

2021-22

HANDWRITTEN NOTES

LATEST EDITION

राजस्थान
कंप्यूटर अनुदेशक
(शिक्षक)

COMPUTER INSTRUCTOR

{Part- 5}

Computer Study - 3

COMPUTER STUDY – III

1. Communication and Network Concepts :

- *Introduction to Computer Networks*
- *Introduction: Network Layers/Models, Networking Devices*
- *Fundamentalas of Mobile Communication.*

2. Network Security :

- *Protecting Computer Systems From viruses and malicious attacks*
- *Introduction to Firewalls and it's utility*
- *backup and Restoring Data*
- *Networking (LAN & WAN)*
- *Security*
- *Ethical Hacking.*

3. DBMS (Database Managements System) :-

- *An Overview of Database Managements*
- *Architecture of Database System*
- *RDBMS*
- *Database Design*
- *Manipulating Data*
- *NoSQL Database Technologies*

- *Selecting right database*

4. System Analysis and Design

- *Introduction, to Requirement Gathering and Feasibility*
- *Analysis Structured Analysis*
- *Structured Design*
- *Object Oriented Modeling using UML Testing*
- *System Implementation and Maintenance*
- *Others Software Developments Approaches.*

5. Web Technology and Multimediya (Lot and it's Applications) :

- *Introduction to Internet Technology and Protocol*
- *LAN, MAN, WAN,*
- *Search Services/Engines*
- *Introduction to online and offiline messaging*
- *WWW, Browsers, Web Publsihing*
- *Basic Knowledge of HTML*
- *XML and Scripts, Creation and Maintenance of Website*
- *HTML interactivity tools*
- *Multiimedia and Graphics*
- *Voice Mail and Video Conferencing*
- *Introduction to E-Commerce.*

नोट -

प्रिय छात्रों, Infusion Notes के राजस्थान कंप्यूटर अनुदेशक के sample notes आपको पीडीऍफ़ format में “फ्री” में दिए जा रहे हैं और complete Notes आपको Infusion Notes की website या (Amazon/Flipkart) से खरीदने होंगे जो कि आपको hardcopy यानि बुक फॉर्मेट में ही मिलेंगे, या नोट्स खरीदने के लिए हमारे नंबरों पर सीधे कॉल करें (8233195718, 9694804063) | किसी भी व्यक्ति को sample पीडीऍफ़ या complete Course की पीडीऍफ़ के लिए भुगतान नहीं करना है | अगर कोई ऐसा कर रहा है तो उसकी शिकायत हमारे Phone नंबर 8233195718, 0141-4045784 पर करें, उसके खिलाफ क़ानूनी कार्यवाई की जाएगी |

Chapter - 1

Communication and Network Concepts

(computer network)

What is a Network?

A network is essentially a collection of physical devices such as computers which are linked in such way that enables the exchange of information to and fro. The act of exchanging information between devices in such a manner is termed as networking. Networking enables two or more physical devices that are separated geographically to be able to communicate and exchange files and services.

What is PAN (Personal Area Network)?

PAN (Personal Area Network) is a computer network formed around a person. It generally consists of a computer, mobile, or personal digital assistant. PAN can be used for establishing communication among these personal devices for connecting to a digital network and the internet.

Characteristics of PAN

Below are the main characteristics of PAN:

- *It is mostly personal devices network equipped within a limited area.*
- *Allows you to handle the interconnection of IT devices at the surrounding of a single user.*
- *PAN includes mobile devices, tablet, and laptop.*
- *It can be wirelessly connected to the internet called WPAN.*
- *Appliances use for PAN: cordless mice, keyboards, and Bluetooth systems.*

Advantages of PAN

Here are the important pros/benefits of PAN network:

- *PAN networks are relatively secure and safe*
- *It offers only short-range solution up to ten meters*
- *Strictly restricted to a small area*

Disadvantages of PAN

- *Here are the cons/drawbacks of using PAN network:*
- *It may establish a bad connection to other networks at the same radio bands.*
- *Distance limits.*

What is a LAN (Local Area Network)?

A **Local Area Network (LAN)** is a group of computer and peripheral devices which are connected in a limited area such as school, laboratory, home, and office building. It is a widely useful network for sharing resources like files, printers, games, and other application. The simplest type of LAN network is to connect computers and a printer in someone's home or office. In general, LAN will be used as one type of transmission medium. It is a network which consists of less than 5000 interconnected devices across several buildings



Local Area Network (LAN)

Characteristics of LAN

Here are the important characteristics of a LAN network:

- It is a private network, so an outside regulatory body never controls it.
- LAN operates at a relatively higher speed compared to other WAN systems.
- There are various kinds of media access control methods like token ring and ethernet.

Advantages of LAN

Here are the pros/benefits of LAN:

- Computer resources like hard-disks, DVD-ROM, and printers can share local area networks. This significantly reduces the cost of hardware purchases.
- You can use the same software over the network instead of purchasing the licensed software for each client in the network.
- Data of all network users can be stored on a single hard disk of the server computer.
- You can easily transfer data and messages over networked computers.
- It will be easy to manage data at only one place, which makes data more secure.
- Local Area Network offers the facility to share a single internet connection among all the LAN users.

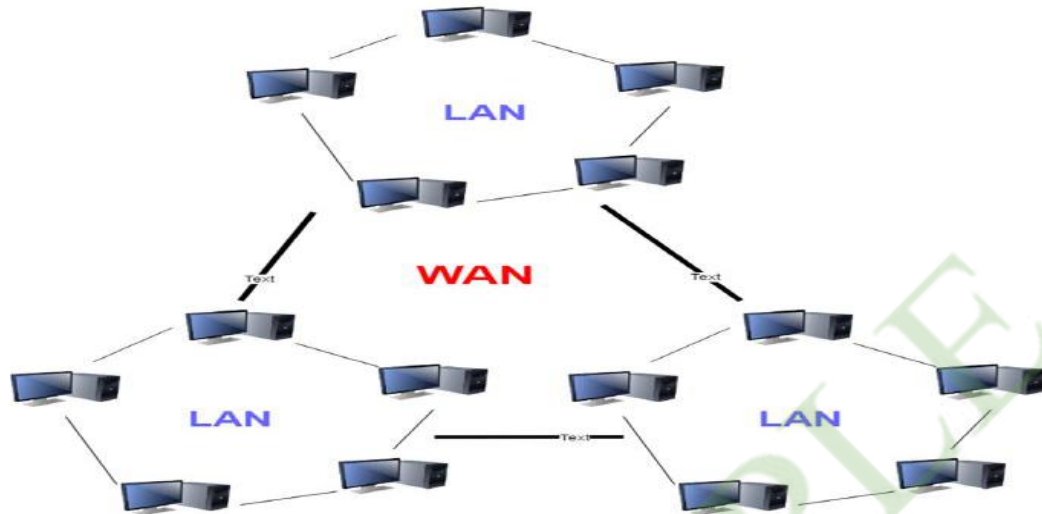
Disadvantages of LAN

Here are the cons/drawbacks of LAN:

- LAN will indeed save cost because of shared computer resources, but the initial cost of installing Local Area Networks is quite high.
- The LAN admin can check personal data files of every LAN user, so it does not offer good privacy.
- Unauthorized users can access critical data of an organization in case LAN admin is not able to secure centralized data repository.
- Local Area Network requires a constant LAN administration as there are issues related to software setup and hardware failures.

What is WAN (Wide Area Network)?

WAN (Wide Area Network) is another important computer network that which is spread across a large geographical area. WAN network system could be a connection of a LAN which connects with other LAN's using telephone lines and radio waves. It is mostly limited to an enterprise or an organization.



Wide Area Network (WAN)

Characteristics of WAN

Below are the characteristics of WAN:

- The software files will be shared among all the users; therefore, all can access to the latest files.
- Any organization can form its global integrated network using WAN.

Advantages of WAN

Here are the benefits/pros of WAN:

- WAN helps you to cover a larger geographical area. Therefore business offices situated at longer distances can easily communicate.

- *Contains devices like mobile phones, laptop, tablet, computers, gaming consoles, etc.*
- *WLAN connections work using radio transmitters and receivers built into client devices.*

Disadvantages of WAN

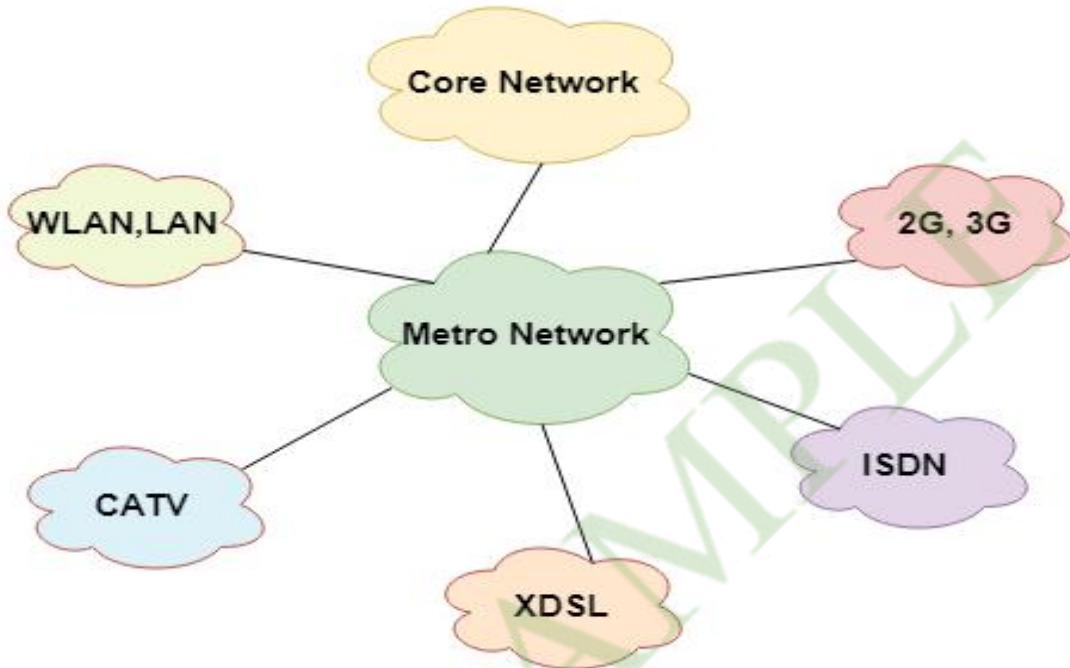
Here are the drawbacks/cons of WAN network:

- *The initial setup cost of investment is very high.*
- *It is difficult to maintain the WAN network. You need skilled technicians and network administrators.*
- *There are more errors and issues because of the wide coverage and the use of different technologies.*
- *It requires more time to resolve issues because of the involvement of multiple wired and wireless technologies.*
- *Offers lower security compared to other types of network in computer.*

What is MAN (Metropolitan Area Network)?

A Metropolitan Area Network or MAN is consisting of a computer network across an entire city, college campus, or a small region. This type of network is large than a LAN, which is mostly limited to a single building or site.

Depending upon the type of configuration, this type of network allows you to cover an area from several miles to tens of miles.



Metropolitan Area Network (MAN)

Characteristics of MAN

Here are important characteristics of the MAN network:

- It mostly covers towns and cities in a maximum 50 km range
- Mostly used medium is optical fibers, cables
- Data rates adequate for distributed computing applications.

Advantages of MAN

Here are the pros/benefits of MAN network:

- It offers fast communication using high-speed carriers, like fiber optic cables.
- It provides excellent support for an extensive size network and greater access to WANs.
- The dual bus in MAN network provides support to transmit data in both directions concurrently.
- A MAN network mostly includes some areas of a city or an entire city.

Disadvantages of MAN

Here are drawbacks/cons of using the MAN network:

- You need more cable to establish MAN connection from one place to another.
- In MAN network it is tough to make the system secure from hackers

Other Types of Computer Networks

Apart from above mentioned computer networks, here are some other important types of networks:

WLAN (Wireless Local Area Network)

Storage Area Network

System Area Network

Home Area Network

POLAN- Passive Optical LAN

Enterprise private network

Campus Area Network

Virtual Area Network

Let's see all these different types of networks in detail:

1) WLAN

WLAN (Wireless Local Area Network) helps you to link single or multiple devices using wireless communication within a limited area like home, school, or office building. It gives users an ability to move around within a local coverage area which may be connected to the network. Today most modern day's WLAN systems are based on IEEE 802.11 standards.

2) Storage-Area Network (SAN)

A Storage Area Network is a type of network which allows consolidated, block-level data storage. It is mainly used to make storage devices, like disk arrays, optical jukeboxes, and tape libraries.

3) System-Area Network

System Area Network is used for a local network. It offers high-speed connection in server-to-server and processor-to-processor applications. The computers connected on a SAN network operate as a single system at quite high speed.

4) Passive Optical Local Area Network

POLAN is a networking technology which helps you to integrate into structured cabling. It allows you to resolve the issues of supporting Ethernet protocols and network apps.

POLAN allows you to use optical splitter which helps you to separate an optical signal from a single-mode optical fiber. It converts this single signal into multiple signals.

5) Home Area Network (HAN):

A Home Area Network is always built using two or more interconnected computers to form a local area network (LAN) within the home. For example, in the United States, about 15 million

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	1 st शिफ्ट		
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अन्य परीक्षाओं में भी इसी तरह प्रश्न आये हैं *Proof* देखने के लिए हमारे *youtube* चैनल (*Infusion Notes*) पर इसकी वीडियो देखें या हमारे नंबरों पर कॉल करें।

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- **MOBILE COMMUNICATION**

Introduction

Communication is one of the integral parts of science that has always been a focus point for exchanging information among parties at locations physically apart. After its discovery, telephones have replaced the telegrams and letters. Similarly, the term 'mobile' has completely revolutionized the communication by opening up innovative applications that are limited to one's imagination. Today, mobile communication has become the backbone of the society. All the mobile system technologies have improved the way of living. Its main plus point is that it has privileged a common mass of society. In this chapter, the evolution as well as the fundamental techniques of the mobile communication is discussed. The first wireline telephone system was introduced in the year 1877. Mobile communication systems as early as 1934 were based on Amplitude Modulation (AM) schemes and only certain public organizations maintained such systems. With the demand for newer and better mobile radio communication systems during the World War II and the development of Frequency Modulation (FM) technique by Edwin Armstrong, the mobile radio communication systems began to witness many new changes. Mobile telephone was introduced in the year 1946. However, during its initial three and a half decades it found very less market penetration owing to high costs and numerous technological drawbacks. But with the development of the cellular concept in the

1960s at the Bell Laboratories, mobile communications began to be a promising field of expanse which could serve wider populations. Initially, mobile communication was restricted to certain official users and the cellular concept was never even dreamt of being made commercially available. Moreover, even the growth in the cellular networks was very slow. However, with the development of newer and better technologies starting from the 1970s and with the mobile users now connected to the Public Switched Telephone Network (PSTN), there has been an astronomical growth in the cellular radio and the personal communication systems. Advanced Mobile Phone System (AMPS) was the first U.S. cellular telephone system and it was deployed in 1983. Wireless services have since then been experiencing a 50% per year growth rate. The number of cellular telephone users grew from 25000 in 1984 to around 3 billion in the year 2007 and the demand rate is increasing day by Day.

Mobile Telephony Development -

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Cellular Concept: -

The power of the radio signals transmitted by the BS decay as the signals travel away from it. A minimum amount of signal strength (let us say, x dB) is needed in order to be detected by the MS or mobile sets which may be the hand-held personal units or those installed in the vehicles. The region over which the signal strength lies above this threshold value x dB is known as the coverage area of a BS and it must be a circular region, considering the BS to be isotropic radiator. Such a circle, which gives this actual radio coverage, is called the foot print of a cell (in reality, it is amorphous). It might so happen that either there may be an overlap between any two such side by side circles or there might be a gap between the

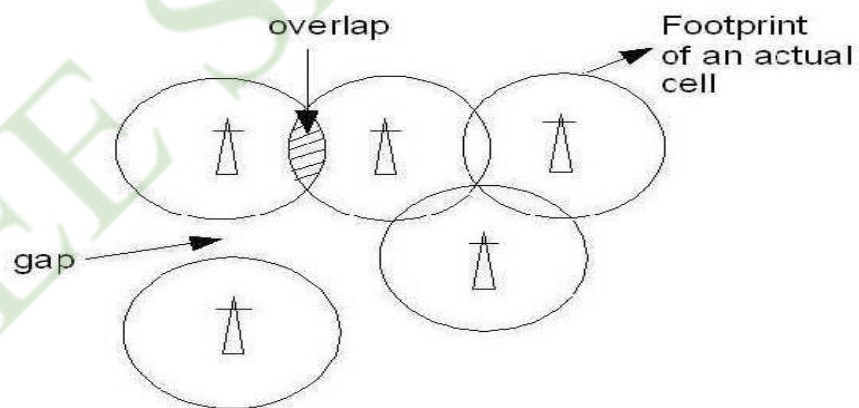


Fig 1:Footprint of cells showing the overlaps and gaps.

coverage areas of two adjacent circles. This is shown in Figure 1. Such a circular geometry, therefore, cannot serve as a regular shape to describe

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INFUSION NOTES
WHEN ONLY THE BEST WILL DO

• Basic Methods of Propagation: -

Diffraction

Diffraction is the phenomenon due to which an EM wave can propagate beyond the horizon, around the curved earth's surface and obstructions like tall buildings. As the user moves deeper into the shadowed region, the received field strength decreases. But the diffraction field still exists as it has enough strength to yield a good signal. This phenomenon can be explained by the Huygen's principle, according to which, every point

on a wave front acts as point sources for the production of secondary wavelets, and they combine to produce a new wave front in the direction of propagation. The propagation of secondary wavelets in the shadowed region results in diffractions. The field in the shadowed region is the vector sum of the electric field components of all the secondary wavelets that are received by the receiver.

Scattering

The actual received power at the receiver is somewhat stronger than claimed by the models of reflection and diffractions. The cause is that the trees, buildings and lampposts scatter energy in all directions. This provides extra energy at the receiver.

$$h_c = \frac{\lambda}{8 \sin \theta_i}$$

Roughness is tested by a Rayleigh criterion, which defines a critical height h_c of surface protuberances for a given angle of incidence θ_i , given by,

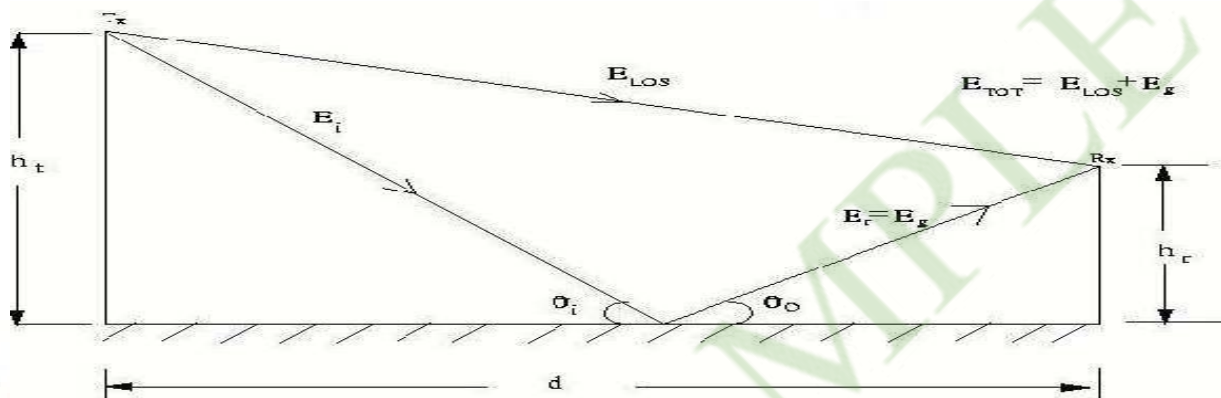
A surface is smooth if its minimum to maximum protuberance h is less than h_c ,

and rough if protuberance is greater than h_c . In case of rough surfaces, the surface

$$p_s = \exp\left(-8\left(\frac{\pi \sigma_h \sin \theta_i}{\lambda}\right)^2\right)$$

refection coefficient needs to be multiplied by a scattering loss factor ρ_S , given by

where Δh is the standard deviation of the Gaussian random variable h . The following result is a better approximation to the observed value



$$\rho_S = \exp\left(-8\left(\frac{\pi\sigma_h \sin\theta_i}{\lambda}\right)^2\right) I_0\left[-8\left(\frac{\pi\sigma_h \sin\theta_i}{\lambda}\right)^2\right]$$

Fig 9: Two-ray refraction model

$$G(h_t) = 20 \log_{10}(h_t/200), \quad 30m < h_t < 1000m$$

which agrees very well for large walls made of limestone. The equivalent

$$\Gamma_{rough} = \rho_S \Gamma$$

refection

coefficient is given by,

Outdoor Propagation Models

There are many empirical outdoor propagation models such as Longley-Rice model, Durkin's model, Okumura model, Hata model etc. Longley-Rice model is the most commonly used model within a frequency band of 40 MHz to 100 GHz over different terrains. Certain modifications over the rudimentary model like an extra urban factor (UF) due to urban clutter near the receiver is also included in this model. Below, we discuss some of the outdoor models, followed by a few indoor models too.

Okumura Model

The Okumura model is used for Urban Areas is a Radio propagation model that is used for signal prediction. The frequency coverage of this model is in the range of 200 MHz to 1900 MHz and distances of 1 Km to 100 Km .It can be applicable for base station effective antenna heights (h_t) ranging from 30 m to 1000 m. Okumura used extensive measurements of base station-to-mobile signal attenuation throughout Tokyo to develop a set of curves giving median attenuation relative to free space (A_{mu}) of signal propagation in irregular terrain. The empirical path loss formula of Okumura at distance d parameterized by the carrier frequency f_c is given by

$$P_L(d)dB = L(f_c, d) + A_{mu}(f_c, d) - G(h_t) - G(h_r) - G_{AREA}$$

where $L(f_c; d)$ is free space path loss at distance d and carrier frequency f_c , $A_{mu}(f_c; d)$ is the median attenuation in addition to free-space path

$$G(h_t) = 20 \log_{10}(h_t/200), \quad 30m < h_t < 1000m$$

loss across all environments(h_t) is the base station antenna height gain factor, $G(h_r)$ is the mobile antenna height gain factor, G_{AREA} is the gain due to type of environment. The values of

$A_{mu}(f_c; d)$ and G_{AREA} are obtained from Okumura's empirical plots. Okumura derived empirical formulas for $G(h_t)$ and $G(h_r)$ as follows:

$$G(h_r) = 10 \log_{10}(h_r/3), \quad h_r \leq 3m$$

$$G(h_r) = 20 \log_{10}(h_r/3), \quad 3m < h_r < 10m$$

Correlation factors related to terrain are also developed in order to improve the models accuracy. Okumura's model has a 10-14 dB empirical standard deviation between the path loss predicted by the model and the path loss associated with one of the measurements used to develop the model.

Multipath & Small-Scale Fading

Multipath signals are received in a terrestrial environment, i.e., where different forms of propagation are present and the signals arrive at the receiver from transmitter via a variety of paths. Therefore there would be multipath interference, causing multipath fading. Adding the effect of movement of either Tx or Rx or the surrounding clutter to it, the received overall signal amplitude or phase changes over a small

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• 3G: Third Generation Networks -

3G is the third generation of mobile phone standards and technology, superseding 2.5G. It is based on the International Telecommunication Union (ITU) family of standards under the International Mobile Telecommunications-2000 (IMT-2000). ITU launched IMT-2000 program, which, together with the main industry and standardization bodies worldwide, targets to implement a global frequency band that would support a single, ubiquitous wireless communication standard for all countries, to provide the framework for the definition of the 3G mobile systems. Several radio access technologies have been accepted by ITU as part of the IMT-2000 framework. 3G networks enable network operators to offer users a wider range of more advanced services while achieving greater network capacity through improved spectral efficiency. Services include wide-area wireless voice telephony, video calls, and broadband wireless data, all in a mobile environment. Additional features also include HSPA data transmission capabilities able to deliver speeds up to 14.4Mbit/s on the down link and 5.8Mbit/s on the uplink. 3G networks are wide area cellular telephone networks which evolved to incorporate high-speed internet access and video telephony. IMT-2000 defines a set of technical requirements for the realization of such targets, which can be summarized as follows: -

- high data rates: 144 kbps in all environments and 2 Mbps in low-mobility and indoor environments

- *symmetrical and asymmetrical data transmission*
- circuit-switched and packet-switched-based services*
- *speech quality comparable to wire-line quality*
- *improved spectral efficiency*
- *several simultaneous services to end users for multimedia services*
- *seamless incorporation of second-generation cellular systems*
- *global roaming*
- *open architecture for the rapid introduction of new services and technology.*

Beyond 3G networks, or 4G (Fourth Generation), represent the next complete evolution in wireless communications. A 4G system will be able to provide a comprehensive IP solution where voice, data and streamed multimedia can be given to users at higher data rates than previous generations. There is no formal definition for 4G ; however, there are certain objectives that are projected for 4G. It will be capable of providing between 100 Mbit/s and 1 Gbit/s speeds both indoors and outdoors, with premium quality and high security. It would also support systems like multicarrier communication, MIMO and UWB.

GSM Architecture -

Figure below depicts the original GSM architecture that supported circuit switching services only. Mobile Stations (MS) (handheld phones) have a radio connection with a cell. One or a set of cells are supported by a Base Transceiver Station (BTS). A BTS may have an antenna high above the ground on top of a mast in order to increase the coverage of the cells. Cells cover the area where GSM users are reachable. Cells may be organized into several layers. Large cells are useful for fast moving Mobile Stations and small cells are needed to increase network capacity – the number of MSs that can be served simultaneously in a particular spot. A call may start in one cell, the MS may traverse through a number of cells while the call is on and the MS may be located in a cell under a different BTS or even a different MSC when the call ends. The action of changing a cell during a call is called a handover. Several BTSs are controlled by a Base Station Controller (BSC). There may be many BSCs under the control of one Mobile Switching Center (MSC). An MSC controlling BSCs is in the same position GSM as a Local Exchange in PSTN or ISDN. The difference is that an MSC does “own” its subscribers. Rather, all the MSs it is controlling are visitors. A Visitor Location Register (VLR) for storing information about the users and MSs visiting this MSC is separately specified but always resides in the MSC. Recall that also a wire line Local Exchange contains a subscriber database.

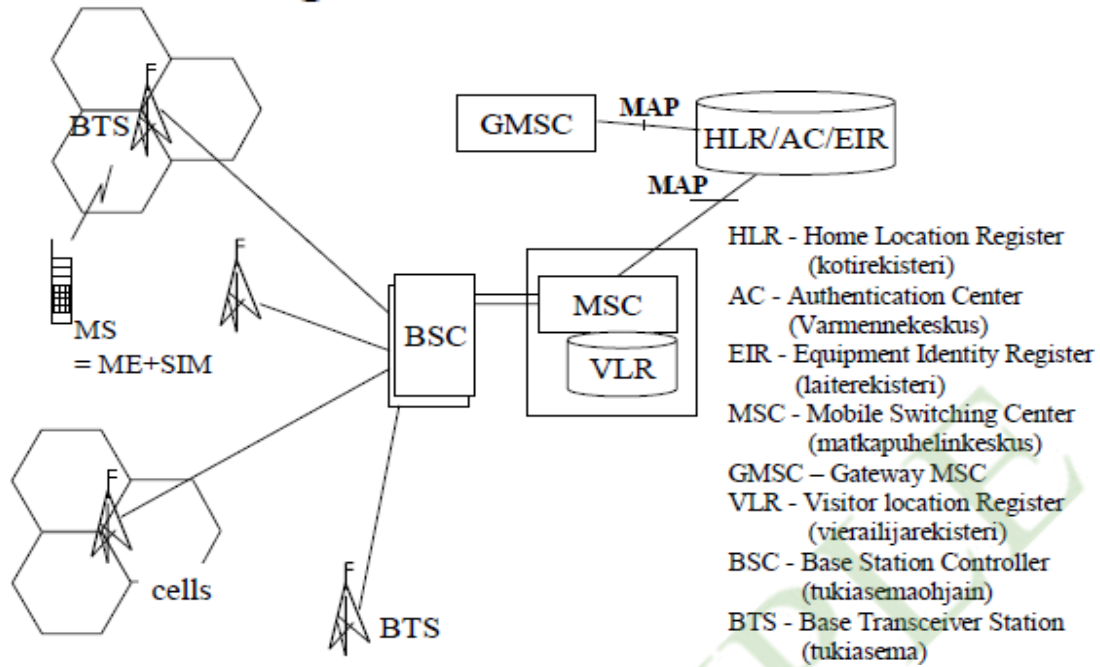


Fig 17: GSM Architecture

Cells normally forming a continuous geographical area are organized into a Location Area. A location area is a logical concept and gives the accuracy with which the location of MSs is

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पूर्ण विश्वास है कि ये नोट्स आपकी राजस्थान कंप्यूटर अनुदेशक (शिक्षक) की परीक्षा में पूर्ण संभव मदद करेंगे, धन्यवाद।

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Chapter - 2

Network Security

What is Malware?

Malware is a short term used for MALicious softWARE. It is any software developed with an intention to damage hardware devices, steal data, or cause any other trouble to the user. Various types of malware have been created from time-to-time, and large-scale damages have been inflicted. Many of these malware programs have been identified and counter measures have been initiated. However, different types of malware keep on coming on a regular basis that compromise the security of computer systems and cause intangible damages. Besides, each year, malware incur financial damages worth billions of dollars worldwide. Viruses, Worms, Ransomware, Trojans, and Spyware are some of the kinds of malware.

What is Virus?

The term computer virus was coined by Fred Cohen in 1985 and has been borrowed from biological science with almost similar meaning and behavior, the only difference is that the victim is a computer system and the virus is a malicious software. A virus is a piece of software code created to perform malicious activities and hamper

resources of a computer system like CPU time, memory, personal files, or sensitive information.

Mimicking the behaviour of a biological virus, the computer virus spreads on contact with another system,

i.e. a computer virus infects other computer systems that it comes into contact with by copying or inserting its code into the computer programs or software (executable files). A virus remains dormant on a system and is activated as soon as the infected file is opened (executed) by a user.

Viruses behave differently, depending upon the reason or motivation behind their creation. Some of the most common intentions or motives behind viruses include stealing passwords or data, corrupting files, spamming the user's email contacts, and even taking control of the user's machine. Some well-known viruses include CryptoLocker, ILOVEYOU, MyDoom, Sasser and Netsky, Slammer, Stuxnet, etc.

Modes of Malware distribution -

A malware once designed, can take many routes to reach your computer. Some of the common distribution channels for malware are:

Downloaded from the Internet: Most of the time, malware is unintentionally downloaded into the hard drive of a computer by the user. Of course, the malware designers are smart enough to disguise their malware, but we should be very careful while downloading files from the Internet (especially those highlighted as free stuff).

Spam Email: We often receive an unsolicited email with embedded hyperlinks or attachment files. These links or attached files can be malware.

Removable Storage Devices: Often, the replicating malware targets the removable storage media like pen drives, SSD cards, music players, mobile phones, etc. and infect them with malware that gets transferred to other systems that they are plugged into.

Network Propagation: Some malware like Worms have the ability to propagate from one computer to another through a network connection

Protecting System From Virus and Malware Attacks

Antivirus -

Antivirus is a software, also known as anti-malware. Initially, antivirus software was developed to detect and remove viruses only and hence the name anti-virus. However, with time it has evolved and now comes bundled with the prevention, detection, and removal of a wide range of malware.

Methods of Malware Identification used by Antivirus

Signature-based detection

In this method, an antivirus works with the help of a signature database known as "Virus Definition File (VDF)". This file consists of virus signatures and is updated continuously on a real-time basis. This makes the regular update of the antivirus software a must. If there is an antivirus software with an outdated VDF, it is as good as having no antivirus software installed, as the new malware will infect the system without getting detected. This method also fails to detect malware that has an ability to change its signature (polymorphic) and the malware that has some portion of its code encrypted.

Sandbox detection -

In this method, a new application or file is executed in a virtual environment (sandbox) and its behavioural fingerprint is observed for a possible malware. Depending on its behaviour, the antivirus engine determines if it is a potential threat or not and proceeds accordingly. Although this method is a little slow, it is very safe as the new unknown application is not given access to actual resources of the system.

Data mining techniques

This method employs various data mining and machine learning techniques to classify the behaviour of a file as either benign or malicious.

Heuristics -

Often, a malware infection follows a certain pattern. Here, the source code of a suspected program is compared to viruses that are already known and are in the heuristic database. If the majority of the source code matches with any code in the heuristic database, the code is flagged as a possible threat.

Real-time protection -

Some malware remains dormant or gets activated after some time. Such malware needs to be checked on a real-time basis. In this technique, the anti-malware software keeps running in the background and observes the behavior of an application or file for any suspicious activity while it is being executed i.e. when it resides in the active (main) memory of the computer system.

SPAM -

Spam is a broad term and applies to various digital platforms like messaging, forums, chatting, emailing, advertisement, etc. However, the widely recognised form is email spam. Depending on their requirements, organisations or individuals buy or create a mailing list (list of email addresses) and repeatedly send advertisement links and invitation emails to a large number of users. This creates unnecessary junk in the inbox of the receiver's email and often tricks a user into buying something or downloading a paid software or malware.

Nowadays, email services like Gmail, Hotmail, etc. have an automatic spam detection algorithm that filters emails and makes things easier for the end users. A user can also mark an undetected unsolicited email as "spam", thereby ensuring that such type of email is not delivered into the inbox as normal email in future.

hTTP vs hTTPs -

Both the HTTP (Hyper Text Transfer Protocol) and its variant HTTPS (Hyper Text Transfer Protocol Secure) are a set of rules (protocol) that govern how data can be transmitted over the WWW (World Wide Web). In other words, they provide rules for the client web browser and servers to communicate.

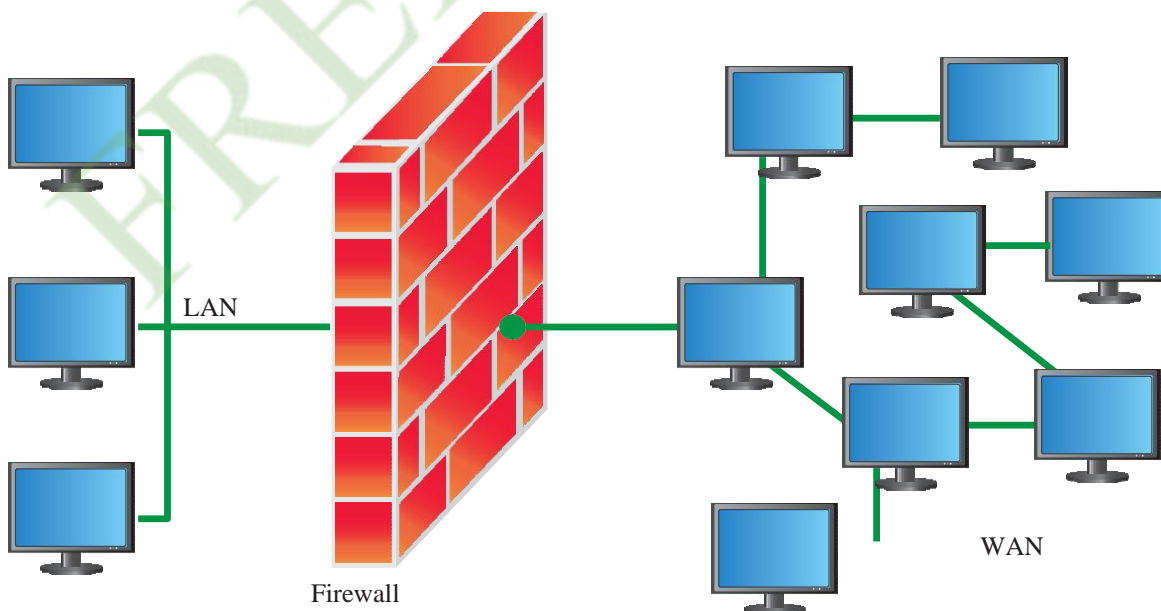
HTTP sends information over the network as it is. It does not scramble the data to be transmitted, leaving it vulnerable to attacks from hackers. Hence, HTTP is sufficient for websites with public information sharing like news portals, blogs, etc. However, when it comes to dealing with personal information, banking credentials and passwords, we need to communicate data more securely over the network using HTTPS. HTTPS encrypts the data before transmission. At the receiver end, it decrypts to recover the original data. The HTTPS based websites require SSL Digital Certificate.

• Introduction Of Firewall -

Computer firewall is a network security system designed to protect a trusted private network from unauthorised access or traffic originating from an untrusted outside network (e.g., the Internet or different sections of the same network) to which it is connected (Figure 12.5). Firewall can be implemented in software, hardware or both. As discussed earlier, a malware like worm has the capability to move across the networks and infect other computers. The firewall acts as the first barrier against malware.

A firewall acts as a network filter and based on the predefined security rules, it continuously monitors and controls the incoming and outgoing traffic. As an example, a rule can be set in the firewall of a school LAN, that a student cannot access data from the finance

12.6.1 Types of Firewall



Network Firewall: If the firewall is placed between two or more networks and monitors the network traffic between different networks, it is termed as Network Firewall.

Host-based Firewall: If the firewall is placed on a computer and

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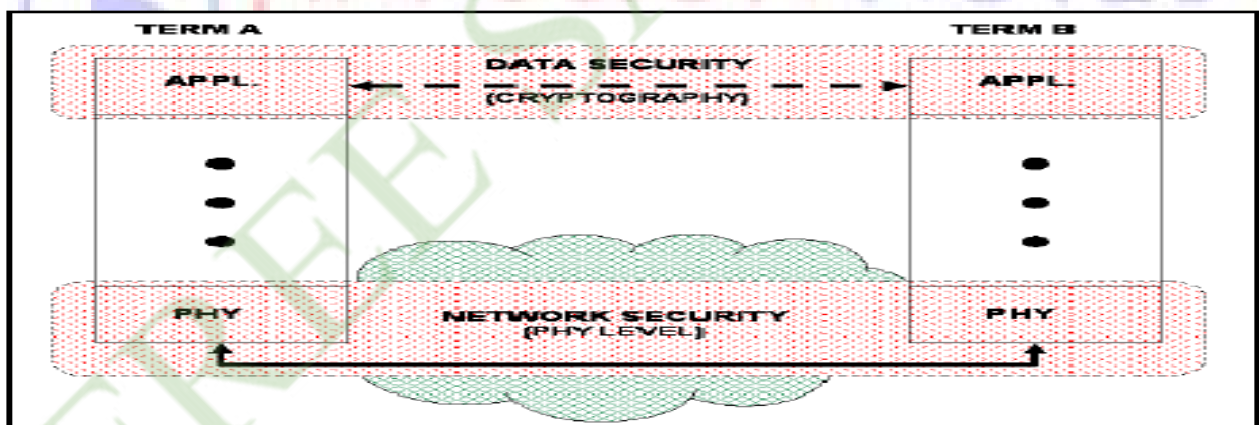
• Network Security -

System and network technology is a key technology for a wide variety of applications. Security is crucial to networks and applications. Although, network security is a critical requirement in emerging networks, there is a significant lack of security methods that can be easily implemented.

- When developing a secure network, the following need to be considered [1]:

Access – authorized users are provided the means to communicate to and from a particular network

Confidentiality – Information in the network remains private



Authentication – Ensure the users of the network are who they say they are

Integrity – Ensure the message has not been modified in transit

Non-repudiation – Ensure the user does not refute that he used the network

Differentiating Data Security and Network Security

Data security is the aspect of security that allows a client's data to be transformed into unintelligible data for transmission. Even if this unintelligible data is intercepted, a key is needed to decode the message. This method of security is effective to a certain degree. Strong cryptography in the past can be easily broken today. Cryptographic methods have to continue to advance due to the advancement of the hackers as well.

When transferring ciphertext over a network, it is helpful to have a secure network. This will allow for the ciphertext to be protected, so that it is less likely for many people to even attempt to break the code. A secure network will also prevent someone from inserting unauthorized messages into the network. Therefore, hard ciphers are needed as well as attack-hard networks [2].

Figure 1: Based on the OSI model, data security and network security have a different security function [2].

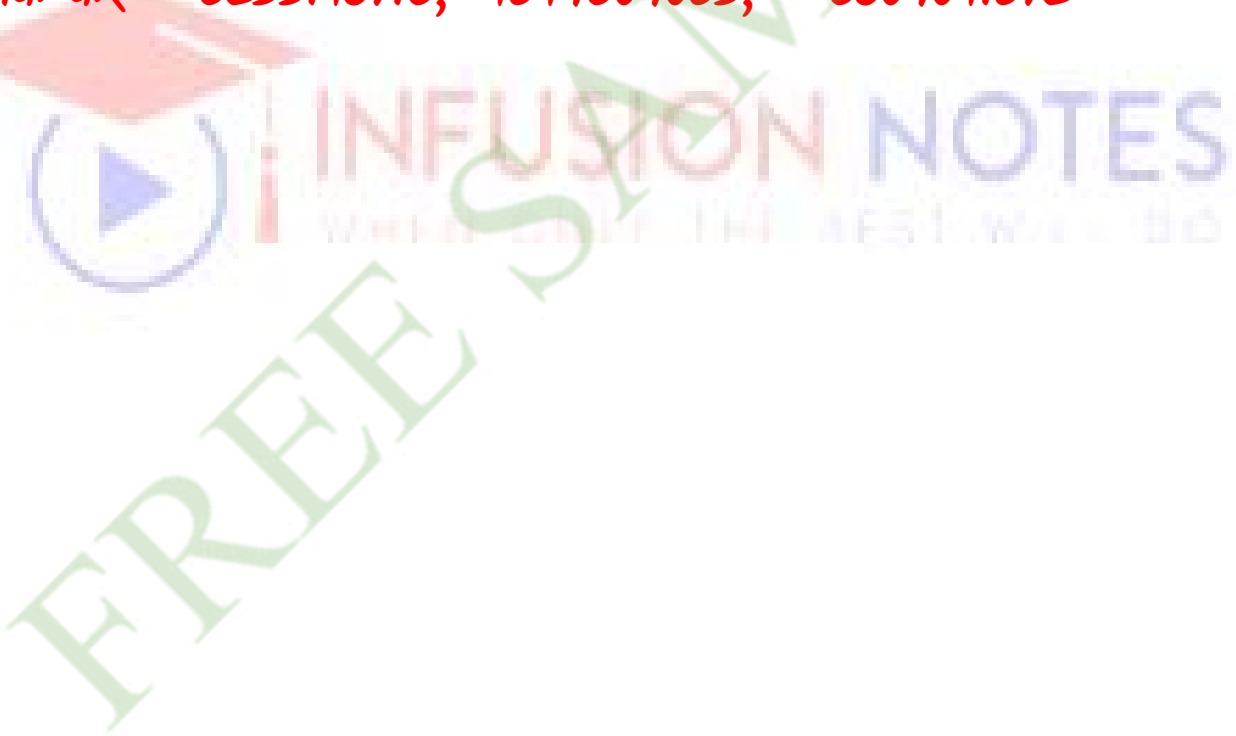
HISTORY OF NETWORK SECURITY -

The birth of the internet takes place in 1969 when Advanced Research Projects Agency Network (ARPANet) is commissioned by the department of defense (DOD) for research in networking.

The ARPANET is a

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Chapter - 3

Database Management System

(DBMS)

DBMS -

A database-management system (DBMS) is a collection of interrelated data and a set of programs to access those data.

This is a collection of related data with an implicit meaning and hence is a database. The collection of data, usually referred to as the database, contains information relevant to an enterprise.

The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.

Data

By data, we mean known facts that can be recorded and that have implicit meaning. For example, consider the names, telephone numbers, and addresses of the people you know.

You may have recorded this data in an indexed address book, or you may have stored it on a diskette, using a personal computer and software such as DBASEIV or V, Microsoft ACCESS, or EXCEL.

Data Processing

Vs.

Data Management Systems

Although Data Processing and Data Management Systems both refer to functions that take raw data and transform it into usable information, the usage of the terms is very different.

The term Data Management Systems refers to an expansion of this concept, where the raw data, previously copied manually from paper to punched cards, and later into data entry terminals, is now fed into the system from a variety of sources, including ATMs, EFT, and direct customer entry through the Inter.

File Oriented Approach

The earliest business computer systems were used to process business records and produce information.

They were generally faster and more accurate than equivalent manual systems.

These systems stored groups of records in separate files, and so they were called file processing systems.

In a typical file processing systems, each department has its own files, designed specifically for those applications.

The department itself working with the data processing staff, sets policies or standards for the format and maintenance of its files. Programs are dependent on the files and vice-versa; that is, when the physical format of the file is changed, the program has also to be changed.

Although the traditional file oriented approach to information processing is still widely used, it does have some very important disadvantages.

S.NO.	File System	DBMS
1.	File system is a software that manages and organizes the files in a storage medium within a computer.	DBMS is a software for managing the database.
2.	Redundant data can be present in a file system.	In DBMS there is no redundant data.
3.	It doesn't provide backup and recovery of data if it is lost.	It provides backup and recovery of data even if it is lost.
4.	There is no efficient query processing in file system.	Efficient query processing is there in DBMS.

5.	There is less data consistency in file system.	There is more data consistency because of the process of normalization.
6.	It is less complex as compared to DBMS.	It has more complexity in handling as compared to file system.
7.	File systems provide less security in comparison to DBMS.	DBMS has more security mechanisms as compared to file system.
8.	It is less expensive than DBMS.	It has a comparatively higher cost than a file system.

Important landmarks from the history:

1960 - Charles Bachman designed first DBMS system

1970 - Codd introduced IBM'S Information Management System (IMS)

1976- Peter Chen coined and defined the Entity-relationship model also knows as the ER model

1980 - Relational Model becomes a widely accepted database component

1985- Object-oriented DBMS develops.

1990s- Incorporation of object-orientation in relational DBMS.

1991- Microsoft ships MS access, a personal DBMS and that displaces all other personal DBMS products.

1995: First Internet database applications

1997: XML applied to database processing. Many vendors begin to integrate XML into DBMS products.

Characteristics of Database Management System -

1. Real World Entity

DBMS these days is very realistic and real-world entities are used to design its architecture. Also behavior and attributes are used by DBMS.

To simplify it we can take an example of an organization database where employee is an entity and his employee id is an attribute.

2. Self-Describing Nature

Before DBMS, traditional file management system was used for storing information and data.

There was no concept of definition in traditional file management system like we have in DBMS.

A DBMS should be of Self- Describing nature as it not only contains the database itself but also the metadata.

A metadata (data about data) defines and describes not only the extent, type, structure and format of all data but also relationship between data.

This data represent itself that what actions should be taken on it.

3. Support ACID Properties

Any DBMS is able to support ACID (Accuracy, Completeness, Isolation, and Durability) properties.

It is made sure in every DBMS that the real purpose of data should not be lost while performing transactions like delete, insert and update.

Let us take an example; if an employee name is updated then it should make sure that there is no duplicate data and no mismatch of employee information.

4. Concurrent Use of Database

There are many chances that many users will be accessing the data at the same time. They may require altering the database system concurrently.

At that time, DBMS supports them to concurrently use database without any problem. With the help of concurrency, economy of the system

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INFUSION NOTES
WHEN ONLY THE BEST WILL DO

FREE SAMPLE

- **ACID properties and RDBMS**

Four crucial properties define relational database transactions: atomicity, consistency, isolation, and durability—typically referred to as ACID.

Atomicity defines all the elements that make up a complete database transaction.

Consistency defines the rules for maintaining data points in a correct state after a transaction.

Isolation keeps the effect of a transaction invisible to others until it is committed, to avoid confusion.

Durability ensures that data changes become permanent once the transaction is committed.

Stored procedures and relational databases

Data access involves many repetitive actions. For example, a simple query to get information from a data table may need to be repeated hundreds or thousands of times to produce the desired result.

These data access functions require some type of code to access the database. Application developers don't want to write new code for these functions in each new application.

Luckily, relational databases allow stored procedures, which are blocks of code that can be accessed with a simple application call.

For example, a single stored procedure can provide consistent record tagging for users of multiple applications.

Stored procedures can also help developers ensure that certain data functions in the application are implemented in a specific way.

Database locking and concurrency

Conflicts can arise in a database when multiple users or applications attempt to change the same data at the same time.

Locking and concurrency techniques reduce the potential for conflicts while maintaining the integrity of the data.

Locking prevents other users and applications from accessing data while it is being

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कॉल करें , हमें पूर्ण विश्वास है कि ये नोट्स आपकी राजस्थान कंप्यूटर अनुदेशक (शिक्षक) की परीक्षा में पूर्ण संभव मदद करेंगे , धन्यवाद !

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INFUSION NOTES
WHEN ONLY THE BEST WILL DO

FREE SAMPLE

- **DBMS Generalization -**

Generalization, as the name suggests, is a process of generalizing two or more lower-level entity types into a higher-level entity type.

Entities are clubbed or grouped together to represent a more generalized view. In this process, the common attributes of two or more entities combine to form a new entity type.

The new entity type formed is called a generalized entity.

It may be possible that this generalized entity may combine further with other entity types to form another higher-level entity type.

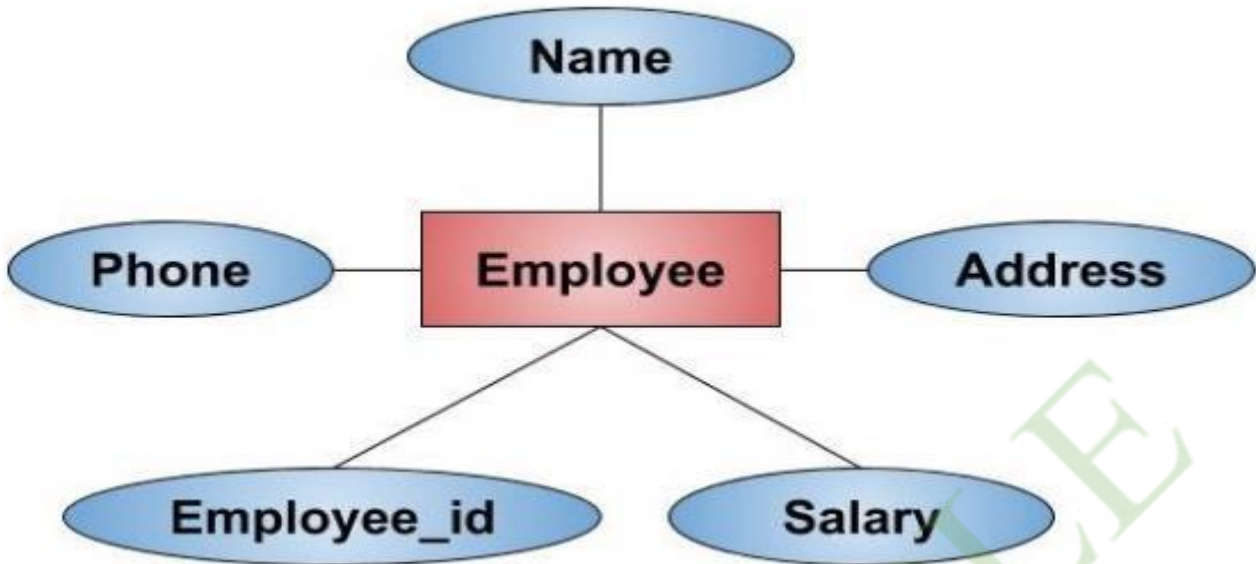
It is a bottom-up approach.

It is the reverse process of Specialization.

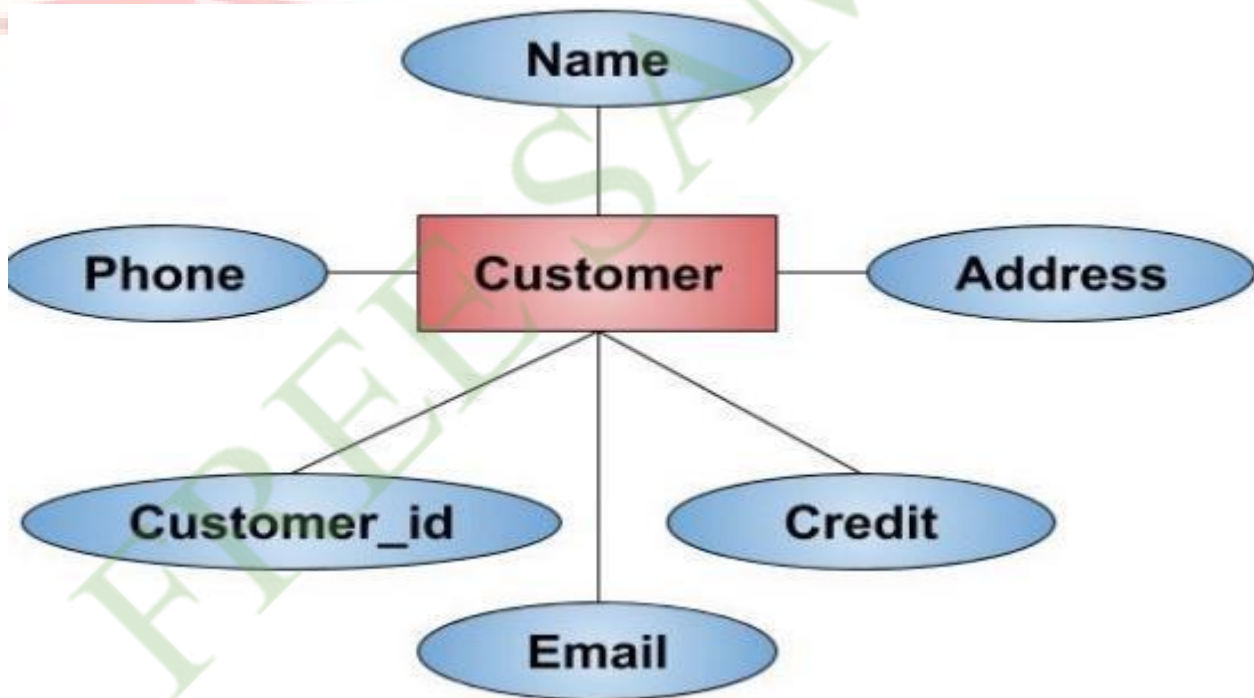
For example, Whales, Sharks, and Dolphins can be generalized as Fish. Similarly, Bicycle, Bike, and Car can be generalized as Vehicles.

Example: Suppose we have two entity types, Employee and Customer.

The attributes of Employee entity type are Name, Phone, Salary, Employee_id, and Address.



The attributes of Customer entity type are Name, Phone, Address, Credit, Customer_id, and Email.



We can see that the three attributes i.e. Name, Phone, and Address are common here.

When we generalize these two entities, we form a new higher-level entity type Person.

The new entity type formed is a generalized entity.

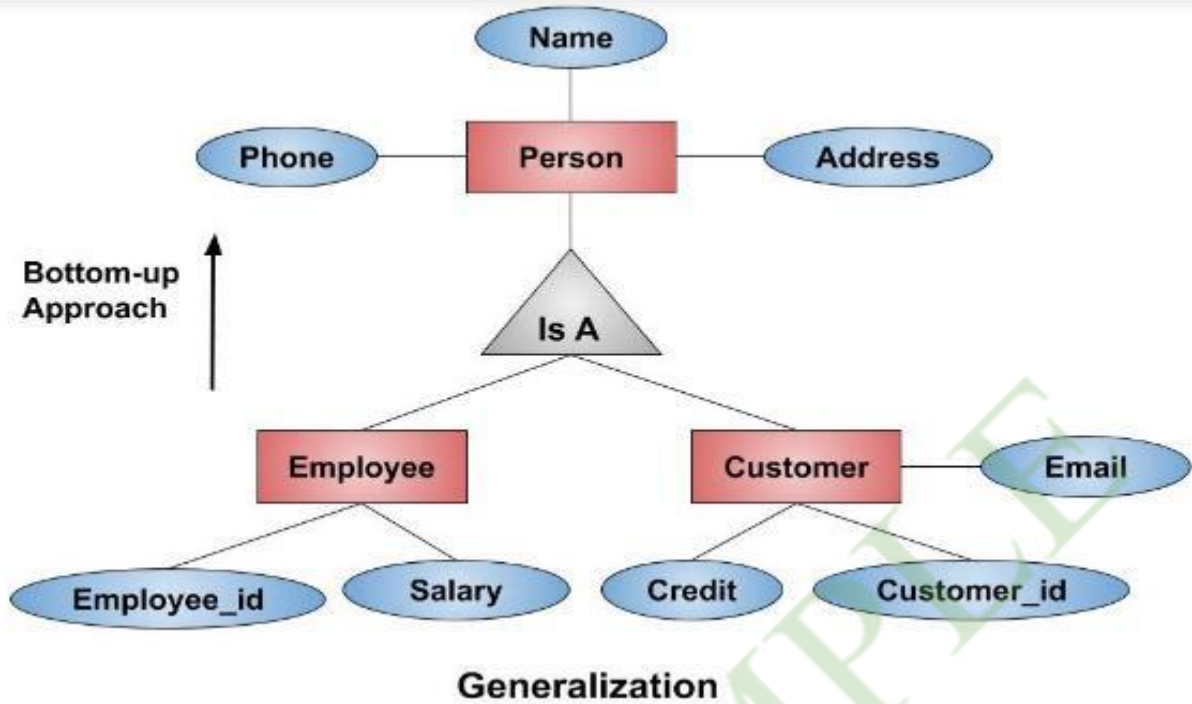
We can see in the below E-R diagram that after generalization the new generalized entity Person contains only the common attributes i.e. Name, Phone, and Address.

Employee entity contains only the specialized attribute like Employee_id and Salary.

Similarly, the Customer entity type contains only specialized attributes like Customer_id, Credit, and Email.

So from this example, it is also clear that when we go from bottom to top, it is a Generalization and when we go from top to bottom it is Specialization.

Hence, we can say that Generalization is the reverse of Specialization.



Specialization -

Specialization is a top-down approach in which a higher-level entity is divided into multiple specialized lower-level entities. In addition to sharing the attributes of the higher-level entity, these lower-level entities have specific attributes of their own. Specialization is usually used to find subsets of an entity that has a few different or additional

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INFUSION NOTES
WHEN ONLY THE BEST WILL DO

• SQL -

History -

The SQL language was originally developed at the IBM research laboratory in San José, in connection with a project developing a prototype for a relational database management system called System R in the early 70s.

The first database management systems based on SQL became available commercially by the end of the 70s. At the same time, relational database management systems based on other languages were published. The best known alternative for SQL was the QUEL language in the Ingres system.

SQL was elected for standardization. Both the American ANSI and the international ISO took part in the standardization

In 1986, the first SQL standard was approved (the core SQL about 40 pages + the module language, and embedding in programming languages, altogether about 100 pages)

In 1989, an integrity enhancement was approved by ISO, containing, among other features, the specification possibility for keys, foreign keys and some other constraints (c. 20 pages)

In 1992, the new version SQL-92 (also called SQL2) was approved. It contained large enhancements to the language. The size of the standard was about. 600 pages + the data dictionary standard; altogether c. 1000 pages. Three levels were specified for SQL

the basic level, mainly containing the core of the old SQL/89

the intermediate level, containing new data types, operations and structures

the full SQL with even more data types and structures

Instead of one massive standard, the decision was taken to continue development in parts.

In 1995, the SQL/CLI call level interface was approved, i.e. the interface specification for use through programs. The standard specifies the ODBC interface.

In 1996, the SQL/PSM (persistent stored modules) was approved as a database procedure specification language.

In 1999, the new version SQL-99 (also called SQL3) was approved. The standard is divided into five parts.

Framework (introduction)

Foundation (core)

CLI (call level interface)

PSM (persistent stored modules)

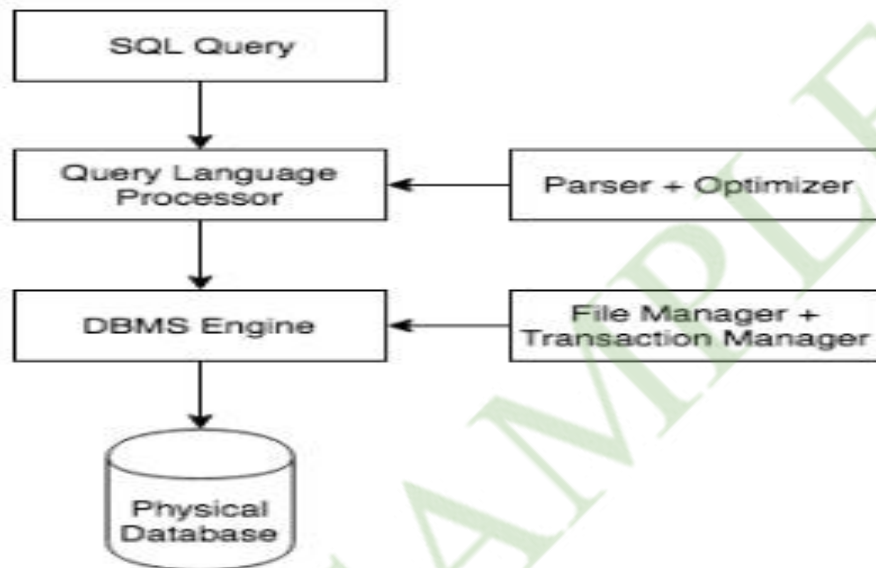
Bindings (to programming languages)

SQL Process -

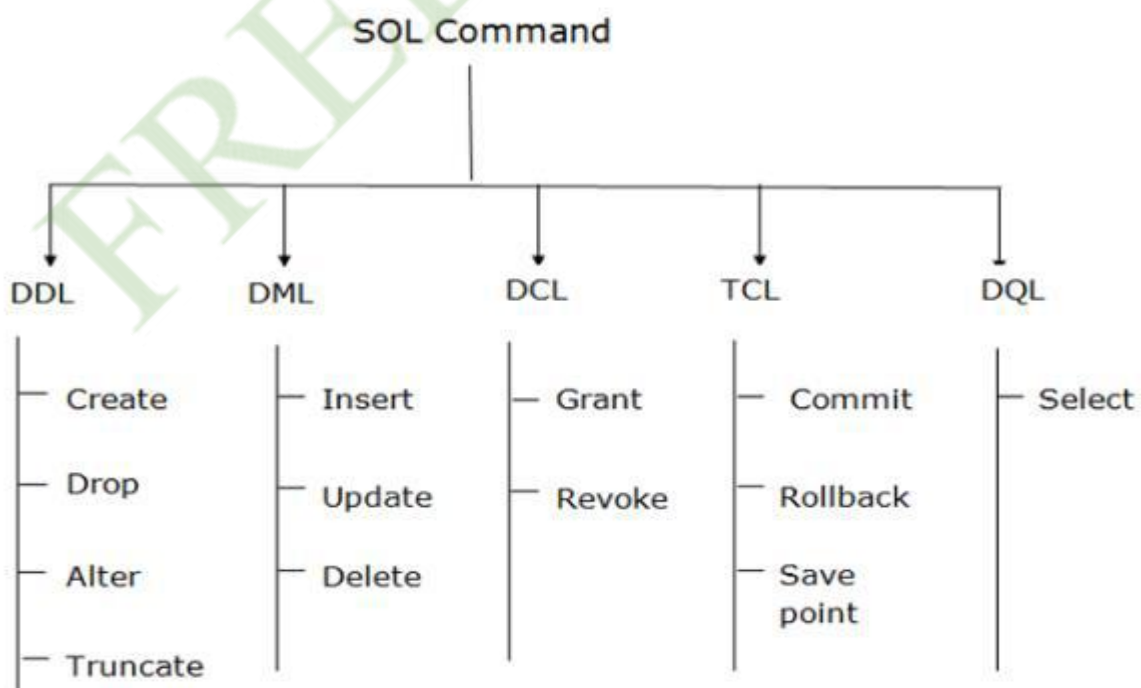
When a SQL command is executed in any RDBMS, the system determines the best way to carry out your command and SQL engine figures out how to interpret the task.

Components like Query Dispatcher, Optimization Engines, Classic Query Engine, SQL Query Engine etc are involved in this process.

Note: A classic query engine handles all the non-SQL queries, but a SQL query engine won't handle logical files.



SQL commands -



1.DDL(Data Definition Language) :

DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database schema.

It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the

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Chapter - 4

System Analysis And Design

INTRODUCTION -

Systems are created to solve problems. One can think of the systems approach as an organized way of dealing with a problem. In this dynamic world, the subject System Analysis and Design (SAD), mainly deals with the software development activities.

OBJECTIVES

After going through this lesson, you should be able to define a system explain the different phases of system development life cycle enumerate the components of system analysis explain the components of system designing

DEFINING A SYSTEM

A collection of components that work together to realize some objectives forms a system. Basically there are three major components in every system, namely input, processing and output.

SYSTEM LIFE CYCLE -

System life cycle is an organizational process of developing and maintaining systems. It helps in establishing a system project plan, because

it gives overall list of processes and sub-processes required for developing a system.

System development life cycle means combination of various activities. In other words we can say that various activities put together are referred as system development life cycle. In the System Analysis and Design terminology, the system development life cycle also means software development life cycle.

Following are the different phases of system development life cycle:

Preliminary study

Feasibility study

Detailed system study

System analysis

System design

Coding

Testing

Implementation

Maintenance

PHASES OF SYSTEM DEVELOPMENT LIFE CYCLE

Let us now describe the different phases and related activities of system development life cycle.

Preliminary System Study

Preliminary system study is the first stage of system development life cycle. This is a brief investigation of the system under consideration and gives a clear picture of what actually the physical system is? In practice, the initial system study involves the preparation of a 'System Proposal' which lists the Problem Definition, Objectives of the Study, Terms of reference for Study, Constraints, Expected benefits of the new system, etc. in the light of the user requirements. The system proposal is prepared by the System Analyst (who studies the system) and places it before the user management. The management may accept the proposal and the cycle proceeds to the next stage. The management may also reject the proposal or request some modifications in the proposal. In summary, we would say that system study phase passes through the following steps:

problem identification and project initiation

background analysis

inference or findings (system proposal)

Feasibility Study

In case the system proposal is acceptable to the management, the next phase is to examine the feasibility of the system. The feasibility study is basically the test of the proposed system in the light of its

workability, meeting user's requirements, effective use of resources and of course, the cost effectiveness. These are categorized as technical, operational, economic and schedule feasibility. The main goal of feasibility study is not to solve the problem but to achieve the scope. In the process of feasibility study, the cost and benefits are estimated with greater accuracy to find the Return on Investment (ROI). This also defines the resources needed to complete the detailed investigation. The result is a feasibility report submitted to the management. This may be accepted or accepted with modifications or rejected. The system cycle proceeds only if the management accepts it.

Detailed System Study -

The detailed investigation of the system is carried out in accordance with the objectives of the proposed system. This involves detailed study of various operations performed by a system and their relationships within and outside the system. During this process, data are collected on the available files, decision points and transactions handled by the present system. Interviews, on-site observation and questionnaire are the tools used for detailed system study. Using the following steps it becomes easy to draw the exact boundary of the new system under consideration:

Keeping in view the problems and new requirements

Workout the pros and cons including new areas of the system

All the data and the findings must be documented in the form of detailed data flow diagrams (DFDs), data dictionary, logical data struc-

tures and miniature specification. The main points to be discussed in this stage are:

Specification of what the new system is to accomplish based on the user requirements.

Functional hierarchy showing the functions to be performed by the new system and their relationship with each other.

Functional network, which are similar to function hierarchy but they highlight the functions which are common to more than one procedure.

List of attributes of the entities – these are the data items which need to be held about each entity (record)

System Analysis -

Systems analysis is a process of collecting factual data, understand the processes involved, identifying problems and recommending feasible suggestions for improving the system functioning. This involves studying the business processes, gathering operational data, understand the information flow, finding out bottlenecks and evolving solutions for overcoming the weaknesses of the system so as to achieve the organizational goals. System Analysis also includes subdividing of complex process involving the entire system, identification of data store and manual processes.

The major objectives of systems analysis are to find answers for each business process: What is being done, How is it being done, Who is doing it, When is he

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• System Implementation and Maintenance

The results obtained from the evaluation process help the organization to determine whether its information systems are effective and efficient or otherwise. The process of monitoring, evaluating, and modifying of existing information systems to make required or desirable improvements may be termed as System Maintenance.

System maintenance is an ongoing activity, which covers a wide variety of activities, including removing program and design errors, updating documentation and test data and updating user support. For the purpose of convenience, maintenance may be categorized into three classes, namely:

i) **Corrective Maintenance:** This type of maintenance implies removing

errors in a program, which might have crept in the system due to faulty design or wrong assumptions. Thus, in corrective maintenance, processing or performance failures are repaired.

ii) **Adaptive Maintenance:** In adaptive maintenance, program functions are changed to enable the information system to satisfy the information needs of the user. This type of maintenance may become necessary because of organizational changes which may include:

- a) Change in the organizational procedures,
- b) Change in organizational objectives, goals, policies, etc.
- c) Change in forms,
- d) Change in information needs of managers.
- e) Change in system controls and security needs, etc.

iii) **Perfective Maintenance:** Perfective maintenance means adding new programs or modifying the existing programs to enhance the performance of the information system. This type of maintenance undertaken to respond to user's additional needs which may be due to the changes within or outside of the organization. Outside changes are primarily environmental changes, which may in the absence of system maintenance, render the information system ineffective and inefficient. These environmental changes include:

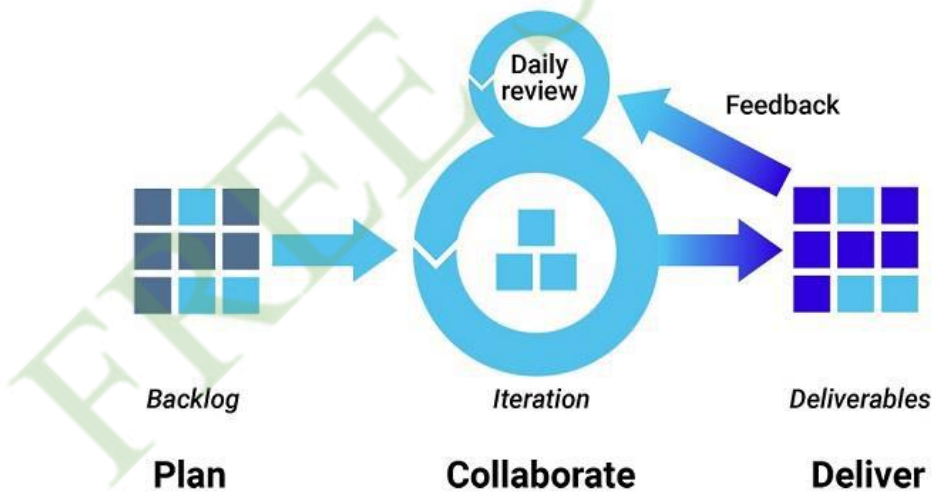
- a) Changes in governmental policies, laws, etc.,

- b) Economic and competitive conditions,
- c) New technology.

Software Development Approches

Agile development methodology

Teams use the agile development methodology to minimize risk (such as bugs, cost overruns, and changing requirements) when adding new functionality. In all agile methods, teams develop the software in iterations that contain mini-increments of the new functionality. There are many different forms of the agile development method, including scrum, crystal, extreme programming (XP), and feature-driven development (FDD).



Pros: The primary benefit of agile software development is that it allows software to be released in iterations. Iterative releases improve efficiency by allowing teams to find and fix defects and align expectation early on.

They also allow users to realize software benefits earlier, with frequent incremental improvements.

Cons: Agile development methods rely on real-time communication, so new users often lack the documentation they need to get up to speed. They require a huge time commitment from users and are labor intensive because developers must fully complete each feature within each iteration for user approval.

Agile development methods are similar to rapid application development (see below) and can be inefficient in large organizations. Programmers, managers, and organizations accustomed to the waterfall method (see below) may have difficulty adjusting to an agile SDLC. So a hybrid approach often works well for them.

DevOps deployment methodology

DevOps is not just a development methodology but also a set of practices that supports an

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पूर्ण विश्वास है कि ये नोट्स आपकी राजस्थान कंप्यूटर अनुदेशक (शिक्षक) की परीक्षा में पूर्ण संभव मदद करेंगे, धन्यवाद।

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Chapter - 5

Web Technology and Multimedia

Overview -

WWW stands for **World Wide Web**. A technical definition of the World Wide Web is : all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).

A broader definition comes from the organization that Web inventor **Tim Berners-Lee** helped found, the **World Wide Web Consortium (W3C)**.

The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge.

In simple terms, The World Wide Web is a way of exchanging information between computers on the Internet, tying them together into a vast collection of interactive multimedia resources.

Internet and Web is not the same thing: Web uses internet to pass over the information.

Evolution -

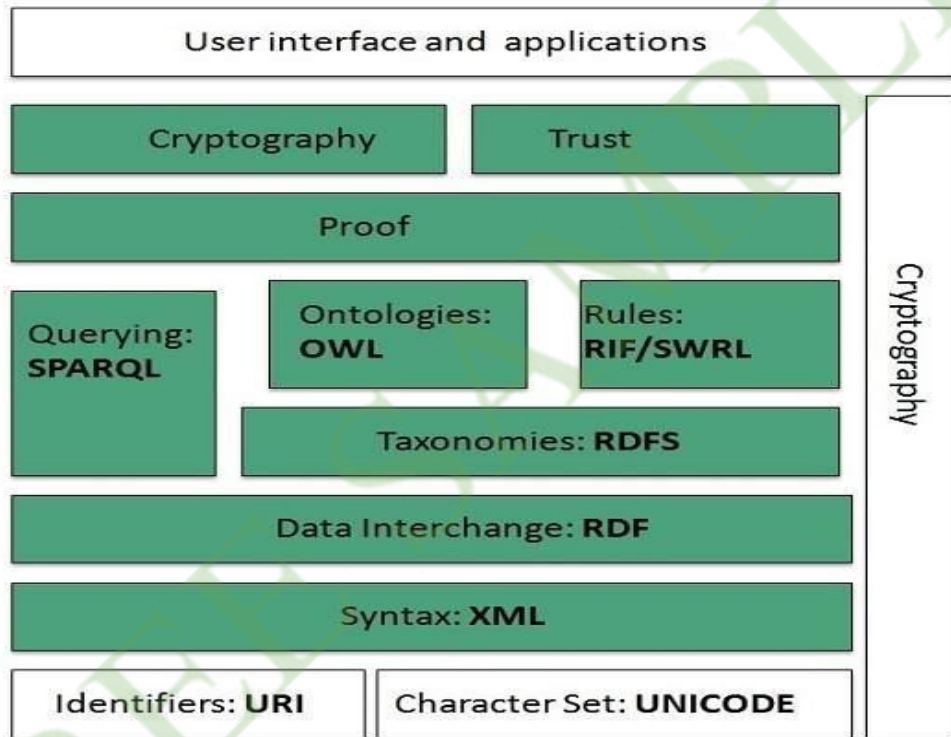
World Wide Web was created by Timothy Berners Lee in 1989 at CERN in Geneva. World Wide Web came into existence as a proposal by him, to allow researchers to work together effectively and efficiently at CERN. Eventually it became World Wide Web.

The following diagram briefly defines evolution of World Wide Web:



WWW Architecture

WWW architecture is divided into several layers as shown in the following diagram:



Identifiers and Character Set

Uniform Resource Identifier (URI) is used to uniquely identify resources on the web and UNICODE makes it possible to build web pages that can be read and write in human languages.

Syntax

XML (Extensible Markup Language) helps to define common syntax in semantic web.

Data Interchange

Resource Description Framework (RDF) framework helps in defining core representation of data for web. RDF represents data about resource in graph form.

Taxonomies

RDF Schema (RDFS) allows more standardized description of **taxonomies** and other **ontological constructs**.

Ontologies

Web Ontology Language (OWL) offers more constructs over **RDFS**. It comes in following three versions:

OWL Lite for taxonomies and simple constraints.

OWL DL for full description logic support.

OWL for more syntactic freedom of **RDF**

Rules

RIF and **SWRL** offers rules beyond the constructs that are available from **RDFs** and **OWL**. **Simple Protocol and RDF Query Language (SPARQL)** is **SQL** like language used for querying **RDF** data and **OWL** Ontologies.

Proof

All semantic and rules that are executed at layers below Proof and their result will be used to prove deductions.

Cryptography

Cryptography means such as digital signature for verification of the origin of sources is used.

User Interface and Applications

On the top of layer **User interface and Applications** layer is built for user interaction.

WWW Operation

WWW works on client- server approach. Following steps explains how the web works:

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User enters the URL of the web page in the address bar of web browser.

Then browser requests the Domain Name Server for the

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	(2nd शिफ्ट)		
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- HTML

Tim Berners-Lee, a physicist at the CERN research institute in Switzerland invented HTML in 1991.

This first version consisted of 18 HTML tages. Now, there are currently about 140 HTML tags, although not all of them are supported by modern browsers. Learn more about Tim Berners-Lee here:

YEAR	VERSION
1991	HTML
1993	HTML+
1995	HTML 2.0
1997	HTML 3.2
1999	HTML 4.01
2000	XHTML 1.0
2008	HTML5 (First draft)
2012	HTML5
2014	HTML5
2016	HTML 5.1
2017	HTML 5.2

HTML Tags List PDF

HTML Tags	Description
<!--...-->	Defines a comment
<!DOCTYPE>	Defines the document type
<a>	Defines a hyperlink
<abbr>	Defines an abbreviation or an acronym
<acronym>	Not supported in HTML5. Use <abbr> instead. Defines an acronym
<address>	Defines contact information for the author/owner of a document
<applet>	Not supported in HTML5. Use <embed> or <object> instead. Defines an embedded applet
<area>	Defines an area inside an image map
<article>	Defines an article
<aside>	Defines content aside from the page content
<audio>	Defines embedded sound content
	Defines bold text
<base>	Specifies the base URL/target for all relative URLs in a document
<basefont>	Not supported in HTML5. Use CSS instead. Specifies a default color, size, and font for all text in a document

<code><bdi></code>	Isolates a part of text that might be formatted in a different direction from other text outside it
<code><bdo></code>	Overrides the current text direction
<code><big></code>	Not supported in HTML5. Use CSS instead. Defines big text
<code><blockquote></code>	Defines a section that is quoted from another source
<code><body></code>	Defines the document's body
<code>
</code>	Defines a single line break
<code><button></code>	Defines a clickable button
<code><canvas></code>	Used to draw graphics, on the fly, via scripting (usually JavaScript)
<code><caption></code>	Defines a table caption
<code><center></code>	Not supported in HTML5. Use CSS instead.
	Defines centered text
<code><cite></code>	Defines the title of a work
<code><code></code>	Defines a piece of computer code
<code><col></code>	Specifies column properties for each column within a <code><colgroup></code> element
<code><colgroup></code>	Specifies a group of one or more columns in a table for formatting

<code><data></code>	Adds a machine-readable translation of a given content
<code><datalist></code>	Specifies a list of pre-defined options for input controls
<code><dd></code>	Defines a description/value of a term in a description list
<code></code>	Defines text that has been deleted from a document
<code><details></code>	Defines additional details that the user can view or hide
<code><dfn></code>	Specifies a term that is going to be defined within the content
<code><dialog></code>	Defines a dialog box or window
<code><dir></code>	Not supported in HTML5. Use <code></code> instead.
<code><dl></code>	Defines a directory list
<code><div></code>	Defines a section in a document
<code><dl></code>	Defines a description list
<code><dt></code>	Defines a term/name in a description list
<code></code>	Defines emphasized text
<code><embed></code>	Defines a container for an external application
<code><fieldset></code>	Groups related elements in a form
<code><figcaption></code>	Defines a caption for a <code><figure></code> element
<code><figure></code>	Specifies self-contained content

<code></code>	Not supported in HTML5. Use CSS instead. Defines font, color, and size for text
<code><footer></code>	Defines a footer for a document or section
<code><form></code>	Defines an HTML form for user input
<code><frame></code>	Not supported in HTML5. Defines a window (a frame) in a frameset
<code><frameset></code>	Not supported in HTML5. Defines a set of frames

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Basic html tags -:

All html tags that lay the foundation of a web page. That is, from the top part of that web page to the content area and footer area are used to create. Basic html tags are called. All the basic tags below are explained with their example.

`<!DOCTYPE>` - This Doctype tag tells any Browser which type (html, xml etc.) the Runed Document file is in. Its full name is Document Type Definition.

`<html>` - This tag is the root element of html element. This tells the browser that the file run is in the html document.

`<head>` - This tag is the container element of the rest of the head element's. Important information of the document in the head element is enclosed. Elements such as title, style, base, link, meta, script, noscript are written within this tag.

`<body>` - This tag defines the body of the document. The content area to be shown in a web page is created with the help of this head element. The body element contains all the content of the document like - text, hyperlink, images, tables, lists etc. Is included

`<title>` - This tag defines the title of the document. The title tag is required for every html document. The title tag is written within the head element.

`<meta>` - `<meta>` tag provides metadata about html document. The metadata page will not show, but the machine will be parsable. The meta element is usually used to specify the page description, keyword, author of the document, last modified, and other metadata.

Text Tags:

All html tags that design the content area of a web page are called text tags. Using the text tags given below, you can control the text in html document according to yourself.

`<heading>` - This tag defines html heading. The heading tag from `<h1>` to `<h6>` is used in an html document. `<h1>` defines the most important heading of the document. The same `<h2>`, `<h3>`, `<h4>`, `<h5>`, `<h6>` define the least important heading

`<p>` - This tag defines the paragraph of the document. Several paragraph elements can

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अनुदेशक (शिक्षक) के इन कम्पलीट नोट्स में पढ़ने को मिलेगा / यदि आपको हमारे नोट्स के सैंपल अच्छे लगे हों तो कम्पलीट नोट्स खरीदने के लिए हमारे संपर्क नंबर पर कॉल करें , हमें पूर्ण विश्वास है कि ये नोट्स आपकी राजस्थान कंप्यूटर अनुदेशक (शिक्षक) की परीक्षा में पूर्ण संभव मदद करेंगे , धन्यवाद /

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- Schema -

A schema is a formal way of defining and validating the content of an XML document. A well-formed XML document that conforms to its schema is said to be valid. The schema is how we assign the data types to each tag and any attributes that are contained in the XML document. A schema is a structured document which must obey XML syntax rules. It is composed of a series of predefined tags and

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attributes that are part of the XML language and are used to set the data types for the values associated with our custom tags. Not only do we get to create custom XML tags, but we can also denote that an XML data value is, for example, an integer data type. Thus we can assign specific data types to specific XML data values. A schema can be part of the XML document or a separate file.

The XML tags and attributes to create a schema are: -

The Schema tag serves as a container element that delimits the beginning and end of the schema. This tag must be closed.

The `xmlns` attribute is used to declare the data types of the schema XML namespace. The value is a URL or URN address that the browser will access to get information on the data types to allow code validation.

The `xmlns:dt` attribute is used to declare the data types of the schema XML namespace. The value is a URL (Uniform Resource Locator) or URN (Uniform Resource Name) address that the browser will access to get information on the data types to allow code validation. If we are using IE 5 to view our XML document, then we must include the `xmlns` and the `xmlns:dt` attributes exactly as displayed below

```
<Schema xmlns="urn:schema-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes">
...
</Schema>
```

The AttributeType tag is used to declare the data type for an attribute of an XML tag. This tag must

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• Displaying XML Using XSL -

XSL is the acronym for the *Extensible Stylesheet Language* which is an application of XML. XSL is a powerful styling language that uses special stylesheets to create templates to display the data contained in an XML page in a variety of ways. We use XSL to transform an XML document into an HTML page that can be viewed on Internet Explorer. We do this by creating a separate XSL document that is linked to the XML document. XSL is composed of two parts: XSLT which stands for XSL Transformation and is used to transform from an XML document to another format which may be HTML, PDF or LaTeX. XSLFO which stands for XSL Formatting which is the native XML equivalent of Cascading Style Sheets (CSS). XSLFO is thus responsible for rendering information in a visual way.

This technology can be used with IE 5 and IE 6. The Microsoft version and XSL does not fully support all the recommendations set for this language by the World Wide Web Consortium (W3C). However, XSL can be used on the server-side so that the output is browser independent.

XSL is not a large language. It is composed of twenty tag-like elements and associated attribute-like methods. Like XML, all XSL
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elements must have an opening and closing tag. All XSL tags have the same namespace prefix, `xsl:`, to denote that this is an XSL element. Notice the use of the colon. After the prefix, the suffix designates the tag's purpose.

In order to display our XML document, we only need three of the XSL elements.

xsl:template

The `xsl:template` element is used to define a template. It can also be used as a container element to declare the start and stop of an XSL coding sequence. We use it in this manner in our example. In order for this to work in IE 6, we must use the following code exactly

```
<xsl:template  
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
```

The next element we use is

xsl:for-each

This element is used to create a `for ... each` loop which allows looping through all the values for an XML data field. We use the `select` attribute to specify the name of the XML data element.

xsl:value-of

The xsl:value-of element is used to insert the value of the XML data field into the template. We use the select attribute to specify the name of the XML data

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• JavaScript -

Introduction

The HTML language used to create pages for the World Wide Web was originally designed to produce plain and static documents, stuff like engineering notes and long-winded arguments by scientist types. When the Web first started, the only browsing software available for it was text-based.

JavaScript makes HTML come alive. JavaScript is a scripting language for HTML and the Netscape Navigator browser, version 2.0 and later. JavaScript is a cross-platform, object-oriented language. Core JavaScript contains a core set of objects as Array, Date, and Math, and a core set of language elements such as operators, control structures, and statements. JavaScript “scripts” are small programs that interact with Netscape and the HTML content of a page. We can create a JavaScript program to add sound or simple animation, pre-validate a form before the user’s response is sent to our company’s server, search through a small database, set options based on user preferences, and much more. JavaScript performs the same function as a macro in a word processor or electronic spreadsheet program. A macro is a small program designed solely to run inside a program, automating some task or enhancing a feature of the program. The difference here is that instead of a word processor or electronic spreadsheet application,

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JavaScript is designed for use with Netscape and surfing on the World Wide Web.

JavaScript is used in Netscape 2.0 and later versions, as well as in Microsoft Internet Explorer 3.0 and later versions. As the co-developer of JavaScript, Netscape has wanted to make JavaScript an open standard, meaning that other companies can use and implement JavaScript in their own Internet products. When JavaScript was first announced in December of 1995, over two dozen companies jumped on the bandwagon, promising to support it in future products.

Thus JavaScript is an authoring language for the typical Web page designer. It is a scripting language in which the program is embedded as part of the HTML document retrieved by the browser.

A JavaScript program consists of one or more instructions (also referred to as code or commands) included with the HTML markup tags that form our Web documents. When Netscape encounters a JavaScript instruction, it stops to process it. For example, the instruction might tell Netscape to format and display text and graphics on the page. Unlike a program written in Java, JavaScript programs are not in separate files (though this is an option using Netscape 3.0 and later). Instead, the JavaScript instructions are

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mixed together with familiar HTML markup tags such as `<H1>`, `<P>`, and ``.

Because JavaScript is embedded in HTML documents, we can use any text editor or Web page editor to write our JavaScript programs. The only requirement is that the editor must allow direct input.

Netscape needs to be told that we are giving it JavaScript instructions, and these instructions are enclosed between

`<SCRIPT> ... </SCRIPT>`

tags. Within the script tag we can have only valid JavaScript instructions. We cannot put HTML tags for Netscape to render inside the `<SCRIPT>` tags, and we cannot put JavaScript instructions outside the `<SCRIPT>` tags.

JavaScript is designed on a simple object-based paradigm. An object is a construct with properties that are JavaScript variables or other objects. An object also has functions associated with it that are known as the object's methods. In addition to objects that are predefined in the Navigator client and the server, we can define or own objects. A JavaScript object has properties associated with it. We access the properties of an object with a simple notation

`objectName.propertyName`

Note that JavaScript is case-sensitive. Comments in JavaScript are the same as in C, C++ and Java, namely

`// ...`

and

`/* ... */`

Core JavaScript can be extended for a variety of purposes by supplementing it with additional objects; for example: Client-side JavaScript extends the core language by supplying objects to control a browser and its Document Object Model. Server-side JavaScript extends the core language by supplying objects relevant to running JavaScript on a server.

DOCUMENT OBJECT -

Document Object

The document object contains information about the current document, such as its title, when it was last modified, and the color of the background.

The document methods interact with the document. The most commonly used

document method is `document.write("text");` and `document.writeln("text");`

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which writes text to the browser's window. The document object is itself a property of the window object. JavaScript assumes that

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- **Creation and Maintenance of Websites:**

Web publishing -- the development and maintenance of websites -- has become a key issue for any business that wants to remain competitive. Developing a Web page involves designing and implementing the part that your readers see and interact with, known as the front end, as well as the programming and database elements of the page, known as the back end. Maintenance includes hosting your Web page and updating it so that the content remains current.



Web Design

Web design involves developing the look and feel of your pages. It includes selecting graphics, choosing fonts and colors and planning the layout of the page. Web design uses HTML to determine the behavior of the page while the appearance is usually programmed using Cascading Style Sheets. Web page design traditionally requires some programming but you can implement simple pages without any knowledge of HTML or CSS. Some website hosts offer page building tools that allow you to assemble your site from elements such as text fields and graphics. Web designers use packages such as Adobe Dreamweaver and Adobe GoLive to program Web pages. Code-free Web design packages that let you construct sites without knowing how to program include Xara's Web Designer packages.

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Server-Side Scripting -

Scripting adds extra usability and functionality to a website. Server-side scripting refers to programs that tell the server hosting the Web page how to operate. Examples of server-side scripting languages include ASP and PHP. Functionality provided by server-side scripting includes processing information from Web forms, such as your customer's login details; accessing a database and sending the result to a browser; and customizing a Web page for an individual user.

Client-Side Scripting

Client-side scripts run in a browser instead of on a server. JavaScript is commonly used to create client-side scripts that are embedded directly into a HTML Web page; they allow extra functionality such as comments or menus.

Databases

A database organizes information in an orderly fashion. Examples of databases used in Web page development include MS Access, MySQL and Oracle. A database can be used to store, access and edit detailed information that is then supplied to the Web page. An example would be an Internet message board. These use databases to store users' details

and membership status, the titles of various discussion threads and the content of their posts.

Web Hosting

Once you've designed and created your Web page you will need to host it on a server so that it can be accessed by Internet users. While it's possible to program your own servers, it's more common to buy server space from a hosting company. The fees charged by a hosting company will depend on factors such as the number of pages you want to host, how much data those pages contain and the amount of traffic your site receives. Web design firms often offer packages that include both design and hosting; this can be an economical option.

Maintenance

Maintenance includes regular visits to the page to make sure that it is displaying properly. Database files and other files can sometimes become corrupted or damaged; these would need to be repaired. Other possible problems could include the site going offline due to too much traffic or an attack by hackers. If the site contains details of prices, services or products that you offer, for example, these would need to be updated to reflect any changes. You also need to periodically check the links on your pages to ensure they're not broken.

- **HTML INTERACTIVITY TOOLS:**

Introduction -

For any web developer or designer, HTMLS tools prove to be a great help when it comes to step up their workflow and perform repetitive tasks. These tools are blessed with all the richness and power that help webmasters to augment the value of their work and improve the usability of their web designs. They are compelling enough to build beautiful and responsive websites in the quickest possible manner. The majority of HTMLS tools is available for free and they are popular because they take less time and efforts to fabricate a commendable website.

Using HTMLS tools, developers can easily incorporate eye-catching animation effects, videos, fonts, and graphics to their websites. If you are interested in HTMLS tools, then you have come to the right place. Here, we have handpicked a list of some 10 HTMLS tools that are considered best of breed and are famous for their promising nature. You can pick any one of them to manage and build the code for your website.

1. Font dragr

Font dragr is all what you need to preview custom web fonts in the browser. It's a very simple tool that comes with a drag and drop interface

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allowing you to drop your typefaces, scalable vector graphics, and Web Open Fonts on the web page to test all of them instantly. Use Font Dragr to instantly load your font and know whether it's appropriate or not.

2. HTMLS Maker

Animations make a dynamic visual impact on the appearance of a website, and HTMLS Maker is a richly different take on this aspect. Being the finest online animation tool, HTMLS Maker makes it easy for developers to add interactive content to their website with the help of HTML, CSS and JavaScript. The tool is extremely easy to use and helps developers to attain desirable results efficiently. HTMLS Maker also allows you to develop cross-compatible animated content such as Slideshows, HTMLS animation, sliders and more.

3. HTML Kickstart

HTML Kickstart is a set of HTML, CSS, jQuery elements, and

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- **Voice mail and Video Conferencing**

Introduction: -

In this era of globalization, information technology is playing a very important role in bringing different stakeholders in the corporate sector closer. A number of such devices have been developed through which a person can take to several persons at a time. Not only this, they can video chat, i.e. they can see each other while talking. Thus, conference calls, video conferencing, voice mail etc. have become an integral part of the secretariat of an organization. These facilities not only enhance the efficiency of the office persons, but also give fillip to business transactions. In view of this, it is imperative to be familiar with these modern devices and know the nuances involved therein. In this unit, you will read about these techniques in detail.

VIDEO CONFERENCING :

A videoconference is a form of telecommunication which simultaneously allows two or more locations to interact via two-way audiovisual transmissions. It helps people sitting at different sites to come together for a meeting. This meeting may be between two people, each in his/her private office, or it may involve several sites with more than one person in large rooms at different sites. These sites may be anywhere in the

world. It helps share not just ideas in a discussion, but also documents, and information displayed on the computer or on a whiteboard.

The Need for Planning

Some amount of planning needs to be done for a video conference, though there is nothing really complicated about it, and it would generally take the same amount of time as it would for a face-to-face meeting or a telephone conversation. Some key things to note are given below:

Make a note of the number of people and locations participating in the video conference.

Make an agenda to circulate among all participants before the meeting. Mail this to all other sites too.

See that lighting is appropriate. Diffused lighting is preferred so that light is evenly distributed and shadows are minimized. Draw drapes or blinds to cover windows.

Ensure that chair placements are such that all participants are visible in the camera's field of view. A U or V shaped arrangement, facing the camera, is usually the most suitable.

It is advisable for participants to wear neutral colours as bright colours and complex patterns can be distracting.

Call each location 15-19 minutes prior to the scheduled start time to make sure you are all connected.

Do a test call before the meeting to ensure that lighting, chair placements and microphone placements are all optimal.

See that all participants are seated before the session begins to avoid going in and out during the call.

During the Call

The planning is all done, but for the video conference to go off smoothly, there are a few precautions to be kept in mind during the talk.

While in a video conference, as in any meeting, avoid side talking, walking in and out of the room, typing, or doing any other work that distracts or causes sound disturbance.

If more than two sites are participating, it is advisable that sites that are not talking mute their microphones so as to minimize disruption due to noise.

Remember that there is a short time delay in video conferencing. This is why it is important to leave a longer pause between two speakers than in

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• Introduction of E-commerce

The term e-commerce was coined back in the 1960s, with the rise of electronic commerce – the buying and selling of goods through the transmission of data – which was made possible by the introduction of the electronic data interchange. Fast forward fifty years and e-commerce has changed the way in which society sells goods and services.

E-commerce has become one of the most popular methods of making money online and an attractive opportunity for investors. For those interested in buying an e-commerce business, this article serves to provide an introduction to e-commerce, covering the reasons for its popularity, the main distribution models and a comparison of the major e-commerce platforms available.

Why Do People Buy 'Online'?

Lower Prices: Managing an online storefront is far cheaper than an offline, brick and mortar store. Typically less staff are required to manage an online shop as web-based management systems enable owners to automate inventory management and warehousing is not necessarily required (as we discuss later). As such, e-commerce business owners can afford to pass operational cost savings on to consumers (in

the form of product or service discounts) whilst protecting their overall margin. Furthermore, with the rise of price comparison websites, consumers have more transparency with regard to prices and are able to shop around, typically purchasing from online outlets instead.

Accessibility and Convenience: Unlike many offline stores, consumers can access e-commerce websites 24 hours a day. Customers can read about services, browse products and place orders whenever they wish. In that sense, online shopping is extremely convenient and gives the consumer more control. Furthermore, those living in more remote areas are able to order from their home at a touch of a button, saving them time travelling to a shopping centre.

Wider Choice: For the past twenty years, the growth of online shopping has to a large extent been based around increased choice. With an almost endless choice of brands and products to choose from, consumers are **not limited by the availability of specific products in their local town, city or country. Items can be sourced and shipped globally.** Interestingly, one recent study found that consumers are actually starting to become frustrated by e-commerce sites that offer too much choice. Whichever way you look at it though, more choice has likely been a good thing over the long term.

Naturally e-commerce has **significant benefits for the consumer**, but it has also been useful for businesses too. Next, we look at some of the reasons **why businesses have been quick to race into the space**.

Why Do Businesses Sell 'Online'?

Higher Margins: Setup costs and ongoing operational costs such as rent, heating, electricity, warehousing (if operating a drop-ship model) and inventory management are often significantly reduced or otherwise eliminated. Further, customer service and other administrative tasks can be automated or outsourced at a relatively low-cost. As such, **higher margins can usually be achieved when selling via an online store compared to operating an offline business**.

Scalability: With a brick and mortar business, the owner is often limited by the amount of people who can physically be in the store at any one time. There is **no limit when trading online**. Running an e-commerce business means **tapping into a truly global market**. Furthermore, online platforms enable rapid scaling. With the emergence of **social media and content marketing** as well as the option of generating traffic and conversions through **pay-per-click (PPC)**, expanding into new regions or markets can happen quickly. A great example of this in practice is **Choxi**, a business that experienced 1,023% growth in revenue in just one year.

Consumer Insight / Technology: E-commerce businesses typically collate a tremendous amount of customer data. With every element of consumer behavior being tracked, e-commerce business owners are able to understand, tweak and improve the customer shopping experience for customers – making data-led decisions to increase conversion rates and sales. With technology rapidly evolving, it is important that online retailers use tools such as Google Analytics correctly to understand their customers' buying habits, unlocking insight from this data presents a unique advantage, not available to offline stores. Those who leverage the right systems and technology can see their businesses grow extremely quickly.

Having understood the benefits of running an e-commerce business, it's time to turn attention towards the **different types of e-commerce businesses available.**

Overview of E-Commerce Fulfilment Models -

There are **three main fulfillment models** associated with e-commerce that dictate the role of the retailer as well as the way in which a product is stored and distributed to the end-user. These models have a **significant impact on the operational characteristics of the business** and its day-to-day running as well as the overall operating margin.

The three main models are: -

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Dropshipping Model

In a dropshipping model, the e-commerce business takes **no physical possession of the items on sale**. The store owner does not keep products in stock and there is no inventory held. Instead, orders are **sent directly to the manufacturer**, who is responsible for storing the items and shipping them to the customer. In this sense, the merchant never sees or touches the products, which has some unique advantages over adopting a more traditional order fulfilment model.

Traditional Order Fulfilment Model

Buying wholesale is arguably closest to the traditional offline retail model. In effect, the business owner (retailer) **acquires stock directly from a wholesaler** at a discounted rate, applies a margin onto each product and decides to deliver to consumers directly.

Benefits of Dropshipping vs. Traditional Order Fulfilment:

Eliminates Inventory Risk: One of the biggest drawbacks of running an offline retail business or a non-dropship e-commerce business is the fact that generally speaking inventory has to be acquired upfront. Naturally, buying stock costs money and with **no 100% guarantee of being able to sell it**, there is an inherent risk to the business owner. Drop-shipping however, **does not generally require any upfront investment** in inventory.

Less Time / Lower Ongoing Costs: Shipping products requires a certain amount of owner and staff time. **Time will be required to not only**

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order stock but manage it, ensuring optimal stock control at all times to avoid turning away orders, all of which can be avoided with a dropshipping model. Instead, the owner can be free to use this time to manage the overall strategy of the business and to ensure sales objectives are being met.

***Product Flexibility:** If dropshipping, as a retailer, you have the flexibility to try out new product lines in your online store and sales channels which enables business owners to 'go to market' more quickly - an attractive proposition*

नोट - प्रिय पाठकों , यह अध्याय अभी यहीं समाप्त नहीं हुआ है यह एक सैंपल मात्र है / इसमें अभी और भी काफी कंटेंट पढ़ना बाकी है जो आपको राजस्थान कंप्यूटर अनुदेशक (शिक्षक) के इन कम्पलीट नोट्स में पढ़ने को मिलेगा / यदि आपको हमारे नोट्स के सैंपल अच्छे लगे हों तो कम्पलीट नोट्स खरीदने के लिए हमारे संपर्क नंबर पर कॉल करें , हमें पूर्ण विश्वास है कि ये नोट्स आपकी राजस्थान कंप्यूटर अनुदेशक (शिक्षक) की परीक्षा में पूर्ण संभव मदद करेंगे , धन्यवाद /

संपर्क करें - 8233195718, 9694804063, 8504091672

[प्रिय दोस्तों, अब तक हमारे नोट्स में से अन्य परीक्षाओं में आये हुए प्रश्नों के परिणाम -](#)

EXAM (परीक्षा)	DATE	हमारे नोट्स में से आये हुए प्रश्न	कट ऑफ
RAS PRE. 2021	27 अक्टूबर	74 (98 MARKS)	64 (84.9 M.)
राजस्थान S.I. 2021	13 सितम्बर	113 of 200	117
राजस्थान S.I. 2021	14 सितम्बर	119 of 200	117
राजस्थान S.I. 2021	15 सितम्बर	126 of 200	117
RAJASTHAN PATWARI 2021	23 अक्टूबर (1st शिफ्ट)	79 of 150	Not declared yet
RAJASTHAN PATWARI 2021	23 अक्टूबर (2 nd शिफ्ट)	103 of 150	
RAJASTHAN PATWARI 2021	24 अक्टूबर (1st शिफ्ट)	95 of 150	
RAJASTHAN PATWARI 2021	24 अक्टूबर (2 nd शिफ्ट)	91 of 150	
RAJASTHAN VDO 2021	27 दिसंबर (1 st शिफ्ट)	59 of 100	
RAJASTHAN VDO 2021	27 दिसंबर (2 nd शिफ्ट)	61 of 100	

RAJASTHAN VDO 2021	28 दिसंबर (1 st शिफ्ट)	56 of 100	
RAJASTHAN VDO 2021	28 दिसंबर (2 nd शिफ्ट)	57 of 100	
U.P. SI 2021	14 नवम्बर 2021 1 st शिफ्ट	91 of 160	
U.P. SI 2021	21 नवम्बर 2021 1 st शिफ्ट	89 of 160	

अन्य परीक्षाओं में भी इसी तरह प्रश्न आये हैं Proof देखने के लिए हमारे youtube चैनल (Infusion Notes) पर इसकी वीडियो देखें या हमारे नंबरों पर कॉल करें।

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