Chapter 1

Basics in Website Design

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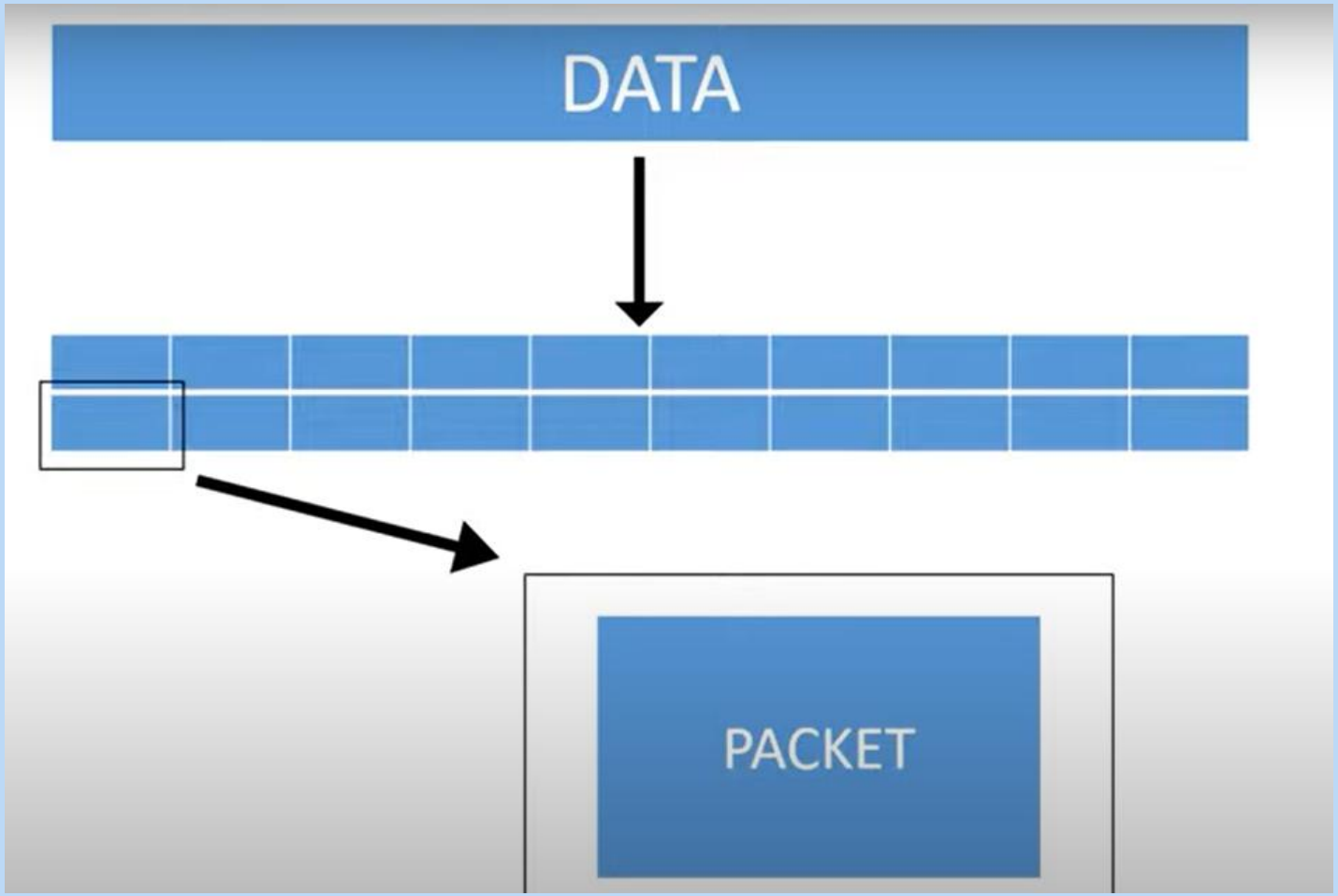
What is internet?

- The internet is a global network of computers and other devices that are connected together to share information and communicate with each other. It allows people all over the world to connect with each other, access information, and share resources.
- The internet is made up of many different technologies, including routers, switches, servers, and cables, which work together to ensure that data can travel from one device to another quickly and efficiently.
- Through the internet, people can send emails, access websites, stream videos, play games, and much more.
- The internet has become an essential part of modern life, connecting people and businesses across the world and transforming the way we communicate and share information.

How was the internet created?

- The internet was created because people needed a way for computers to talk to each other without being interrupted. Before the internet, computers used a slow method called circuit switching, where all the data had to be sent at once. If something went wrong during the transfer, the whole thing would fail.

- So, scientists came up with a new way called packet switching. With packet switching, data is broken into smaller pieces called packets, and each packet is sent separately. If something goes wrong, only that packet is affected, not the whole transfer. Once all the packets arrive, they are put back together to create the original message. This is how the internet works!

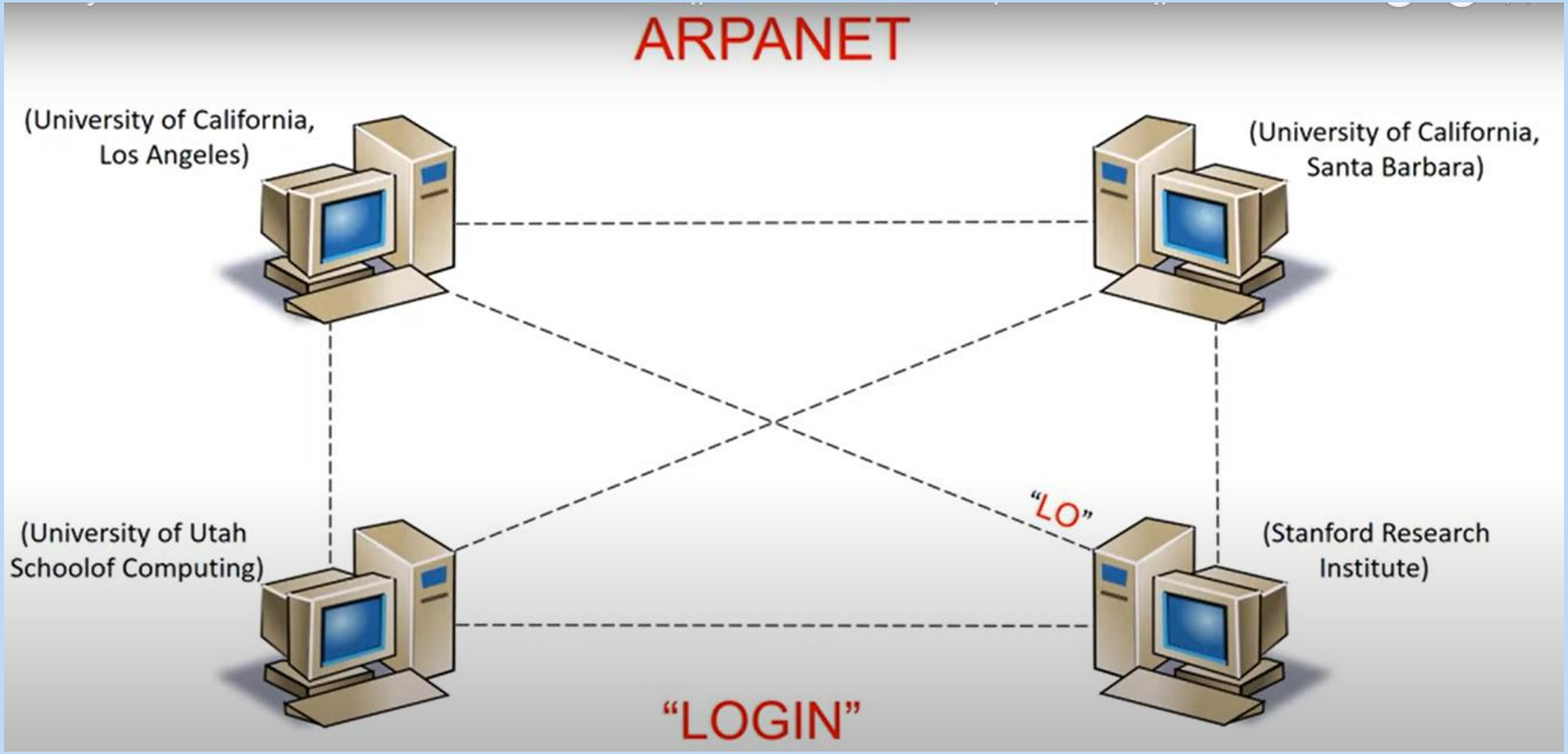

DATA
PACKET

Evolution of Internet

- The internet evolved from packet switching, allowing computers to connect through a network called ARPANET(Advanced Research Projects Agency Network).

- Then, the World Wide Web (WWW) was developed, which is an internet-based global information system that allows people to view web pages containing text, images, videos, and other multimedia and navigate between them by using hyperlinks.

Evolution of Internet



Evolution of Internet

- Here is a timeline of the important events in the history of the internet:
  - 1965: First two computers are connected via packet switching at MIT.
  - 1969: ARPANET, the first widely used computer network, is launched.
  - 1971: Email is developed, allowing electronic messages to be sent between computers.
  - 1973: Nodes in Norway and Great Britain are connected to ARPANET, making it a global network.
  - 1974: The first ISP, Internet Service Provider, is launched. The initial design for TCP is published.
  - 1981: The National Science Foundation establishes CSNET, a network for computer scientists at research universities.
  - 1982: ARPANET computers switch to the TCP/IP protocols.

- 1983: The Domain Name System (DNS) establishes the naming conventions for websites, such as .com, .org, .edu, and .gov.
- 1988: IRC, Internet Relay Chat, was launched, a precursor (ansestor) of our current instant messaging apps.
- 1990: Tim Berners-Lee develops HTML, which has a huge impact on how people interact with the internet.
- 1991: The World Wide Web is introduced to the public.
- 1993: The first browser accessible for the general user, Mosaic, is launched. The White House and the United Nations create web pages.
- 1995: Commercial businesses begin operating on the internet, including eBay and Amazon.
- 1996: Hotmail, the first web-based email service, is launched.
- 1998: Google goes online, revolutionizing the way users locate resources on the internet.
- 2004: Web 2.0 becomes popular, which refers to websites that are user-driven and interactive. Facebook launches.
- 2005: YouTube and Reddit launch.
- 2010: The internet records 400 million active users for the first time.

WWW

- The World Wide Web (WWW) (Also known as w3 and the Web) is a global information system that operates on the Internet.
- It is a system of interlinked hypertext documents contained on the internet. With the help of a web browser, you can access web pages that may contain text, images, videos, and other multimedia, and navigate between them by using hyperlinks.
- The main purpose behind the development of the World Wide Web was to create a platform for sharing and accessing vast amounts of information on a global scale which would allow collaborators in remote sites to share their ideas and all aspects of a common project.
- In simple terms, the web is the most popular Internet service, which can access a higher variety of data like text, image, audio, video, and many more service on the internet. It has revolutionized the way we share and access information, and has made it possible for people from all over the world to collaborate on projects and ideas.

WWW's features

The World Wide Web has several features that make it a powerful tool for accessing and sharing information:

1. **Hypertext Technology:** The WWW is built on Hypertext technology, which makes it easy to access linked documents on the Internet and navigate between them.

2. **Efficient Connection:** Each time you access a new document through a link, a connection is made with the web server that the document is on, and once the appropriate document is retrieved, the connection is broken. This makes the WWW efficient and fast.

3. **Browser Interface:** The interface for the WWW is a browser, which allows users to search, traverse, and use many types of information at numerous sites and in multiple forms.

4. **Operating System Compatibility:** The WWW is accessible on multiple operating systems, including Apple, UNIX, Macintosh, DOS, and Windows.

5. **Hypertext Transfer Protocol:** The WWW has a protocol called Hypertext Transfer Protocol (HTTP), which acts as an interface between a Web Client Software like Netscape Navigator. HTTP helps to facilitate the transfer of data between web servers and clients.

6. **URLs:** To access different types of information on the Internet, you use different kinds of URLs. Most URLs begin with http:// , which indicates a file at an actual web site. If you want to get to a file on the Web using FTP, you would use a URL that looks like ftp://name_of_site/directory/f1_name.

Advantages of WWW

1)**Easy accessibility:** The WWW is accessible to anyone with an internet connection and a browser, making it easy to access information from anywhere in the world.

2)**Wide range of information:** The WWW contains a vast amount of information on virtually every topic, making it a valuable resource for research, learning, and entertainment.

3)**Easy navigation:** The use of hyperlinks on the WWW makes it easy to navigate between different pages and websites, allowing users to quickly find the information they need.

4)**Universal access:** The WWW is designed to be accessible to anyone, regardless of their location or the device they are using, making it a powerful tool for global communication and collaboration.

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Advantages of WWW

5)Interactive content: The WWW allows for the creation of interactive content, such as videos, animations, and games, which can engage and entertain users in new ways.

6)User-generated content: The WWW enables users to create and publish their own content, such as blog posts, videos, and social media updates, allowing for greater participation and collaboration in online communities.

7)Cost-effective: The WWW is a relatively low-cost way to share information and promote products and services, making it an important tool for businesses and organizations of all sizes.

8)Real-time communication: The use of instant messaging, chat rooms, and video conferencing on the WWW enables real-time communication between individuals and groups, regardless of their location.

Components of web

- URL (Uniform Resource Locator): It is a web address that specifies the location of a resource (such as a webpage, image, or video) on the internet. A URL consists of several components, including the protocol (such as HTTP or HTTPS), the domain name or IP address of the server hosting the resource, and the path to the resource on the server.
- HTTP (Hypertext Transfer Protocol): It is the protocol used for transferring data over the World Wide Web. It defines the rules for how web clients (such as web browsers) and web servers communicate with each other. HTTP is responsible for requesting resources from web servers and transmitting the response data back to the client.
- HTML (Hypertext Markup Language): It is the standard markup language used to create web pages. HTML defines the structure and content of a webpage, including headings, paragraphs, images, links, and other elements. Web browsers use HTML to render web pages and display them to users.

Comparision between internet and www

Basis for comparision	Internet	WWW
Definition	A huge network which is a collection of several networks.	A system of interconnected hypertext documents and resources accessed via the internet
Invention	Late 1960's	1989
Nature	Physical infrastructure	Software oriented
Protocols used	IP (Internet Protocol)	HTTP (Hypertext Transfer Protocol)
Identefication	Thorugh IP address	Through URL (Uniform Resource Locator)
1st version	APRANET(Advanced Research Projects Agency Network)	NSFNET(National Science Foundation Network)
Dependency	Independent existance	Existence depends on the internet
Users/website	Over 4.9 billion users (as of 2021)	Over 1.8 billion websites (as of 2021)
Accessiability	Through various software and devices	through internet browser

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Web Standards

Web standards are defined as **guidelines** developed by the **World Wide Web Consortium W3C** to **promote consistency** in design code used to built website.This standard exist as long technical document called specification,which details exactly how the technology should work.

- web standards is a set of standardized **"best practices"** for building websites.
- Web Standard are created by standard bodies.W3C is best known standard bodies.

Why we need standards?

Benefits of Web Standards:

There are many benefits in designing website that meet webstandars, some of them are:

I. Faster downloading times
II. Lower maintenance costs
III. Less time consuming to update
IV. More accesible to wider range of user, including people with disabilities
V. Lower bandwidth cost
VI. More search engine friendly
VII. More adaptable to future technology

Web standards..

The most common W3C standards

- HTML (Hyper Text Markup Language)
- XML (Extensible Markup Language)
- XHTML (Extensible Hypertext Markup Language)
- CSS (Cascading Style Sheet)
- WCAG (Web Content Accessibility Guidelines)

Five important and revolutionary ideas were produced that would lead standards to where they are today.

i. Decentralization

ii. Nondiscrimination

iii. Bottom-up design

iv. Universality

v. Consensus(agreement)

Web Protocols

- A web protocol refers to the **set of rules and procedure** that govern the communication between web servers and clients. Protocols are used to enable communicat**of** ion and data transfer between devices connected to the Internet. Web protocols are essential to the functioning of the internet and enable users to access and share information online. They ensure that data is transmitted efficiently, securely, and reliably.
- **Different types protocols are:**
  - Gopher
  - TCP/IP (Transmission Control Protocol / Internet Protocol)
  - UDP (User Datagram Protocol)
  - HTTP/HTTPS (Hypertext Transfer Protocol /Hypertext Transfer Protocol Secure)
  - NNTP (Network News Transfer Protocol)
  - Telnet (Teletype Network)
  - FTP (File Transfer Protocol)
  - SMTP (Simple Mail Transfer Protocol)
  - DNS (Domain Name System)

1. **Gopher:** It was popular in the early days of the internet, before the World Wide Web became widely used. It provided a simple and efficient way to navigate and retrieve information from distributed data repositories using a hierarchical structure of menus and submenus, and a text-based interface.
2. **TCP/IP** - It is a set of communication protocols that are used for transmitting data over the internet or other networks. TCP ensures reliable and ordered transmission of data between applications, while IP provides the addressing and routing mechanism to send packets of data across networks.
3. **UDP** - a connectionless protocol used for sending small packets of data. Datagram refers to a self-contained packet of data that is transmitted over the network.
4. **HTTP /HTTPS** - stateless protocol used for transferring hypertext document like webpage between a web server and a web browser.It work in conjuction to HTML to display webpages. A secure version of HTTP that uses encryption to protect sensitive data.
5. **NNTP** - It is used for distributing and retrieving Usenet newsgroup articles. NNTP operates on top of TCP/IP and allows users to read and post messages in newsgroups using newsreader software.
6. **Telnet** - Telnet is a network protocol that provides remote access and management of devices, servers, and computers. It allows users to execute commands and run programs on remote systems using a command-line interface. However, Telnet is not secure and has largely been replaced by more secure protocols such as SSH.
7. **FTP** - a protocol used for transferring files over the internet.
8. **SMTP** - a protocol used for sending and receiving email messages.
9. **DNS** - a protocol used for translating domain names into IP addresses.

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Application of web protocols:

1. Helps to transform information from one place to another.
2. Used to store data.
3. With protocols we can transfer files from site to our device.
4. Help to make our data secure and safe.

Web Browser

- A browser is a software program that is used to explore, retrive and display information available in WWW.
- Information can be in many form such as pictures, webpages, videos, and other files that are connected via hyperlinks and categorized with the help of URLs.
- When a user requests some information, the web browser fetches the data from a web server and then displays the webpage on the user's screen.
- It is a client program runs on user device and it contact web server on behalf of user for information requested by user.

Functions of Web Browser:

- The main function is to retrieve information from the World Wide Web and making it available for users.
- Visiting any website can be done using a web browser. When a URL is entered in a browser, the web server takes us to that website.
- It makes Internet surfing easy as once we reach a website, we can easily check the hyperlinks and get more and more useful data online.
- When a user visits a website using a browser, the browser stores a copy of the website's resources, such as HTML, CSS, and images, in its cache. This allows the browser to load the website more quickly on subsequent visits, as it can retrieve the resources from the cache instead of downloading them again from the internet.
- Multiple webpages can be opened at the same time on a web browser.
- Options like back, forward, reload, stop reload, home, etc. are available on these web browsers, which make using them easy and convenient.

History of Web Browser

Dates	Event in the History of browser
1990	1st web browser is created by W3C Director **Tim Berners-Lee** named **World Wide Web**.Later renamed to **Nexus** to avoid confusion with actual www.
1992	Text based browser named **Lynx** was invented,it was not able to display graphical content.
1993	1st graphical UI browser; most popular in the world, named **NCSA Mosaic** is introduced.
1994	some improvements occured in **Mosaic** and came to **Netscape Navigator**.
1995	Microsoft introduced its 1st web browser named **Internet Explorer.**
1996	**Opera** is publically introduced.
2003	Apple's **safari** browser is introduced.
2004	**Firefox** was developed by the Mozilla project, which included former Netscape employees.
2007	**Mobile safari** was released as Apple mobile web browser.
2008	**Google chrome** is launched
2011	Fast-growing mobile-based browser **Opera Mini** was released
2015	**Microsoft Edge** was launched

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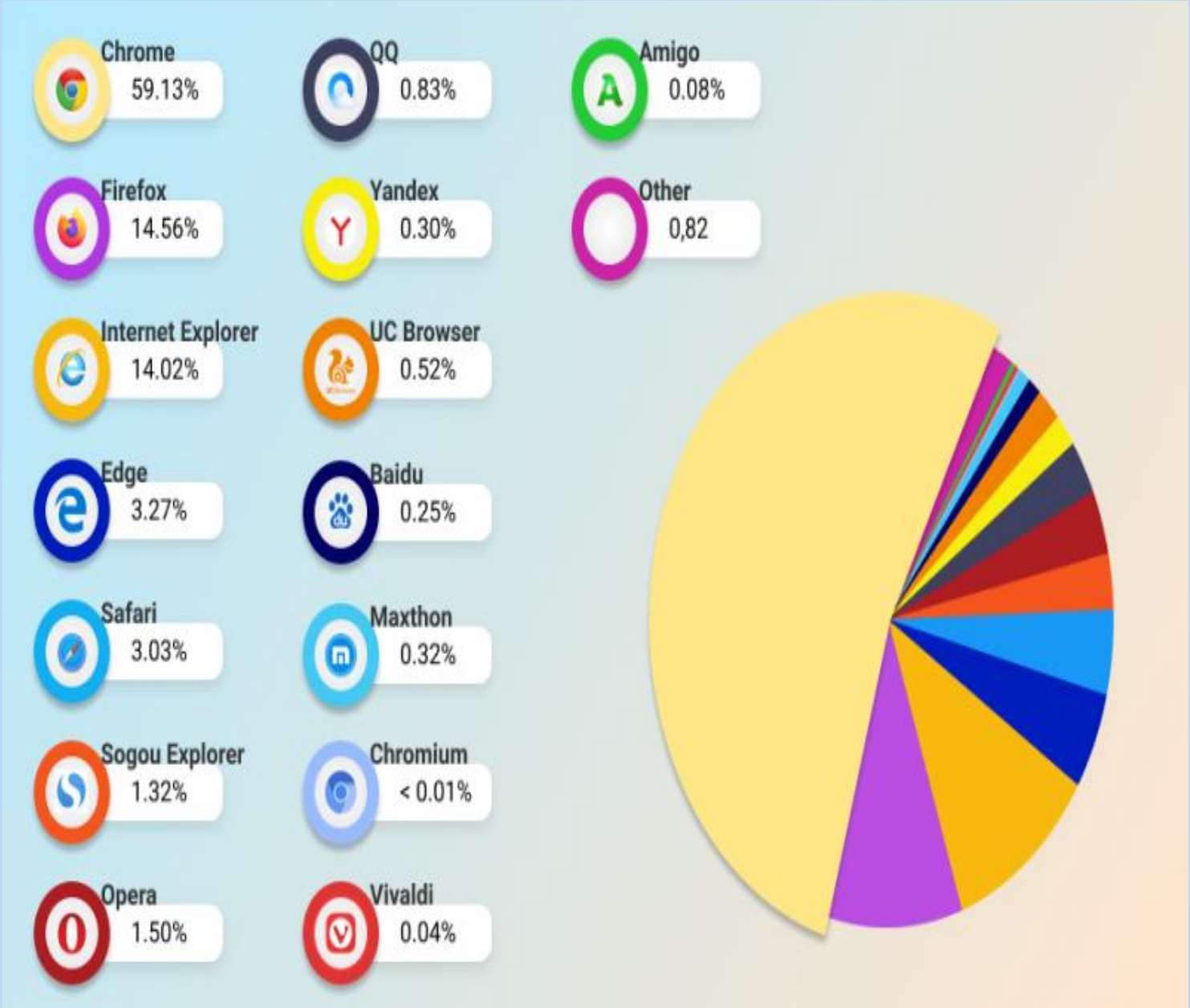
Types of Web Browser

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Safari
- Opera
- Brave
- Vivaldi
- Chromium
- UC Browser
- Torch Browser
- Tor Browser etc.



Features of Web Browser

1. Refresh button
2. Stop button
3. Home Button
4. Web address bar
5. Tabbed browsing
6. Bookmarks

Uses of Web Browser

1. **Bookmarking**: Saving links to web pages you want to revisit later.
2. **Forward/Backward:** Navigating back and forth between previously visited web pages.
3. **Using address bar:** Typing in a URL to navigate to a specific web page.
4. **Clicking on hypertext:** Clicking on links to navigate to different web pages.
5. **Recording history:** Keeping track of previously visited web pages for easy access.
6. **Tabbed browsing:** Opening multiple web pages in separate tabs within the same browser window.
7. **Using plugins:** Adding additional functionality to the browser through third-party plugins or extensions.
8. **Start page:** Choosing a default page that loads when you open the browser.
9. **Downloading web pages and assets:** Saving web pages and associated files to your device.
10. **Controlling performance:** adjusting settings to improve performance, block unwanted content.
11. **Scraping content:** Extracting data from web pages for various purposes.
12. **Viewing HTML source code:** Inspecting the underlying code of web pages.
13. **Controlling server IP address:** Changing the IP address of the server that the browser communicates with.
14. **Controlling server security:** Adjusting security settings to protect against malware or threats.
15. **Caching data:** Storing frequently accessed web page data locally to improve loading speed.
16. **Displaying local files:** Viewing files saved on your local device within the browser.

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Search Engine

- A search engine is a software program that helps people find the information they are looking for online using keywords or phrases.
- it perform web searches on WWW. It is also called as answering machine.
- Google, yahoo, Baidu, Bing, DuckDuckGo are some popular search engine.

How it works ?

3 important task are performed by a search engine when user searches for are:

- **Crawling:** searching and collecting information from various sources on the internet using specialized tools and techniques.
- **Indexing:** This process stores and organize the content that is found from crawling process.
- **Ranking:** This ranks the best content at the top, which is the best answer for user's query. It means most relevent result shows on the top.

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Uses of Search Engine

- **Finding information**: Search engines help users find information on a wide range of topics, from news and entertainment to education and research.
- **Shopping**: Search engines can help users find products and services online, compare prices, and make purchases.
- **Marketing**: Search engines are used by businesses to promote their products and services, and to reach potential customers through advertising and search engine optimization.
- **Navigation**: Search engines can help users navigate the web by providing links to relevant pages and websites.
- **Entertainment**: Search engines can be used to find music, movies, TV shows, and other forms of entertainment.
- **Research**: Search engines can be used by students and researchers to find academic resources and research papers on a variety of topics.
- **Social media:** Search engines are used to find and connect with people on social media platforms like Facebook, Twitter, and LinkedIn.
- **News:** Search engines are a primary source of news and information for many people, allowing them to stay up-to-date on current events and trends.
- **Travel**: Search engines can be used to find travel deals, book flights and hotels, and plan trips.
- **Local search:** Search engines can help users find businesses and services in their local area, such as restaurants, shops, and healthcare providers

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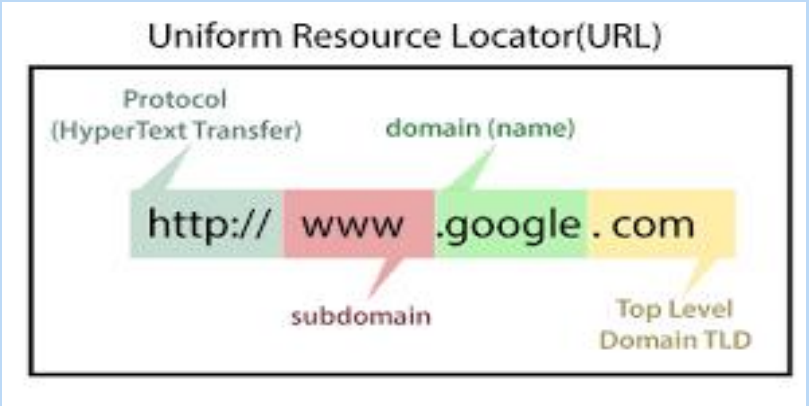
Web Domain



- Simply put, a domain name (or just "domain") is the name of a website. It's what comes after "@" in an email address, or after "www." in a web address.
- A domain name is a string of text that maps to a numeric IP address, used to access a website from client software. In plain English, a domain name is the text that a user types into a browser window to reach a particular website. For instance, the domain name for Google is ‘google.com’.
- The actual address of a website is a complex numerical IP address (e.g. 172.217.7.206), but thanks to DNS, users are able to enter human-friendly domain names and be routed to the websites they are looking for. This process is known as a DNS lookup.

❖ **Who manages domain names?**

Domain names are all managed by domain registries, which delegate the reservation of domain names to registrars. Anyone who wants to create a website can register a domain name with a registrar, and there are currently over 300 million registered domain names.

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Web Hosting

- Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet.
- It is storage location where your website content files are placed.
- A web host, or web hosting service provider, is a business that provides the technologies and services needed for the website or webpage to be viewed in the Internet. Websites are hosted, or stored, on special computers called servers. When Internet users want to view your website, all they need to do is type your website address or domain into their browser. Their computer will then connect to your server and your webpages will be delivered to them through the browser.

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Type of Website Hosting

- **Shared hosting**: A type of hosting where multiple websites share a single server and its resources. It is a cost-effective solution for small websites and businesses.
- **WordPress hosting:** A type of hosting designed specifically for WordPress websites. It offers specialized features and tools to optimize WordPress performance and security.
- **Reseller hosting:** A type of hosting where a user can resell hosting services to other customers. It allows individuals and businesses to start their own web hosting business.
- **Dedicated hosting:** A type of hosting where a single website has access to an entire server and its resources. It offers the highest level of performance, security, and control but is also the most expensive.
- **VPS(Virtual Private Server) hosting:** A type of hosting where multiple websites share a single server but have their own dedicated resources and virtualized environment. It provides more flexibility and control than shared hosting.

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End of Chapter 1
Any Queries ?