<Semester II>

</Programming for Interactive Surfaces//>

Week 1 Part 1

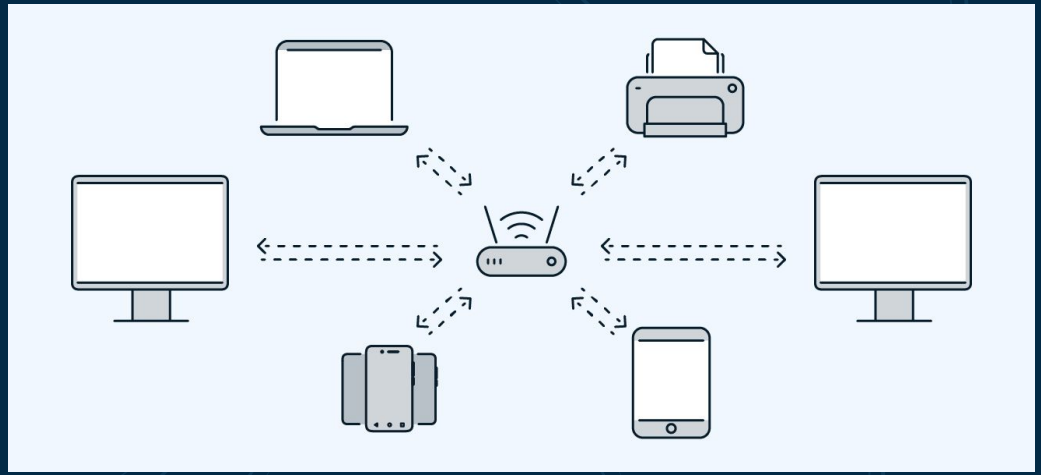
</Front-End Development/>

Computer Networks

Today, computers send and receive information over a global telecommunications network.
First computer networks appeared in in 1950s and 60s. They were used within an organization, like a company or research laboratory, to facilitate the exchange of information between different people and computers.

Computer Networks

A computer network is a system that connects many independent computers to share information (data) and resources.A network connection can be established using either cable or wireless media.
A local area network (LAN) is a computer network that connects computers within a single physical location. It is used in homes and buildings including offices or schools,for sharing data and devices including Internet access. Ethernet and Wifi are the two most common technologies used for local area networks



The Internet

A The Internet (or internet) is the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to communicate between networks and devices. It is a network of networks that consists of private, public, academic 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, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail and file sharing.

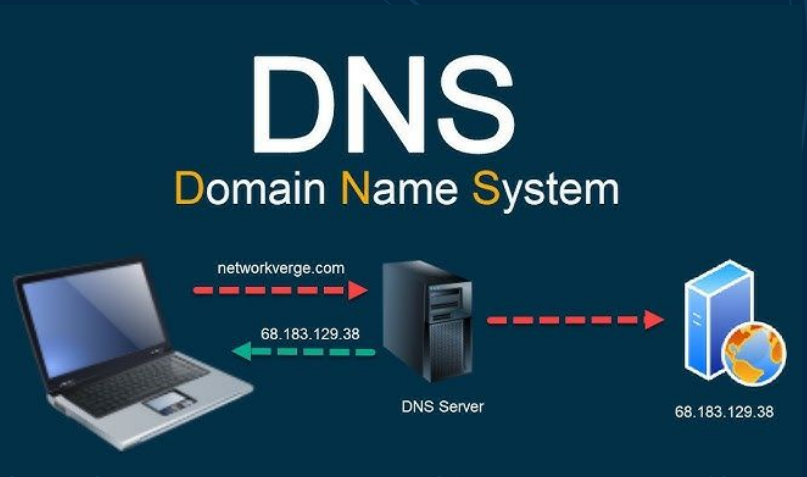
Domain Name System

The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like google.com or youtube.com. Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources.

Each device connected to the Internet has a unique IP address which other machines use to find the device. DNS servers eliminate the need for humans to memorize IP addresses such as 192.168.1.1 (in IPv4), or more complex newer alphanumeric IP addresses such as 400:cb00:2048:1::c629:d7a2 (in IPv6).

Domain Name System

The DThe Domain Name System has been an essential component of the functionality of the Internet since 1985. **The Domain Name System (DNS) is a hierarchical and distributed name service that provides a naming system for computers, services, and other resources on the Internet or other Internet Protocol (IP) networks.** There are over 360 million second-level domain names. The Domain Name System has been an essential component of the functionality of the Internet since 1985.

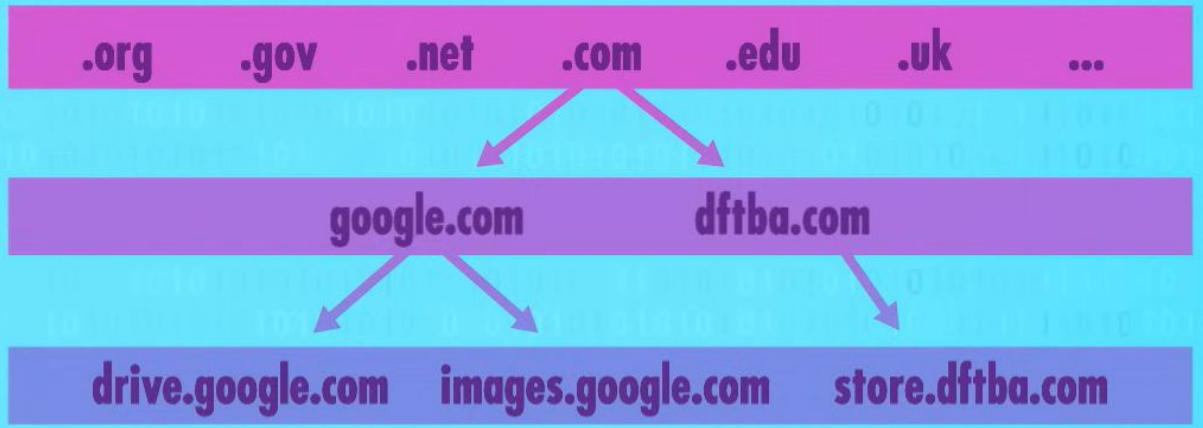


DOMAIN STRUCTURE

TOP LEVEL DOMAINS

SECOND LEVEL DOMAINS

SUB-DOMAIN OF PARENT



World Wide Web

Web Page and Website

A webpage is a digital document that is linked to the World Wide Web and viewable by anyone connected to the internet having a web browser. It can contain any type of information, such as text, color, graphics, animations, videos, sounds, etc.

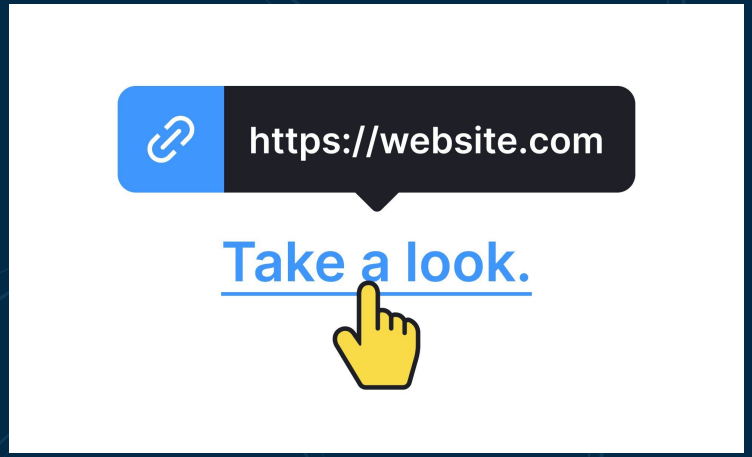
A webpage is a document that is written in HTML, it can be viewed from the Internet. It can be accessed by entering the URL on the address bar of the web browser.

A website is a collection of many web pages, and web pages are digital files that are written using HTML(HyperText Markup Language). To make your website available to every person in the world, it must be stored or hosted on a computer connected to the Internet round a clock. Such computers are known as a Web Server.

Hyperlink and Hypertext

A hyperlink can be thought of as an interface that links a source to a target. Clicking the hyperlink at the source will navigate to the target. It can be in the form of text, images or a button. The Web's original purpose was to provide an easy way to reach, read, and navigate through text documents.

Hypertext is a type of text that contains links to other texts, images, or other content. These links, called hyperlinks, are clickable and allow users to navigate between documents or sections of a document.
Features of Hypertext: It is non-linear, interactive, and allows for multimedia integration.

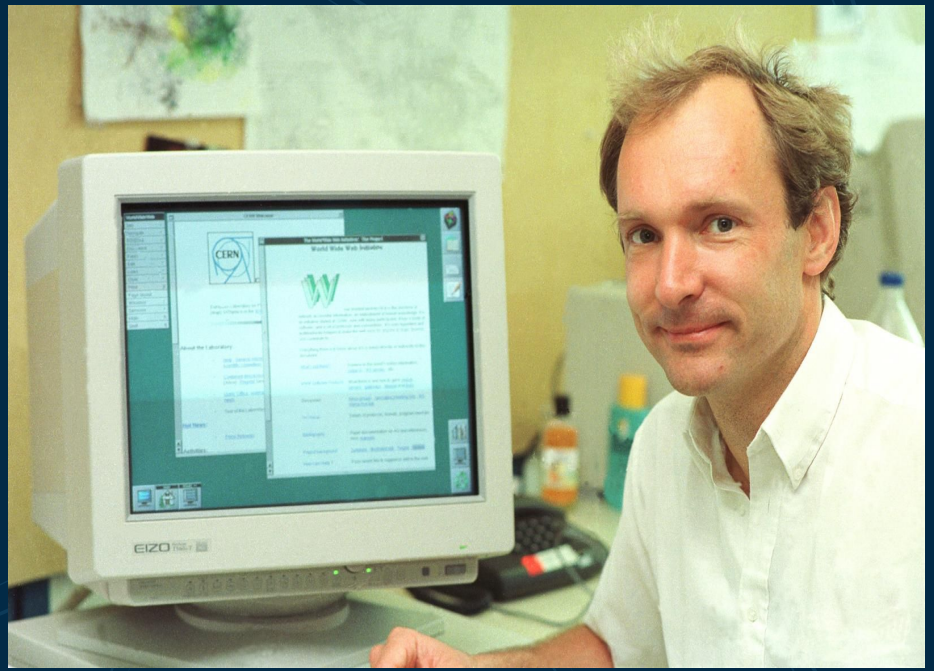


Pillars of the World Wide Web

Back in 1989, Tim Berners-Lee, the Web's inventor, spoke of the three pillars on which the Web stands:

1. **URL, an address system that keeps track of Web documents**
2. **HTTP, a transfer protocol to find documents when given their URLs**
3. **HTML, a document format allowing for embedded *hyperlinks***

As you can see in the three pillars, everything on the Web revolves around documents and how to access them.



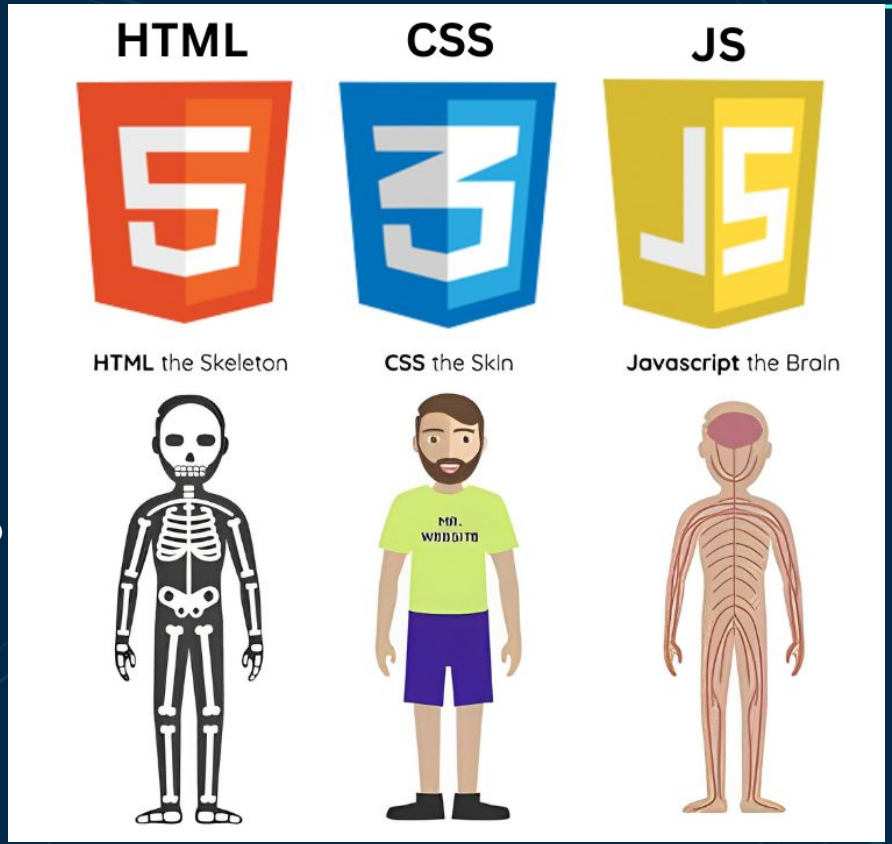
Pillars of the World Wide Web

1. **URL: A URL (Uniform Resource Locator)** is the address of a unique resource on the internet. It is one of the key mechanisms used by browsers to retrieve published resources, such as HTML pages, CSS documents, images, and so on.
2. **HTTP: *Hypertext Transfer Protocol*** is an application-layer protocol for transmitting hypermedia documents, such as HTML. HTTP follows a classical client-server model, with a client opening a connection to make a request, then waiting until it receives a response from the server.
3. **HTML - Markup Language:** Markup languages are computer languages that are used to structure, format, or define relationships between different parts of text documents with the help of symbols or tags inserted in the document.

Homework: find out the difference between URL vs DNS

How the Web Works

Creating Websites involves three main technologies: HTML, CSS, and JavaScript. HTML helps organize the content of a webpage, CSS makes it look good, and JavaScript adds interactive features. These three tools dominate web development. Every library or tool seems to be centered around HTML, CSS, and JS. Together, we use these three languages to format, design, and program web pages.
HTML stands for Hyper Text Markup Language
CSS stands for Cascading Style Sheets.



Hypertext Markup Language

Hypertext: HyperText simply means "Text within Text." HyperText is a way to link two or more web pages (HTML documents) with each other.

Markup language: A markup language is a computer language that is used to apply layout and formatting conventions to a text document. Markup language makes text more interactive and dynamic. It can turn text into images, tables, links, etc. With the help of HTML, we can only create static web pages.

HTML is the standard markup language for creating Web pages.

- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

Web Browser

A web browser is an application for accessing websites. When a user requests a web page from a particular website, the browser retrieves its files from a web server and then displays the page on the user's screen. The first web browser World Wide Web was invented in the year of 1990 by Tim Berners-Lee. Later, it becomes Nexus. Virtually all URLs on the Web start with either *http:* or *https:* which means they are retrieved with the Hypertext Transfer Protocol (HTTP). When the web browser fetches data from an internet connected server, it uses a piece of software called a rendering engine to translate that data into text and images. This data is written in Hypertext Markup Language (HTML) and web browsers read this code to create what we see, hear and experience on the internet.

Internet vs WWW

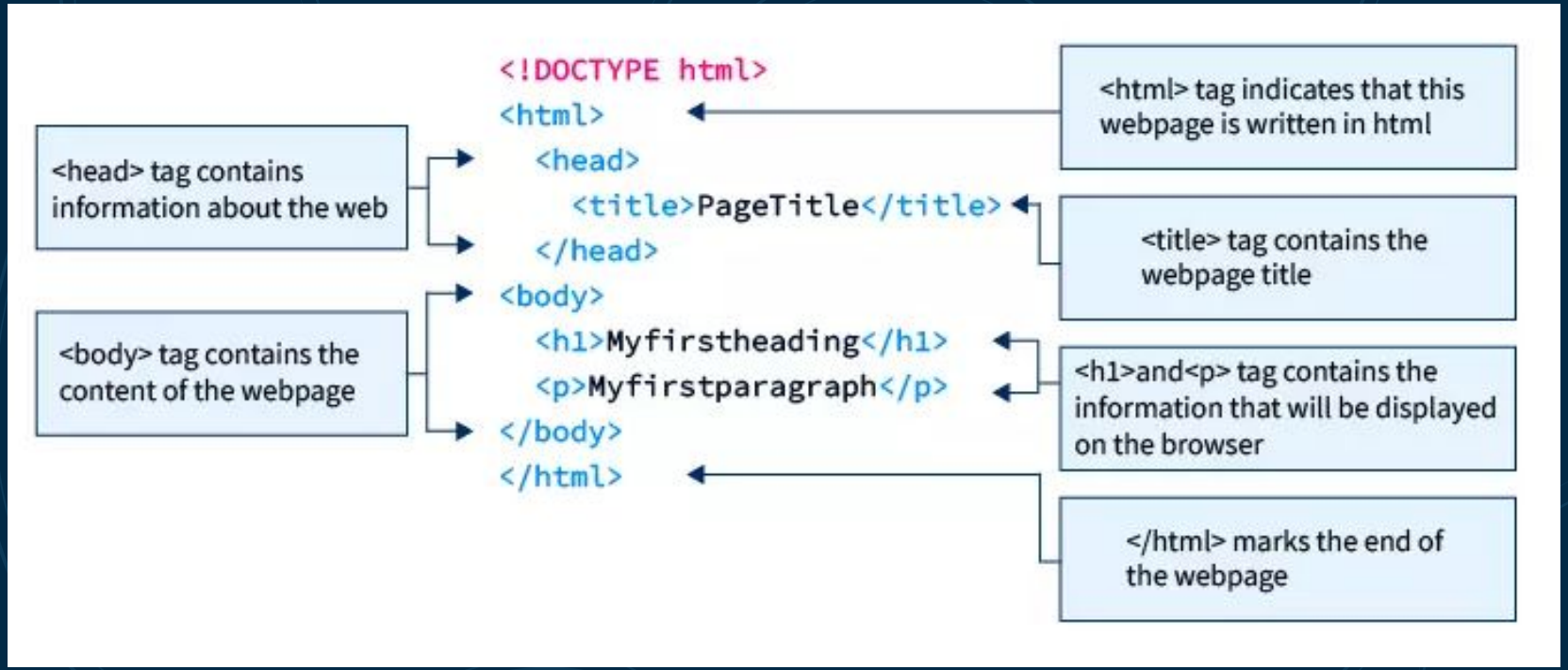
Internet

- The computers connect with each other with the help of TCP/IP protocol and the IP address is called the internet.
- The internet follows decentralized architecture and is termed as a network of networks.
- The internet depends on hardware.
- Computers can be connected to each other through different means like wired networks. Wi-Fi, satellite links, direct connections, wireless connections, etc.

World Wide Web

- The The World Wide Web is a collection of web pages which can be accessed with the help of two protocols: HTTP and HTTPS
- The architecture on which the World Wide Web depends is the client-server.
- WWW depends on software applications.
- WWW can be accessed through the clients called web browsers. The clients are known as web browsers that send requests to the web servers to retrieve information.

Structure of an HTML document



Classwork: Open up notepad, write a basic HTML web document. Add images and links in it (put all documents in the same folder.) The file extension should be .html. Once you are done, open the file in any web browser. Refer these websites to learn about more tags you can use:

W3Schools HTML Tutorial

HTML: HyperText Markup Language | MDN

Reference

1. Crash Course Computer Science Computer Networks
2. Crash Course Computer Science Internet
3. Crash Course Computer Science World Wide Web
4. What is computer Networking? Geeks for Geeks
5. How Domain Name Systems Work
6. What are Hyperlinks?
7. Birth of the Web - CERN
8. Web Browser - Wikipedia
9. W3 Schools HTML
10. HTML Reference - Mozilla Developer Network

Fonts & colors used

This presentation has been made using the following fonts:

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