

Name: _____ Class: X-___ School: Azamgarh Public School

Unit 1: NETWORKING

(worth 5 marks)

PART I: INTERNET

- Internet:** is the global system of interconnected computer networks to link devices worldwide. Vint Cerf is regarded as the father of Internet.
- World Wide Web (W3/ Web):** is the graphical part of internet, where documents and other web resources are identified by URL, and are interlinked by hypertext. Tim Berners Lee is regarded as the father of World Wide Web.



Figure 1 Client & Server in a network

- Web Servers (Server):** is server software, or hardware used to provide information based on the request made by World Wide Web clients. The server hardware runs on a server software.
- Web Clients:** is a computer hardware or software that access information offered by a server by sending request. The client software runs on the user's machine.
- Web Site:** is a collection of web resources such as web pages and multimedia content with a common URL address.
- Web Pages:** is a digital page in a website that displays its multimedia content to the user through a browser.
- Home page:** is the first web page when a website is opened. It has links to other webpages of the same and/or different site.

8. **Web Browsers:** is a software to surf or browse websites. Examples are Google Chrome, UC Browser, Mozilla Firefox, Dolphin, Apple Safari etc.
9. **Blog (Weblog):** is a website written in style of an online journal or diary where entries are posted by an individual (blogger) so that anyone can read and share them. Example of a blog is marcandangel.com. Popular blog creating websites are wix.com, wordpress.com, blogger.com etc.
10. **Newsgroups:** is an online discussion forum on a specific topic where users from around the world can create, post to, read from, comment on and reply to topics of similar interests easily. Examples are rcgroups.com, diy-forums.com
11. **HTML:** stands for Hyper Text Markup Language. It is a computer language used to create webpages with embedded multimedia contents.
12. **Web Address (URL/ Domain name):** is the unique identification of all web resource, which identifies where it is located on a computer network.

a. **URL:** stands for Uniform Resource Locator. (Same definition as for web address)

b. **Parts Of URL:**

https://	www.	mck.	edu.	au	/subjects/IPT
Protocol	Informs that the resource is a webpage	Domain name	Top Level Domain	Geographical TLD	File Path/ Directory

TLD	.com	.org	.net	.edu	.gov	.mil
Entity	Commercial	Organization	Network	Education	Government	Military

Geo TLD	.in	.us	.uk	.ca	.au	.de
Country	India	United States	United Kingdom	Canada	Australia	Germany

- c. **IP Address:** is unique identification for computers to locate them on a network. It has four set of numbers separated by periods. For example, 192.0.2.1. It changes whenever a computer is connected to different network.
- d. **Domain Name Server (DNS)** is a directory on internet in which all the domain names are linked to a particular IP Address.
- e. **E-Mail Address** is a unique identification of email inbox to which email messages are delivered. Every email address has two main parts: a username and domain name, separated by '@'. Example, info@apsazamgarh.org where 'info' is the username and 'apsazamgarh.org' is the domain name.

13. Downloading And Uploading

- a. **Downloading** is the copying of data from server to client over internet.
- b. **Uploading** is the copying of data from client to server over internet.

14. Internet Protocols:

- a. **Protocol:** is a set of rules followed by devices to communicate with each other in a network. Multiple protocols work together to ensure that data is communicated between devices in a network. Examples include HTTP for browsing, FTP for file transfer, SMTP for email, Telnet for virtual terminals etc.

b. **Introduction to OSI model:**

It stands for Open Systems Interconnection model. It is an architecture used to standardize communication between devices in a network.

It has seven layers

- i) **The Application Layer:** uses protocols such as HTTP(S) on client side applications like browser.
- ii) **Presentation Layer:** mainly converts the data into machine understandable binary code.
- iii) **Session Layer:** helps establish, maintain and close network connection.
- iv) **Transport Layer:** uses protocol such as TCP to divide the data into small parts called segments.
- v) **Network Layer:**
 - uses protocol such as IP to assign source and destination IP address to these segments.
 - Segments are attached with IP address of source & destination computers, now becomes packets.
 - Packets now know where to go, not who to go to.
- vi) **Data Link Layer:**
 - MAC address of sender and receiver is added to packets, now becomes Frame.
 - MAC address is an identification number written in each LAN card (a hardware used inside CPU for networking)
 - Frames now know who to go to.
- vii) **Physical Layer:**
 - It receives the signal at receiver's end and passes on.

c. **SMTP vs POP3:**

Simple Mail Transfer Protocol (SMTP) is a set of communication rules which allow programs to send mail over the internet. It works in the Application layer of OSI model.

Post Office Protocol 3 (POP3) is a set of communication rules which allow programs to retrieve mail over the internet. Here, the mails previously received by the mail server are later downloaded on the client's account. Since the mail server and client account are not synced,

any changes made on the client side is not shown on the mail server. It works in the Application layer of OSI model.

- d. HTTP, HTTPS, Remote login and file transfer protocols (TELNET, SSH, FTP, SFTP, SCP, TCP/IP)
- i. Hyper Text Transfer Protocol (HTTP): is a protocol used for communication between web clients and servers. It works in the Application layer of OSI model.
 - ii. Hyper Text Transfer Protocol Secure (HTTPS): is a protocol for securing communication between devices in a network. It works in the Application layer of OSI model.
 - iii. Remote login protocols: are protocols that was designed to access remote computers over a network. Examples are TELNET, SSH.
 - Terminal Network (TELNET): is a remote login protocol to access remote computers over a network. The data transmitted is not encrypted and thus prone to eavesdropping. It works in The Application layer of OSI model.
 - Secure Shell (SSH): is also a remote login protocol to securely access remote computers over a network by using a public key encryption. Thus even if the data is leaked, it remains safe due to encryption. It works in the Application layer of OSI model.
 - iv. File Transfer Protocols: are protocols used for the transfer of computer files between a client and server on a computer network. Examples are FTP, SFTP, SCP.
 - File Transfer Protocol (FTP): It is a protocol used for the transfer of computer files between a client and server on a computer network. It works in the Application layer of OSI model. It allows user to see and modify all the files on the server. It is very fast.
 - Secure File Transfer Protocol (SFTP): is a secure version of File Transfer Protocol, which allows file transfer over a Secure Shell (SSH) data stream. It works in the Application layer of OSI model. It also allows user to see and modify all the files on the server. It is relatively fast.
 - Secure Copy Protocol (SCP) is a protocol which uses Secure Shell and allows secure file transfers between devices in a network. It works in the Application layer of OSI model. It doesn't allow user to see and modify files on the server. It is relatively slow.

v. **Internet Protocol Suite (TCP/ IP):** is a set of protocols used in networks for communication between devices. It is commonly known as TCP/IP because the foundational protocols in the suite are the **Transmission Control Protocol (TCP)** and the **Internet Protocol (IP)**.

- **Transmission Control Protocol (TCP):** is a protocol which allows to transport segments of data between computers over the internet. It works in the Transport layer of OSI model.
- **Internet Protocol (IP):** is a protocol which allows to transport packets of data between computers over the internet using their IP addresses. It works in the Network layer of OSI model.

1. **Internet Services:** are services which are offered through internet to the users quickly and easily. Examples include E-commerce, E-governance, communication services, cloud computing etc.

Few examples of websites/ apps providing these services are:

- a. E-commerce sites:
 - i. www.amazon.com
 - ii. www.flipkart.com

- b. E-governance sites:
 - i. india.gov.in
 - ii. indiapost.gov.in
 - iii. passportindia.gov.in

- c. Communication applications
 - i. Skype
 - ii. WhatsApp

- d. Cloud computing service
 - i. www.tatacommunications.com
 - ii. www.cloud4c.com

Advantages of internet services are: (sscrgtwal)

- i. It helps to easily share data.
 - ii. It helps to scale up operations.
 - iii. It helps in quick communication.
 - iv. It makes process more transparent.
 - v. It helps in easy mapping through GPS.
 - vi. It helps in real-time monitoring of events.
 - vii. It helps to work from anywhere around the world due to easy access to data.
 - viii. It makes authorities more accountable regarding their actions. It helps in extending services like banking, healthcare etc. to customers easily.
 - ix. It provides vast resource for learning through e-learning platforms such as khanacademy.org
2. **Information Retrieval:** is the activity of obtaining necessary information from a collection of web resources. It is done usually by searching the required information (query) in a Search Engine.

Some information regarding search engine is as follows:

- a) **Search Engine** is a program which provides relevant information by searching the World Wide Web. It works on browser connected to internet.

- b) **Keywords** are the words in the query which a user types in the search box of search engine to search for information.

- c) **Query** is the combination of keywords which a user types in the search box of search engine to search for information.
- d) **Working of a Search Engine:**
At the very basic, when a user searches for information, the search engine matches the keywords in query with data in the indexed (arranged in sequence) webpages and then shows the most suitable of them in the search result. The webpages are indexed when programs from search engine called spiders/crawlers/bots crawl (visit) web pages available on W3.

Locating Sites Using Search Engines:

To search web sites, a user can search part of the domain name or other site specific data on search engines like Google (from Google), Bing (from Microsoft) or Yahoo (from Yahoo).

***add working of search engine to this portion if the topic comes for 3 or more marks.*

3. Finding People On The Net

They can be found on internet using social networking sites like facebook.com, linkedin.com; dedicated websites such as peekyou.com; or by using search engine like Google. A user has to first search for the information specific to the person to be found. Based on that, the search result is shown optimally.

1. **Web Services:** has a different definition. For the purpose here, refer to internet services above. Note that advantages for these services can be taken from that in internet services, whereas disadvantages can be thought of by just looking at the downside of the advantages.
2. **Chat or Online chat** refers to communication over the Internet that allows a real-time transmission of multimedia messages from sender to receiver. It involves an application (app) which uses internet to relay messages. It may be a text chat, audio chat or video chat. It may be used for point-to-point communication or group chat. Popular chat applications are Skype, WhatsApp, Facebook Messenger, Google Hangouts etc.
3. **Electronic mail (E-mail):** is a method of exchanging messages/ mail between people using electronic devices using internet. It was invented by Ray Tomlinson.

It has following fields:

- a. **To:** is used to write the email id of the recipient.
 - b. **Cc (Carbon Copy):** is used to send copy of the mail to the email id mentioned. If a mail is sent with multiple email ids mentioned in Cc field, people with respective email ids can see that who else has received copies of this mail.
 - c. **Bcc (Blind Carbon Copy):** is used to secretly send copy of the mail to the email id mentioned. If a mail is sent with multiple email ids mentioned in Bcc field, people with respective email ids cannot see that who else has received copies of this mail.
 - d. **Subject:** is used to write the title of the mail. It is visible to the recipient even before opening the mail.
 - e. **Body:** is used to write the main body of the message. Here, if any multimedia files such as images, videos etc. and other documents are sent along with the mail, they are called as attachment.
4. **Video Conferencing:** is a method in which a conference between two or more participants at different location is conducted. It is done by using computer, fast internet connection, and web camera to transmit audio and video data. Various apps such as Skype, IMO, WhatsApp etc. can be used for this purpose.
 5. **E-Banking (Internet Banking/ Online Banking):** is an online service that provides the facility to the customer to make banking transactions from his/her net banking account. It enables paperless bill paying, record keeping and money transfers between accounts. User can either visit the bank's website or use its mobile app, then using the login credentials, he/she can log into the account and use the service.

6. **E-Shopping (Electronic Shopping/ Online Shopping):** is a form of e-commerce which allows consumers to buy goods or services from a seller over the internet. The payment is often made through e-banking. It enables customer to search for and buy a good rated product/service from a large variety at less price.
7. **E-Commerce (Electronic Commerce):** is an online service which involves range of activities such as creating a product, showcasing it online with exact information, and processing its sale. E-commerce is much larger than e-shopping.
***Note that if only e-commerce is asked for 3 marks or more, after writing its definition, write under it definition of e-shopping as well.*
8. **E-Reservation (Electronic Reservation/ E-booking):** is an online service using which one can check for availability of seats in a bus, train, aircraft, and rooms in hotels etc. and later book them in advance. For example, one may use Indian railways' official website www.irctc.co.in or IRCTC Rail Connect app for e-reservation in trains.
It uses Global Distribution System (GDS) to facilitate the process.
9. **E-Governance:** is an online service wherein government interacts with and offers services to citizens, businesses, interest groups and other governmental departments by making use of Information and Communication Technology. It results in faster communication, better integration of data and services, quick feedback, live monitoring of process, and more accountable as well as responsible governance. It makes use of mobile apps (mParivahan, UMANG, BHIM, Online RTI etc.) and governmental websites (indiapost.gov.in, india.gov.in, passportindia.gov.in)
10. **E-Groups (Newsgroup/ E-community/ E-club):** is an online discussion forum on topics of similar interest where users from around the world can create, post to, read from, comment on and reply to such topics. It is also the primary feature in all the social networking sites. Examples are rcgroups.com, diy-forums.com
11. **Social Networking:** is a method in which dedicated websites and apps are used by a user to interact with other users. It is also used to find people with similar interests, promote business and events, spread news etc. Few popular social networking sites include facebook.com, twitter.com, instagram.com etc. Twitter is the only site in which users can post short entries called tweets with a maximum of 140 characters. This facility at Twitter is known as microblogging.

1. **Short Message Service (SMS):** is a ***communication service*** in which we can send message of ***up to 160 characters*** to another device ***in a single SMS***. It uses ***SMPP protocol***.
2. **Multimedia Messaging Service (MMS):** is a ***communication service*** in which we can send a ***multimedia message*** including pictures, video or audio content to another device ***using an internet connection***. It makes use of ***WAP protocol***.
3. **Third Generation (3G):** is a ***communication standard*** introduced in 2001 which allows mobile phones, computers, and other portable electronic devices to ***access the internet wirelessly***. It has ***0.2 Mbps to 3.1 Mbps*** data transfer rate.
4. **Fourth Generation (4G):** is a ***communication standard*** introduced in 2009 with a data transfer rate of ***100 Mbps***. It enabled ***smooth functioning*** of various multimedia services such as online gaming, mobile television, VoIP telephony etc.