers. It also allow us to share resources such as HardDisks, CD/DVD Writers and Printers. They are used in all environments where people need to share resources – ex: Schools, Universities, Companies etc. (processor power distribution, distributed storage space)

Laptops – These are very small portable computers that can run on batteries as well as the mains powers supply. They use a LCD (Liquid Crystal Display) flatscreen. These computers are slightly more expensive than the normal PCs and are usually used by people “on the move” such as business man.

PDA – Personal Digital Assistants are very small and compact computers which can easily fit in the palm of your hand or in your pocket. Usually they use a light-pen instead of a keyboard. They will also have a special Operating system and other special software. They can also be connected easily to a network or the Internet. These PDAs are common amongst people who need a very small & handy computer to work out some work or write notes while on the move. Ex: Journalists, Students, Business men.

Smartphone - A telephone that provides additional information accessing features. Any mobile telephone that combines voice services with e-mail, fax, pager or Internet access is called a smart phone.

Tablet PC - A Tablet PC is a notebook or slate-shaped mobile computer, equipped with a touch screen or graphics tablet/screen hybrid technology which allows the user to operate the computer with a stylus or digital pen, or a fingertip, instead of a keyboard or mouse.

Health & Safety

Ergonomics – With ergonomics we understand the elements and practices that help create a good and healthy working environment.

The Screen – Should be fully adjustable so that our eyes are at the same height as the top of the screen. Good screens have filters to reduce the emitted glare. We should periodically refocus into the distance so that we relieve the tension on our eye lenses.

The Chair – should be adjustable and be able to be moved up or down. It should also include an adjustable back.

The Keyboard – a good keyboard should include a wrist pad to relieve the pressure on your wrist.

The Mouse – Should have the shape of your palm so that while using the mouse your palm can rest on it.

Your Feet – The desk should include a footpad which enables our feet to rest on it while using the computer.

Breaks – When using a computer it is important to take frequent short breaks.

Other factors - The area that you are using the computer in should be adequately lit and well ventilated.

RSI – Repetitive Strain Injury – This condition/injury is caused by constant use of the computer (usually keyboard & mouse). To avoid RSI it is important to take frequent short breaks.

Other Precautions:

Power Cables – We should make sure that the cables are connected properly and fixed in their place.

Overloading Cables – All computers and equipment should use adequate and proper power supply cabling to avoid overloading of power supply points. Overloading will increase the chance of starting a fire through excess tension / heat of the cables.

Environment:

In some way or another, computers are also polluting the environment. Still some of these problems can be minimized:

Recycling of Printer Cartridges & Printer Toners – Refilling and reusing the container will help in minimizing the amount of empty ink containers dumped daily around the world.

Minimizing the amount of Printing – By printing only the necessary material we save on Paper and Ink. Using on-line help will save on printing bulky printed manuals.

Energy saving modes – Most devices nowadays support the Energy Saving mode while they are not being used. For example a monitor goes into 'sleep mode' after some time displaying the screen saver. In this way we save on electric energy being used.