**FRONT-END PREREQUISITES:**

**What is Internet?**

* It is a global network of computers connected to each other which communicate through a standardized set of protocols.
* Internet is a network of networks.
* It is a distributed packet switching network.
* It is an independent operated network.

**How the Internet works?**

* The information travels from one computer to another in the form of bits.
* Internet Protocol (IP) is mostly responsible for the Communication over the network.
* All the different devices in the network have an unique addresses which are called as IP addresses.
* IP address is required to identify and communicate to a particular device in a network.
* Domain name system (DNS) associates names to the IP addresses.
* The Data in the network is not transmitted in a fixed path. The Data travels from source to the destination in the different paths based on the factors like traffic etc.
* The data is split into multiple data packets and each packet travels in different paths.
* Routers are the intermediate devices which keeps the packets moving smoothly in the network. They also choose the cheapest path for the packet to travel from source to the destination.
* All the packets of data are reassembled and then transferred to the destination.
* Transmission control protocol (TCP) controls and manages the sending and receiving the packets of data in the network.
* TCP ensures that the packets are properly combined and aligned in an order before transmitting to the destination.
* The information travels from source to the destination through the transmission mediums.
* Transmission mediums can be wired and wireless.
* The data can travels in form of electricity(e.g-Ethernet wires),Light(fibre-optic cables/copper cables etc) and radio waves.

**What is HTTP and how it evolved?**

* HTTP stands for Hypertext Transfer Protocol.
* It is a Standard protocol used to transfer web pages over the Internet.
* HTTP has evolved from an early protocol to exchange files in a semi-trusted laboratory environment, to the modern maze of the Internet, now carrying images, videos in high resolution and 3D.
* HTML stands for Hypertext markup language which is responsible for structuring the web pages.
* HTTP Get Request is used to get the information from the server to the web browser.
* Post Request is used to send information from the web browser to the server.

**How browsers work: Behind the scenes of modern web browsers**

* The main function of a browser is to present the web resource you choose, by requesting it from the server and displays it in the browser interface.
* The resource is usually a HTML document, but may also a PDF file, image or other formats of content.
* The location of the resource is specified by the user using an URI (Uniform resource identifier).

**Browsers high level Structure:**

* The browsers main components are

1. User Interface: this includes the address bar, Bookmark options, forward/backward options etc. Every part of the browser display except the window that displays the requested page.
2. Browser engine: marshals actions between the UI and the rendering engine.
3. Rendering engine: responsible for displaying the requested content. For example the requested content is HTML ,the rendering engine parses HTML and CSS, and displays the parsed content on the screen.
4. Networking: for network calls such as HTTP requests.
5. UI backend: drawing basic widgets like combo boxes, windows etc. This backend exposes a generic interface that is not platform specific. Underneath it uses operating system user interface methods.
6. Java script interpreter: used to parse and execute the Java script code.
7. Data storage: this is a persistence layer. The browser may need to save all sorts of data locally, such as cookies. Browsers also support storage mechanisms such as local Storage, Indexed DB, WebSQL and FileSystem

**What is DNS?**

* Domain name system associates names to the IP addresses.
* DNS servers are connected in distributed heirarchy divided into multiple zones.
* It splits the responsibilities for the major domains such as .org, .com and .net etc.
* The process of finding the IP address is called DNS resolution.

**How DNS works?**

* Initially, user specifies URI to open a web resource (e.g-https://www.google.com), the browser can’t open any web page without knowing the IP address for it.
* Finding the IP address is called DNS resolution.
* IP address is checked in different list of places with a respective order- next being checked only if the current one fails to give IP address.

1. Local caches: certain places on the machine that contains DNS cache, Browser cache, hosts file.
2. Recursive DNS servers: DNS settings are configured in the machine which by default refers to the DNS servers that exists at your ISP are checked for the existence of IP address which might have cached from the previous visits of any other customer to same website.
3. Root DNS servers: each of the TLD like .com, .org, .net etc has its own name servers which are called Top level DNS servers. The root servers are responsible for finding the respective TLD server for requested domain name and routes the request to it.
4. Top level DNS servers: these servers know where we can find the relevant information that we are looking for.
5. Authoritative DNS servers: this is the place which contains the domain information. Authoritative DNS servers are then asked for a record of domain name which contains the IP address of the server where it is hosted.

* The found IP address is sent to the browser, the browser requests the respective server and then the webpage will be served.