# 1

# INTRODUCTION TO COMPUTERS

## UNIT – 1: INTRODUCTION TO COMPUTERS

1. **Definition of Computer:** Electronic Data Processing device capable of receiving input, storing sets of instructions for solving problems and generating output with high speed and accuracy.

2. **Five Generations of Computers:**

   2.1 **First Generation** - employed Vacuum Tubes

   2.2 **Second Generation** - employed transistors and others solid state devices

   2.3 **Third Generation** - employed Integrated Circuits

   2.4 **Fourth Generation** - employed Large Scale Integrated Circuit (LSI)

   2.5 **Fifth Generation** - employed Artificial Intelligence and Parallel Data Processing (PDP)

3. **Four Types of Computer based on the Size and Functions**

   3.1 **Super Computer** - Largest and fastest computer used in specialized areas such as in Defense, Aircraft design, Movies, Weather research. Examples are CRAY, CDC, PARAM 10000.

   3.2 **Mainframe Computer** - Big general purpose computer capable of handling scientific and business applications which can support more than 10000 terminals.

   3.3 **Mini Computer** - Perform Data Processing activities on a smaller scale and were developed for process control and system monitoring. Examples are Data General Nova, DEC, PDP-11 and IBM Series/1.

   3.4 **Micro Computers -** Use Microprocessor as its CPU i.e. a small silicon chip on Circuit board in computer system. Examples are IBM PC, APPLE II, PS/2.

**Other Types of Computer Systems**

**3.5 Workstations** – Based on the architecture of CPU called Reduced Instructions Set Computing (RISC) and are used by scientists and engineers.

**3.6 Server-** Provide services to other computing system called clients over a network.

**4. Advantages and Limitations of Computer**

**4.1 Advantages of Computer:** Speed, Accuracy, Reliability.

**4.2 Disadvantages of Computer:** Lack of reliability, Difficult to understand application logic.

**5. Components of Computer System - CPU**

**5.1 CPU: Microprocessor**

**5.1.1 Control Unit** – Manages the resources of computer system by executing set of instructions that the CPU can perform.

**5.1.2 ALU** – Arithmetic operations include addition, multiplication, subtraction and division. Logical operations include comparison such as equal to, greater than or less than.

**5.2 Features of CPU:** Clock speed, Cache, Architecture, Slot, Density, MMX.

**5.3 Types of Microprocessor:** 8080, 6502, 8086/8088, MC 68000, 80286, 80386, 80486, P-I, P-II, P-III, P IV, P-V.

**5.4 Processor Speed:**

- P-II ranges between 233 MHz to 300 MHz.
- P-III and P-IV ranges from 2.1 GHz and more.

**6. Mother Board** – Circuit board acts as a direct channel for the various components to interact and communicate with each other.

**6.1 Components of Mother Board:** Processor Slot, Expansion Slots and Boards, Cards, Ports and Connectors, Bus.

**7. Storage Device:** A block of space which helps computer in processing arithmetical and logical operations by holding programs and data being manipulated.

**7.1 Types of Storage:** Primary storage, Secondary storage, Tertiary and off-line storage, Network storage.

**7.2 Characteristic of storage:** Volatility of information, Ability to access non-contiguous information, Ability to change information, Addressability of information, Capacity and performance.

**7.3 Primary Storage**

**7.3.1 Semi Conductor Memory:** The number of transistors are integrated or combined together on a thin silicon wafer to form a complete set of circuits that can hold data.

**7.3.2 Random Access Memory (RAM):** Volatile memory constructed with Metal-Oxide Semi Conductor Storage elements (MOS). Two types of RAM are - Dynamic and Static RAM .

**7.3.3 Read Only Memory:** Perform the basic control and supervisory operation of the computer. Three types of ROM are - PROM, EPROM, EEPROM.

**7.3.4 Bubble Memory:** Small magnetic bubbles formed on a thin single crystal film of synthetic garnet is used to store the data permanently.

**7.3.5 Flesh Memory:** Non-Volatile memory , store data similar to those used in primary storage.

**7.3.6 Video RAM:** Used to accelerate the display of graphics on the screen.

**7.4. Secondary Storage Devices:** Stores the data permanently in millions and billions of bytes.

**7.4.1 Floppy Diskette:** 3.5 inches, 1.44 MB diskette has a total of 2880 sectors (80 tracks per side x 2 sides x 18 sectors per track).

**7.4.2 Magnetic Disc**: Direct access medium known as Hard Disk, is a stack of one or more metal platters that spin on one spindle like a stack of rigid diskette.

**7.4.2.1 Various operations of Magnetic Disc:** Data storage consists of 3 components namely Seek Time, Rotational Time, Data Transfer Time.

**7.4.3 Optical Laser Disk:** Store vast amount of data using optical laser beam that writes to the recording surface by scoring macroscopic pits in disk, and another laser reads the data from the light sensitive recording surface.

**7.4.3.1 Four categories of optical laser:** CD-ROM Disk, WORM Disk, Magneto – Optical Disk, Digital Video Disk.

**7.4.4 Tape Device:** Secondary storage devices are capable of storing and accessing data sequentially.

**7.4.4.1 Two types of Tape devices:** Detachable Reel Magnetic Tape and Tape Cartridge System.

## UNIT – II: INPUT AND OUTPUT DEVICES

1. **Definition of Input Device:** A device that is used to feed the data or information from outside world into the computer system.

2. **Types of Input Devices**

**2.1 ON-LINE ENTRY:** Key board, Mouse, Touch Screen, Light Pen, Track Ball, Joy Stick, Display devices

**2.1.1 Types of Display Devices -** Monitors and Terminals.

**2.1.1.1 Five types of Terminals:**

- **Dumb Terminal:** Provides for data entry and information exit.
- **Intelligent Terminal:** Having built-in processing capability storage area through Microprocessor.
- **Smart Terminal:** Having Microprocessors and some internal storage. It has data editing capability and can consolidate input data.
- **Remote Job Terminal:** groups data into blocks for transmission to a computer from remote site.
- **Keyboard Printer Terminal:** Consists of a key board for sending information to the computer and a printer, for providing a copy of the input and for receiving information from the computer.

**2.1.1.2 Features of Display Devices:** Screen resolution, Text and Graphics, CRT Versus Flat-Panel.

**2.2 DIRECT DATA ENTRY:** Entry of data directly into the computer through machine readable source documents.

**2.2.1 Types of DDE:**

**2.2.1.1 Magnetic Ink Character Recognition (MICR):** Vertical bars contain a magnetizable material.

**2.2.1.2 Optional Character Reading (OCR):** Light scanning techniques used to produce light dark pattern.

2.2.1.3 **Optical Mark Recognition (OMR):** Use photo-electric device, which recognizes character by absorption on the document. It is commonly used for scoring tests.

2.2.1.4 **Smart Card System:** It contains a microprocessor chip and memory to store the data.

2.2.1.5 **Bar Code Reader:** A light sensitive detector identifies the bar code image using laser beam.

2.2.1.6 **Image Processing:** It captures an electronic image of data to be stored and shared. It includes Data Capturing, Indexing, Storage, Retrieval, Output.

**3. Types of Output Devices**

**3.1 Printer:** are devices that produce hard copies of information stored in computer on to the papers or on transparencies or on other media.

**3.1.1 Impact Printer -** A printer which utilizes some form of striking device to transfer ink from an inked ribbon onto the paper being printed to form images or characters.

**3.1.1.1 Serial Printers:** Dot-matrix printer, Daisywheel printer.

**3.1.1.2 Line Printers:** Chain Printer, Drum printer.

**3.1.2 Non-Impact Printer -**A Printer do not strike a print head on the ribbon and form the character by chemical or electronic means.

**3.1.2.1 Types of Non-Impact Printer:** Thermal printer, Ink-Jet printer, Laser printer.

**3.1.3 Computer Output Microfilm (Microfiche):** Output from a computer as microscopic images on roll or sheet film.

**3.1.4 Microphones and Voice Recognition:** Recording of voice into digitized form through a device called Microphone.

Translating voice to text is a capability known as voice recognition or speak recognition.

**3.1.5 Graph Plotter:** A device capable of tracing out graphs, designs and maps into paper.

## UNIT - III: SOFTWARE

1. **Definition of Software:** A set of instructions, which is known as program, are combined together to perform specific task.

2. **Three Types of Software:** System Software, Application Software, General Purpose Software.

   2.1 **System Software:** Comprises of those programs that control and support the computer system and its data processing applications. Various types of System software are Programming Language, Operating Systems, Subroutines, Utility Programming, Diagnostic routines and Language translators.

   2.1.1 **Various functions of Operating Systems:** Schedule Jobs, Manage H/W and S/W resources, Maintain system security, multiple user resource sharing, Interrupts handling, Maintain usage records.

   2.1.2 **Various Operating Systems:** MS/PC DOS, Microsoft Windows(Windows 95, Windows 98, Windows NT, OS/2, Windows 2003, Windows Vista), UNIX, LINUX, OS/400.

   2.1.3 **Features of Operating Systems:** Multiprogramming, Foreground /background processing, Multi-tasking, Virtual Memory, Multiprocessing.

   2.1.4 **Various types of Utility Programs:** Sort utilities, Spooling software, Text editor, Disk copy program, File copy program, Disk formatting program, File deletion program, File viewing program, Directory program.

   2.1.5 **Diagnostic Routines:** They assist in program debugging.

   2.1.6 **Three types of Language Translators:** Compilers, Interpreter, Assembler.

3. **General Purpose Software/Utilities:** A framework for business, scientific and personal applications. Three types of software namely Commercial, Shareware, Open Source can be categorized as General Purpose software.

   3.1 **Various types of software:** Word Processor, Spread Sheet Program, DBMS, Internet Browser, E-mail.

4. **Application Software:** It employs the capability of the computer to perform task given by the user. It ranges from Payroll software, Accounting software, Inventory control, CAD, CAM, ERP etc.

   4.1 **ERP:** Integrates all data and process of organization into a single unified system that covers wide range of applications in the organization such as Manufacturing, Supply chain, Financials, CRM, HRM and Warehouse management.

   4.2 **Decision Support System:** Information processing system used by accountants, managers and auditors to assist them in the decision making process.

      4.2.1 **Characteristics of DSS:** Supports management decision making, Solve relatively unstructured problems and provides friendly computer Interface.

      4.2.2 **Four Components of DSS:**The User, One or More Databases, Planning Language ,The Model Base.

   4.3 **Artificial Intelligence:** A software that tries to emulate aspects of human behavior, such as reasoning, communicating, seeing and hearing.

   4.4 **Expert Systems:** A computerized information system that allows non-experts to make decisions comparable to those of an expert.

      4.4.1 **Five components of Expert Systems:** Knowledge base, Inference engine, User interferes, Explanation facility and Knowledge acquisition facility. These are used to solve complex tasks which require experience and specialized knowledge in specific subject areas.

# 2

# DATA STORAGE, RETRIEVAL AND DATA BASE MANAGEMENT SYSTEMS

1. **Number Systems:** Represent the numbers , alphabets and the special characters which are converted into 0s and 1s ,so that computer can understand to do the task.

   1.1 **Types and number system operation:** Decimal number system, Binary number system, Decimal-binary conversion, Binary-decimal conversion, Fixed point and floating point number representation, Binary Coded Decimal code, ASCII code, EBCEDIC code.

2. **Data Types:** Double precision, Logical, Character, String, Variables, Memo data.

3. **Key:** Defines uniqueness with one or more columns whose combined values are unique among all occurrences in a given table.

   3.1 **Types of Key:** Candidate Key, Primary Key, Alternate Key, Secondary Key.

   3.2 **Types of Index Fields:** Currency Field, Date Field, Integer Field, Text Field.

4. **Data Processing:** A series of actions or operations that converts data into useful information.

   4.1 **Data Storage Hierarchy:** Character, Field, Record, File, Database.

5. **File organization:** A method or technique through which users of database can organize, access, and process records and files depending upon the application.

   5.1. **Three commonly used file organizations:**

   5.1.1 **Serial:** Records are arranged one after another, in no particular order.

   5.1.2 **Sequential:** Records are arranged one after another in an ascending or descending order determined by the key field of the records.

   5.1.3 **Direct Access:** Records are stored or accessed immediately.

5.1.3.1 **Direct Sequential Access:** Self direct addressing, Index sequential addressing method.

5.1.3.2 **Random Access :** Address generation method, Indexed random method.

6. **Database Management Systems:** A set of software programs that controls the organization, storage, management, and retrieval of data in a database.

   6.1 **Management Problem of File Processing:** Data duplication, Lack of data integration, Data dependence, Other problems.

   6.2 **Benefits of DBMS:** Reduce data redundancy and Inconsistency, Enhance data Integrity, Provide logical and physical data independence, Provide application data independence, Reduce complexity.

7. **Database Definition:** A collection of data designed to be used by different people or a collection of interrelated data stored together with controlled redundancy to serve one or more applications in an optional fashion.

   7.1 **3 level of Database Architecture:** External or User view, Conceptual or Global view, Physical or Internal view.

   7.2 **Data Independence:** Logical and Physical Data independence.

   7.3 **DBMS Users:** Native users, Online users, Application programmers, Database Administrator.

   7.4 **File Pointer:** Address of another related record, which points to that related records. Example, Linked List.

   7.5 **Record Relationship:** One-to-One, One-to-Many, Many-to-One, Many-to-Many.

8. **Structure of Database:** Three Types of Database structures are:

   8.1 **Hierarchical Database Structure:** Records are logically organized into a hierarchy of relationships that implements one-to-one and one-to-may relationships.

   8.2 **Network Database Structure:** Views all records in sets and each set is composed of an owner record and one or more member records that implements one-to-one, one-to-many and many-to-many record structure.

   8.3 **Relational Database Structure:** The database is structured into a series of two-dimensional tables known as relation.

9. **Components of Database**

   9.1 **DDL:** Defines the conceptual schema providing a link between the logical and physical structure of database.

   9.2 **DML:** Enables the user and application program to be independent of the physical data structures using manipulation techniques like deletion, modification, insertion of data or records.

10. **Structure of DBMS:** DDL Compiler, Data Manager, File Manager, Disk Manager, Query Manager, Data Dictionary.

11. **Types of Databases:** Operational Database, Management Database, Information Warehouse Database, End-user Database, External Database, Text Database, Image Database, Distributed Database, Object Oriented Database, Client-server Database and Knowledge Database.

12. **Structured Query Language:** A query language is a set of commands to create, update and access data from a database allowing users to raise adhoc queries/questions interactively without the help of programmers.

13. **Documentation and Program Library:**

   13.1 **Program Library Management System Software:** Functional capabilities, Integrity capabilities, Uses capabilities, Update capabilities, Reporting capabilities, Interface capabilities.

   13.2 **User Interface Design elements:** Source documents, Hard copy, Screen layout, Inquiry screen, Command languages, Query languages, Graphic display, Voice output, Screen layout, Icons.

14. **Backups, and Recovery:** Utility program used to make a copy of the contents of database files and log files. Recovery is a sequence of tasks performed to restore a database to some point-in-time.

   14.1 **Types of Log:** Transaction Log and Mirror Log.

   14.2 **Types of Backup:** Online backup, Offline backup, Live backup, Full and Incremental backup.

15. **Data Warehouse:** Repository of an organization's electronically stored data which facilities reporting and supporting data analysis.

   15.1 **Development stages of Data Warehouse:** Offline operational databases, Offline data warehouse, Real time data warehouse, Integrated data warehouse.

**15.2 Component of Data Warehouse:** Data Sources, Data Transformation, Data Warehouse, Reporting, Metadata , Operations.

**16. Data Mining:** Analysis of data and picking out relevant information from database. Also responsible for finding the patterns by identifying the underlying rules and features in the data.

**16.1 Development stages of Data Mining:** Selection, Preprocessing, Transformation, Data Mining, Interpretation and Evaluation.

# 3

# COMPUTER NETWORKS AND NETWORK SECURITY

1. **Definition of Computer Network:** A network is a set of devices (also known as nodes, terminals or stations) interconnected by communication links. A computer network is collection of computers and terminal devices connected together by a communication system.

   1.1 **Scope of Network:** File sharing, Print sharing, E-Mail, Fax sharing, Remote Access, Shared databases, Fault tolerance, Internet access and security, Communication and collaboration, Organization.

   1.2 **Benefits of using network:** Improve communication, Reduce costs and improve efficiency, Reduce errors.

2. **Networks Classification**

   2.1 **Function Based:** Data Network, Voice Network, Multimedia Network.

   2.2 **Area Coverage Based:** LAN,MAN,WAN.

   2.3 **Forwarding Based:** Switch Network, Shared Network, Hybrid Network.

   2.4 **Ownership Based:** Public Network, Private Network, Virtual Private Network, Leased Network.

   2.5 **Media Based:** Wired Network and Wireless Network.

   2.2.1 **Area Coverage Based**

   2.2.1.1 **Local Area Network (LAN):** A high speed data transfer network that supports 1 MBPS to 30 Mbps or more.

   2.2.1.2 **Metropolitan Area Network (MAN):** Based on Fiber Optic transmission technology that supports 10 Mbps transferring of data.

2.2.1.3 **Wide Area Networks (WAN):** Uses long distance telephone services and satellite transmission. It operates at lower link speeds of about 1 Mbps.

2.2.2 **Network Models:** Client Server model and Peer-to-peer Model.

3. **Components of Network:**

3.1 **Sender / Receiver:** A host computer at both ends which send and receive the data.

3.2 **Communication Interface Devices:** Network Interface Cards, Switches and Routers, Hubs, Bridges, Repeaters and Gateways, Modem, Multiplexer, Front-end communication processors, Protocol converters, Remote access devices.

3.3 **Communication Channel:** Guided Media (Twisted Pair cable, Coaxial cable and Optical Fiber cable) and Unguided Media (Wireless transmission).

3.4 **Communication Software Functions:** Access control, Network management, Data and file transmission, Error detection and control, Data security.

4. **Definition of Network Topology:** Geometrical arrangement of computer resources, remote devices, and communication facilities to share the information.

4.1 **Four types of Network Topology:**

4.1.1 **Star Topology:** Communication channel controlled by Centralized System.

4.1.2 **Bus Topology:** Single network cable connected with node via communication line.

4.1.3 **Ring Topology:** Direct point-to-point link between two neighboring nodes with unidirectional mode.

4.1.4 **Mesh Topology:** Random connection of nodes using communication links.

5. **Data Transmission Techniques:** Transferring of data on a communication channel between sender and receiver determines by transmission techniques which include direction of exchanges of data, no. of bits sent and synchronization between the transmitter and receiver.

5.1 **Serial versus Parallel transmission:** Single path of data transmission serially versus multiple path of data transmission simultaneously.

5.2 **Synchronous versus Asynchronous transmission:** Data transmission based on regular versus irregular time interval.

5.3 **Transmission modes:** Simplex, Half-duplex and Full-duplex connection.

5.4 **Transmission techniques:** Circuit switching, Message switching, Packet switching.

6. **Transmission Protocols:** Protocols are set of rules for communication between computer ensuring timings, sequencing, and error checking for data transmission.

6.1 **Protocol Definition:** Syntax, Semantics and Timing.

6.2 **Open System Interconnection (OSI) Model:** Application layer, Presentation layer, Session layer, Transport layer, Network layer, Data link layer, Presentation layer.

6.3 **Transmission Control Protocol / Internet Protocol (TCP/IP):** Application layer, Transport layer, Internet layer, Network Interface layer.

7. **Definition of Local Area Network:** A data transmission system intended to link computers and associated devices with in a restricted geographical area. It is useful for sharing resources like files, printers or other applications.

7.1 **Benefits of using LAN:** Security, Inexpensive workstation, Distributed processing, Emailing and message broadcasting, Organizational benefits, Data management benefits, Software cost and up-gradation.

7.2 **LAN Requirements:** Compatibility, Internetworking, Growth path and modularity, System reliability and maintenance.

7.3 **Components of a LAN:** File server, Network operating system, Workstations, Network Interface Card (NIC), Network cabling.

8. **Client/Server Technology:** A computing technology in which the hardware and software components are distributed across a network to accept the request sent by the client machine to the server machine for processing of data.

8.1 **Limitation of the traditional computing models:** Mainframe architecture, Personal computers, File sharing architecture.

8.2 **Component of C/S technology:** Client, Server, Middleware, Fat-client or Fat-server, Network.

9. **Virtual Private Network (VPN):** A network that uses a public network (usually the Internet) to connect remote sites or users together with "virtual" connections routed

through the Internet from the company's private network to the remote site or employee.

**9.1 Two types of VPN:** Virtual Private Dial-up Network (VPDN) , Site-to-site VPN.

**10. ISDN:** System of digital phone connections to allow simultaneous voice and data transmission across the world.

**10.1 Two types of ISDN services:**

**10.1.1 Basic Rate Interface (BRI):** BRI consists of two 64 Kbps B channels and one 16 Kbps D channel suitable for individual users.

**10.1.2 Primary Rate Interface (PRI):** PRI consists of 23 B channels and one 64 Kbps D channel for users with higher capacity requirements.

**11. Types of Servers:**

**11.1** Database Servers, Application Servers (Web Information Server, Component Server, Active Application Server), Print Servers, and Transaction Servers.

**11.2 Types of Internet Server:** File Server, Mail Server, Gopher Server, Web Server, FTP Server, News Server, Chat Server, Caching Server, Proxy Server.

**12. Network Tier Architecture:**

**12.1 Single tier system:** Single computer that contains a database and a front end to access the database.

**12.2 Two tier system:** Client at front-end and server at back-end.

**12.3 Three tier system:** provides process management with business logic and rules.

**12.4 N-tier system:** An application is executed by more than one distinct software agent.

**13. Definition of Data Centre:** Centralized repository for the storage, management and dissemination of data and information with high security, fault-resistant facilities, hosting customer equipment that connects to telecommunication networks.

**13.1 Private and Public Data Centre:**

**13.1.1** Tier 1 data centre can tolerate upto 28.8 hours of downtime per year.

**13.1.2** Tier 4 data centre can tolerate upto 0.4 hours of downtime per year.

13.2 **Value added services by Data Centre:** Database monitoring, Web monitoring, Backup and restore, Intrusion detection system, Storage on demand.

13.3 **Features of Data Centers:** Size, Data Security, Availability of Data, Electrical and power systems, Security.

13.4 **Management challenges in Data Centre:** Maintain skill staff and high infrastructure, Maximization uptime and performance, Technology selection, Resource balancing.

13.5 **Disaster recovery sites:** Cold site, Warm site, Hot site.

13.6 **Business Continuity Planning (BCP):** A BCP is a logistical plan for how an organization will recover and restore partially or completely interrupted critical functions within a predetermined time after a disaster or extended disruption.

13.6.1 **Life Cycle of BCP:** Analysis, Solution design, Implementation, Testing and organization acceptance, Maintenance.

14. **Network Security:** Ensure safeguarding of assets and maintain the data integrity within the system.

14.1 **Need of Security:** safeguard assets, ensure and maintain the data integrity.

14.2 **Level of Security:** Prepare project plan, Assets identification, Assets valuation, Threats identification, Threats probability of occurrence assessment, Exposure analysis, Control adjustment, and Report generation.

14.3 **IDS Components:** Network Intrusion Detection, Host-based Intrusion Detection, Hybrid Intrusion Detection, Network-Node Intrusion Detection.

14.4 **Threats and Vulnerabilities:** Fire, Water, Energy variations, Pollution, Intrusion, Viruses and Worms, Misuse of software, Hackers.

14.5 **Techniques of Network security:** Firewall.

# 4

# INTERNET AND OTHER TECHNOLOGIES

1. **History of Internet:**Advanced Research Project Agency (ARPA) of Department of Defense, U.S., developed a network named ARPANET in 1970 to share information between networks.

   1.1 **What is Internet ?:** A network of computers that offers access to information through e-mail, bulletin boards, chatting, and information retrieval services that can access files, directories and database around the world.

   1.2 **World Wide Web:** A network of computers which communicates with each other using standard is called HTTP (Hyper Text Transfer Protocol) , A protocol which provides access to large amount of information located on many different servers. Web Page and Web Browser are elements of WWW.

   1.3 **Uniform Resource Locators (URLs):** A Text string used to address and access individual web pages and Internet resources.

   1.4 **Applications of Internet:** Communication, Data retrieval, Data publishing.

   1.5 **Business use of Internet:** Reach a worldwide audience, Provide product information, Save costs, Replace phone banks, Provide easy access to customer, Reduce the burden of customer service, Create corporate image, Recruitment and staffing services, Provide useful services, Online services, Eliminate the middle man, Online ecommerce etc.

   1.6 **Types of Internet Connections:** Analog/ Dial-up Connection, ISDN Connection, B-ISDN Connection, DSL Connection, ADSL Connection, SDSL Connection, VDSL Connection, Cable Connection, T-1 Lines Connection, Bonded T-1 Connection, T-3 Lines Connection, Satellite Connection.

2. **Components of Internet**

   2.1 **Electronic Mail (e-mail):** A technique in which messages or documents is sent to another person using Internet.

2.1.1 **Advantages of E-mail:** Easy, Fast, Inexpensive, Easy to Filter, Secure and Reliable.

2.1.2 **Features of E-mail:** Composing, Replying, Address book, Printing, Editing, Forwarding, Transfer of data files, Greeting cards.

2.2 **Web Casting or Push Technology:** Allows users to passively receive broadcast information rather than actively search the web for information. For example, Internet news service.

3. **Intranet:** An information system that facilitates communication within the organization, among widely dispersed departments, divisions, and regional locations.

3.1 **Benefits of using Intranet:** Workforce productivity, Time, Communication, Web publishing, Business Operations and Management, Cost-effective, Promote Common corporate culture, Enhance collaboration, Cross-platform capability.

4. **Extranet:** An extension of an Intranet which is accessible to outside companies or individuals with or without an Intranet. A collaborative Internet connection with other companies and business partners.

4.1 **Benefits of using Extranet:** Exchange large volumes of data, Share product catalogs, Collaborate with other companies, Develop and use training programs, Access services by one company, Share news of common interest.

5. **Internet Protocol Suite:** A set of communication protocol that implements the protocol stack on which the Internet and most commercial networks run.

5.1 **Layers of TCP/IP:** Application Layer, Transport Layer, Network Layer, Link Layer.

6. **E-Commerce:** A process of doing business electronically which involves the automation of a variety of business-to-business and business-to-consumer transactions through reliable and secure connection.

6.1 **Working of E-Commerce:** Order Placed, Authorization Request, Authorization Response, Order Fulfilled, Settlement Request, Settlement Deposited.

6.2 **Internet's dramatic impact on the scope of business networking applications:** Universality, Reach, Performance, Reliability, Cost, Momentum.

7. **Types of e-Commerce**

   7.1 **Business-to-Business (B2B):** Exchange of services, information and/or products from one business to another that takes the form of automated processes between trading partners.

   7.2 **Business-to-Consumer (B2C):** Exchange of services, information and/or products from a business to consumer, as opposed to between one business and another.

      7.2.1 **Two types of B2C:** Direct Seller, Online Intermediaries.

   7.3 **Consumer-to-Business (C2B):** Exchange of services with business vendors by posting their project work with set budget online. The consumer reviews all the bids and select the company for further processing.

   7.4 **Consumer-to-Consumer (C2C):** An Internet-facilitated form of commerce between consumer of the product.

8. **CRM:** The methodologies, technology and capabilities that help an enterprise to manage customer relationship in a better way through the introduction of reliable systems, processes and procedures.

   8.1 **Three types of Application Architecture of CRM**

      8.1.1 **Operational:** Sales force automation (SFA), Customer service and support (CSS), Enterprise marketing automation (EMA).

      8.1.2 **Analytical:** Analysis of data to segment customers or to identify potential to enhance client relationship. Types of operations are Acquisition, Retention, Information, Modification.

      8.1.3 **Collaborative:** Benefits are Efficient productive customer interactions, Web collaboration to reduce service cost, Enabling multi-channel personal customer interaction, Interaction at the transaction level.

   8.2 **Functions of CRM:** Scalability, Multiple communication channels, Workflow, Assignment, Database, Customer privacy considerations.

9. **Supply Chain Management:** A process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible.

   9.1 **Potential Growth area of SCM:** Fulfillment, Logistics, Production, Revenue & Profit, Costs, Cooperation.

9.2 **Problems in SCM:** Distribution Network Configuration, Distribution Strategy, Information, Inventory Management.

9.3 **Supply Chain Management Activities:** Strategic, Tactical, Operational.

9.4 **The Bullwhip Effect:** Observed phenomenon in forecast-driven distribution channels. Forecasts are based on statistics and are rarely perfectly accurate.

10. **Electronic Data Interchange (EDI):** Electronic exchange of business documents in a standard and universally accepted format between trading partners which includes invoices, purchase orders, and shipping notices in a standard, machine processable data format.

10.1 **Advantages of EDI:** Issue and receive orders faster, Make sales more easily, Get paid sooner, Minimize capital tied up in inventory, Reduce letters and memos, Decrease enquiries, Make bulk updates of catalogues and parts listings.

10.2 **EDI process:** Translation of data into standard format, Transmission over communication lines, Re-transmission of data.

11. **EFT:** Stands for Electronic Fund Transfer that represents the way the business can receive direct deposit of all payments from the financial institution to the company's bank account. EFT can be performed using 4 methods. They are: Automated Teller Machines (ATMs), Point-of-Sale (POS) Transaction, Preauthorized Transfers, Telephone Transfers.

12. **Types of Electronic Payments:** Credit Cards, Transaction using third party verification, Secured Electronic Transaction (SET), Joint Electronic Transaction, Electronic Cheques, Smart Cards, Electronic purses.

13. **Risk and Security Consideration:** Reliability, Scalability, Ease of use, Payment methods.

13.1 **General Management Concern:** Loss of paper audit trail , Business continuity, Exposure of data to third parties, Potential legal liability, record retention and retrievability, Segregation of duties.

13.2 **Information and systems security tools:** Firewalls, Encryption, Message authentication, Site blocking.

14. **Mobile Commerce:** Buying and selling of goods and services through wireless handheld devices such as Cellular Telephone and Personal Digital Assistants (PDAs) known as next-generation e-commerce. M-commerce enables users to access the Internet without need to find a place to plug in which is based on technology called Wireless Application Protocol (WAP).

15. **BLUE TOOTH:** Telecommunication Industry specification that describes how mobile phones, computers, and Personal Digital Assistants (PDAs) can be easily interconnected using a short-range wireless connection. A data can be exchanged at a rate of 1 Mbps to 2 Mbps.

16. **Wifi – Wireless Fidelity:** A technology of Wireless Local Area Network (WLAN) based on IEEE 802.11 specifications to be used for mobile computing devices, such as laptops, in LANs, in Internet, VOIP, gaming and basic connectivity of consumer electronics such as televisions and DVD Players.