CHAPTER 5

FUNDAMENTALS OF THE INTERNET

Q1. **Discuss Internet History and Working of Internet.**

INTERNET:

- The Internet was brought online in 1969 by ARPANET.
- ARPANET was the new name of ARPA (Advanced Research Projects Agency).
- ARPA initially connected four major computers at universities and defense organizations.
- The Internet was designed to made communication possible in the days of war (nuclear attack).
- If the most direct route was not available, routers would direct traffic around the network via alternate routes.
- Almost at the same time another research organization, National Science Foundation, joined the ARPA project.
- NSF established their own network to connect five supercomputing centers.
- These centers were available to all researchers for academic purpose.
- To provide high speed access to their supercomputers, NSF established a separate high speed network called NSFnet.
- During this era some other networks were also established in different universities. All these networks were joined and referred to as the Internet.

WORKING OF INTERNET

- Internet is a network of networks.
- A lot of interconnected networks made internet.
- The network allows users to share information with each other.
- A person at home can connect his computer to the internet using phone line modem, **DSL** or cable modem. He connects his computer to an **ISP** (Internet Service Provider).

- A person at office or in college laboratory will connect his computer to the local network to get the internet access.
- This local network then connects to an **ISP** (Internet Service Provider) using a high-speed phone line like a **T1** line.
- A **T1** line can carry **1.5 million** bits and a normal phone line can carry **30000** to **50000** bits per second.
- ISP then connects to larger ISP's and these largest ISP's are connected through fiber-optic backbones.
- Backbones around the world are connected through submarine cable system, or satellite links.
- In this way all the computers on the internet are connected.

Q2.   Discuss Internet Addressing Schemes.

ADDRESSING SCHEMES

- In real life when we want to send a letter to our friend, we must know his address which is unique. Otherwise we can't send him a letter.
- Similarly on the internet every computer has a unique address. Using this address that computer can be contacted.
- There are two types of addressing schemes used on the internet.

IP ADDRESSING

- It is a numeric address of a computer on the network.
- IP stands for **Internet Protocol**.
- Each computer connected to the Internet must have a unique address.
- Internet addresses are in the form nnn.nnn.nnn.nnn where nnn must be a number from 0 - 255. This address is known as an **IP** address.
- The picture below illustrates two computers connected to the Internet; your computer with IP address 1.2.3.4 and another computer with IP address 5.6.7.8. The Internet is represented as an abstract object in-between. (As this paper progresses, the Internet portion of Diagram 1 will be explained and redrawn several times as the details of the Internet are exposed.)

Your Computer 1.2.3.4   Internet   Another Computer 5.6.7.8
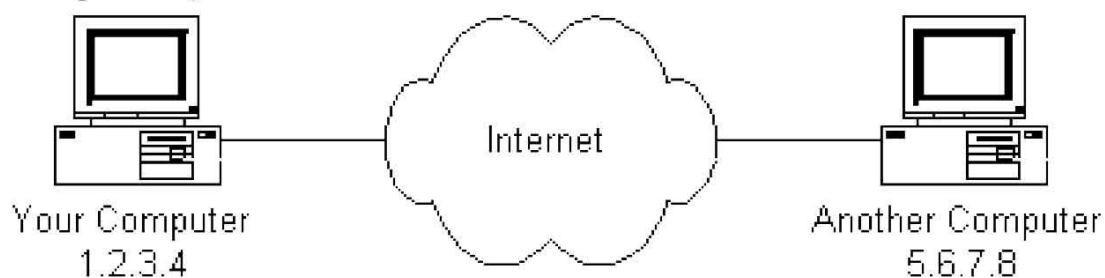
- If you connect to the Internet through an **Internet Service Provider (ISP)**, you are usually assigned a temporary IP address for the duration of your dial-in session.

- If you connect to the Internet from a local area network (LAN) your computer might have a permanent IP address or it might obtain a temporary one from a **DHCP Server.**
- DHCP stands for Dynamic Host Configuration Protocol.
- In any case, if you are connected to the Internet, your computer has a unique IP address.
- As internet's machines are concerned, you need an IP address to talk to a server. For example in your browser, you can type the URL http://243.24.54.121 and arrive at the machine that contains the web server for the specified IP-Address.

DNS ADDRESSING

- It is a human readable name of a computer on a network.
- It is difficult to remember the addresses in the form of strings of numbers.
- These numeric addresses are need to be changed, for this purpose all internet servers also have human readable names called domain names e.g. **www.yahoo.com** is a name in human readable form. It is easier to remember IP address in this form.
- The name **www.yahoo.com** has two parts, a host name and domain.
- These domain names are called top level domain. Following is the list of few top level domain types.

Domain	Type of Institution
.com	Commercial
.gov	Government organizations
.edu	Educational institutions
.org	Other organizations
.pk	Domains from Pakistan
.biz	Commercial institutions (New)
.info	Unrestricted use (New)
.net	Commercial institution (addition to .com)

Q3.   What is Web Browsing? Discuss different terminologies of Internet.

WEB BROWSING

- The software to use internet is called browser and the searching information on the World Wide Web is called Web Browsing.
- For this purpose software called web browser or web client is used.
- Millions of web pages are available on the World Wide Web having information on every topic.
- Here we are discussing some important terminologies about World Wide Web.

WORLD WIDE WEB (WWW)

- The World Wide Web is a system of interlinked, hypertext documents accessed via the Internet.

- With a web browser, a user views web pages that may contain text, images, and other multimedia and navigates between them using hyperlinks.

- The World Wide Web was created in 1989 by the Englishman Sir Tim Berners-Lee and the Belgian Robert Cailliau working at CERN (Particle Physics Laboratory) in Geneva, Switzerland.

- The www uses http (hypertext transfer protocol) to link hypertext documents on the World Wide Web.

- A **web page** is a document written in HTML (Hyper Text Markup Language).

- The language allows embedding hyperlinks in the documents.

- A hypertext document is also called web page.

- Collection of related web pages is called **web site**.

- Web sites are hosted on web severs. The process of launching web page is called **publishing the page**.

URL (UNIFORM RESOURCE LOCATOR)

- Complete address of a web site is called URL or "web address". It is always unique for a web page e.g. **http://www.yahoo.com/weather/lahore/weather.html**

- A URL is made up of several parts. The **first part** is the protocol, which tells the web browser what sort of server it will be talking to in order to fetch the URL. In this example, the protocol is http.

- The **second part** of the example URL above is the **fully qualified domain** name of the web site to connect to. In this case, the fully qualified domain name is **www.yahoo.com**. This name identifies the web site containing the page. The term "fully qualified domain name" refers to a complete web site or other computer's name on the Internet. The term **"domain name"** usually refers only to the last part of the name, in this case yahoo.com, which has been registered for that particular company's exclusive use.

- The **third part** of the example URL is the path at which this particular web page is located on the web server. In this case, the path is **/weather/lahore/weather.html**. Similar to a filename, a path usually indicates where the web page is located within the web space of the web site; in this case it is located in the **lahore** sub-folder of the **weather** folder, which is located in the top-level web page directory of our web site.

Q4.   What are Search Engines?

SEARCH ENGINE

- A search engine is a website used to search information on the internet.

- They are useful because otherwise you would have to know the address of the site you are going to, or keep going from one web page to the next till you find it which would take a pretty long time.

- Search engines maintain a list of billions of web pages containing information on variety of topics.

- Search engines ask you to enter some key words about the data or information you want to search on the Internet.

- On the basis of your provided information search engine find the list of web pages, and finally display the links of the required web pages containing that information.

Q5.   What is Email? Discuss different techniques and Limitation of Email; also discuss email address.

EMAIL

- Email is shorthand term meaning Electronic Mail.
- Email is like a letter, but exchanged in a different way.
- Computers use the TCP/IP protocol suite to send email messages in the form of packets.
- Email takes a few seconds to go across the world.
- It leaves a written record.
- You can keep copies of email messages for your record.
- In order to send and receive e-mail, you will need an e-mail address.
- There are two different sources from which you might get an e-mail address:

Internet Service Provider

- If you are using an e-mail address from your ISP, you need a special program e.g. Microsoft Outlook.
- Once set-up, that program will remember your log-in and password and download your e-mail onto your computer.

A website on the internet that offers it. (Yahoo, G-mail, Hotmail)

- The "**web mail**" style of e-mail is accessed directly through the World Wide Web.
- Just open your web browser and go to the website that handles your e-mail. At that point, you will need to enter your log in and password.
- All the e-mail you receive is kept on your e-mail provider's website rather than sent to your computer.

- A powerful feature of email is attachment. An e-mail **attachment** is a computer file which is sent along with an e-mail message. Attached files are sent as part of the message to which it is attached.
- You can attach word processing document, spreadsheet programs, images even audio message to your email message.
- Attached messages are sent in **MIME (Multipurpose Internet Mail Extension)** format.
- In MIME, the standard Internet e-mail format, messages and their attachments are sent as a single multipart message.
- Yahoo allows a file of size of 10MB to be attached. This limit varies for paid accounts.

LIMITATIONS ON EMAIL

Privacy:

- When we communicate through internet, a lot of intermediary systems are involved.
- There is a great chance of interception of email messages.
- Many systems have the protection to stop users from reading other's email but it is still possible for a system administrator to read the email of someone.

Text only Emails:

- There is a facility to send images with email but not necessarily all the recipients of mail are able to view those pictures.
- It is subject to the availability of the program on their computer to display pictures.

Forged Emails:

- This is not common but it is possible to forge the address of the sender.
- You may need to take steps to confirm the source of some important emails you receive.

No Emotions:

- Through emails recipients are not able to view your facial expressions and hear your voice.
- You have to be very careful with humor or irony, since it is easy for someone to take your message the wrong way.

Unwanted Emails:

- You receive a lot of junk mails from different sources.
- These mails reach to your mailbox just like other emails. These junk mails are also called **spam**.

Unknown Emails:

- Using emails communication can be possible with unknown people.
- Some people misrepresent themselves. Because of text message of email it is possible for us to get an incorrect impression of the person sending us email.

EMAIL ADDRESS

- To send and receive email you need an email address.
- This address can be created on email server e.g. yahoo, hotmail and google.
- The general format of an email address is **username@DNS Address**
- For example, **abc@yahoo.com**. In this email address **abc** is the username and **yahoo.com** is DNS Address of the email server.

Q6.   What are Newsgroups?

NEWSGROUPS

- A discussion group on the Internet is called news group.
- Just as e-mail and the Web are two distinct services on the Internet, newsgroups are part of the "Usenet" (user network), which is another service, or facility, on the Internet.
- Newsgroups have nothing to do with the daily news; thus, the term is somewhat misleading.
- Newsgroups are organized into categories and subcategories, with the alt (alternative) category having the most diversity. Newsgroups were started in the late 1970s as a message board for UNIX and related technical issues. They continue to prosper alongside the Web.
- Newsgroups start by someone posting an initial query or comment.
- As others reply, the text forms a chain of related postings called a "**message thread.**"
- Newsgroups are similar to **blogs**, but usually have more questions and answers, whereas the blog is often used for general commentary.
- Newsreader software NNTP (Network News Transfer Protocol) client is used to "subscribe" to newsgroups and read and post messages.
- A newsreader, which may be a stand-alone application or part of an e-mail program or Web browser, offers many features such as searching for and automatically subscribing to newsgroups that match some criteria.