MILESTONES

Milestone 1 :

1) Internet :

- Inter connected Networks
- Group of computers that are connected with each other and has an ability to exchange information. Example: Social circle, A group of people who all know each other and they regularly exchange and share information.
- Computers connect to each other and to the internet by Cables, Radio waves, Wires and some type of networking infrastructures.
- Data's sent over the internet is translated into ***Pulses of light/Electricity*** called as ***Bits.***
- 2 fundamental ways will be performed:

1. Packets
2. Protocols

- **Packets : Small segment of larger information. Packets contains data and the information about the data called Header. Header goes in front of data to give instructions that need to be performed by the data.**
- **Protocols : Data are sent over the internet in the form of Packets and those packets follow some communication techniques known as protocols.**
- Packets get routed to reach their destination by various networking devices like Routers and Switches. The receiving device reassembles the packets in order and can display the data.
- Routers - Operates on Network Layer (Layer 3). They make decisions about the best path for data to travel based on the destination IP address contained within each data packet. Routers forwards data packets between computer networks and they are used to connect multiple networks line LAN, WAN...
- Switches - Operates on data link layer (Layer 2) of the OSI model. They use MAC addresses to forward data within the same network or LAN.

2) HTTP : Hyper Text Transfer Protocol.

- Operates on Application Layer.
- Transfer files between Client and Server.
- VERSIONS : http/0.9 → http/1.0 → http/2 → http
- HTTP PORT : 80; HTTPS PORT : 443
- Web Servers contains **http server or http daemon or web server**, is a software application or program that listens for incoming HTTP requests from clients (such as web browsers) and responds by serving web pages, files, or other content over the internet.
- HTTP REQUEST : ***GET /index.html HTTP/1.1***
    - Version - Version of protocol being used.
    - URL - Specifies the location of the resource on the server.
    - http request method - GET, PUT, POST DEL
        - GET - It is used for retrieving data from the server without modifying it.
        - PUT - The PUT method is used to update or replace the specified resource with the request payload.

- POST - The POST method is used to submit data to be processed by the server. It often results in a change in state or side effects on the server. POST is commonly used for form submissions, file uploads, and other actions that may cause state changes.
- DELETE - The DELETE method requests the server to remove the specified resource. It deletes the resource identified by the given URI.

- http request headers - Host, User-Agent, Accept, Content-Type, Authorization.

  Host: www.example.com
  User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.190 Safari/537.36
  Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,/;q=0.8,applicatio exchange;v=b3;q=0.9

  - Host: Specifies the hostname and port number of the server being requested.
  - User-Agent: Identifies the client software (e.g., web browser) making the request.
  - Accept: Indicates the types of content the client is willing to accept from the server.
  - Content-Type: Specifies the media type of the data being sent in the request body (applicable for POST, PUT, etc. requests).
  - Authorization: Provides credentials for authenticating the client with the server.
- http request body (optional)

- HTTP RESPONSE : HTTP/1.1 200 OK
  - HTTP Version: Specifies the version of the HTTP protocol being used.
  - Status Code: A three-digit numeric code indicating the result of the request.
    - 1XX - Informational
    - 2XX - Success
    - 3XX- Redirection
    - 4XX - Client Error
    - 5XX - Server error
  - Status Message: A human-readable description of the status code

    Common status codes include 200 for "OK", 404 for "Not Found", 500 for "Internal Server Error", etc.
  - http response header : Content type, Content length, Server, Date, Set-Cookie

    HTTP/1.1 200 OK
    Content-Type: text/html; charset=UTF-8
    Content-Length: 1234
    Date: Wed, 30 Mar 2024 12:00:00 GMT
    Server: Apache/2.4.38 (Unix)

    - **Content-Type**: Specifies the media type of the content sent by the server.
    - **Content-Length**: Indicates the length of the response body in bytes.
    - **Server**: Identifies the server software (e.g., Apache, Nginx) serving the request.
    - **Date**: Specifies the date and time when the response was generated.
    - **Set-Cookie**: Sets a cookie on the client for session management or other purposes.

3) HOSTING :

Hosting refers to the process of storing, serving, and managing files, databases, and other resources that make up a website or web application on a server that is accessible over the internet.

TYPES :

1) Shared
2) Virtual Private Server(VPS)
3) Dedicated
4) Cloud Hosting
5) Managed

4) BROWSER :

A web browser is a software application used to access and view information on the World Wide Web. It interprets and renders HTML (Hypertext Markup Language) documents, allowing users to navigate websites, interact with web content, and access various online resources.

KEY FEATURES :

- GUI - includes a navigation toolbar, address bar, back/forward buttons, tabs for managing multiple web pages, and other controls for browsing the web.
- **Rendering Engine**: The rendering engine is a core component of the browser responsible for parsing HTML, CSS (Cascading Style Sheets), and JavaScript code to render web pages visually.
- **Address Bar**: The address bar, also known as the URL bar, allows users to enter the URL (Uniform Resource Locator) of a website or web page they want to visit. It also displays the current URL of the page being viewed.
- **Navigation Controls**: Navigation controls such as back, forward, refresh, and stop buttons allow users to navigate between pages, reload pages, or stop loading a page

5) DNS - DOMAIN NAME SYSTEM

- DNS is a naming system used to translate human-readable domain names (such as www.example.com) into numerical IP addresses (such as 192.0.2.1) that computers use to identify and communicate with each other on a network.
  - DNS serves as the "phonebook" of the internet, enabling users to access websites and services using easy-to-remember domain names rather than complex IP addresses.
  - ***DOMAIN NAME : "www.example.com",***
    - ***"www" is the subdomain,***
    - ***"example" is the second-level domain (SLD), and***
    - ***".com" is the top-level domain (TLD).***
    - **HIERARCHY :**
      - User enters domain name (www.facebook.com) →DNS Resolver (initiates query to resolve the domain name into an IP address) → Local cache (if the domain is already searched and resolved) - If yes returns, Else → Recursive DNS resolver → Root DNS server (to find authoritative DNS servers for TLD of the req domain (.com) → after finding the RECURSIVE DNS RESOLVER sends

query to asking IP address of the authoritative DNS server responsible for the SLD(facebook.com) → DNS RESOLVER → sends IP address to the clients application → connection to the website is established.