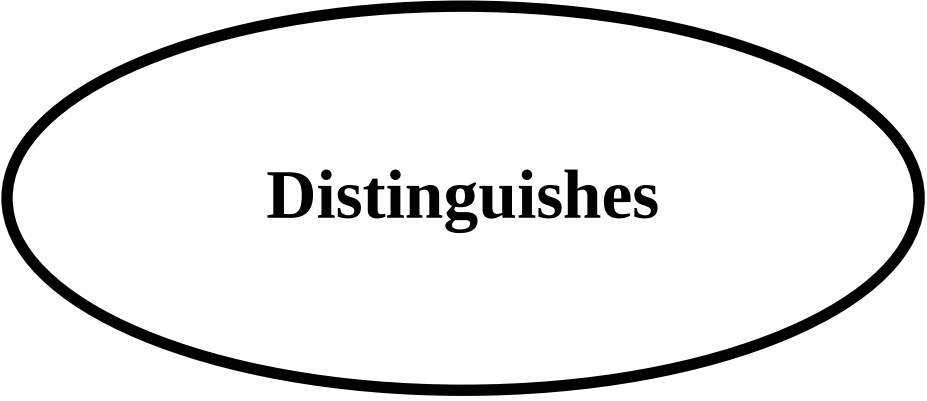




Distinguishes

Hardware and Software: Computer uses two things for any data processing one is hardware and second one is software. Hardware is physical items whereas software are applications or programs which are running on hardware for data processing.

S.N	Hardware	Software
1.	All physical parts of computer are known as hardware.	Applications or programs running on computers are known as software.
2.	Hardware is dumb it is software which makes it intelligent.	Software too requires hardware for executions.
3.	Hardware is manufactured.	Software is developed.
4.	Hardware contains physical parts made by using some material like Integrated Circuits (IC) etc.	Software contains logics etc written in programming languages.
5	Hardware is normally one time purchase item.	Use of software is ongoing process and user can use new applications as and when he required on same hardware.

System Software and Application Software: System and application software are two popular types of software.

S.N	System Software	Application Software
1.	This software is used for managing system (computers and application) like Window Operating System.	This software is used for a particular task like payroll, banking application, etc.
2.	Systems software are main requirement for any computer to work and manage like we know we cannot use computers without operating system	Application software requirement depend upon the type of use we want to take from computers.
3.	System software are difficult to develop and require high level of intelligence.	Application software are comparatively easy to develop.
4.	Examples of system software are operating system and programming languages.	Examples of application software are Banking Software, Railway, Reservation etc.
5	For Developing system software user should have expert knowledge of functioning of computer hardware also.	Application software can be developed without having the knowledge of computer hardware.

Application Software and General Purpose Software: Application software are used for specific tasks whereas General Purpose Software used for general tasks.

S.N	Application Software	General Purpose Software
1.	This type of software is used for particular tasks like payroll, banking application etc.	This type of software is used for general tasks like creating documents, data management etc.
2.	Developed as per the requirements therefore known as customized software	Available as package software
3.	It takes time to implement these software for use	Package software can be installed immediately and put for use.
4.	High cost software because developed as per the organization requirement	Low cost software because development cost is distributed among large number of buyers
5	Examples: Banking applications, ERP and Railways reservations software	Examples: MS-Word, MS-Excel and MS-Access etc.

Distinguishes

Third – Generation Languages (3GLs) and Fourth-Generation Languages (4GLs): Programming languages are used for developing software. There are various types of programming languages used for developing software as per requirement like BASIC, COBOL, C, Java etc.

SNo	3 GL (3 rd Generation Language)	4 GL (4 th Generation Language)
1.	Intended for use by professional Programmers.	Can be used by end users as well as professional programmers.
2.	These are procedural programming languages and work on how to do Principle.	These are function oriented languages and work on what to do principle?
3.	Comparatively difficult to learn	Many features can be learned easily
4.	Require large nos. of procedural instructions.	Require fewer instructions in a program
5.	Difficult to debug	Easy to debug
6.	Take more time for software development, testing and updation	Take less time for software development, testing and updation
7.	BASIC, COBOL, FORTRAN etc	FOCUS, SQL

Multiprogramming and Multiprocessing: Both of these are advance techniques used in present computers to increase the overall efficiency (Processing speed) of computers.

S.N	Multiprogramming	Multiprocessing
1.	In this concurrent execution of programs take place by single CPU.	In this multiple CPUs are used for concurrent processing.
2.	In this single CPU works in Timesharing mode to allocate its time for various programs.	In this multiple CPUs are used for simultaneously execution of multiple programs.
3.	Multiprogramming offers lower data processing capabilities than multiprocessing systems.	This offers higher data processing capabilities.
4.	This is not a parallel processing system (Executing one program simultaneously by many processors for fast execution)	This is a parallel processing system.
5	It costs less than multiprocessing system.	This is more costly and complex system than multiprogramming system.

Multiprogramming and Multitasking: These advance techniques are provided by operating system to increase the overall efficiency of computers and users.

S.N	Multiprogramming	Multitasking
1.	In this technique, concurrent execution of many programs takes place by a single CPU .	In this technique, multiple programs or tasks are executed for a user .
2.	In this single CPU works in Timesharing mode to allocate its time for various programs.	In this multiple tasks are allowed to be executed by a user.
3.	Multiprogramming helps to increase efficiency of a computer for programs execution	Multitasking increases the efficiency of a user by allowing him to work on many programs together and by exchanging data from one program to another.
4.	Multiprogramming is normally a feature of any operating system.	Multitasking is normally a feature of GUI based operating system like Window.

Multithreading and Multitasking: These advance techniques help to increase the efficiency of computers and users

S.N	Multithreading	Multitasking
1.	In this multiple processes or threads are provided in a single program or software to execute the program efficiently.	In this technique, multiple programs or tasks are executed for a user .
2.	Multithreading increases the efficiency of a program execution.	Multitasking increases the efficiency of a user by allowing him to work on many programs together and by exchanging data from one program to another.
3.	Multithreading helps to provide execution of a same program by many users simultaneously.	In this multiple tasks are allowed to be executed by a user.
4.	It increases the capability of a program or software.	It increases the capability of a user.

Interpreter and Compiler: We write programs normally in High Level Languages like BASIC, COBOL, FORTRAN etc. In these high level languages programs are written in English language but we know computer can understand only machine language (Binary Code). Therefore we require some software which can convert high level language program into machine language program and these software are known as compiler and interpreter.

S.N	Interpreter	Compiler
1.	Interpreter converts the high level language program in machine language, statement by statement.	Compiler converts full program into machine language at once.
2.	Interpreter executes the converted program statement by statement.	Compiler executes the converted programs at once.
3.	Interpreters are inefficient in comparison to compiler for program execution.	Compilers are very efficient and most of the languages are compiler based languages.
4.	Interpreter languages are easy to learn because of better error messaging system	Compiler languages are difficult to learn.
5.	Interpreter require less memory space and is inexpensive than compiler.	Compilers require more memory space and are expensive than interpreter.
6.	BASIC is the key popular interpreter based language	most of the languages are compiler based languages e.g. COBOL, C, C++, JAVA and FORTRAN etc

Assembler and Compiler: To execute any program written by programmer in any language other than machine language the program should be first of all converted into machine language with the help of compiler, interpreter or Assembler.

S.N	Assembler	Compiler
1.	Assembler converts Assembly Language program in machine language.	Compiler converts High level language program into machine language.
2.	Assembler converts Assembly Language program in machine language normally statement by statement.	Compiler convert High level language program into machine language at once.
3.	Assembler is fast in operation than compiler.	Compilers are slower in operation than assembler.
4.	Assemblers are only for one language and that is assembly language.	Compiler are there for almost all the high level languages like COBOL, C, FORTRAN etc.
5.	Assembler requires less memory space than compiler.	Compilers require more memory space than interpreter.

Distinguishes

Source Programs and Object Programs: Programs which are known as collections of statements or instructions can be in two forms: Source programs and Object programs.

S.N	Source Programs	Object Programs
1.	This is program which programmer has written using some programming language.	This is program converted from source program with the help of interpreter or compiler.
2.	Source program is usually written in high Level languages like BASIC, COBOL etc.	Object program is always in machine language.
3.	CPU cannot execute Source Program	CPU can directly execute Object Program
4.	Source program should be compiled, interpreted or assembled for execution	Direct execution takes place for the object programs
5	Application and Package software which we use are normally given in object program form not in the Source Program form.	Object program cannot be read or understand by a normal user or programmer.

Loader and Linker: To execute a program, the program should first of all be converted into machine language normally by a compiler because most of languages are compiler based languages. After compilation program is linked with other programs, with the help of Linker, and then loaded into CPU, with the help of Loader, for execution.

S.N	Linker	Loader
1.	Linker is used after the program is compiled.	Loader is used after the linker has been used on compiled program.
2.	Linker is used for linking the complied object program with other object programs which are to be used with the complied object program.	Loader is used for loading program in CPU for execution.
3.	Linker provides Executable Program (.Exe program) from the complied object program.	Loader is used to execute the Executable Program
4.	Linker saves lots of memory space and programming efforts by not requiring all the instructions of other object programs in the complied object program	Loader helps in fast execution of program.

Decision Support System and Expert System: There are various types of information system which help organization for managing their business application by using computer like Decision Support System (DSS) and Expert System (ES) etc.

SNo	Decision Support System	Expert System
1.	This Information System normally used by Managers.	This Information System normally used by Managers as well as end users.
2.	This is used for solution of semi structured problems.	This is used for unstructured as well as semi structured problem.
3.	These provide the solution on basis of operational database, knowledge of managers etc.	Expert System acts as an Expert for any particular problem
4.	DSS is easy to develop.	Expert System is difficult to develop.
5.	DSS are extensively used in industry for decision making process.	Expert system relatively has low existence in industry.

File Access Method and File Organization Methods: Files are used for keeping data in organized manner. To have an efficient utilization of storage and efficient access of records from file there are various types of file access and organization methods.

S N	File Access Method	File Organization Methods
1.	These are related with access of data from file	These are related with how the data would be organized in file
2.	There are two principal methods of data access.	There are many methods of file organization.
3.	Two principal ways to access data is sequentially or directly.	Some common ways to organize data are serial, sequential, indexed sequential and direct file organization.
4.	The type of data access method from file also depends upon the type of file organization method and device for data storage like magnetic tape can have sequential file organization and sequential access of data	File organization is how data would be organized in files and accordingly how data can be accessed depending upon file organization.

Direct Access Method and Sequential Access Method:

Data from storage devices can be accessed using two methods known as direct and sequential access methods

S.N	Direct Access Method	Sequential Access Method
1.	In this method data is accessed directly from its location in storage device	In this data is accessed sequentially i.e. one-by-one from its location in storage device.
2.	Provides immediate or fast access of required data	Provides slow access of required data
3.	This method is used in the storage devices like hard disk and CD/DVD	This method is used in the storage devices like cartridge take or audio/video cassette.

Direct File Organization and Sequential File Organization:

There are only two principal ways to access the data, sequentially and directly. But there are many methods to organize the data like serial, sequential, indexed, indexed sequential and random organization.

S.N	Sequential File Organization	Direct File Organization
1.	In this records are arranged one after another in sequence	In this records are arranged directly (Randomly) or sequentially.
2.	Data Access is sequential.	Data Access is Direct.
3.	Data Access Speed is slower.	Data is accessed at high speed.
4.	Used mainly in Magnetic Tape.	Used in Disk type of media like, Hard disk, CD, Floppy etc.
5	Used in mainly Backup and updating types of jobs of larger size of files	Used in any type of jobs and size of files.

Distinguishes

Self Address File Organization and Index Sequential Access Method (ISAM) File Organization:

Data in files can be organized as serial, sequential and direct file organization approaches. In the direct file organization, data can be organized either using random file or direct sequential file organization. Finally, in the direct sequential file organization data can be organized either using Self Address Method or Indexed Sequential Access Method (ISAM)

S.N	Self Address File Organization	Index Sequential Access Method (ISAM)
1.	In this records are organized using same Logical and Physical address i.e. record no. acts as location no. on storage device	In this, an index of Logical address and Physical address is created i.e. an index table is developed that maintains a relationship between record no. and location no. on storage device
2.	This method results in space saving as it does not require a separate index table for addresses	This requires a separate space for index table
3.	This result in empty space on storage device if any record is deleted	This does not result in this but re-indexing is needed to use the deleted space record
4.	This can use only fixed size record	This can use variable size records.

Master File and Transaction File:

Data in files are stored for future use. There are different types of files which are used for data management. But the master file and transaction files are the two most important types of files for data management in computerized system

S.N	Master File	Transaction File
1.	This file is known as main file and it maintains the key information like balances	This file is known as detailed file and maintains detail of transactions.
2.	Master file provides authority to enter a transaction into transaction file	Transaction file accepts the transactions
3.	Master file is updated by transaction file	Transaction file update the master file
4.	Master file is normally a permanent file	Transaction file is a temporary file and normally exists for a particular period like financial year
5	Ledger in maintained in master file	Day book is maintained in the transaction file

File System Data Management and DBMS based Data Management. There are two key methods to manage data in computers. File System and using DBMS

S N.	File System Data Management	DBMS based Data Management
1.	In this method, data is managed using flat files like in simple text files.	In this method, data is managed using a separate data management software known as DBMS
2.	This method is an old technique of managing data and results in many disadvantages	This method provides score of advantages over file system method, thus is the primary method for managing data in the current computerized systems
3.	In this method, data management may result in low data integrity, data inconsistency and data duplicity	In this method, data is managed using linked tables and thus does not result data duplicity, data inconsistency and low data integrity.
4.	In this method, data management is dependent upon particular software or programs for access and storage.	This method provides data management independent of any particular software or program i.e. any software or program can access or store the data

Network Database Structure and Relational Database Structure: There are three (Hierarchical, Network and Relational) approaches for organizing records and their relationships logically in databases. These approaches are known as database structures.

S N.	Network Database Structure	Relational Database Structure
1.	This structure is not as flexible as Relational structure is.	This is most flexible structure for representing data relationships.
2.	DBMS based on Network structure are no more in used.	Most of the DBMS in market are based on relational structure and known as RDBMS.
3.	In this relationships between records are represented in a graph manner.	In this relationships between records are represented in table form.
4.	Database based on this structure was not efficient in terms of data access, storage etc.	Database based on this structure are very efficient in terms of data access and storage etc.

SQL (Structured Query Language) and QBE (Query By Example): Databases are used for holding data in organized manner. And there are four basic operation which are performed on databases like search, update, delete and insert. To carry out these operation on database either the SQL commands or QBE can be used.

S.No	SQL	QBE
1.	It is a language for database operation	It is graphical tool for database operation
2.	It has certain commands like select, update, delete and insert etc for working on database.	In this one graphical interface is presented for working on database.
3.	To work on database with SQL require knowledge of commands of SQL	In this no knowledge is required for any commands etc for working on database.
4.	SQL is supported by all the RDBMS like ORACLE, MS-ACCESS etc	It is not supported by all the RDBMS.

Data Administrators (DA) and Data Base Administrator (DBA): DBMS provides various functionalities for creating and managing secured and efficient database. DA and DBA are the persons responsible for developing and maintaining secured and efficient database for organization.

S.No	Data Administrator	Data Base Administrator
1.	Person responsible for making policy for database development and control.	Person responsible for implementing policies by using various functionalities provided by DBMS.
2.	The role played by DA is more administrative than technical.	The role played by DBA is absolutely technical.
3.	DA decides what data will be stored and to whom it will be available.	DBA uses functionalities of database like DDL, DML, security features, Integrity controls, Transaction Management etc
4.	DA is key person involve in strategic planning of database and its resources.	DBA is a technical professional having and experience in use of DBMS for efficient management of database.

Distinguishes

DDL and DML: DDL is known as Data Definition Language and DML is known as Data Manipulation Language. Both of these languages are part of DBMS and presently both of these languages are part of universal database language known as SQL (Structured Query Language)

S.N	DDL	DML
1.	DDL is Data Definition Language.	DML is Data Manipulation Language
2.	DDL is used for defining the structure of database.	DML is used for manipulating the already created database.
3.	DDL has commands which help in the creation of database (Tables etc) like CREATE etc	DML has commands which help in manipulation of data in tables like UPDATE, DELETE, INSERT etc.
4.	DDL is used for providing security features to database.	DML provide the operational features for database like add, count etc.
5	DDL is used for creating relationship in various data items and defining the type of data to be used in database.	DML enable end user to use database and generate the information as per his requirement.

Database Administrators (DBA) and Database Designer: DBMS provides various functionalities for creating and managing secured and efficient database. Data Administrator, Database Administrator and Database Designer are the persons responsible for designing, developing and maintaining secured and efficient database for organization.

S.No	Database Administrator (DBA)	Database Designer
1.	Person responsible for making policy for database development and control.	Person responsible for designing the structure of database.
2.	The role played by DA is more administrative than technical.	This role is also absolutely technical. In this designer need to know internal architecture of DBMS to prepare a best of database design.
3.	DA decides what data will be stored and to whom it will be available.	The database designer uses internal functionalities of DBMS to create a structure which is ultimately used by DBA for managing data.
4.	DA is key person involve in strategic planning of database and its resources.	Designer is expert in creating tables, linking tables and creating file organization for tables etc.

Data Warehouse and Data Mining: Data warehouse and Data Mining are the two important techniques for managing and using large volume of database efficiently. .

S.No	Data Warehouse	Data Mining
1.	This technique is used to store large volume of data from different data sources in data warehouse	This technique is used provide data useful for business decisions automatically from a large volume of database
2.	Data warehouse is data collection technique	Data mining is data extraction technique
3.	This techniques help organization to develop a centralized repository of data which is collected at different locations and in different style	This is business intelligence technique which automatically searches data from large volume of data which can provide benefits to organization
4.	This technique help organization in efficient access and storage of organization data	This technique provide useful data patterns from volume of data which are then analyzed by managers for better business decisions

Offline Data Warehouse and Real-time Data Warehouse: There are different data warehouse management techniques; For example: Offline data warehouse, Real-time data warehouse and Integrated Data warehouse.

S.No	Offline Data Warehouse	Real-time Data Warehouse
1.	In this technique data updates in warehouse are performed on daily, weekly or monthly basis.	In data updates in the data warehouse are performed instantaneously i.e. at the same instant when data input to operational database.
2.	This warehouse does not provide updated information.	This warehouse provides updated information.
3.	This is an old technique and normally used in small organizations.	This is used by online systems or big organization like banks, telecom organizations etc.
4.	This is low cost, easy to implement but complex to manage technique and not used for large volume data applications	This is high cost, complex to implement but once implemented then easy to manage and used for large volume data applications.

External View and Conceptual View of Database: In database architecture there are three type of views known as: External view (or User View), Conceptual View or Logical view and Internal View or Physical View.

S.No	External View	Conceptual View
1.	This view is available to the end users and also known as user view	This view is available to database experts and also known as Logical view
2.	This provides database access with the help of application software	This provides access of database using DBMS
3.	User can only use those functionality for database which are provided by application software	Database experts can use any functionality of database
4.	This view is used only for input, output, update and delete of data values with the help of application software	This view is used by database experts for design and management of database

Online processing systems and Real-time processing systems: These two are mode of data processing. In both these mode the transaction is processed as soon as the transaction happened. In fact, Real-time processing is an advance form of online processing.

S.N	Online Processing	Real-time processing
1.	In this transaction is processed as soon as it is input to system and at the place of origin.	In this even the parts of transaction (also known as events) are processed as soon as any part is input to the system
2.	Online systems are less complex than real time system.	Real-time systems are more complex than online systems.
3.	Response time of online systems are lower than the real-time systems	These systems have the better response time than online system
4.	It takes less resources and cost to develop online systems	These systems take more resources and cost to develop.
5	Online systems are transaction processing systems.	Real-time systems are event processing systems.

Distinguishes

Intranet and Extranet: Networks are used for sharing of information and resources and internet is a network of networks to share information and resources worldwide. Organizations are increasingly using the internet technology to connect offices, customers etc for online processing of data. There are two important private network terminologies which use internet for data communication one is intranet and other one is extranet.

S.N	Intranet	Extranet
1.	Intranet is a private network using internet technologies	Extranet is an extension of Intranet and it is also based on internet technologies
2.	Intranet is available to organization employees only from anywhere in world using internet	This is available to organizations' associates likes buyers and suppliers from anywhere using internet
3.	Intranet provides low cost online services to the organizations' employees	It provides low cost online services to the organizations' associates
4.	It provides intra-organization services like sharing of resources, reduced documentation and availability of updated information.	It provides inter-organization services like suppliers, buyers and distribution management etc.

Client/Server and Peer to Peer to Technique of Networking: There are popular models by which computers can be connected in network for sharing of information and resources: Client/Server and Peer to Peer.

S.N	Client/Server	Peer to Peer
1.	In this one or more computers are used as controlling server.	In this no computer is used as controlling server
2.	In this technique, the servers are used to control and manage the network. Therefore, these are considered better managed networks.	In this no computer is used as controlling authority therefore, management of network is poor.
3.	This technique provides better administration and security features to the network users.	This is not a secured network technique and no quality administrative features are available
4.	This technique is expensive to establish	This technique is inexpensive to establish
5.	Client Server is main type of network techniques used worldwide for networks e.g. banks, railway	This is used at small scale level where security and other networking features are not very important.

Centralized Data Processing and Distributed Data Processing: These two are data processing techniques mainly employed in organizations like bank stock exchange etc

S.N	Centralized Data Processing	Distributed Data Processing
1.	In this one Computer is used for keeping all the processed data at central location mainly head office.	In this data is kept as locally (Branch Office) as well as at head office.
2.	In this processing of data take place at one location only.	In this processing take place locally as well as at main place also.
3.	Information is available at one place only therefore, every one communicate with central office for need of information (even for local information)	In this information is available locally therefore, branches communicate with central office for only that information which is not available locally.
4.	Costly technique to establish for online processing	This is comparatively inexpensive for online processing.
5.	Lower in use than distributed data processing.	Most popular technique these days examples are banking organization etc.

Star Network and Bus Network: there are various topologies for arrangement of network components like Star, Bus, Ring etc.

S.No.	Star Network	Bus Network
1.	In this computers and components are connected in a star form.	In this computer and components are connected on a cable in a path or bus form
2.	In this, it is easy to add and remove nodes (computers) in the network	It is little difficult to add and remove nodes (computers) from network.
3.	If one node fail network will not come to halt.	If one node fails the entire network will stop working
4.	It costs more than Bus Network.	It costs lesser than Star Network
5.	It more reliable and used for all types of network size.	It less reliable and is mainly used for small networks.
6.	It provides point to point data communication	It uses broadcasting technique of data communication which is less reliable

Star Network and Ring Network: Star is considered as the most popular topology and ring is an extension of bus topology.

S.No.	Star Network	Ring Network
1.	In this computers and components are connected in a Star form.	In this computer and components are connected in a Ring form.
2.	In this, it is easy to add and remove nodes (computers) in the network	It is little difficult to add and remove nodes (computers) from network.
3.	If one node fails network will not come to halt.	If one node fails the entire network will stop working
4.	It costs more than Ring topology	It costs less than the Start topology
5.	It more reliable and used for all types of network size.	It less reliable and is mainly used for small networks.
6.	It provides point to point data communication	It uses token ring communication technique which is more reliable than bus' broadcasting technique but less reliable than point to point communication.

Push and Pull Technology: Internet provides various services to user for sharing of information and resources like WWW, email, FTP etc. All these services use some kind of Technology.

S.No	Push Technology	Pull Technology
1.	In push technology, data is pushed to users automatically whether users have requested for the data or not. It is like radio and TV transmission where once the channel is tuned the data keeps coming automatically.	In this information is extracted or pulled from web servers by users by clicking on the links or web pages.
2.	Webcasting and sending emails are based on Push Technology based services.	Viewing web pages and receiving emails are examples of Pull Technology.
3.	Push technology provides webcasting service on internet which is like telecasting for TV and broadcasting for radio transmission.	This is point to point to communication i.e. every user will view data as per the requirement
4.	Few services of internet are based on this technology.	Most services of internet are based on this technology.

Distinguishes

OSI and TCP/IP: An error free and reliable data communication follows certain rules known as protocols. There are different protocols used for data communication and OSI model is base of all the protocols and TCP/IP is the most popular model and is used in internet data communication.

S.No	OSI Model	TCP/IP Model
1.	It is a 7 layers model	It is a 4 layers models
2.	It uses Application, Presentation, Session, Transport, Network, Data Link and Physical Layers	It uses Application, Transport, Internet or Network and Data Link Layers for data communication
3.	This model is a base model for all the protocols used for different communication	This model is used for internet data communication
4.	This a reference model and it was devised before any protocol was invented	It is developed after the OSI model was developed

Serial Communication and Parallel Communication: Data can be communicated serially i.e. bit by bit or by multiple bits together, known as serial and parallel communication.

S.No.	Serial Communication	Parallel Communication
1.	In this technique data is communicated bit-by-bit on communication channel	In this technique multiple bits are communicated together.
2.	Provides slow speed data communication	Provides high speed data communication
3.	In this, single channel is used for data communication	Multiple channels together are used for data communication
4.	It provides less errors for communicated data	It provides more errors for communicated data due to cross talk problem
5.	It is used for long distance communication	It is mainly used for short distance communication

Synchronous and Asynchronous Data Communication: Data between sender and receiver can be communicated by establishing same speed or at individual speed of these devices. Data communicated at same speed is known as synchronous communication and at individual speed s known as asynchronous communication.

S.No.	Synchronous Communication	Asynchronous Communication
1.	Data between sender and receiver is communicated at same speed i.e. sender and receiver work in a synchronous mode.	Data between sender and receiver is communicated at individual speed of sender and receiver
2.	In this same speed is established by sending blank bits between sender and receiver before starting data communication	No such process is required in this technique
3.	Same speed between sender and receiver provides reliability for data	In this start and stop bits are communicated between sender and receiver to ensure

	communication	reliability and accuracy for data communication
4.	In this data is directly communicated to receiver from sender	In this data is first stored in memory then communicated to receiver.
5.	It is used in voice communication e.g. telephone communication	It is used in message communication e.g. SMS

LAN and WAN: There are different types of network based on geography distribution known as LAN, MAN and WAN.

S.No.	LAN (Local Area Network)	LAN (Local Area Network)
1.	This type of network is located within a local area, within a building or limited area only.	This type of network is located without any distance limitations or based on without any geographic limitations.
2.	Normally, cable is used as communication channel in LAN	This type of network uses satellite, optical fiber etc communication channel
3.	Provides very high speed network, 100s MBPS speed	Provides slow speed network on per user basis relative to the LAN
4.	Provides low error rate for data communication	Provides high error rate due to long distance communication.
5.	Used in small organization, school and internet cafe etc.	Used in big organizations. Internet is a kind of WAN only

Circuit Switching and Packet Switching: There are three popular transmission techniques known as Circuit Switching, Packet Switching and Message Switching. These are used for establishing path between sender and receiver for data communication.

S.No	Circuit Switching	Packet Switching
1.	A dedicated path is established between users for data communication	No dedicated path is established for data communication. Large number of users transfer data through common established path
2.	Provide more reliable communication	Provide less reliable communication
3.	High cost of communication	Low cost of communication
4.	Basic Telephony (fixed phone) uses circuit switching	Internet communication uses packet switching

Internet and WWW: Internet is the most popular infrastructure available worldwide for low cost data communication and information sharing. It has various services or components like WWW, Email and FTP etc and WWW is one of the most popular services of internet.

S.N	Internet	WWW
1.	It consists of mainly hardware	It is a service of internet provided with the help of software
2.	It consists of computers, communication channels, communication devices etc	It consists of software, files, folders etc stored on various computers
3.	It is controlled with the help of Internet Protocol Suite	It is mainly controlled with the help of HTTP
4.	It is base infrastructure and independent of WWW	WWW is dependent of Internet for its working

Distinguishes

Application Server and Transaction Server: In organization and Internet different types of servers are used like application servers, transaction server, database server, print server and web server etc.

S.N	Application Server	Transaction Server
1.	This type of server is used to maintain application software for data processing e.g. banking application software	This type of server is used to manage complex transactions
2.	This type of server maintain business logics used for data processing	This manage any transaction details from start to end to ensure that transaction is process correctly
3.	In addition to data processing, application server manages the load balancing, fault tolerance etc to ensure a reliable data processing system	This type of server track the transaction from source to destination and ensure its correct processing in multiple computers/server involved
4.	It is used in almost all the organizations e.g. banks, railway, manufacturing and telecom organizations	It is used in complex transactions environment like banks, telecom organization where inter-banking transactions between different banks need to be tracked for correct processing

Two-Tier and Three-Tier (or n-tier) Client/Server Architecture: The client/server technology can be primarily of two types: Two-Tier and Three-Tier.

S.N	Two-Tier Architecture	Three-Tier Architecture
1.	In this components of client/server server are divided into two parts	In this components of client/server technology are divided into three parts (or more parts for n-tier architecture)
2.	The two parts of this architecture are known as Client and Server.	The three parts of this architecture are known as Client, Middleware and Server.
3.	In this client manages both presentation and processing part of application and server manages the database part of application.	In this client manages presentation, middleware manages processing and server manages the database.
4.	This type of architecture is used in LAN applications	This type of architecture is used in WAN and distributed data processing applications e.g. banking applications.
5.	The client in this type of architecture is known as Fat Client because it manages both presentation and processing parts	The client in this type of architecture is thin client because it manages only presentation part of application.