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JSS2 FIRST TERM NOTES ON COMPUTER

WEEK 1

Topic: THE COMPUTER SYSTEM

Contents:

- Introduction
- History of Computers
- Characteristics of Computers
- Basic Functions of a Computer
- Uses of a Computer

A. INTRODUCTION

A Computer is an electronic device known to be a very powerful tool for processing data into meaning information in a faster, neater and cheaper form. The Computer System is one that is able to take a set of inputs, process them and create a set of outputs.

A Computer is a general-purpose device that can be programmed to carry out a set of arithmetic or logical operations automatically. Since a sequence of operations can be readily changed, the computer can solve more than one kind of problem. Conventionally, a computer consists of at least one processing element, typically a central processing unit (CPU), and some form of memory. The processing element carries out arithmetic and logic operations, and a sequencing and control unit can change the order of operations in response to stored information. Peripheral devices allow information to be retrieved from an external source, and the result of operations saved and retrieved.

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.

An INPUT consists of data or commands that are entered into the computer usually via an input device such as keyboard, mouse, scanner e.t.c. The role of an input is to provide data for further processing.

Processing is the stage where the input data is manipulated to produce meaningful information. Procesing can include a number of stages, sorting, searching, calculating, graphing e.t.c The result obtained is called output.

An OUTPUT is the stage where information received via processing is presented to the user in suitable format. Most outputs involve converting digital data to a physical effect which a person can see or hear. You might be able to see your output via a print out or a display and also hear via music, voice training instructions.

B. HISTORY OF COMPUTERS

The **history of computer science** began long before the modern discipline of computer science that emerged in the 20th century, and hinted at in the centuries prior. The progression, from mechanical inventions and mathematical theories towards the modern computer concepts and machines, formed a major academic field and the basis of a massive worldwide industry.

The earliest known tool for use in computation was the abacus, developed in period 2700–2300 BCE in Summer. The Sumerians' abacus consisted of a table of successive columns which delimited the successive orders of magnitude of their sexagesimal number system. Its original style of usage was by lines drawn in sand with pebbles. Abaci of a more modern design are still used as calculation tools today

Charles Babbage is described as the 'Father of Computer'. Charles Babbage, an English mechanical engineer and polymath, originated the concept of a programmable computer. Considered the "father of the computer", he conceptualized and invented the first mechanical computer in the early 19th century. After working on his revolutionary difference engine, designed to aid in navigational calculations, in 1833 he realized that a much more general design, an Analytical Engine, was possible. The input of programs and data was to be provided to the machine via punched cards, a method being used at the time to direct mechanical looms such as the Jacquard loom. For output, the machine would have a printer, a curve plotter and a bell. The machine would also be able to punch numbers onto cards to be read in later. The Engine incorporated an arithmetic logic unit, control flow in the form of conditional branching and loops, and integrated memory, making it the first design for a general-purpose computer that could be described in modern terms as Turing-complete.

The various generations of computers are listed below:

(i) First Generation (1946-1954) : In 1946 there was no 'best' way of storing instructions and data in a computer memory. There were four competing technologies for providing computer memory: electrostatic storage tubes, acoustic delay lines (**mercury or nickel**), **magnetic drums** (and disks?), and **magnetic core storage.**

The digital computes using **electronic valves** (Vacuum tubes) are known as first generation computers. The first 'computer' to use electronic valves (ie. vacuum tubes). The high cost of vacuum tubes prevented their use for main memory. They stored information in the form of propagating sound waves.

The vacuum tube consumes a lot of power. The Vacuum tube was developed by Lee Deforest in 1908. These computers were large in size and writing programs on them was difficult. Some of the computers of this generation were: Mark I (electro-mechanical computer) built in 1944, ENIAC (First general purpose electronic computer) built in 1946, EDVAC (binary serial computer) built in 1950, EDSAC (first stored-program computer) built in 1949, UNIVAC (First Commercial Computer) built in 1951.

Other Important Computers of First Generation

Some other computers of this time worth mentioning are the Whirlwind, developed at Massachusetts Institute of Technology, and JOHNNIAC, by the Rand Corporation. The Whirlwind was the first computer to display real time video and use core memory. The JOHNNIAC was named in honor of Jon von Neumann. Computers at this time were usually kept in special locations like government and university research labs or military compounds.

Limitations of First Generation Computer

Followings are the major drawbacks of First generation computers.

1. They used valves or vacuum tubes as their main electronic component.
2. They were large in size, slow in processing and had less storage capacity.
3. They consumed lots of electricity and produced lots of heat.
4. Their computing capabilities were limited.
5. They were not so accurate and reliable.
6. They used machine level language for programming.
7. They were very expensive.

Example: ENIAC, UNIVAC, IBM 650 etc

(ii) **Second Generation (1955-1964) :** The second-generation computer used **transistors** for CPU components & **ferrite cores for main memory** & **magnetic disks** for secondary memory. They used high-level languages such as **FORTRAN (1956), ALGOL (1960) & COBOL (1960 – 1961)**. I/O processor was included to control I/O operations.

Around 1955 a device called ***Transistor*** replaced the bulky Vacuum tubes in the first generation computer. Transistors are smaller than Vacuum tubes and have higher operating speed. They have no filament and require no heating. Manufacturing cost was also very low. Thus the size of the computer got reduced considerably.

It is in the second generation that the concept of Central Processing Unit (CPU), memory, programming language and input and output units were developed. The programming languages such as COBOL, FORTRAN were developed during this period. Some of the computers of the Second Generation were

1. **IBM 1620**: Its size was smaller as compared to First Generation computers and mostly used for scientific purpose.

2. **IBM 1401**: Its size was small to medium and used for business applications.

3. **CDC 3600**: Its size was large and is used for scientific purposes.

Features:

1. Transistors were used instead of Vacuum Tube.

2. Processing speed is faster than First Generation Computers (Micro Second)

3. Smaller in Size (51 square feet)

4. The input and output devices were faster.

Example: IBM 1400 and 7000 Series, Control Data 3600 etc.

(iii) Third Generation (1964-1977) : By the development of a small chip consisting of the capacity of the **300 transistors**. These Integrated Circuits (IC) are popularly known as ***Chips***. A single IC has many transistors, registers and capacitors built on a single thin slice of **silicon**. So it is quite obvious that the size of the computer got further reduced. Some of the computers developed during this period were **IBM-360, IBM-370, and VAX-750**. Higher level language such as **BASIC (Beginners All-purpose Symbolic Instruction Code)** was developed during this period. Computers of this generation were small in size, low cost, large memory and processing speed is very high. Very soon ICs Were replaced by **LSI (Large Scale Integration)**, which

consisted about 100 components. An IC containing about 100 components is called LSI.

Features:

1. They used Integrated Circuit (IC) chips in place of the transistors.

2. Semiconductor memory devices were used.

3. The size was greatly reduced, the speed of processing was high, they were more accurate and reliable.

4. Large Scale Integration (LSI) and Very Large Scale Integration (VLSI) were also developed.

5. The mini computers were introduced in this generation.

6. They used high level language for programming.

Example: IBM 360, IBM 370 etc.

(iv) Fourth Generation: An IC containing about 100 components is called LSI (Large Scale Integration) and the one, which has more than 1000 such components, is called as **VLSI (Very Large Scale Integration)**. It uses *large scale Integrated Circuits* (LSIC) built on a single silicon chip called microprocessors. Due to the development of microprocessor it is possible to place computer's *central processing unit* (CPU) on single chip. These computers are called microcomputers. Later *very large scale Integrated Circuits* (VLSIC) replaced LSICs. Thus the computer which was occupying a very large room in earlier days can now be placed on a table. The personal computer (PC) that you see in your school is a Fourth Generation Computer Main memory used fast semiconductors chips up to 4 M bits size. Hard disks were used as secondary memory. Keyboards, dot matrix printers etc. were developed. OS-such as **MS-DOS, UNIX, Apple's Macintosh** were available. Object oriented language, **C++** etc were developed.

Features:

1. They used Microprocessor (VLSI) as their main switching element.

2. They are also called as micro computers or personal computers.

3. Their size varies from desktop to laptop or palmtop.

4. They have very high speed of processing; they are 100% accurate, reliable, diligent and versatile.

5. They have very large storage capacity.

Example: IBM PC, Apple-Macintosh etc.

(v) Fifth Generation (1991- till date) : 5th generation computers use ULSI (Ultra-Large Scale Integration) chips. Millions of transistors are placed in a single IC in ULSI chips. 64 bit microprocessors have been developed during this period. Data flow & EPIC architecture of these processors have been developed. RISC & CISC, both types of designs are used in modern processors. Memory chips and flash memory up to 1 GB, hard disks up to 600 GB & optical disks up to 50 GB have been developed. fifth generation digital computer will be **Artificial intelligence**.

C. CHARACTERISTICS OF A COMPUTER

1. Speed: – A Computer must work very fast. A computer can perform millions of instructions and even more per second. Therefore, we determine the speed of computer in terms of microsecond (10-6 part of a second) or nanosecond (10 to the power -9 part of a second). From this you can imagine how fast your computer performs work.

2. Accuracy: – The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is **7** determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

3. Diligence: – A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

4. Versatility: – It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills or to create classwork notes.

5. Power of Remembering: – Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

6. No IQ: – Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

7. No Feeling: – It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

8. Storage: – The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers.

D. BASIC FUNCTIONS OF A COMPUTER

All computers, from the smallest hand held computer to the largest supercomputer, perform the same basic functions with digital information. Those functions are:

- **Input** – Receiving or accepting information from outside sources. The most common way of performing this function is through the information entered through the keyboard and the click of mouse. Typing characters at a keyboard, moving the mouse around the screen or speaking to a computer.
- **Output** – The results of the processing are made available for use by any user or other devices. The most common ways of producing such outputs are through computer monitor, speakers, and printers. When a computer is connected to other devices, including through Internet, this output is in the form of electrical pulses. Displaying characters or pictures on the screen, printing a research paper, or sending an e-mail message.
- **Processing** – This is really the core of computer operation. The computer processes the data that is fed to the computer by various means and the data already contained in internal memory to produce the results that is the core of all computer application. E.g. Calculating the square root of a number, sorting a list of names, or producing a three-dimensional image

- **Storage** – Store information in the computer. The memory is stored in computer in in several different ways depending on how the information is used. For simplicity we will classify in two broad categories. First is the memory in the central processing unit of the computer, and second is the auxiliary memory. The auxiliary memory includes devices such as fixed hard drives. The information stored in computer can also be divided broadly used in two categories. The user data and the instructions used for internal operation and processing in the compute. These instructions are what we call computer programs or software. E.g. Saving your research paper or resume, keeping track of your credit card purchases, or archiving digital pictures of your relatives
- **Retrieve** – *E.g.* Recalling a list of addresses or business contacts

E. USES OF COMPUTER

Computer can be used in all aspects of our everyday lives.

1. **Education :** Getting the right kind of information is a major challenge as is getting information to make sense. Research shows that computers can significantly enhance performance in learning. Students exposed to the internet say they think the web has helped them improve the quality of their academic research and of their written work. Lots of academic information are available on the internet.
2. **Health and Medicine**: All medical information and patient records can now be digitized. Software is now able to check the risk of a disease through computer usage. Mental health researchers are using computers to screen troubled teenagers in need of psychotherapy.
3. **Defence**: a) Computers are used in helping the military find out where all their assets are (Situational Awareness) and in Communications/Battle Management Systems. b) Computers are used in the logistic and ordering functions of getting equipment to and around the battlefield. c) Computers are used in tanks and planes and ships to target enemy forces, help run the platform and more recently to help diagnose any problems with the platforms. d) Computers help design and test new systems.
4. **Sports**: In today's technologically growing society, computers are being used in nearly every activity such as recording information, analyzing athlete's movement, score board e.t.c

5. **Government**: Various departments of the Government use computer for their planning, control and law enforcement activities. To name a few – Traffic, Tourism, Information & Broadcasting, Education, Aviation and many others.

Assessment

1. The third generation of computer uses ……
   a. transistors
   b. integrated circuit
   c. microprocessor
   d. ultra large scale integrated circuits
2. Valves and vacuum tubes is a feature of ……..
   a. first generation
   b. second generation
   c. third generation
   d. fourth generation
3. Computer can be used in defense. True/False
4. One of this is not a basic function of computer
   a. input
   b. processing
   c. output
   d. collection
5. ……. is not a characteristic of Computer
   a. Speed
   b. Accuracy
   c. Composition
   d. Versatility

Answers

1. B
2. A
3. True
4. D

WEEK 2

Topic: COMPUTER HARDWARE

COMPUTER HARDWARE

The physical parts of a computer are referred to as the hardware which primarily consists of the system unit and other peripheral devices. E.g monitor, keyboard, mouse e.t.c. **Computer hardware** (usually simply called **hardware** when a computing context is implicit) is the collection of physical elements that constitutes a computer system. Computer hardware is the physical parts or components of a computer, such as the monitor, mouse, keyboard, computer data storage, hard disk drive (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), and so on, all of which are physical objects that can be touched (that is, they are tangible).

Examples of External Hardware not inside the computer:

Monitor: A computer monitor is a display adapter that displays information processed by the computer's video card. When a video card or graphics card converts binary information from 1s and 0s into images, these images are displayed onto the directly connected monitor.

Computer Monitor

Printer: A printer is a device that accepts text and graphic output from a computer and transfers the information to paper i.e. physical evidence of your work, usually to standard size sheets of paper.

Printer

Keyboard: A **computer keyboard** is an input device used to enter characters and functions into the computer system by pressing buttons, or **keys**. It is the primary device used to enter text. A keyboard typically contains keys for individual letters, numbers and special characters, as well as keys for specific functions.

Keyboard

Mouse: A mouse has two buttons and a scroll wheel, which can also act as a third button. It is used to point, click and select text, pictures e.t. on your screen. It points and click on icons, menus, command buttons or activates something on a computer.

Mouse

Microphone/Speaker: To input voice/sound recordings and also listen to sound/music

Speaker

Scanner: A scanner is a digital device that converts films, documents and photographic prints to digital images**.** A scanner is a device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display. Scanners come in hand-held, feed-in, and flatbed types and for scanning black-and-white only, or color.

Scanner

Examples of Internal hardware

Hard-disk: Is a data storage device used for storing and retrieving digital information using one or more rigid (“hard”) rapidly rotating disks (platters) coated with magnetic material. There are two types; External and Internal.

External Hard-drive

CPU (Central Processing Unit): The brain of the computer. The thing that carries out the tasks you give it. Better CPUs can perform more tasks at once, and perform them faster. That said, not everyone actually takes advantage of their processor's full speed, so the high-end models are only really crucial.

CPU

Fan: To keep CPU cool and prevent overheating. A **computer fan** is any fan inside, or attached to, a computer case used for active cooling, and may refer to fans that draw cooler air into the case from the outside, expel warm air from inside, or move air across a heat sink to cool a particular component.

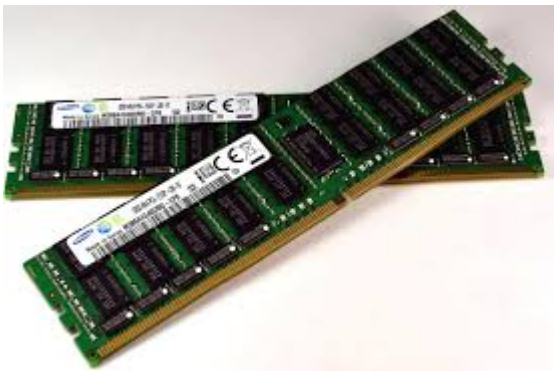
Fan

Graphics Card: The Graphics card, or GPU, is a processor specifically designed to handle graphics. It's what you hook your monitor up to, and it's what draws your desktop and your windows on the screen.

Motherboard: The main printed circuit board in the computer with sockets to connect to other parts. It contains a lot of your machine's core features, like the number of USB ports, the number of expansion cards you can put in (such as video, sound, and Wi-Fi), and also partially determines how big your computer will be.

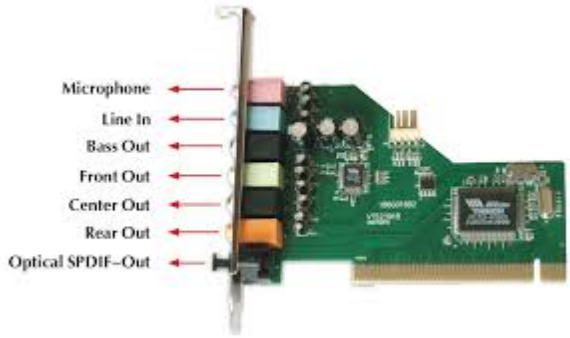
Mother Board

RAM: RAM or Random Access Memory (or "Memory" for short), is like your computer's short-term memory. It stores data your computer needs quick access to to help your programs run faster, and help you run more programs at one time.



RAM- Random Access Memory

Sound card: Used to generate and capture sounds. A **sound card** (also known as an **audio card**) is an internal computer expansion card that facilitates economical input and output of audio signals to and from a computer under control of computer programs. The term *sound card* is also applied to external audio interfaces that use software to generate sound, as opposed to using hardware inside the PC.



Sound card

Input Devices:

- **Text input devices**
    - Keyboard – a device to input text and characters by depressing buttons (referred to as keys), similar to a typewriter. The most common English-language key layout is the QWERTY layout.
- **Pointing devices**
    - Mouse – a pointing device that detects two dimensional motion relative to its supporting surface.

    - Trackball – a pointing device consisting of an exposed protruding ball housed in a socket that detects rotation about two axes.
- **Gaming devices**
    - Joystick – a general control device that consists of a handheld stick that pivots around one end, to detect angles in two or three dimensions.
    - Gamepad – a general handheld game controller that relies on the digits (especially thumbs) to provide input.

Game pad

- Game controller – a specific type of controller specialized for certain gaming purposes.
- Image, Video input devices
    - Image scanner – a device that provides input by analyzing images, printed text, handwriting, or an object.
    - Webcam – a low resolution video camera used to provide visual input that can be easily transferred over the internet.
- **Audio input devices**
    - Microphone – an acoustic sensor that provides input by converting sound into electrical signals

Output

- **Image, Video output devices**
    - Printer
    - Monitor

- **Audio output devices**
    - Speakers
    - Headset

ASSESSMENT

1. Define the following:

- Monitor
- mouse Graphics card
- Sound Card
- CPU

WEEK 3

Topic: SOFTWARE

DEFINITION

Software can be defined as instruction and association data that directs the computer to accomplish a task, sometimes the term refers to a single program but often the term refers to collections of program and data that are packed together. Software are the applications and programming instructions that tell your computer what to do and enable you to use it for things such as playing games, writing an essay or listening to music.

The software you use determines what type of computer you can use and what you can do with the computer.

There are two main types of software which you will learn about in detail later on. They are 'systems software' which basically controls the way the computer works and tells it what to do.

TYPES OF SOFTWARE

1. SYSTEM SOFTWARE: Is designed to directly operate the computer hardware, to provide basic functionality needed by users and other software, and to provide a platform for running application software. System software includes:

- Operating systems, which are essential collections of software that manage resources and provides common services for other software that runs "on top" of them. Supervisory programs, boot loaders, shells and window systems are core parts of operating systems. In practice, an operating system comes bundled with additional software (including application software) so that a user can potentially do some work with a computer that only has an operating system.
- Device drivers, which operate or control a particular type of device that is attached to a computer. Each device needs at least one corresponding device driver; because a computer typically has at minimum at least one input device and at least one output device, a computer typically needs more than one device driver.
- Utilities, which are computer programs designed to assist users in maintenance and care of their computers

The system software manages the fundamental operation of a computer such as

(i) loading programs and data into memory

(ii) Executing program

(iii) Saving data to disk

(iv) Displaying information on the monitor

(v) Transmitting of data through a point to peripheral device.

2. APPLICATION SOFTWARE: Application software is a program that is designed to accomplish a specific task.

Some examples include:

- Word processors such as Word
- Spreadsheets such as Excel
- Databases such as Access
- Games applications such as Half Life, Call of Duty etc

The application software can be subdivided into two class namely

- **General and customized software:** General and customized software can be found in most computer accessories designers outlets/shop hence the reason they are sometimes refers to as off shop packages software. In the business world today, some examples of tasks accomplished with application software and document production are spreadsheet and database management. In addition, business may sometimes like graphics and also presentation software, including multimedia application
- **Personally customized software:** Personally customized software, is a software that is being used personally by an end user programmer for a specific task and it not be seen in a public outlets.

TYPES OF APPLICATION SOFTWARE

- **Microsoft word:** Microsoft word is majorly used for document formatting and arrangement
- **Microsoft excel:** Microsoft excel is majorly used for calculation and arrangement for pay record.
- **Microsoft access:** Microsoft access is majorly used for database arrangement and accessibilities

- **Microsoft power point:** Microsoft power point is majorly for slide presentation during conferences and seminars
- **Corel draw:** Corel draw is a graphic suit application that enables a computer user to create graphic and pictures**.**
- **Multimedia software: M**ultimedia software allows the user to create and play audio and media e.g Window media.

3. MALICIOUS SOFTWARE OR MALWARE: Are computer programs developed to harm and disrupt computers. As such, malware is undesirable. Malware is closely associated with computer-related crimes, though some malicious programs may have been designed as practical jokes.

ASSESSMENT

1. Define Software?
2. List TWO types of software
3. List FOUR applications of software

WEEK 4
Topic: Computer Professionals

COMPUTER PROFESSIONALS

Computer professionals are information technology. The definition has extended to those involved in the internet industry too.those who deal with the computer industry to develop something. They may design, build, write or sell software. A *computer professional* is a person who works in the field of

A computer professional may be:

1. A person working in the field of information technology
2. A person who has undergone training in a computer-related field college, universities and computer institutes
3. A person who has an extensive knowledge in the area of computing.

In today's technology rich world, the demand for computer professionals is growing. The current ICT (Information and Communication Technology) workforce is approximately 6.7 million people. It predicts that ICT will be one of the fastest growing industries for the next several years. The computer industry offers many rewarding careers which often requires a unique combination of hand on skills, creative problem solving, understanding of the industry as a whole and your organization specific business needs.

FIELDS THAT REQUIRE COMPUTER PROFESSIONALS

1. **MANAGEMENT**

In this field, the role of computer professional (manager) includes directing the planning, research, development, evaluation and integration of technology. The jobs that are available and their functions in the management field are as follows:

- **CHIEF INFORMATION OFFICER (CIO)** which directs the company's information service and communication functions.
- **AN E-COMMERCE DIRECTOR:** Supervises the development and executing of the internet or e-commerce system and also work with the company's marketing division.

- **WIRELESS NETWORK ADMINISTRATORS**: Install, configure and maintain the company's network and internet system and identifies and resolves connectivity issues.
- **A PROJECT MANAGER:** Oversees all assigned project, allocate resources select team and performs analysis and program task.

2. **SYSTEM DEVELOPMENT AND PROGRAMMING:** The role of system developer and programmer includes analysis, designing, developing and implementing new information technology, maintaining and improving existing systems. The jobs available and programming fields are as follows.

- **COMPUTER PROGRAMMER:** A computer programmer designs games and translate the design into a computer program, using an appropriate computer language such as visual Basic, Java, C#, F# and C+
- **COMPUTER SCIENTIST:** A computer scientist is someone who makes research, invents and develops innovations and solutions to complex software requirement or problems.
- **DATABASE ANALYST:** This is a person who models techniques and tools to analyse, tune and specify data usage within an application area.
- **SOFTWARE ENGINEER:** A software engineer specifies, designs, implements, tests and documents high quality software in a variety of fields including robotics, operation system.
- **SYSTEM ANALYST:** A system analyst works closely with users to analyse their requirements, designs and develops new information system, and incorporates new technologies.
- **SYSTEM PROGRAMMER:** Installs and maintains operating system software, and provides technical support to the programming staff.
- **TECHNICAL LEADER:** Guides the designer and the developer. He also serves as an interface between a programmer/developer and the management.
- **TECHNICAL WRITER:** Works alongside the analyst, the programmer and the user to create system documentation and user materials.
- **WEB SOFTWARE DEVELOPER**: Designs, implements and support web application, he also works with HTML, Ajax Java Script and multimedia.

3. **TECHNICAL SERVICES:** The role of this professional includes evaluation and integration of new technologies, administering and organization of data resources and supporting the centralized computer operating system and server. The jobs available under the technical services are as follows:

- **COMPUTER TECHNICIANS**: Install, maintain and repair hardware, upgrade and configures software and troubleshoot hardware problems
- **DATABASE ADMINISTRATOR:** Creates and maintains the data dictionary and monitors database performances
- **DESKTOP PUBLISHER COMPOSITOR:** Formats and combines text and graphics to produce publication ready materials.
- **GRAPHIC DESIGNER:** Develops visual impression of products for advertisement and marketing materials
- **QUALITY ASSURANCE SPECIALIST:** Reviews programs and documentation to ensure that they meet the organization's standard.
- **STORAGE ADMINISTRATOR:** Installs, maintains and upgrades storage system, also analyses organization's storage needs.
- **WEB DESIGNER:** Designs graphics contents using Photoshop, flash and multimedia
- **WEB ADMINISTRATOR:** Maintains the organization's website, create web pages, and oversees website performance.

4. **OPERATIONS:** These include operating the centralized computer equipment and administering the network including data and voice communication. The following are the jobs available and their functions.

- **COMPUTER OPERATOR:** Performs equipment related activities such as monitoring performance running jobs, keeping backups and restoring data.
- **DATA COMMUNICATION ANALYST:** Installs and monitors communication equipment software and maintains internet WAN connections.

5. **TRAINING:** The role of this computer professional includes training and teaching employees how to use components of the information system and answer specific user question. The jobs and job profiles available in this stage are:

- **CORPORATE TRAINER:** Teaches employees how to use software, designs and develops system and program applications, and also performs other computer related activities.
- **COMPUTER INSTRUCTOR:** Teaches students computer science and information technology skills.
- **HELP DESK SPECIALIST:** Is a person who answers computer related questions over the telephone or in a chat room.

6. **SECURITY:** This includes developing and enforcing policies that are designed to safeguard an organization's data and information from unauthorized users. The following are the jobs available and the functions are:

- **CHIEF SECURITY OFFICER (CSO):** Is responsible for the physical security of an organization's property and the people n it. He is also in charge of securing computer resources.
- **COMPUTER SECURITY SPECIALIST:** Is responsible for the security of data and information stored on computer and the mobile devices within an organization.
- **NETWORK SECURITY ADMINISTRATOR:** Configures router, firewall and specifies web protocol and also interpret technologies.
- **SECURITY ADMINISTRATOR:** Administers the network security access and monitors it. He also protects against unauthorized access.

CAREERS IN COMPUTER INDUSTRY

Now a day's computer industry is the largest industry where jobs are created for thousands of people and primary business people and primary businesses which are computer related jobs. Examples are:

1. General business and IT development
2. Computer equipment field
3. Computer software field
4. Computer service and repair filed
5. Computer sales
6. Computer education and training field
7. IT consultation.

CERTIFICATE: This is the process of verifying the technical knowledge of an individual who has demonstrated competence in a particular area, today there are more than 200 certificates available, such as.

1. MICROSOFT CERTIFIED APPLICATION SPECIALIST
2. MICROSOFT CERTIFIED APPLICATION PROFESSIONAL
3. MICROSOFT CERTIFIED DESKTOP TECHNICIANS and so many more.

Assessment

Mention 3 fields that require Computer professionals

WEEK 5&6

Topic: OPERATING SYSTEM

DEFINITION

An operating system (sometimes abbreviated as "OS") is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer. The other programs are called *applications* or application programs. The application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface such as a command language or a graphical user interface (GUI).

Operating system controls the basic input and output, allocates system resources, manage storage space, maintain security and delete equipment failure. The operating system controls the flow of data.

Examples of popular modern operating systems include Android, BlackBerry 10, BSD, Chrome OS, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone, and z/OS

An operating system performs these services for applications:

- In a multitasking operating system where multiple programs can be running at the same time, the operating system determines which applications should run in what order and how much time should be allowed for each application before giving another application a turn.
- It manages the sharing of internal memory among multiple applications.
- It handles input and output to and from attached hardware devices, such as hard disks, printers, and dial-up ports.
- It sends messages to each application or interactive user (or to a system operator) about the status of operation and any errors that may have occurred.
- It can offload the management of what are called *batch* jobs (for example, printing) so that the initiating application is freed from this work.
- On computers that can provide parallel processing, an operating system can manage how to divide the program so that it runs on more than one processor at a time.

FUNCTIONS OF AN OPERATING SYSTEM

The Operating System has three main functions

A. Manage the computer's resources, such as the central processing unit, memory, disk drives, and printers

B. Establish a user interface

C. Execute and provide services for applications software

Other functions are:

1. Boot process: When the computer is switched on the boot program that is resided in Rom initialize the setup of the computer, the then load the rest of the operating system from the banking storage (hard ware) in the RAM.
2. Operating system does the work of sharing and accounting of the computer resources
3. Operating system handles the input and output of data and information.
4. Operating system handles the management of memory.
5. Operating system handles the management of the hardware.
6. Operating system handles multitasking and multi programming.
7. Operating system handles protection and error trending.
8. Operating system acts as an interface between the user and the computer
9. Operating system controls interaction and program control

Assessment

Mention 3 Functions of an Operating System

Week 7

Topic: NUMBER BASE SYSTEM

NUMBER BASE

A computer or any digital system works in a binary manner. The main number systems used in digital hardware are as follows.

DECIMAL NUMBER SYSTEM: The decimal number system (base10) number system has ten as it base. It uses various symbols called digit for ten distinct value (0, 1,3,4,5,6,7,8 and 9) to represent numbers. It requires 10 different types of electronic pulse.

The decimal system is a position number system. It has position for unit, tens, hundred e.t.c The position of each digit conveys the multiplier(a power of ten) to be used with the digit- each position has value to ten time of a position to its right. For example:

$275 = 2\times100 + 7\times10 + 5\times1$

$2x\ 10^2 + 7 + 10^1 + 5\ x\ 10^0$

BINARY NUMBER

The binary number (base 2) number system represents values using symbols typically 0 and 1. In other words, the binary number system is a position number system with a power of two (2). Owing to its relatively straightforward implementation in electronic circuitry, the binary is used internally by virtually in all modern computers.

The numerals 0 and 1 have the same meaning in the decimal system, but a different interpretation is placed on the position occupied by a digit.

In the binary number system, the individual digit represent the coefficient of power 2 rather than 10 as in the decimal number system. For example, the decimal number system 19 is written in the binary representation as 10011

$1^4O^3O^21^11^0_2 = 1\ x\ 2^4 + O\ x\ 2^3 + O\ x\ 2^2 + 1\ x\ 2^1 + 1\ x\ 2^O$

$= 16 + O + O + 2 + 1.$

Let's look at base-two, or binary, numbers. How would you write, for instance, 12_{10} ("twelve, base ten") as a binary number? You would have to convert to base-two columns, the analogue of base-ten columns. In base ten, you have columns or

“places” for $10^0 = 1$, $10^1 = 10$, $10^2 = 100$, $10^3 = 1000$, and so forth. Similarly in base two, you have columns or “places” for $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, and so forth.

The first column in base-two math is the units column. But only “0” or “1” can go in the units column. When you get to “two”, you find that there is no single solitary digit that stands for “two” in base-two math. Instead, you put a “1” in the twos column and a “0” in the units column, indicating “1 two and 0 ones”. The base-ten “two” (2_{10}) is written in binary as 10_2.

A “three” in base two is actually “1 two and 1 one”, so it is written as 11_2. “Four” is actually two-times-two, so we zero out the twos column and the units column, and put a “1” in the fours column; 4_{10} is written in binary form as 100_2. Here is a listing of the first few numbers:

decimal (base 10)	**binary (base 2)**	
0	0	0 ones
1	1	1 one
2	10	1 two and zero ones
3	11	1 two and 1 one
4	100	1 four, 0 twos, and 0 ones
5	101	1 four, 0 twos, and 1 one
6	110	1 four, 1 two, and 0 ones
7	111	1 four, 1 two, and 1 one
8	1000	1 eight, 0 fours, 0 twos, and 0 ones
9	1001	1 eight, 0 fours, 0 twos, and 1 one
10	1010	1 eight, 0 fours, 1 two, and 0 ones
11	1011	1 eight, 0 fours, 1 two, and 1 one
12	1100	1 eight, 1 four, 0 twos, and 0 ones
13	1101	1 eight, 1 four, 0 twos, and 1 one
14	1110	1 eight, 1 four, 1 two, and 0 ones
15	1111	1 eight, 1 four, 1 two, and 1 one
16	10000	1 sixteen, 0 eights, 0 fours, 0 twos, and 0 ones

Converting between binary and decimal numbers is fairly simple, as long as you remember that each digit in the binary number represents a power of two.

- **Convert 101100101_2 to the corresponding base-ten number.**

I will list the digits in order, and count them off from the RIGHT, starting with zero:

digits: 1 0 1 1 0 0 1 0 1

numbering: 8 7 6 5 4 3 2 1 0

The first row above (labelled “digits”) contains the digits from the binary number; the second row (labelled ” numbering”) contains the power of 2 (the base) corresponding to each digits. I will use this listing to convert each digit to the power of two that it represents:

$1\times2^8 + 0\times2^7 + 1\times2^6 + 1\times2^5 + 0\times2^4 + 0\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0$

$= 1\times256 + 0\times128 + 1\times64 + 1\times32 + 0\times16 + 0\times8 + 1\times4 + 0\times2 + 1\times1$

$= 256 + 64 + 32 + 4 + 1$

$= 357$

DECIMAL	BINARY
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111
100	0100100
512	1000000000

= 19

DECIMAL	BINARY
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000

- **OCTAL NUMBER SYSTEM**

The octal number system is a base 8 number system, and uses the digits from 0 to 7. Programs often display in an octal format because it can be translate relatively in binary format, each digit in the octal number system represents a power of base 8. For example the binary representation for decimal 74 is 1001010, which group into 1001010, so the octal representation is 112

$1128 = 1 \times 8^2 + 1 \times 8^1 + 2 \times 8^0$

$= (1 \times 64) + (1 \times 8) + (2 \times 1)$

$= 64 + 8 + 2$

$= 74.$

So, the decimal equivalent of octal number 1128 is 7410. Since there are only 8 digit (0-8) in the octal number system, 3 bits are sufficient to represent an octal number in a binary digits.

OCTAL	BINARY
0	000
1	001
2	101
3	011
4	100
5	101
6	110
7	111

With this table, it is easy to translate octal and binary system for example

$65_8 = 110\ 101_2$

$17_8 = 001\ 111_2$

HEXADECIMAL NUMBER SYSTEM

In the hexadecimal number system is a number with a base of 16, usually written using symbols 0-9 and A-F. for example, the decimal number 79 whose binary representation is 01001111 can be written as 4F in hexadecimal (4 = 0100, F = 1111) for example 1FF16 = 1 x 132 + F x 161 + F x 160

= 1 x 256 + 15 x 16 + 16 x 1

= 511.

Thus, the decimal equivalent of hexadecimal number 1FF16 is 51110. Since there are only 16 digits in the hexadecimal number system, 4 bits are sufficient to represent any hexadecimal number in binary.

The current decimal number system was first introduced to the computing world in 1963 by international business machine (IBM). An early version that used the digit 0-9 and u-2 was introduced in 1956, in the Bendix G-15 computer

The tale given below displays the binary and decimal equivalent of some hexadecimal numbers

HEXADECIMAL	BINARY	DECIMAL
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
A	1010	10
B	1011	11
C	1100	12
D	1101	13
E	1110	14
F	1111	15

The hexadecimal number 4B3A translates the following binary number.

A	B	3	A
0100	1011	0011	1010

ASSESSMENT

The main number systems used in digital hardware are___

Week 8

Topic: CONVERSION OF NUMBER BASE SYSTEM

DECIMAL TO BINARY CONVERSION

To convert a decimal number to its binary equivalent, follow these five steps

Step 1 The decimal number is divided by 2 (base of binary number)

Step 2 The reminder is written in the one place

Step 3 the result is again divided by two

Step 4 its reminder is written in the next place to the left

The process is repeated until the number becomes zero

Example, to convert the decimal n

OPERATION	**REMIANDER**
118÷ 2 = 59	0
59 ÷ 2 = 29	1
29 ÷ 2 = 14	1
14 ÷ 2 = 7	0
7 ÷ 2 = 3	1
3 ÷ 2 = 1	1
1 ÷ 2 = 1	1

Number 118 to its binary equivalent.

Writing the sequence of reminders from the button up given the binary number 1110110_2

BINARY TO DECIMAL CONVERSION

To convert a binary to decimal equivalent, follow the given steps

Step 1: Multiply each of the binary number with 2 to the power of 0, 1, 2, 3 e.t.c

Step 2: All the products of multiplication are added to get the decimal equivalent of the number

Example, to convert the binary number 11011 = $1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^1 + 1 \times 2^0$

$= 32 + 16 + 0 + 4 + 1$

$= 55$

The decimal value of 110/11 is 55

DECIMAL TO OCTAL CONVERSION

To convert a decimal number into its octal equivalent, the same procedure is adopted as in the decimal to binary conversion, but here the decimal number is divided by the number 8

Example, to convert the decimal number 1510 to its octal equivalent.

8	15	REMAINDER
8	1	7
	0	1

The octal equivalent of 15 is 17

OCTAL TO DECIMAL CONVERSION

To convert an octal number to its decimal equivalent, the same procedures is used a in the binary to decimal conversion, but here the octal number is expressed as the sum of power of 8

Example, $56_8 = (6 \times 8^1) + (5 \times 8^0) = (6 \times 8) + (5 \times 1) = 53_{10}$

Therefore, the decimal value of 65_8 will be 53

OCTAL TO BINARY CONVERSION

To convert an octal number into its binary equivalent, each octal digit of the number is converted into its 3 bit binary equivalent.

For example, binary 000 is equivalent to octal digit 0, 111 is equivalent octal 7 and so on

Example $(1574)_8 = (001101111100)_2$. The binary equivalent of 1572 is 001101111100

BINARY TO OCTAL CONVERSION

To convert a binary into its octal equivalent, see the following example:

Example 1011002 = 101100_2 grouped = 54_8

HEXADECIMAL TO DECIMAL CONVERSION

To convert hexadecimal number into its decimal equivalent, the same procedure is used as in the binary into decimal conversion, but here the number is expressed as the sum of power 16.

If you are doing this conversion orally, it is easier to start backward because counting the number of digit takes extra time, you might count wrongly.

If you do not remember what particular value of a power 16 is, it is easier to calculate it from the previous power value. For instance, if you do not remember what the value of 16_3 is, then just multiply the value of 16_2 (which you are likely to already have, if you start backward)16.

Example $(5FA8)_{16} = (24488)_{10}$

The decimal equivalent of 5FA8 is 24488

$5FA8 = 8 \times 16^0 + A \times 16^1 + F \times 16^2 + 5 \times 16^3$

$= 8 \times 1 + 10 \times 16 + 15 \times 256 + 5 \times 4096$

$= 8 + 160 + 3840 + 20480$

$= 24488$

Therefore, the decimal value of 5FA8 is 24488

DECIMAL TO HEXADECIMAL CONVERSION

To convert decimal to hexadecimal, follow the stops below

Step 1: divide the decimal number by 16; treat the division as an integer division

Step 2: write down thee remainder (in hexadecimal)

Step 3: divide the result by 16, treat the division as an integer division

Step 4: repeat step 2 and 3 until the result is 0

Step 5: the hexadecimal value is the digit sequence of remainder from the last to the first.

16	**256**	**REMAINDER**
16	**16**	**0**
16	**1**	**0**
	0	**1**

ASSESSMENT

A remainder in this topic refers to the left over value after performing an integer division

Example to convert the number decimal 256 to hexadecimal

WEEK 9

Topic: UNITS OF STORAGE IN COMPUTER

Introduction

The most common unit of storage in computer is called a byte which is equal to 8 bits. A computer memory is made up of millions of bytes. All data and information fed into a computer, as well as the program that comes pre-loaded are stored in form of bytes.

Each byte resides temporary on the computer memory and this specific location is called an address.

Different computer have different size of memory. The size of a computer memory is stated by manufacturer in terms of byte.

- 1,024 byte make a kilobyte (KB)
- 1 megabyte (MB) is equal to 1,024 kilobytes, or approximately one million bytes
- 1 gigabytes (GB) is equal to 1, 024 megabytes

In order to make calculations and definition of memory size easier, 1.024 bytes are often rounded off to 1000 bytes. Thus, user will often state that 1 KB is equal to 1000 bytes.

BINARY DIGIT (BITS)

The smallest unit in computer processing is called a bit. It is a unit of data that can be either of two conditions 0-1. Group of bits makes up storage units in the computer called character, bytes, or word, which are manipulated as group. A **bit** is the basic unit of information in computing and data transmission; a bit can have only the value of either one or zero, which may be implemented in a variety of systems by means of a two-state device. An example of such a device in electronics can be a flip-flop, a logic gate or a relay (in relay logic). The two values can also be interpreted as logical values (true/false, yes/no), activation states (on/off), or any other two-valued attribute.

NIBBLE

Haft a byte is called a nibble. A nibble is a collection of bits on a 4 bit boundary. A **nibble** (also called nybble or nyble) is a four-bit aggregation, i.e. half of an octet. There are sixteen (2^4=16) possible values of a nibble, therefore it corresponds to a single hexadecimal digit.

WORD LENGTH

A computer word is a group of a fixed number of bytes which varies from computer to computer but is fixed for each computer. The length of a computer word is called word length, which is in the range of 1 byte to 64 bytes. It implies the number of its which can be handled like a single operation. A **word** is the natural unit of data used by a particular processor design. A word can be considered as a fixed-size group of bits that are handled as a unit by the instruction set and the processor hardware. The number of bits in a word (also called word width, word size, or word length) is an important characteristic of specific processor design or computer architecture, which is often described as n-bit architecture where n is usually equal to 8, 16, 32 or 64.

BLOCK

In data transmission and data storage, a **block** is a sequence of bytes or bits, having a nominal length (a block size). Putting data into blocks (blocking) blocking is used to speed up the handling of the data-stream by the communication equipment. Blocked data is normally read a whole block at a time.

CHARACTER

A **character** is a unit of information that roughly corresponds to a smallest unit in a written language, that is, a symbol, such as in an alphabet letter, or a digit, or a punctuation mark. A character can be represented with one (ASCII) or several (Unicode) bytes.

REPRESENTING CHARACTERS IN THE MEMORY

BYTE: A byte is the basic unit in the computer memory. One bytes is one character. A character can be a number, letter, or symbol. One byte consists of eight bits (binary digits). A byte is the basic unit in the computer memory. One bytes is one character.

A character can be a number, letter, or symbol. One byte consists of eight bits (binary digits). A **byte** is a unit of digital information in computing and data transmission that most commonly consists of eight bits. The de facto standard of eight bits is a convenient power of two (2^8) permitting the values 0 through 255 for one byte.

KILOBYTE (KB): One kilobytes is 1.024. This approximately equal to a character in one page of a text of a book. A **kilobyte** (kB) is a decimal multiple of the unit byte for digital information or computer storage. The prefix kilo (symbol k) is defined in the International System of Units (SI) as a multiplier of 10^3, therefore, 1 kilobyte = 10^3 bytes = 1000 bytes. At the same time, traditionally this metric prefix is used to designate binary multiplier 2^{10} = 1024, so 1 Kbyte = 1024 bytes (note the capital K).

MEGABYTE (MB): One megabyte is 1,048,576 characters. This is approximately equal to all the character in one book. A **megabyte** (MB or Mbyte) is a decimal multiple of the unit byte for digital information or computer storage. The prefix mega (symbol M) is defined in the International System of Units (SI) as a multiplier of 10^6, therefore, 1 megabyte = 10^6 bytes = 1,000,000 bytes. At the same time, traditionally this metric prefix is used to designate binary multiplier 2^{20}, so 1 MB = 1024 Kbytes (note the capital K)

GIGABYTE: One gigabyte is 1,073,741,824 characters. This is approximately equal to all the character in a pile of books. A **gigabyte** (GB or Gbyte) is a decimal multiple of the unit byte for digital information or computer storage. The prefix giga (symbol G) is defined in the International System of Units (SI) as a multiplier of 10^9, therefore, 1 gigabyte = 10^9 bytes = 1,000,000,000 bytes. At the same time, traditionally this metric prefix is used to designate binary multiplier 2^{30}, so 1 GB = 1024 Mbytes.

TERABYTE: One terabyte is 1,099,511,627,776 characters. This is approximately equal to all the character in all the books on a book stand. A **terabyte** (TB or Tbyte) is a decimal multiple of the unit byte for digital information or computer storage. The prefix tera (symbol T) is defined in the International System of Units (SI) as a multiplier of 10^{12}, therefore, 1 terabyte = 10^{12} bytes. At the same time, traditionally this metric prefix is used to designate binary multiplier 2^{40}, so 1 Tbyte = 1024 Gbytes.

ASSESSMENT

1. Define Byte?
2. What's the difference between a Terabyte and a Gigabyte?

WEEK 10

Topic: Classification of computer

Outline:

- Operating principles
- Area of application
- Size and capability
- Number of Microprocessors
- Word length and numbers of users
- Area of Application

The Computer is an Electronic Device which accepts the input data processing according to their Instruction and it gives output result. Computers may be classified based on the following:

i. Operating principles (based on their construction and working)

ii. Applications

iii. Size and capability (or classification into micro, mini, mainframe and supercomputers)

iv. Number of Microprocessors

v. Word length and

vi. Number of users

CLASSIFICATION BASED ON OPERATING PRINCIPLES

i) Classification based on Operating Principles

A. Digital Computers

B. Analog Computers

C. Hybrid Computers

A. Digital Computers: – Operate essentially by counting. All quantities are expressed as discrete or numbers. Digital computers are useful for evaluating arithmetic expressions and manipulations of data (such as preparation of bills, ledgers, solution of simultaneous equations etc)

B. Analog Computers:- An **analog computer** is a form of computer that uses the continuously changeable aspects of physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved. In contrast, digital computers represent varying quantities symbolically, as their numerical values change.

C. Hybrid Computers:- are computers that exhibit features of analog computers and digital computers. The digital component normally serves as the controller and provides logical operations, while the analog component normally serves as a solver of differential equations.

CLASSIFICATION BASED ON AREA OF APPLICATION

1. Special Purpose Computers

2. General Purpose Computers

a. Special Purpose Computers: A special purpose computer is designed only to meet the requirements of a particular task or application. The instructions needed to perform a particular task are permanently stored into the internal memory, so that it can perform the given task on a single command. It therefore doesn't posses unnecessary options and is less expensive.

b. General Purpose Computers: A General Purpose computers are designed to meet the needs of many different applications. In these computers, the instructions needed to perform a particular task are wired permanently into the internal memory. When one job is over, instructions for another job can be loaded into the internal memory for processing. This, a general purpose machine can be used to prepare pay-bills, manage inventories, print sales report and so on.

CLASSIFICATION BASED ON SIZE AND CAPABILITY

a) Microcomputers (Personal Computer): A microcomputer is the smallest general purpose processing system. Microcomputer can be classified into 2 types :The older

pc started 8 bit processor with speed of 3.7MB and current pc 64 bit processor with speed of 4.66 GB. Some examples are IBM PCs, APPLE computers

1. Desktops: The difference is portables can be used while travelling whereas desktops computers cannot be carried around.
2. Laptop: This computer is similar to a desktop computer but the size is smaller. They are expensive than desktop. The weight of laptop is around 3 to 5 kg.
3. Palmtop (Handheld): They are also called as personal Digital Assistant (PDA). These computers are small in size. They can be held in hands. It is capable of doing word processing, spreadsheets and handwriting recognition, game playing, faxing and paging. These computers are not as powerful as desktop computers. Ex: – 3com palmV.

b) Workstations: It is used in large, high-resolution graphics screen built in network support, engineering applications (CAD/CAM), and software development desktop publishing.

c) Minicomputer: A minicomputer is a medium-sized computer. That is more powerful than a microcomputer. These computers are usually designed to serve multiple users simultaneously (Parallel Processing). They are more expensive than microcomputers.

d) Mainframe computers: Computers with large storage capacities and very high speed of processing (compared to mini- or microcomputers) are known as mainframe computers. They support a large number of terminals for simultaneous use by a number of users like ATM transactions. They are also used as central host computers in distributed data processing system.

e) Supercomputer: Supercomputers have extremely large storage capacity and computing speeds which are many times faster than other computers. A supercomputer is measured in terms of tens of millions Instructions per second (mips), an operation is made up of numerous instructions. The supercomputer is mainly used for large scale numerical problems in scientific and engineering disciplines such as Weather analysis. Examples: IBM Deep Blue

f) Wearable computer: – The size of this computer is very small so that it can be worn on the body. It has smaller processing power. It is used in the field of medicine.

For example pacemaker to correct the heart beats. Insulin meter to find the levels of insulin in the blood.

g) Notebook: – These computers are as powerful as desktop but size of these computers are comparatively smaller than laptop and desktop. They weigh 2 to 3 kg. They are more costly than laptop.

CLASSIFICATION BASED ON NUMBER OF MICROPROCESSORS

a. Sequential computers: Any task complete in sequential computers is with one microcomputer only. Most of the computers (today) we see are sequential computers where in any task is completed sequentially instruction after instruction from the beginning to the end.

b. Parallel computers: The parallel computer is relatively fast. New types of computers that use a large number of processors. The processors perform different tasks independently and simultaneously thus improving the speed of execution of complex programs dramatically. Parallel computers match the speed of supercomputers at a fraction of the cost.

CLASSIFICATION BASED ON WORD LENGTH AND NUMBER OF USERS

Based on number of users, computers are classified into:

a. **Single User**: – Only one user can use the resource at any time.

b. **Multi User**: – A single computer shared by a number of users at any time.

c. **Network**: – A number of interconnected autonomous computers shared by a number of users at any time.

A binary digit is called **"BIT"**. A word is a group of bits which is fixed for a computer. The number of bits in a word (or word length) determines the representation of all characters in these many bits. Word length leis in the range from 16-bit to 64-bitsf or most computers of today.

SECOND TERM NOTES ON COMPUTER

WEEK 1

Topic: BASIC LANGUAGE

BASIC LANGUAGE

A computer language is a special language understood by a computer. It consists of various commands that we give to the computer to do any work.

A programming language is a vocabulary and set of grammatical rules for instructing a computer or computing device to perform specific tasks. The term *programming language* usually refers to high-level languages, such as BASIC, C, C++, COBOL, Java, FORTRAN, Ada, and Pascal.

Each programming language has a unique set of keywords (words that it understands) and a special syntax for organizing program instructions.

BASIC (an acronym for **Beginner's All-purpose Symbolic Instruction Code)** is a family of general-purpose, high-level programming languages whose design philosophy emphasizes ease of use.

A computer language is a set of words, symbols and codes that are used to write a computer program. The process of writing these instructions (program) is called PROGRAMMING. The people who write these programs are called PROGRAMMERS.

Human beings understand a variety of spoken languages (English, Hausa, Igbo and so on) but computer cannot understand these languages. Computer can only understand on language, that is the machine language.

Computer uses machine language to carry out their jobs. This language uses binary digits, 0 and 1, which stand for 'off and on' condition of the electric current. It is difficult for the programmer to write the program directly in terms of these digits. So, they write their program in a language called Programming Language.

Programming language code programs in such a manner that the computer can understand them and decode (translate) them into its machine language.

CATEGORIES OF PROGRAMMING LANGUAGE

There are a number of programming languages available nowadays. Some languages are developed for specific computer, other were developed for specific uses, such as scientific or business application.

Programming languages are classified into two major categories.

1. **LOW LEVEL LANGUAGE**: Low level languages are written to run one particular computer and cannot be easily used on another computer. These languages are difficult for a common programmer to learn

- **Machine Language**: A machine language is a language directly understood by a computer without any translator. It refers to 0's and 1's that the computers understand as instruction. Due to this reason, it is also called a low level language or the first generation language. Writing or coding of programs in the 1s and 0s of machine can be boring and can take a lot of time.

- A machine language program written in assembly language uses a short sequence of letter called mnemonic code like A for addition, C for comparison, L for loading and M for multiplying. As the computer only understands machine languages, you have to convert these mnemonic codes to machine language (0s and 1s). To convert these mnemonic codes into machine language requires the use of translators. An assembler is a program used to translate assembly language into machine language so that the computer can understand it.

2. **HIGH LEVEL LANGUAGE**: A high level language has the instructions which are similar to English language. It is very user friendly. It is much easier to understand and write with a program using this language. The greatest advantages of these languages are its independence. A program written in HLL can be used on almost all computers without any change. The instructions written in HLL are also converted into machine language with the help of translators. Interpreter and compiler are two program used to translate a high level language into machine language so that the computer can understand it.

- **Third generation language**: Third generation language uses English – like words to make it easy for the programmer to write the program. For example, a programmer writes ADD for addition and PRINT for print. Many third generation language also use arithmetic operation such as * for multiplication and + for addition. A third generation program is called source program, which must be translate into machine language before the computer can understand it. Compiler and interpreters are the program used to perform the translation for third generation language. BASIC, COBOL, PASCAL, and FORTRAN are example third generation language.

- **Fourth generation language**: The fourth generation language also uses English like statement. A fourth generation language is fast and requires much less time and effort on the part of the programmer. In fact, fourth generation language is so easy that the user with very little program background can

develop programs while using it. VISUAL BASIC, ORACLE, JAVA e.t.c are example of fourth generation language.

- **Natural language**: A natural language program does not follow a specific set of rules unlike the fourth generation language. A natural language, sometimes called fifth generation language is a type query language that allows the user to enter request that resembles the speech. Natural languages are often associated with expert system and artificial intelligence.

These systems are popular in the medical field, but are not widely used in business application.

SOME HIGH LEVEL PROGRAMS

1. **BASIC**: It stands for Beginner's all-purpose symbolic instruction code. It is a programming language used by beginners
2. **LOGO**: It stands for Language of Graphics Oriented. It is a programming language used to draw different shapes and figure.
3. **COBOL**: It stands for Common Business Oriented Language. This language is specially designed for business application
4. **FORTRAN**: It stands for 'Formula Translation'. It is one of the oldest high level languages. This language was designed to solve scientific problems
5. **C AND C++**: They are the general purpose programming languages popular on minicomputer and microcomputer. They are the most widely used language for developing commercial applications.
6. **JAVA**: Java is a programming language developed to write programs. It helps in creating games and animation and in developing multimedia effect for the internet.

TYPICAL BASIC KEYWORDS

Data Manipulation

- **LET**: assigns a value (which may be the result of an expression) to a variable.
- **DATA:** holds a list of values which are assigned sequentially using the READ command.

Program Flow Control

- **IF … THEN … ELSE**: used to perform comparisons or make decisions.

- **FOR … TO … {STEP} … NEXT**: repeat a section of code a given number of times. A variable that acts as a counter is available within the loop.
- **WHILE … WEND and REPEAT … UNTIL**: repeat a section of code while the specified condition is true. The condition may be evaluated before each iteration of the loop, or after.
- **DO … LOOP {WHILE} or {UNTIL**}: repeat a section of code Forever or While/Until the specified condition is true. The condition may be evaluated before each iteration of the loop, or after.
- **GOTO**: jumps to a numbered or labelled line in the program.
- **GOSUB:** jumps to a numbered or labelled line, executes the code it finds there until it reaches a RETURN Command, on which it jumps back to the operator following the GOSUB – either after a colon, or on the next line. This is used to implement subroutines.
- **ON … GOTO/GOSUB**: chooses where to jump based on the specified conditions. See Switch statement for other forms.
- **DEF FN**: a pair of keywords introduced in the early 1960s to define functions. The original BASIC functions were modelled on FORTRAN single-line functions. BASIC functions were one expression with variable arguments, rather than subroutines, with a syntax on the model of DEF FND(x) = x*x at the beginning of a program. Function names were originally restricted to FN+one letter.

Input and Output

- **PRINT:** displays a message on the screen or other output device.
- **INPUT**: asks the user to enter the value of a variable. The statement may include a prompt message.
- **TAB or AT:** sets the position where the next character will be shown on the screen or printed on paper.

Miscellaneous

- **REM**: holds a programmer's comment or REMark; often used to give a title to the program and to help identify the purpose of a given section of code.
- **USR**: transfers program control to a machine language subroutine, usually entered as an alphanumeric string or in a list of DATA statements.

- **TRON**: turns on a visual, screen representation of the flow of BASIC commands by displaying the number of each command line as it is run. The TRON command, largely obsolete now, stood for, TRace ON. This meant that command line numbers were displayed as the program ran, so that the command lines could be traced. This command allowed easier debugging or correcting of command lines that caused problems in a program. Problems included a program terminating without providing a desired result, a program providing an obviously erroneous result, a program running in a non-terminating loop, or a program otherwise having a non-obvious error.
- **TROFF:** turns off the display of the number of each command line as command lines run after the command TRON has been used.
- **ALT+CTRL+DEL:** For re-booting a computer

Practice Questions

1. COBOL means _____

a. Common Business Oriented Language
b. Command of Business or Language
c. Command Business Oriented Learning
d. none of the above

2. A _____ is a set of words, symbols and codes that are used to write a computer program.

a. Computer language
b. Basic language
c. Simple language
d. Computer program

3. ____ holds a list of values which are assigned sequentially using the READ command

a. LET
b. COBOL
c. DATA
d. LOGO

4. BASIC means _____

5. Third generation language uses ____

a. English like statement
b. English

c. Specific rules
d. Basic language

Answers

1. A
2. A
3. C
4. Beginners All Purpose Symbolic Instruction
5. B

WEEK 2

Topic: Simple BASIC Language

Introduction

We will write your first BASIC program. In it, you will see examples of **PRINT**, **CLS**, and **END** commands. Their roles in the program may or may not be apparent at the time, but, as they're so vital to the BASIC language, they will be discussed here.

Program Example

10 CLS

20 PRINT "Hellooooooooooooo, world!"

30 PRINT "I'm learning about commands in BASIC."

40 PRINT "This text is being printed via the PRINT command."

50 PRINT "On the next line, I'll use CLS."

60 CLS "Now the next word would be PRINT."

70 PRINT "Finally, on line 80, I'll use END."

80 END "And return to PRINT"

90 PRINT "this is my answer."

Output

Finally, on line 80, I'D.

Discussion

From that example, it's fairly easy to deduce what each command does.

CLS

An abbreviation that stands for the words **Cl**ear **S**creen. In the above program, when you used CLS on line 60, all of the words that were printed to the screen were wiped away.

PRINT

Writes to the screen. There are commands for printing to other things, like a printer, but that's to be discussed later. Each new PRINT command will start printing on a

new line. To insert a blank line, don't specify a string to print. The syntax for "PRINT" is: PRINT "[whatever you want to be printed here]"

END

It stops the program at that line; that is, anything that's added after that won't show. That's why the PRINT command on line 90 didn't print anything. The END command can be included in control structures to end the program if a condition is met. This will be discussed with control structures.

What is happening?

Line 10 the display is cleared.

Lines 20 through 50 shows first paragraph displayed.

Line 60 again clears the display.

Line 70 shows the message you should see after you run this program.

Line 80 Ends the program.

Line 90 This line helps to show that a END statement stops the program at that point.

Given the state of computer speed today you should not see the paragraph displayed by lines 20 through 50, it should be cleared by the CLS statement on Line 60 before you have a chance to see it. If you slow the program down you can see the program write the message to the screen. Line 70 is then written to the screen/display then Line 80 stops everything. Line 90 never, ever runs.

ASSESSMENT

1. List THREE program example?

Week 3

Topic: Features of Graphic Package

INTRODUCTION

Vector mapped software is ideal for drawings, charts, graphs, and diagrams. It creates an image by defining line, position, shape, and fill pattern. You plot or vector a series of points to define a shape. This shape is calculated into a mathematical formula called an algorithm. Image manipulation and editing is automatically calculated by the computer when you change parameters, making modifications easy and fast. The use of a vector-based program requires preplanning and more computer savvy than a bitmapped program.

Graphics Drafting, drawing, and painting are distinctly different functions and not all software programs will be equally adept at processing all three. Base your choice of features program on command requirements. Also, let your software drive your hardware. Select a software program that fulfills the needs of the command and allows for some growth. Purchase hardware based on software requirements. Invest in the very best monitor possible. All of this affects the graphics resolution, the ease of processing, and the end product. In general, graphics software programs offer the following features:

FEATURES OF GRAPHIC PACKAGE

TITLE BAR: The Title bar display the name of the user of the application and the application name on top of the screen

MENU BAR: Menu bar contains menu and commands in all graphic packages. The user of the graphic select their command from there.

TOOL BAR: Tool bar contains every tools need for graphics to be created.

FILL: Fill is a command to fill a shape with color or pattern. Make sure the shape is completely closed or the fill will bleed into the adjacent area. Color or pattern selection is nearly limitless.

BELZIER CURVES: The axis of a Bezier curve automatically changes as you move the cursor or mouse across the screen.

GEOMETRIC SHAPES: These are closed shapes whose major and minor axis change with the movement of the cursor or mouse.

DELETE: Use a geometric shape to surround or isolate segments you want removed from the image and click into place. Then press the DELETE key to remove everything inside the geometric shape.

UNDO: UNDO is a feature that eliminates the last command given and its associated affects.

ASSESSMENT

1. Highlight FIVE features of graphic package?

WEEK 4

Topic: Graphic Package (1)

GRAPHICS PACKAGE

Graphics package is application software that enables a computer user to create images and graphics. With graphic packages, book cover, magazines, logos e.t.c can be created. A **graphics package** is an application that can be used to create and manipulate images on a computer. There are two main types of **graphics package**: painting **packages**. Drawing **packages**.

TYPES OF GRAPHICS PACKAGE

Painting Packages

- A painting package produces images by changing the color of pixels on the screen.
- These are coded as a pattern of bits to create a bit-mapped graphics file.
- Bit-mapped graphics are used for images such as scanned photographs or pictures taken with a digital camera.

Advantage

- The main advantage offered by this type of graphic is that individual pixels can be changed which makes very detailed editing possible.

Disadvantages of painting packages

- Individual parts of an image cannot be re-sized;
- Only the whole picture can be increased or decreased in size.
- Information has to be stored about every pixel in an image which produces files that use large amounts of backing storage space.

Examples of graphics packages that produce bit-mapped images include: - MS Paint, PC Paintbrush, Adobe Photoshop and JASC's Paint Shop Pro.

Drawing Packages

- A drawing package produces images that are made up from colored lines and shapes such as circles, squares and rectangles.
- When an image is saved it is stored in a vector graphics file as a series of instructions, which can be used to recreate it.

Main advantages of vector graphics are:

- They use less storage space than bitmap graphics
- Each part of an image is treated as a separate object, which means that individual parts can be easily modified.

Disadvantages of Drawing Package

- They don't look as realistic as bitmap graphics.

Examples of drawing graphic packages include CorelDraw, Micrographic Designer and Computer Aided Design (CAD) packages such as AutoCAD

- PHOTO PAINT: This is a graphic package that comes with the system software of a computer. A computer user does not need to install this application. All the user needs to do is follow the list below

1. Click on start button on the screen
2. Point to all programs
3. Point to accessories
4. Select paint inside a box that appears. This takes you to the paint environments.

ASSESSMENT

1. What is a Graphics Package?
2. List TWO types of Graphics package?

WEEK 5

Topic: GRAPHICS PACKAGE 2

Graphics Package

Graphics is a word used for all the different types of artwork, such as photographs, graphs, charts etc.

Graphics Package

A Graphics package may not be as detailed as you think. It can be a simple paint package, which has features of shading, drawing line diagrams and many other simple but effective features. These packages can be an alternative to complicated DTP packages. As it is very difficult to draw with the mouse, many people scan the drawings on the computer and now there are software packages, which do not use a mouse.

New equipment used by professionals so that they can get pictures from a variety of places. A video grabber lets you get pictures from the television or a video camera and you then can alter it on your computer. A digital camera is also very popular as you can take pictures and then put them on your PC and alter then. This also means that you do not have to pay for the developing cost. You can also use clip art for pictures.

Bit map Vector graphics

When using a graphics package the graphics file can have the image represented as a:

1.Bit map

2.Vector image

A bit map files makes every dot or pixel on the screen has a single bit of information in a file. If it is in colour, you then need to store additional bits. The disadvantage to this is that if you want to alter anything you have to change it at a pixel at a time. When you enlarge an image, the number of pixels stays the same.

In vector graphics, the lines are stored as equations on the computer. They are stored in vectors. The advantage of vector graphics over bit map files is that it is easy to alter things without any loss in resolution. When you enlarge an image, the number of pixels increases to the proportion of the image. CAD packages use vector images.

Clip Art

Clip Art is a collection of copyright-free drawings which you can place on your drawings. The drawings on clip-art look very professional, as they have been drawn in detail.

Presentation software

Pictures let you give ideas and concepts a better understanding than only words. Good presentations use things such as slides and transparencies to express views. A projector could be used for a large audience or a rolling slide show could be produced on a computer for smaller audiences.

Multimedia presentations

These presentations are useful for training students as the students can see demonstrations and interact with the software. There are many different types of packages, for multimedia presentations, that suit each person's need.

Color

If you want to print out your graphics, then you will need a printer. An ink-jet printer is not that expensive if you need one or you could buy a laser printer which is a better quality but tends to be quite expensive. If you do not have a color printer, then you do not need to worry about color in the design. If you use black and white on screen, then it will come clearer if you have a black and white printer.

Computer Aided Design

Engineers, architects, etc use CAD, short for computer aided design, so that they can produce high quality drawings. You can have plans of houses, maps, 3-D plans of a room etc. CAD lets the designers to make changes quite easily. They package even let you rotate the images at different angles. The most popular CAD package is AutoCAD, which is quite expensive but there are many cut down versions available here are the advantages of using CAD:

1. It can save time
2. It enables you to produce accurate scale diagrams
3. It is easy to alter images
4. You can produce a 3-D image, which is useful for diagrams of rooms, buildings etc.

5. Images can be saved on disk and retrieved later
6. Drawings can be scaled up and down

ASSESSMENT

1. Graphics is a word used for all the different types of artwork, such as___?
2. List FIVE advantages of Computer Aided Designs?

WEEK 6

Topic: ICT as a transformation tool

ICT

ICT – ICTs stand for Information and Communication Technologies and are defined, for the purposes, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broad casting technologies (radio and television), and telephony.

AS A TRANSFORMATIONAL TOOL: Information communication technology is so important in the world today that it makes it necessary for every person to be competent in the use Information communication technology for the task they have to accomplish. Organization of all sizes, even the smallest schools and businesses, rely on computer to help them operate more efficiently and effectively.

ADVANTAGES OF INFORMATION COMMUNICATION TECHNOLOGY

These are some the advantages of information communication technology

1. **COMMUNICATION:** Communication has become cheaper, quicker and more efficient. We can now communicate with anyone around the globe by the simply text messaging them or sending them an e-mail for an almost instantaneous part of the world with the help of video conferencing.
2. **COST EFFECTIVENESS**: Information communication technology helps to computerize the business process. Thus streaming business to make them extremely cost effective, money making machine. This in turn, will increase productivity, which will also increase profit and that means better pay and less strenuous working condition.
3. **BRIDGING THE CULTURAL GAP:** Information communication technology has helped to bridge the cultural gap helping people from different cultures to communicate with one another and allowing for the exchange of views and ideas, thus increasing awareness and reducing prejudice.
4. **MORE TIME:** Information communication technology has made it possible for business to be open 24×7, all over the globe. This means that a business can be open anytime, anywhere, making purchase from different countries easier

and more convenient. It also means that you can have goods delivered right to your door step without having to move an inch.

5. **CREATION OF NEW JOBS**: The best advantage of information communication technology is the creation of new and interesting job. Computer programmers, system analyzers, hardware and software developed and web designers are just some of the new job opportunity created with the help of it.
6. **VERSATILITY:** Computer can perform vast activities effectively. Where the human imagination fails, computer comes into the picture, for instance, observing the motion of very fast moving particles. They can also work with different types of data and information like graphics and audio visual character.

DISADVANTAGES OF INFORMATION COMMUNICATION TECHNOLOGY

1. **UNEMPLOYMENT**: While information communication technology may have streamlined the business process, it still has created job redundancies, downsizing and outsourcing. This means that a lot of lower and middle level jobs have been done away with, causing more people to become unemployed.
2. **PRIVACY:** Though information communication technology may have made communication so easy, quicker and more convenient, it has also given rise to privacy issues, from cell phone signal interceptions to e-mail hacking, people are now worried about their private information becoming public knowledge.
3. **LACK OF JOB SECURITY:** Industry experts believe that the internet has made job security a big issue since technology keeps advancing each day. This means that one has to be in a constant learning mode, in order for job to be secure.

GENERAL BENEFITS OF ICT

- Greater efficiency throughout the school.
- Communication channels are increased through email, discussion groups and chat rooms
- Regular use of ICT across different curriculum subjects can have a beneficial motivational influence on students' learning.

Assessment

What are the benefits of ICT?

Week 7

Topic: Benefits of ICT

INRODUCTION

ICT is beneficial to our everyday lives as the world is fast becoming a global city. Information and communication technology is a very broad term. It refers to various gadgets that aid in communication such as mobile phones, radios and satellite communication. The term is also used to refer to various means of direct communication such as video conferencing.

In short, information and communication technology, better known in its abbreviated form as ICT, is a tool that helps in improving communication among businesses and commerce activities in different parts of the world. In fact, ICT is so commonly used in commerce field to communicate various financial matters such as acceptance of money, producing receipts and transferring funds that ICT and e-commerce have become almost synonymous terms. ICT creates inroads for better accessibility of all sorts of information for people from all over the world. ICT is useful in commerce, health and medical sciences, education, communication, entrepreneurship etc. but our main focus is on Education.

ICT IN EDUCATION

Educational technology is the effective use of technological tools in learning. As a concept, it concerns an array of tools, such as media, machines and networking hardware, as well as considering underlying theoretical perspectives for their effective application.

Educational technology is not restricted to high technology. Nonetheless, electronic educational technology, also called **e-learning**, has become an important part of society today, comprising an extensive array of digitization approaches, components and delivery methods.

Benefits to Teachers

- ICT facilitates sharing of resources, expertise and advice
- Greater flexibility in when and where tasks are carried out
- Gains in ICT literacy skills, confidence and enthusiasm.
- Easier planning and preparation of lessons and designing materials

- Access to up-to-date pupil and school data, anytime, anywhere.
- Enhancement of professional image projected to colleagues.
- Students are generally more ‘on task’ and express more positive feelings when they use computers than when they are given other tasks to do.
- Computer use during lessons motivate students to continue learning outside school hours.

Benefits to Students

- Higher quality lessons through greater collaboration between teachers in planning and preparation resources.
- More focused teaching, tailored to students’ strengths and weaknesses, through better analysis of attainment data
- Improved pastoral care and behavior management through better tracking of students
- Gains in understanding and analytical skills, including improvements in reading
- Comprehension.
- Development of writing skills (including spelling, grammar, punctuation, editing and re-drafting), also fluency, originality and elaboration.
- Encouragement of independent and active learning, and self-responsibility for learning.
- Development of higher level learning styles.
- Students who used educational technology in school felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem
- Students found learning in a technology-enhanced setting are vaster than students in a traditional classroom.
- Broadband technology supports the reliable and uninterrupted downloading of web-hosted educational multimedia resources
- Opportunities to address their work to an external audience
- Opportunities to collaborate on assignments with people outside or inside school

Benefits to Parents

- Easier communication with teachers
- Higher quality student reports – more legible, more detailed, better presented
- Greater access to more accurate attendance and attainment information
- Increased involvement in education for parents and, in some cases, improved self-esteem
- Increased knowledge of children's learning and capabilities, owing to increase in learning activity being situated in the home
- Parents are more likely to be engaged in the school community
- You will see that ICT can have a positive impact across a very wide range of aspects of school life.

ASSESSMENT

1. List FIVE benefits of ICT to Teachers?
2. List FOUR benefits of ICT to students?

WEEK 8

Topic: ICT Gadgets: The GSM

INTRODUCTION

GSM (**Global System for Mobile Communications**, originally *Grouped Spécial Mobile*) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation digital cellular networks used by mobile devices such as tablets, first deployed in Finland in December 1991. As of 2014, it has become the global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories.

2G networks developed as a replacement for first generation (1G) analog cellular networks, and the GSM standard originally described as a digital, circuit-switched network optimized for full duplex voice telephony. This expanded over time to include data communications, first by circuit-switched transport, then by packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution, or EGPRS).

Subsequently, the 3GPP developed third-generation (3G) UMTS standards, followed by fourth-generation (4G) LTE Advanced standards, which do not form part of the ETSI GSM standard.

"GSM" is a trademark owned by the GSM Association. It may also refer to the (initially) most common voice codec used, Full Rate.

Advantages of GSM:

GSM (Global System for Mobile communication) is a cellular technology used for transmitting mobile voice and data services. Out of all cell technologies in use today, GSM is the most widespread. However, it is important to know that although GSM is currently the industry standard in cell technology, it has both advantages and disadvantages of which consumers should be aware.

GSM technology is the industry standard for mobile voice and data.

1. Extensive Coverage

The most obvious advantage of GSM is its widespread use throughout the world. According to Gsmworld.com, GSM has a harmonized spectrum, which means that even though different countries may operate on different frequency bands, users can transfer seamlessly between networks and keep the same number. As a result, GSM users essentially have coverage in over 218 countries.

2. Greater Phone Variety

Another advantage of GSM is that because it is used throughout the world, there is a greater variety of **phones** that operate on GSM. Therefore, consumers have more flexibility in choosing a handset that fits their specific desires, and they are not limited to purchasing phones only made in their respective country.

3. No Roaming Charges on International Calls

Because GSM is the same network worldwide, users are not charged a roaming fee for international calls. However, most providers still charge a service fee on international calls.

Disadvantages of GSM

1. Bandwidth Lag

Perhaps the greatest disadvantage of GSM is that multiple users share the same bandwidth. With enough users, the transmission can encounter interference. Therefore, faster technologies, such as 3G, have been developed on different types of networks than GSM, such as CDMA, in order to avoid such bandwidth limitations.

2. Causes Electronic Interference

Another disadvantage of GSM is that is can interfere with certain electronics, such as pace makers and hearing aids, according to Inc. Technology. com. Such interference is due to the fact that GSM uses a pulse-transmission technology. As a result, many locations such as hospitals and airplanes require cell phones to be turned off.

ASSESSMENT

1. List TWO advantages and disadvantages of GSM?

WEEK 9

Topic: Information Communication Technology Gadgets

ICT GADGETS

An information communication technology gadget involves the technology and the applications which are used in creating communication, transmission and storage devices. There are many **ICT gadgets** which are used in communication technology. Some of them are:

1. **GLOBAL SYSTEM FOR MOBILE (GSM)**: Global system for mobile communication is an ICT gadget and second generation digital technology. GSM is top-class standard gadget relied on by millions of people worldwide. Today's GSM is a huge success wireless technology and an unprecedented story of global achievement. It is approximated that 80 percent of the world used GSM technology while making wireless calls.
2. **FAX MACHINE**: The fax machine is a device that can send or receive picture and text over telephone line. The idea of fax machine has been around since 1842, when Alexander Bain invented a machine capable of receiving signals from telegraph wire and translating them into images on paper. However, fax machine did not become popular until mid-1980s. A fax machine consist of an optical scanner for digitizing image on paper, a printer for printing incoming fax message and a telephone for making the connection.
3. **TELEPHONE**: Telephone is an electronic telecommunication device used for transmitting and receiving sounds. The most basic function of a telephone is to allow communication between two points, whether they are near or far from each other.
4. **COMPUTER SYSTEM**: The computer system will include the computers along with software and peripherals devices that are necessary to make the computer function. Every computer system requires an operating system.
5. **PAGER**: A Pager is a small telecommunication device that receives and sends alert signals or short messages. It is the size of a pocket calculator and has built in miniature keyboard and LCD screen that can display several lines of text.
6. **TELEX**: Telex is a communication system consisting of small typewriters connected to a telephonic network to send and receive signals or message.

ASSESSMENT

1. There are many **ICT gadgets** which are used in communication technology, mention FIVE?

THIRD TERM NOTES ON COMPUTER

Week 1

Topic: THE INTERNET

Definition

Internet is defined as a global electronic communication network. It is one of the largest networks that link trillions of computers all over the world. You can access this network via communication devices and media such as modems, cable, telephone lines and satellite.

The **Internet** is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to link several billion devices worldwide. It is a *network of networks* that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies.

The internet offers many conveniences at your fingerprints. You can send messages to others, meet new friends, bank, invest, shop, fill prescription, file taxes, take online courses, play games, listen to music or watch a movie on the internet, the advantage of the internet is that you can use it from a computer anywhere in the world.

Success today in the business world requires knowledge of the internet. Without it, you are missing out on a tremendous source for goods, services, information and, communication.

Here are some of the things one can do on the internet.

- Banking called E-banking Or Internet Banking
- Invest
- Shop for goods and services
- Watch movies
- Download and listen to music
- Access Educational material e.g. Passnownow.com
- Access source of entertainment and leisure, such as online games, magazines or vacation planning guide
- Access other computer and exchange files, share and edit document with other in real time
- Provide information, photographs or audio or video clips

History of the Internet

The history of the internet begins with the following

1. **ARPANET**: The US defense department created a project called Advanced Research Project Agency (ARPA) in late 1960s, which was to work as network that would allow scientist and military personnel to exchange information in war scenario without disruption in communications. The network was connected in a way which ensured that if one section of the network was damage, the remaining computer on the network would still be able to communicate with each other. This network was called ARPANET. By 1984, ARPANET had more than 1,000 individual computers linked as hosts.
2. **NSFNET**: In 1986, the national science foundation (NSF) connected its huge network of five supercomputer centre called NSFNET, to ARPANET. They used the technology developed for ARPANET to allow universities and schools to connect to each other. By 1987, NSFNET could no longer handle the amount of information that was being transferred. The national science foundation improved the network to allow more information to be transferred. This configuration of complex came to be known as the internet. Most of the people accessing the internet till late 1980s were scientist and researchers. In the early 1990s, many companies started to offer access to home users. This allows anyone with a modem and a computer to access the internet.
3. **WORLD WIDE WEB**: The World Wide Web was created in the early 1990s by European organization for nuclear research. The goal of WWW was also to allow researchers to work together on projects and to make project information easily accessible. The first publicly accessible website was created in 1991. By the mid 1990s, over 30 million people had access to the internet. Reach this huge market, most big companies created their own sites on the World Wide Web or provide information about their products. Now there are thousand companies on the web.

Assessment

- Mention five things you can do on the internet

Week 2

Topic: HOW THE INTERNET WORKS

INTRODUCTION

On the internet, data and information are transferred worldwide through the servers and clients (which are computers) connected to the internet.

The computers which are responsible for management of resources i.e program and data on a network, by providing a centralized storage area, is called a SERVER. The computer which has an access to the contents of the storage area on the server is CLIENT. On the internet, a client which can access file and services on a number of servers called a Host computer. Your computer is a Host computer.

The inner structure of the internet resembles a transportation system. In the transportation system, the maximum load of traffic is concentrated on the highways, which are linked to the major cities. Similarly, on the internet, there are certain main communication lines which carry the maximum load of traffic. These lines are collectively called the INTERNET BACKBONE.

The internet is a packet oriented network. It means that the data you transfer is divided into packets.

So what happens when you transfer data across the internet various networks?

The networks are linked by special computer, called ROUTERS. A router checks where your packet data goes and decides in which direction to send it. Of course, not every router is linked with every other router, they just decide on the direction your data takes. The internet knows where your data is going, as every destination has an address called an Internet Protocol (IP) address. The data transferred with IP is divided into packets. This is handled by another protocol, the transmission control protocol (TCP).

The internet is an addressing system used to send data and information to a fixed or specific destination, just like the postal system. An IP address i.e. internet protocol address has it own unique identification attached to a computer or a device connected to the internet. The IP address has a group of number and is separated by a period (.). The number varies between 0 and 255. For instance, the number 153, 25. 15,10 are an IP address. Generally, the first part of the IP address identifies the network and the last portion identifies a specific computer.

It is difficult to remember and use this all numeric IP address. Hence, the internet favors the use of text name that represents one or more IP addresses.

The text version on IP is the domain name. The component of the domain name is separated by periods just like an IP address.

Every domain name contains a Top Level Domain (TLD) abbreviation that identifies the type of organization which is associated with the domain. Dot com (.com) is the name sometimes used to described an organization that has TLD of com. The domain name system is a system on the internet that stores the domain names and their corresponding IP address. Each time you specify a domain name, an internet server called the DNS server translates the domain name into its associated IP address, so data can be routed to the correct computer.

WEB PAGE

Web page is an electronic document on the World Wide Web. A web page consists of a HTML file in a particular directory on a particular machine (and in thus identification by a URL) a vast amount of information is provided by these web pages. The information may include graphics, sounds, or even movies. Usually, a web page contains links to other pages as well

WEBSITE

A website is a collection of web pages. Most websites have a home page as their starting point, which frequently has a table of contents for the site. Users need a web browser and a connection to access a website.

HOME PAGE

Home page is the first page retrieved when accessing a website. It serves as a table of contents for the rest of pages on the site and offers links to other websites. For example, a company's welcome page typically includes the company logo, a brief description and links to the additional document available on that site.

UNIFORM RESOURCE LOCATOR

The uniform resource locator is the address that defines the router to a file on the web. URLs are typed into the browser to access web pages for example **https://www.testreams.com** Retrieved home page for testreams website. The http is the web protocol and **www.testsreams.com** is the domain name.

HYPERLINKS

Web pages contain highlighted text or image, called hyperlinks that connect to other pages on the web. A hyperlink allows you to easily move through vast amount of information y jumping from one web page to another. You can select a hyperlink to jump to a web page located on the same computer or on a computer across the city, country or world. You can easily identify a text hyperlink in a web page because it appears underlined and in color.

WEB SERVER

A web server is a computer on the internet that stores web pages. A web page is available for other people to view, when it is stored in the web server.

WEB BROWSER

A web browser is a software program that allows you to access and view web pages. The web browser software is built on the hyperlinks, which allows users to point and click with a mouse in order to jump from one document to another in whatever order the are desire.

TYPES OF BROWSER

In January 1993, the first browser, viola and Midas were released for the X window system (UNIX). At the same time, a Macintosh browser was released called ALPHA version.

In February 1993, the first popular graphical World Wide Web browser was NCSA Mosaic. It was released for all common platforms (UNIX, windows and Macintosh) in September 1993.

Marc Andersen, the mastermind of mosaic, founded his own company, Mosaic communication corp., now known as Netscape and released a browser, the Netscape navigator 1.0. He soon controlled 70 percent of the browser market. Microsoft saw this gigantic success and soon released a browser called MS internet explorer, for free, now new version of both browsers support most HTML.

TYPES OF WEB BROWSER

1. **MICROSOFT INTERNET EXPLORER**: Microsoft internet explorer is the most widely used by people around the world. It was developed by Microsoft in 1995 as a supportive package to the Microsoft windows operating system.
2. **MOZILLA FIREFOX:** Mozilla fire fox is the second browser after the internet explorer. It can be used on many different operating systems including windows, Macintosh, OS/2 and UNIX. It supports tabbed browsing that allows user to open multiple sites in a single window.
3. **OPERA:** Opera is a web browser that was developed by Opera software in 1996. It is a well-known browser that is mainly used in activated mobile phone and smart phones. It is used with many operating systems like Linux, MAC OS and MS window.
4. **NETSCAPE NAVIGATOR**: Netscape navigator was developed by Netscape Communication Corporation and was very popular in the 1990s. it was compatible with almost every operating system.

Assessment

There are numerous web browsers, mention 3 others that you know

Week 3

Topic: BENEFITS OF THE INTERNET

The benefits of the internet are as follows:

1. **INFORMATION**: The internet gives you access to information on any subjects of your interest. This makes the internet a valuable research tool. Most sources such as newspaper and magazines have websites and a number of them only exist online.
2. **RESEARCH:** You can make use of the internet search facilities to research just about any topic you can think of. This information can help you with a school project, or a presentation at work. You can search for the data you need, or go to specific research sites.
3. **E-MAIL (electronic mail)**: Electronic mails enable us to exchange message with people around the world, including friends, family members, colleagues, customers and even people you meet on the internet. E-mail is an exciting feature of the internet as we can send and receive message over long distances. It is also fast, easy and inexpensive.
4. **ENTERTAINMENT**: The internet offers many different forms of entertainment, such as radio and television broadcast, video and music. You can find picture from the latest film, watch live interview of your favorite celebrities and listen to music before it is available in stores.
5. **PROGRAM**: You can find thousands of programs that can be used on your computer, such as word processors, drawing programs, games and accounting programs.
6. **ONLINE SHOPPING**: You can order for products on the internet, while sitting at home. You can purchase items such as books, flowers, music, CDs, pizzas, stock and used cars.
7. **CHATTING**: Chat features allow you to exchange typed message with another person on the internet. The message you send will instantly appear on the other person's computer. You can chat with a person or a group at the same time.
8. **BANKING**: You can use the internet to find financial sites that enables you to do your banking and investing online. Banking online is much more convenient and much less time consuming than doing it in person. Online banking is

extremely secure because all modern browsers support robust security protocol which ensures that your financial data remains safe.

9. **E-LEARNING**: E-learning is a training or education program by electronic means. E-learning involves the use of computer or an electronic device (GSM handset) to provide training on educational technology as a tool for learning. Distant education can be done by e-learning.

Assessment

As a student, what are the benefits of the internet to you?

Week 4

Topic: Internet Environment

INTRODUCTION

An internet is a logical collection of networks supported by gateways, routers, bridges, hosts, and various layers of protocols. An internet permits different physical networks to function as a single, large, virtual network, and permits dissimilar computers to communicate with each other, regardless of their physical connections. Processes within gateways, routers, and hosts originate and receive packet information. Protocols specify a set of rules and formats required to exchange these packets of information.

Protocols are used to accomplish different tasks in TCP/IP software. To understand TCP/IP, you should be familiar with the following terms and relationships.

A **client** is a computer or process that requests services on the network. A **server** is a computer or process that responds to a request for service from a client.
A **user** accesses a service, which allows the use of data or some other resource.

A **datagram** is a basic unit of information, consisting of one or more data packets that are passed across an internet at the transport level.

A **gateway** is a functional unit that connects two computer networks of different network architectures. A **router** is a device that connects networks at the ISO Network Layer. A router is protocol-dependent and connects only networks operating the same protocol. Routers do more than transmit data; they also select the best transmission paths and optimum sizes for packets. A **bridge** is a router that connects two or more networks and forwards packets among them. The operations carried out by a bridge are done at the physical layer and are transparent to TCP/IP and TCP/IP routing.

A **host** is a computer, connected to a network, that provides an access point to that network. A host can be a client, a server, or a client and server simultaneously. In a communication network, computers are both the sources and destinations of the packets. The **local host** is the computer to which a user's terminal is directly connected without the use of an internet. A **foreign host** is any machine on a network that can be interconnected. A **remote host** is any machine on a network that requires a physical link to interconnect with the network.

An **internet address** is a unique address identifying each node in an internet. Internet addresses are used to route packets through the network. Currently, there are two versions used for internet addressing: Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6). **Mapping** relates internet addresses to physical hardware

addresses in the network. For example, in IPv4, the Address Resolution Protocol (ARP) is used to map internet addresses to Token-Ring or Ethernet physical hardware addresses. In IPv6, Internet Control Message Protocol Version 6 (ICMPv6) is used to map internet addresses to physical hardware addresses.

A **network** is the combination of two or more nodes and the connecting branches among them. A **physical network** is the hardware that makes up a network. A **logical network** is the abstract organization overlaid on one or more physical networks. An internet is an example of a logical network.

Packet refers to the unit or block of data of one transaction between a host and its network. A packet usually contains a network header, at least one high-level protocol header, and data blocks. Generally, the format of the data blocks does not affect how packets are handled. Packets are the exchange medium used at the internetwork layer to send and receive data through the network.

A **port** is an end point for communication between applications, generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification. When the port number is combined with an internet address, a **socket** address results.

Protocol refers to a set of rules for achieving communication on a network.

Characteristics of the Internet

The characteristics of the Internet that are clearly of importance in cyberlibel proceedings are:

- its global nature
- interactivity
- its potential to shift the balance of power in the offline world
- accessibility
- anonymity
- its facilitation of republication
- the prominence of intermediaries
- its reliance on hyperlinks/hypertext
- its long-term impact — the use of permanent archives
- its multimedia character
- its temporal indeterminacy

Assessment

- Briefly describe the following terms; i. Client ii. Datagram iii. Internet Address iv. Host

Week 5

Topic: ABUSE OF THE INTERNET

Internet abuse refers to improper use of the internet and may include:

- **Computer Crime** – or **cybercrime**, is any crime that involves a computer and a network. Use of computers for criminal activity.
- **Cyber-bullying** – Use of the internet to bully and intimidate. The use of information technology to repeatedly harm or harass other people in a deliberate manner.
- **Spam (electronic)** – Is the use of electronic messaging systems to send unsolicited messages (**spam**), especially advertising, as well as sending messages repeatedly on the same site. Sending of unwanted advertising messages.
- **Malware** – Software designed to harm a user's computer, including computer viruses. Malware, short for **malicious software**, is any software used to disrupt computer operation, gather sensitive information, or gain access to private computer systems. Malware is defined by its malicious intent, acting against the requirements of the computer user, and does not include software that causes unintentional harm due to some deficiency.
- **Other ways of Abuse include**:

    1. You can get harassing/threatening messages from people or from stalkers.
    2. It is very easy to find sites that promote hatred, violence, drug, sex, and other things not appropriate for children.
    3. There is no restriction on marketing products, such as alcohol, tobacco to children on the internet.
    4. Request for personal information for contests, survey etc. are used in unauthorized way.
    5. Pornographic sites are easily found on the internet instead of it being restricted.

    Assessment

    Briefly explain three internet abuse

Week 6

Topic: File Sharing

Definition

File sharing is the practice of sharing or offering access to digital information or resources, including documents, multimedia (audio/video), graphics, computer programs, images and e-books. It is the private or public distribution of data or resources in a network with different levels of sharing privileges.

File sharing can be done using several methods. The most common techniques for file storage, distribution and transmission include the following:

- Removable storage devices
- Centralized file hosting server installations on networks
- World Wide Web-oriented hyperlinked documents
- Distributed peer-to-peer networks

Computer Network

A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams. A *network* is defined as a group of two or more computer systems linked together.

Computer networks allow you to share information with friends, family, coworkers and customers. **Network file sharing** is the process of copying data files from one computer to another using a live network connection.

Before the Internet and home networks became popular, data files were often shared using floppy disks. Nowadays, some people still use CD-ROM / DVD-ROM disks and USB sticks for transferring their photos and videos, but networks give you more flexible options.

Types of Network

- **Personal Area Network** – The smallest and most basic type of network, a PAN is made up of a wireless modem, a computer or two, phones, printers, tablets, etc., and revolves around one person in one building. These types of networks

are typically found in small offices or residences, and are managed by one person or organization from a single device. Often used at home, this network is more on connections between a computer and another gadget such as a telephone or a modem.

- **Local Area Network** – A connection that's used for groups of computers. This is common in small offices and internet cafes. This is where everyone can share files basically, and is also known to be a good way to connect between computers whenever they want to share an internet connection, or whenever they want to play games with each other.
- **Metropolitan Area Network** – A more powerful version of the local area network where it can cover up the whole city in terms of connection. A huge server is usually used for this type of connection.
- **Wide Area Network** – This is a common type of network nowadays that's made possible by wireless technology. As the term implies, a WAN spans a large physical distance. The Internet is the largest WAN, spanning the Earth. Usually, a credential or service from a certain company is needed to enter a connection in this type of network, but there are others that can be used for free. This is good for internet connection. The internet is a well-known version of this one. A WAN is a geographically-dispersed collection of LANs. A network device called a router connects LANs to a WAN. In IP networking, the router maintains both a LAN address and a WAN address.
- **Storage Area Network** – A type of network that specializes in file sharing and other matters in storing various software within a group of computers.
- **Enterprise Private Network** – This is a software network that's often used in businesses so that they can have privacy over files and interactions between computers.
- **Virtual Private Network –** This is a software that's capable of setting up a network where everyone registered in the network using a credential will be able to access each other through other registered computers.
- **Wireless Personal Area Network (WPAN)** which is virtually a synonym since almost any personal area network would need to function wirelessly. Conceptually, the difference between a PAN (personal area network) and a wireless LAN (Local Area Network) is that the former tends to be centered around one-person Network while the latter is a local area network (LAN) that is connected without wires Network and serving multiple users. **Wireless Networks**

  • The fastest growing segment of the computer industry is the mobile computers such as notebook computers and personal digital assistant (PDAs).

• The wireless networks are becoming increasingly important because the wired connection is not possible in cars or airplanes.

• Wireless networks can have many applications. A very common example is the portable office

• People traveling on road often want to make use of their portable electronic equipment for telephone calls, e-mails, faxes, read remote files etc.

• Wireless networks can exist on trucks, buses, taxies, aero planes etc. They are used where the telephone systems are destroyed in the event of disasters such as. fires, floods and earthquakes etc.

• The wireless networks are important for military.

• Wireless networks and mobile computing are related but they are not identical because portable computers are sometimes wired and some wireless computers are not portable.

Types of Network Topology

A topology for the network is known to be a layout for the connected devices. This is important because this is used to provide a proper flow of data within the said network. Here are the various topologies:

- **Bus** – This is the type of structure that uses a single medium to connect the computer.
- **Ring** – Each computer is connected to another neighboring computer for data transfer. One failed network can cause all networks to turn off.
- **Star** – This is a structure that's common in homes. It uses a certain hub or a router to make the network possible.
- **Tree** – This is a complicated structure that connects the star into multiple buses. This is common for internet cafes and offices.
- **Mesh** – this is a connection that leads to various data transmissions which are perfect for routing huge networks.

Assessment

- Mention four types of networks
- Name three types of Network topology

Week 7

Topic: COMPUTER ETHICS I

COMPUTER ETHICS

Computer ethics are rules that govern the use of a computer system. **Ethics** deals with placing a "**value**" on acts according to whether they are "**good**" or "**bad**". Every society has its rules about whether certain acts are ethical or not. These rules have been established as a result of consensus in society and are often written into laws. Computer ethics are increasingly becoming important because of the rising number of cybercrime issues, including software piracy, unauthorized access, pornography, spamming, target marketing, and hacking. The widespread popularity and use of the Internet has given rise to a number of cybercrime issues and concerns about user privacy. Various computing applications are tampered with to invade into other's privacy. Malware, spyware, freeware, and browser cookie exploits are some of the notorious computing applications that have spurred the debate of importance of ethical behavior in technology. Some of the rules you should follow while using computer are:

BASIC RULES

- Check your email regularly
- Avoid liquid and moist from dropping into the computer system
- Protect the system from power fluctuation
- Unplug the system when not in use
- Respond to email promptly and politely
- Use dust cover or proof to cover the system after use

GENERAL RULES

- Any restricted files stardom the computer should not be accessed
- You should not give your user name and password to any one
- You should not alter any information on the system except your own
- Be polite to others on the net

- Be careful not to use rude or bad language online
- Do not break any laws
- Be patients with new comers
- Your message should be simple on the point.

Assessment

- Mention five Basic rules in computer ethics
- List four General rules in computer ethics

WEEK 8

Topic: THE TEN COMMANDMENTS OF COMPUTER ETHICS

The **Ten Commandments of Computer Ethics** were created in 1992 by the Computer Ethics Institute. The Ten Commandments is "a set of standards to guide and instruct people in the ethical use of computers."

1. Thou shalt not use a computer to harm other people.
2. Thou shalt not interfere with other people's computer work.
3. Thou shalt not snoop around in other people's computer files.
4. Thou shalt not use a computer to steal.
5. Thou shalt not use a computer to bear false witness
6. Thou shalt not copy or use proprietary software for which you have not paid.
7. Thou shalt not use other people's computer resources without authorization or proper compensation.
8. Thou shalt not appropriate other people's intellectual output.
9. Thou shalt think about the social consequences of the program you are writing or the system you are designing.
10. Thou shalt always use a computer in ways that ensure consideration and respect for your fellow humans.

EXPLANATION:

- **Commandment 1**

Simply put: Do not use the computer in ways that may harm other people.

Explanation: It is unethical to use a computer to harm another computer user. It is not limited to physical injury. It includes harming or corrupting other users' data or files. The commandment states that it is wrong to use a computer to steal someone's personal information. Manipulating or destroying files of other users is ethically wrong. It is unethical to write programs, which on execution leads to stealing, copying or gaining unauthorized access to other users' data. Being involved in practices like hacking, spamming, phishing or cyber bullying does not conform to computer ethics.

- **Commandment 2**

Simply put: Do not use computer technology to cause interference in other users' work.

Explanation: Computer software can be used in ways that disturb other users or disrupt their work. Viruses, for example, are programs meant to harm useful computer programs or interfere with the normal functioning of a computer or delete files on a computer. Malicious software can disrupt the functioning of computers in so many ways. It may overload computer memory through excessive consumption of computer resources, thus slowing its functioning. It may cause a computer to function wrongly or even stop working. Using malicious software to attack a computer is unethical.

- **Commandment 3**

Simply put: Do not spy on another person's computer data.

Explanation: We know it is wrong to read someone's personal letters. On the same lines, it is wrong to read someone else's email messages or files or documents. Obtaining data from another person's private files is nothing less than breaking into someone's room. Snooping around in another person's files or reading someone else's personal messages is the **invasion of his privacy**. There are exceptions to this. For example, spying is necessary and cannot be called unethical when it is done against illegitimate use of computers. For example, intelligence agencies working on cyber-crime cases need to spy on the internet activity of suspects.

- **Commandment 4**

Simply put: Do not use computer technology to steal information.

Explanation: Stealing sensitive information or leaking confidential information is as good as robbery. It is wrong to acquire personal information of employees from an employee database or patient history from a hospital database or other such information that is meant to be confidential. Similarly, breaking into a bank account to collect information about the account or account holder is wrong. Illegal electronic transfer of funds is a type of fraud.

- **Commandment 5**

Simply put: Do not contribute to the spread of misinformation using computer technology.

Explanation: Spread of information has become viral today, because of the Internet. This also means that false news or rumors can spread speedily through social networking sites or emails. Being involved in the circulation of incorrect information is unethical. Mails and pop-ups are commonly used to spread the wrong information or give false alerts with the only intent of selling products.

- **Commandment 6**

Simply put: Refrain from copying software or buying pirated copies. Pay for software unless it is free.

Explanation: Like any other artistic or literary work, software is copyrighted. A piece of code is the original work of the individual who created it. It is copyrighted in his name. In case of a developer writing software for the organization he works for, the organization holds the copyright for it. Copyright holds true unless its creators announce it is not. Obtaining illegal copies of copyrighted software is unethical.

- **Commandment 7**

Simply put: Do not use someone else's computer resources unless authorized to.

Explanation: Multi-user systems have user specific passwords. Breaking into some other user's password, thus intruding his private space is unethical. It is not ethical to hack passwords for gaining unauthorized access to a password-protected computer system. Accessing data that you are not authorized to access or gaining access to another user's computer without his permission is not ethical.

- **Commandment 8**

Simply put: It is wrong to claim ownership on a work which is the output of someone else's intellect.

Explanation: Programs developed by a software developer are his/her property. If he is working with an organization, they are the organization's property. Copying them and propagating them in one's own name is unethical. This applies to any creative work, program or design. Establishing ownership on a work which is not yours is ethically wrong.

- **Commandment 9**

Simply put: Before developing a software, think about the social impact it can have.

Explanation: Looking at the social consequences that a program can have, describes a broader perspective of looking at technology. A computer software on release, reaches millions. Software like video games and animations or educational software can have a social impact on their users. When working on animation films or designing video games, for example, it is the programmer's responsibility to understand his target audience/users and the effect it may have on them. For example, a computer game for kids should not have content that can influence them negatively. Similarly, writing malicious software is ethically wrong. A software developer/development firm should consider the influence their code can have on the society at large.

- **Commandment 10**

Simply put: In using computers for communication, be respectful and courteous with the fellow members.

Explanation: The communication etiquette we follow in the real world applies to communication over computers as well. While communicating over the Internet, one should treat others with respect. One should not intrude others' private space, use abusive language, make false statements or pass irresponsible remarks about others. One should be courteous while communicating over the web and should respect others' time and resources. Also, one should be considerate with a novice computer user.

Assessment

- Briefly explain the ten commandments of computer ethics

WEEK 9

Topic: SAFETY MEASURES

SAFETY MEASURES

A person who uses computer sometimes face many problems if the computer is used for a long period of time. The problems may be health related, like headache or vision problems and waist pain.

ERGONOMICS

Ergonomics is the study people, their physical character and the ways in which the function in relating to their working environment, the finishers and the machine they use the mail goal of ergonomics is to the design of keyboard, computer, desk, chairs and others in the work place.

Back and neck strain can be avoided be ensuring that the chair which you seat provide proper support and by placing the monitor when you can comfortably.

- **MONITOR PLACEMENT**: The top edge of the monitor should be at the level of the eye or slightly lower than it. You can use a stand to raise the monitor to appropriate level on your desk.
- **POSTURE**: When you are seated, your feet should be flat on the floor and you should not lean forward or slouch in your chair. You should shift position often and stand up to stretch your arm and legs at least one hour.
- **CHAIR**: Adjustable chair that provide support for the lower back should be used.
- **Ergonomic keyboard:** They are designed to reduce the risk of the waist and hand injury that results from prolong use or repetition movement. An ergonomic keyboard includes alternate key layout and plans set to minimize strain while typing.
- To prevent wrist strain while typing, keep your elbow level with the keyboard and your wrist straight and higher than your fingers while you use a mouse, move the mouse with your entire arm instead of your wrist.

GENERAL SAFETY MEASURES

1. The lighting in the room or office should be moderate

2. Keep liquid away from the computer
3. Protect the computer from dust
4. A glare filter should be used to reduce or prevent eye strain

Assessment

- Mention safety measures in computer use

Week 10

Topic: Safety Measures – The Computer Laboratory

Computer Laboratory

A **computer lab** is a space which provides **computer** services to a defined community. **Computer labs** are typically provided by libraries to the public, by academic institutions to students who attend the institution, or by other institutions to the public or to people affiliated with that institution.

Rules and Regulations of Computer Laboratory

1. Students are not allowed to enter the Computer Laboratory without their Instructor or any authorized personnel. The Instructor should be the first person to come in and the last one to leave the laboratory. No computer laboratory shall be opened if there will be no instructor or IT personnel present in the laboratory.

2. Instructors shall closely monitor the conduct of their students while they are inside the laboratory. The Instructor shall not be allowed to leave the class during the instructor's assigned laboratory hours. In the exceptional event that the instructor must leave the class, the instructor must inform IT Personnel.

3. The student must check the computer unit and its peripherals attached before using it. The student must immediately inform the instructor if there's any defect, error or damage observed at the computer (hardware/software) assigned or if there are any missing peripherals (mouse, keyboard, etc.). The instructor should immediately report the incident to IT Department.

4. Students are not allowed to bring bags, food and beverages inside the laboratory. Chewing gum, eating, drinking, smoking, littering is prohibited inside the computer laboratory.

5. Users should always be on guard with their valuables (such as mobile phone, USB flash drive, wallet, and other electronic devices). The IT Department will not be held liable for the loss or damage of any personal belongings of laboratory users.

6. Users are responsible for saving their documents on their own flash drives, any information saved or installed on the systems hard drive will be deleted once the Computer is rebooted (restarted).

7. No one is allowed to alter or delete configuration settings of any computer laboratory equipment. Tampering, deleting or modifying CMOS/BIOS settings, IP Configuration, system parameters, or system files stored in the hard disk are strictly prohibited.

8. Students shall not be allowed to bring in any other computer unit, laptop and/or peripherals inside the laboratory. In cases where there is a need to bring in computer equipment or peripherals, appropriate permission from school authorities must be secured and proper company procedures must be observed.

9. No student or personnel shall be allowed to attach or detach any peripheral to and from any IT equipment or devices without explicit permission from the Head of the IT Department. Users are not allowed also to attach personal devices in any computer laboratory's network without permission from IT Department.

10. Accessing Pornographic, Gambling, Hate/Discrimination, torrent and other unsafe sites is strictly prohibited.

11. Users are not allowed to install, update or download any software in any computers inside the laboratories. It is also prohibited the users to boot from any bootable devices to run software in any computers in the laboratory.

12. All mobile phones must be in silent mode before entering computer laboratory. In cases where the student has to make or receive call, he/she must leave the laboratory to avoid distracting other students. Charging of mobile phone batteries is not allowed inside computer laboratory.

13. Playing games are not allowed inside the computer laboratory, this includes video games, card games and other games. However, in cases of the topic is related to games the instructor must inform the IT personnel on duty.

14. Anyone who is causing disturbance, trouble and exhibiting hostile or threatening behavior will be requested to leave the computer laboratory. Personal display of affection (PDA) inside the laboratory is not allowed.

15. Printing of manuscripts, business letters, banners, personal documents and research works are not allowed in the laboratory. Only the printing of program listings is allowed using the laboratory printer.

16. If the computer laboratory is to be used for thesis presentation, special training sessions, tutorials, and case study sessions or for other purposes outside the regular offerings of the campus, a formal written request must be approved by the Head of Administration duly endorsed by the Dean. The written request must state the name of AMA personnel who will be responsible in the safekeeping of all laboratory resources during the conduct of the event.

17. Proper computer laboratory etiquette must be observed;

- Ensure that no trash is left behind.
- Turn-off computer units and arrange the computer peripherals (mouse, keyboard and headset) after use.
- Wearing of hats/caps inside the laboratory is not allowed.
- Chairs must be returned properly to its original places
- Orderly dismissal must be observed by the instructor and the class.

18. Theft, vandalism, or abuse in any form is a grave offense and shall be dealt with accordingly. Willful violations of the above provisions shall constitute disciplinary actions. Violators of these guidelines may be subject to any, but not limited to, the following sanctions:

- admonition
- temporary or permanent suspension of computer laboratory privileges
- dismissal from the school

Advantages of Computer Labs:

1. Equity: One of the greatest advantages of having labs in schools is the fact that in the majority of cases it means everyone can have equal access to the computers. Most labs are equipped with enough computers for each student to have a machine. This is both equitable and engaging for the students.

2. Security and Maintenance of the Computers: Let's be realistic…computers are expensive! When they are kept in a dedicated room controlled by a specialist teacher, they are more secure and far less prone to becoming misused or broken. Also, the computer lab teacher will be able to perform small maintenance jobs and oversee compatible software delivery.

3. Specialist Teacher: The actual computer lab teacher is a huge advantage of having computer labs. These are typically teachers who have been selected due to their extensive knowledge in the area of I.T. Not only do they provide solid instruction in technology for the students, but also help the regular teachers with anything technology related as well. The computer lab teacher becomes the "go to" and resource person when it comes to do with anything I.T. related in the school.

4. Group Work Capability: Another key advantage of having computer labs in the school is the capability to train groups of students (a whole class for instance) in key concepts or applications at the same time. If there is a particular program or application which the teacher wants the students to learn and master, the whole class can be given instruction on it at the same time and work through the technological challenges in a supported group.

Disadvantage of Computer Labs:

Frequency of Instruction: This is one of the more obvious disadvantages when we are discussing computer labs. Essentially, the lab is shared by the entire school and therefore is not available very often. It becomes a real juggling act to ensure that the students and their classrooms are all granted equal access. If the majority of the technology is kept in the lab, the only time the students are thus able to expand their skills in this area is when it is their turn to visit the lab. Of course, most labs have open periods for drop ins, but this does not always work out so well as these often conflict with existing schedules.

Assessment

- List ten rules and regulations of the computer laboratory.
- Mention three advantages of computer laboratories.