PRELUDE

INTERNET
- ✓ A worldwide network of computers that can be accessed via the TPL computer network. The Internet allows local computer users to find and use information resources on computers of other academic institutions, research institutes, private companies, government agencies and individuals.

FEATURES OF INTERNET
- ✓ Geographic Distribution
- ✓ Near Light Speed
- ✓ Universal Access
- ✓ The Digital Advantage
- ✓ Freedom Of Speech
- ✓ Ease Of Use
- ✓ Universal Access
- ✓ Search Capabilities
- ✓ Usenet/Newsgroups Features
- ✓ Group Communications
- ✓ IRC Features
- ✓ Distributed Real-Time Communications
- ✓ Emergency Assistance
- ✓ Virtual Space
- ✓ One-to-many communication.

INTERNET PROTOCOLS
- ✓ A protocol is the set of standard rules for data representation, signaling, authentication and error detection required to send information over a communications channel.
- ✓ Protocols for digital computer network communication have features intended to ensure reliable interchange of data over an imperfect communication channel.

TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL (TCP/IP)
- ✓ is the protocol used in the Internet.
- ✓ has to major components: TCP and IP
- ✓ The IP does the following works.
    - o Envelops and addresses the data
    - o Enables the network to read the envelope and forward the data to its destination.
    - o Defines how much data can fit in a single envelope (a packet)
- ✓ The TCP does the following works.
    - o Breaks data up into packets that the network can handle efficiently
    - o Verifies whether all the packets have arrived at their destination
    - o "Reassembles" the data

- ✓ The IP protocol deals only with packets whereas TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

FILE TRANSFER PROTOCOL (FTP)

- ✓ File Transfer Protocol (FTP) is a network protocol used to transfer data from one computer to another through a network such as the Internet.
- ✓ used for exchanging and manipulating files over a TCP computer network. An FTP client may connect to an FTP server to manipulate files on that server.
- ✓ Works on the client/server principal.
- ✓ FTP sites are typically used for uploading and downloading files to a central server computer, for the sake of file distribution.
- ✓ In order to download and upload files to an FTP site, we need to connect using special FTP software. Files can be transferred and stored on computers called FTP servers. To access these files, an FTP client program is used.
- ✓ Files on FTP servers are often compressed which deceases the size and enables more files to be stored on the server. It also makes file transfer time shorter.

HYPERTEXT TRANSFER PROTOCOL (HTTP)

- ✓ set of rules that governs the transfer of hypertext between two or more computers.
- ✓ The information of WWW is available through HTTP
- ✓ HTTP is a request/response standard between a client and a server. A client is the end-user; the server is the web site.
- ✓ HTTP is based on the client server principal. HTTP allows client to establish a connection with the server and make a request. The server accepts the connection initiated by the client and sends back a response. An HTTP request identifies the resource that the client is interested in and tells the server what action to take on the resource.
- ✓ The client making a HTTP request—using a web browser is referred to as the user agent. The responding server—which stores or creates resources such as HTML files and images—is called the origin server. In between the user agent and origin server may be several intermediaries, such as proxies, gateways, and tunnels. HTTP is not constrained to using TCP/IP and its supporting layers, although this is its most popular application on the Internet. Indeed HTTP can be "implemented on top of any other protocol on the Internet, or on other networks. HTTP only presumes a reliable transport; any protocol that provides such guarantees can be used."
- ✓ Typically, an HTTP client initiates a request. It establishes a Transmission Control Protocol (TCP) connection to a particular port on a host (port 80 by default). An HTTP server listening on that port waits for the client to send a request message. Upon receiving the request, the server sends back a status line, such as "HTTP/1.1 200 OK", and a message of its own, the body of which is perhaps the requested resource, an error message, or some other information.

TELNET

- ✓ Telnet is a protocol that enables one computer to connect to another computer and such control is referred to as remote login.
- ✓ The user's computer which initiates the connection is referred to as the local computer and the machine being connection to, which accepts the connection is referred to as the remote, host computer.
- ✓ Once connected, the user has full control over the remote host during the telnet session.

GOPHER

- ✓ is a protocol designed to search, retrieve and display documents from remote sites on the Internet.
- ✓ It is also possible to initiate online-connections with other systems via Gopher.
- ✓ Information accessible via Gopher is stored in Gopher servers. These servers do not just contain files, directories and searchable databases but also reference to other servers.
- ✓ To retrieve and search this information, one needs to run a Gopher client application like TurboGopher.
- ✓ Gopher was created as a piece of software to utilize some of the services that were becoming available on the Internet. It was designed to work with a variety of different Internet stand alone service.
- ✓ Gopher works on the following Internet tools and systems
  - o Search local WAIS (Wide Area Information Service) indices; query remote WAIS servers and funnel the results to Gopher clients
  - o Query remote FTP sites and funnel the results to Gopher clients.
  - o Be queried by WWW clients either using built in Gopher querying or using native HTTP querying.

WIDE AREA INFORMATION SERVICE (WAIS)

- ✓ is an internet search tool that is based on Z39.50 standard. This standard describes a protocol, for computer to computer information retrieval.
- ✓ A WAIS client program enables the user's computer to contact a WAIS server, submit a search query and receive a response to that query.
- ✓ WAIS has the capability of simultaneously searching in more than one database.

INTERNET ADDRESSING

- ✓ is the systematic way to identify people, computers and internet resources.
- ✓ An Internet Protocol (IP) address is a numerical identification (logical address) that is assigned to devices participating in a computer network utilizing the Internet Protocol for communication between its nodes. Although IP addresses are stored as binary numbers, they are usually displayed in human-readable notations, such as 208.77.188.166 (for IPv4), and 2001:db8:0:1234:0:567:1:1 (for IPv6).
- ✓ The role of the IP address has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."
- ✓ Consists of four sections separated by periods. Each section contains a number ranging from 0 to 255.
- ✓ IPv4 uses 32-bit (4-byte) addresses, which limits the address space to 4,294,967,296 (2^{32}) possible unique addresses where the address size was increased from 32 to 128 bits (16 bytes) in IPV6

172 . 16 . 254 . 1

10101100 . 00010000 . 11111110 . 00000001

Eight Bits = 1 byte

32 bits = 4 bytes
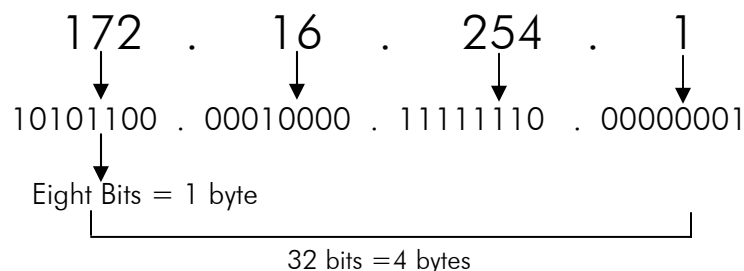
- ✓ The IP addresses have the following characteristics in common.
    - o IP addresses are unique
    - o No two machines can have the same IP number.
    - o IP addresses are also global and standardized.
    - o All machines connected to the Internet agree to use the same scheme for establishing an address.

DOMAIN NAME

- ✓ A domain name is a way to identify and lcoate computer connected to the internet. No two organizations have the same domain name.
- ✓ A domain name usually has two parts separated by periods called dot.
- ✓ E.g. Microsoft.com, intel.com
- ✓ The last portion of the domain name is the top level domain name which describes the type of the organization.
    - o Com – commercial entities
    - o Edu – education institutions
    - o Net – organization directly involved in Internet operations
    - o Org – organizations
    - o Gov- government entities
    - o Mil – military entites
    - o Country code- np for Nepal, uk- United Kingdom, Fr- France
- ✓ Each domain name corresponds to an IP address.
- ✓ The DNS server is responsible for translation of domain names to IP address.

ELECTRONIC MAIL

- ✓ Electronic mail is a method of creating, transmitting, or storing primarily text-based human communications with digital communications systems.
- ✓ Modern e-mail systems are based on a store-and-forward model in which e-mail computer server systems, accept, forward, or store messages on behalf of users, who only connect to the e-mail infrastructure with their personal computer or other network-enabled device for the duration of message transmission or retrieval to or from their designated server.

URL

- ✓ A Uniform Resource Locator specifies where an identified resource is available and the mechanism for retrieving it. In popular language, a URL is also referred to as a Web address.
- ✓ URL represents a standardized addressing scheme for Internet resources and helps the users to locate these resources by indicating exactly where they are.

WWW

- ✓ The World Wide Web begun in 1992 by MIT professor Tim Berners-Lee working at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland.
- ✓ He developed a programming language called HTML on which the web is based. Early web pages contained only text but due to rapid development in technology, the pages now contain pictures and multimedia elements as well.

- ✓ The World Wide Web (commonly abbreviated as "the Web") is a system of interlinked hypertext documents accessed via the Internet.
- ✓ WWW is the universe of information available via HTTP.
- ✓ With a Web browser, one can view Web pages that may contain text, images, videos, and other multimedia and navigate between them using hyperlinks.
- ✓ The WWW is used as a market place, art gallery, library, community center, school or whatever the authors create.
- ✓ The WWW and HTTP
    - o allow you to create "links" from one of information to another
    - o can incorporate references to sounds, graphics, movies, animations and simulations.
    - o Communicate with other Internet protocols such as FTP, Gopher and Telnet

WEB PAGES AND HTML

- ✓ A web page is single unit information often called a document that is available via the WWW.
- ✓ A web page is a resource of information that is suitable for the World Wide Web and can be accessed through a web browser. This information is usually in HTML format, and may provide navigation to other web pages via hypertext links.
- ✓ Web pages may be retrieved from a local computer or from a remote web server. The web server may restrict access only to a private network, e.g. a corporate intranet, or it may publish pages on the World Wide Web. Web pages are requested and served from web servers using Hypertext Transfer Protocol (HTTP).
- ✓ Web pages may consist of files of static text stored within the web server's file system (static web pages), or the web server may construct the (X)HTML for each web page when it is requested by a browser (dynamic web pages). Client-side scripting can make web pages more responsive to user input once in the client browser.
- ✓ HTML stands for hypertext Markup language which consists of standardized codes or tags that are used to define the structure of information on a web page. These codes enable web pages to have many features including bold text, italics, headings, lists, tables, forms and frames.

HTML TAGS

- ✓ HTML Tags is a set of Code to identify the different parts of a document so that a web browser will know how to display it.
- ✓ The HTML is enclosed within the angle brackets <>.
- ✓ HTML tags may be paired or unpaired.
    - o Paired tag : Tags with a closing tag [   ]
    - o Unpaired tag: tags without closing tag [
 <hr>]

WEB BROWSERS

- ✓ is an application software that acts as an interface between the user and the inner-workings of the WWW
- ✓ is a software application which enables a user to display and interact with text, images, videos, music, games and other information typically located on a Web page at a Web site on the World Wide Web or a local area network.

- ✓ Web browsers format HTML information for display, so the appearance of a Web page may differ between browsers.
- ✓ Web browsers are the most-commonly-used type of HTTP user agent. Although browsers are typically used to access the World Wide Web, they can also be used to access information provided by Web servers in private networks or content in file systems.
- ✓ E.g. Microsoft Internet Explorer, Mozilla Firefox, Netspace Navigator, Opera, Maxthon etc.

SEARCHING THE WEB

- ✓ The web is the information superhighway and finding information on the web can be done using two approaches: browsing through subject trees and hierarchies (web index) and keyword searching using the search engine.

WEB INDEX

- ✓ is designed to assist users in locating information on the WWW. Web indexes are also referred to as catalogs or directories.
- ✓ A web index collects and organizes resources available via the WWW.
- ✓ Indexes may be alphabetic or topic based moving from general to specific

SEARCH ENGINE

- ✓ is an interactive tool to help the user locate information avaliable via the WWW.
- ✓ is a tool designed to search for information on the WWW. Information may consist of web pages, images, information and other types of files. Some search engines also mine data available in newsbooks, databases, or open directories. Unlike Web directories, which are maintained by human editors, search engines operate algorithmically or are a mixture of algorithmic and human input.
- ✓ are the databases that contain thousands of resources and return the desired and possible results based on the query of the user.

INTERNET RELAY CHAT

- ✓ is a form of real-time Internet chat or synchronous conferencing.
- ✓ mainly designed for group communication in discussion forums called channels (virtual locations on IRC networks where users talk to one another), but also allows one-to-one communication via private message, as well as chat and data transfers via Direct Client-to-Client.
- ✓ IRC was created by Jarkko Oikarinen in Late August 1988.
- ✓ To take part in an IRC session, a client program is required.

ISP AND ITS FUNCTIONS

- ✓ ISP, also called Internet access provider or IAP is a company that offers its customers access to the Internet.
- ✓ connects to its customers using a data transmission technology appropriate for delivering Internet Protocol datagrams, such as dial-up, DSL, cable modem or dedicated high-speed interconnects.
- ✓ ISPs may provide Internet e-mail accounts to users which allow them to communicate with one another by sending and receiving electronic messages through their ISPs' servers.
- ✓ ISPs may provide other services such as remotely storing data files on behalf of their customers, as well as other services unique to each particular ISP.