1. Introduction to Internet

A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols. "the guide is also available on the Internet"

The Internet is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services.

# **History of Internet**

This marvelous tool has quite a history that holds its roots in the cold war scenario. A
need was realized to connect the top universities of the United States so that they can share all the research data without having too much of a time lag. This attempt was a result of **Advanced Research Projects Agency (ARPA)** which was formed at the end of 1950s just after the Russians had climbed the space era with the launch of Sputnik. After the ARPA got success in 1969, it didn‘t take the experts long to understand that how much potential can this interconnection tool have. In 1971 **Ray Tomlinson** made a system to send electronic mail. This was a big step in the making as this opened gateways for remote computer accessing i.e. telnet.

During all this time, rigorous paper work was being done in all the elite research
institutions. From giving every computer an address to setting out the rules, everything was
getting penned down. 1973 saw the preparations for the vital TCP/IP and Ethernet services. At the end of 1970s, Usenet groups had surfaced up. By the time the 80s had started, IBM came up with its PC based on Intel 8088 processor which was widely used by students and universities for it solved the purpose of easy computing. By 1982, the Defense Agencies made the TCP/IP compulsory and the term ―internet was coined. The domain name services arrived in the year 1984 which is also the time around which various internet based marked their debut. A worm, or a rust the computers, attacked in 1988 and disabled over 10% of the computer systems all over the world. While most of the researchers regarded it as an opportunity to enhance computing as it was still in its juvenile phase, quite a number of computer companies became interested in dissecting the cores of the malware which resulted to the formation **Computer Emergency Rescue Team (CERT)**. Soon after the world got over with the computer worm, **World Wide Web** came into existence. Discovered by **Tim** **Berners-Lee**, World Wide Web was seen as a service to connect documents in websites using hyperlinks.

# World Wide Web

The World Wide Web (abbreviated WWW or the Web) is an information space where
documents and other web resources are identified by **Uniform Resource Locators (URLs)**, interlinked by hypertext links, and can be accessed via the Internet. English scientist **Tim
Berners-Lee** invented the **World Wide Web in 1989**. He wrote the first web browser computer program in 1990 while employed at **CERN** in Switzerland. The Web browser was released outside CERN in 1991, first to other research institutions starting in January 1991 and to the general public on the Internet in August 1991.

The World Wide Web has been central to the development of the Information Age and is the primary tool billions of people use to interact on the Internet. Web pages are primarily text documents formatted and annotated with **Hypertext Markup Language (HTML)**. In addition to formatted text, web pages may contain images, video, audio, and software components that are rendered in the user's web browser as coherent pages of multimedia content.

Embedded hyperlinks permit users to navigate between web pages. Multiple web pages with a common theme, a common domain name, or both, make up a website. Website content can largely be provided by the publisher, or interactively where users contribute content or the content depends upon the users or their actions. Websites may be mostly informative, primarily for entertainment, or largely for commercial, governmental, or non-governmental organizational purposes.

WWW is another example of client/server computing. Each time a link is followed, the client is requesting a document (or graphic or sound file) from a server (also called a **Web server**) that's part of the World Wide Web that "serves" up the document. The server uses a protocol called **HTTP** or **Hyper Text Transport Protocol**. The standard for creating hypertext documents for the WWW is Hyper Text Markup Language or HTML. HTML essentially codes plain text documents so they can be viewed on the Web.

# Browsers

WWW Clients, or "Browser": The program you use to access the WWW is known as a browser because it "browses" the WWW and requests these hypertext documents. Browsers can be graphical, allows to see and hear the graphics and audio; text-only browsers (i.e., those with no sound or graphics capability) are also available. All of these programs understand http and other Internet protocols such as FTP, gopher, mail, and news, making the WWW a kind of "one stop shopping" for Internet users.

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| Year  | List of Web browsers |
| 1991  | World Wide Web (Nexus) |
| 1992  | Viola WWW, Erwise, MidasWWW, MacWWW (Samba) |
| 1993  | Mosaic, Cello,[2] Lynx 2.0, Arena, AMosaic 1.0 |
| 1994  | IBM WebExplorer, Netscape Navigator, SlipKnot 1.0, MacWeb, IBrowse, Agora (Argo),Minuet |
| 1995  | Internet Explorer 1, Internet Explorer 2, Netscape Navigator 2.0, OmniWeb, UdiWWW,Grail |
| 1996  | Arachne 1.0, Internet Explorer 3.0, Netscape Navigator 3.0, Opera 2.0,PowerBrowser 1.5,[4] Cyberdog, Amaya 0.9,[5] AWeb, Voyager |
| 1997  | Internet Explorer 4.0, Netscape Navigator 4.0, Netscape Communicator 4.0, Opera3.0,[6] Amaya 1.0[5] |
| 1998  | iCab, Mozilla |
| 1999  | Amaya 2.0,[5] Mozilla M3, Internet Explorer 5.0 |
| 2000  | Konqueror, Netscape 6, Opera 4,[7] Opera 5,[8] K-Meleon 0.2, Amaya 3.0,[5] Amaya 4.0[5] |
| 2001  | Internet Explorer 6, Galeon 1.0, Opera 6,[9] Amaya 5.0[5] |
| 2002  | Netscape 7, Mozilla 1.0, Phoenix 0.1, Links 2.0, Amaya 6.0,[5] Amaya 7.0[5] |
| 2003  | Opera 7,[10] Apple Safari 1.0, Epiphany 1.0, Amaya 8.0[5] |
| 2004  | Firefox 1.0, Netscape Browser, OmniWeb 5.0 |
| 2005  | Opera 8,[11] Apple Safari 2.0, Netscape Browser 8.0, Epiphany 1.8, Amaya 9.0,[5] AOLExplorer 1.0, Maxthon 1.0,Shiira 1.0 |
| 2006  | Mozilla Firefox 2.0, Internet Explorer 7, Opera 9,[12], SeaMonkey 1.0, K-Meleon 1.0,Galeon 2.0, Camino 1.0, Avant11, iCab 3 |
| 2007  | Apple Safari 3.0, Maxthon 2.0, Netscape Navigator 9, NetSurf 1.0, Flock 1.0, Conkeror |
| 2008  | Google Chrome 1, Mozilla Firefox 3, Opera 9.5,[13], Apple Safari 3.1, Konqueror 4, Amaya10.0,[5] Flock 2, Amaya 11.0[5] |
| 2009  | Google Chrome 2–3, Mozilla Firefox 3.5, Internet Explorer 8, Opera 10,[14], Apple Safari 4,SeaMonkey 2, Camino 2,surf, Pale Moon 3.0[15] |
| 2010  | Google Chrome 4–8, Mozilla Firefox 3.6, Opera 10.50,[16], Opera 11, Apple Safari 5, KMeleon 1.5.4, |
| 2011  | Google Chrome 9–16, Mozilla Firefox 4-9, Internet Explorer 9, Opera 11.50, AppleSafari 5.1, Maxthon 3.0, SeaMonkey 2.1–2.6 |
| 2012  | Google Chrome 17–23, Mozilla Firefox 10–17, Internet Explorer 10, Opera 12, AppleSafari 6, Maxthon 4.0, SeaMonkey 2.7-2.14 |
| 2013  | Google Chrome 24–31, Mozilla Firefox 18–26, Internet Explorer 11, Opera 15–18, AppleSafari 7, SeaMonkey 2.15-2.23 |
| 2014  | Google Chrome 32–39, Mozilla Firefox 27–34, Opera 19–26, Apple Safari 8 |
| 2015  | Google Chrome 40–47, Microsoft Edge, Mozilla Firefox 35–43, Opera 27–34, Vivaldi |
| 2016  | Google Chrome 48–55, Mozilla Firefox 44–50, Microsoft Edge 14, Opera 35–42, AppleSafari 10, SeaMonkey 2.24–2.30, Pale Moon 26.0.0[17], Pale Moon 27.0.0[18] |
| 2017  | Google Chrome 56–60, Microsoft Edge 15, Mozilla Firefox 51–55.0.2, Opera 43–45, OperaNeon |

# Uniform Resource Locators, or URLs

A Uniform Resource Locator, or URL is the address of a document found on the WWW. Browser interprets the information in the URL in order to connect to the proper Internet server and to retrieve your desired document. Each time a click on a hyperlink in a WWW document instructs browser to find the URL that's embedded within the hyperlink.

The elements in a URL: **Protocol://server's address/filename**

Hypertext protocol: http://www.aucegypt.edu
File Transfer Protocol: ftp://ftp.dartmouth.edu
Telnet Protocol: telnet://pac.carl.org
News Protocol: news:alt.rock-n-roll.stones

What are Domains? Domains divide World Wide Web sites into categories based on the nature of their owner, and they form part of a site's address, or uniform resource locator (URL).
**Common top-level domains are:**

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| .com—commercial enterprises  | .mil—military site |
| org—organization site (non-profits,etc.) | int—organizations established byinternational treaty |
| .net—network  | .biz—commercial and personal |
| .edu—educational site (universities,schools, etc.) | .info—commercial and personal |
| .gov—government organizations  | .name—personal sites |

Additional three-letter, four-letter, and longer top-level domains are frequently added.
Each country linked to the Web has a two-letter top-level domain, for example .fr is France, .ie is Ireland.

# MIME (Multi-Purpose Internet Mail Extensions):

MIME is an extension of the original Internet e-mail protocol that lets people use the protocol to exchange different kinds of data files on the Internet: audio, video, images, application programs, and other kind s, as well as the ASCII text handled in the original protocol, the **Simple Mail Transport Protocol (SMTP)**. In 1991, Nathan Borenstein of Bellcore proposed to the IETF that SMTP be extended so that Internet (but mainly Web) clients and servers could recognize and handle other kinds of data than ASCII text. As a result, new file types were added to "mail" as a supported Internet Protocol file type.

# **Hypertext Transport Protocol:**

HTTP means HyperText Transfer Protocol. HTTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

For example, when you enter a URL in your browser, this actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page. The other main standard that controls how the World Wide Web works is HTML, which covers how Web pages are formatted and displayed.

HTTP is called a stateless protocol because each command is executed independently, without any knowledge of the commands that came before it. This is the main reason that it is difficult to implement Web sites that react intelligently to user input.

* HTTPS:

A similar abbreviation, HTTPS means Hyper Text Transfer Protocol Secure. Basically, it is the secure version of HTTP. Communications between the browser and website are encrypted by Transport Layer Security (TLS), or its predecessor, Secure Sockets Layer (SSL).

# The Web Programmer’s Toolbox:

* **HTML** - a *markup* language
	+ To describe the general form and layout of documents
		- HTML is not a programming language - it cannot be used describe computations.
* An HTML document is a mix of content and controls
	+ - Controls are tags and their attributes
			* Tags often delimit content and specify something about how the content should be arranged in the document. For example, <p>Write a paragraph here </p> is an element.
			* Attributes provide additional information about the content of a tag. For example, <img src = "redhead.jpg"/> <font color ="Red" />
* **XML**
* A meta-markup language (a language for defining markup language)
* Used to create a new markup language for a particular purpose or area
* Because the tags are designed for a specific area, they can be meaningful
* **JavaScript**
* A client-side HTML-embedded scripting language
* Provides a way to access elements of HTML documents and dynamically change them.
* **PHP**
* A server-side scripting language
* Great for form processing and database access through the Web
* **Ajax**

Asynchronous JavaScript + XML

* No new technologies or languages
* Much faster for Web applications that have extensive user/server interactions
Uses asynchronous requests to the server
* Requests and receives small parts of documents, resulting in much faster responses
Java Web Software