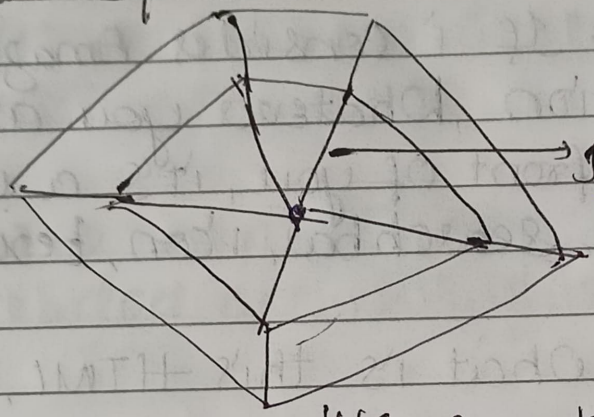
# WEB TECHNOLOGY

What is web?
Web is a short form for WWW
World wide web

By the name itself it suggests web means spider web




That means it's an interconnection of Technology

And collection of documents which are interconnected via links
is WWW i.e web → This can be accessed using Internet

Why we need web Technology?

To build User-Interface application of frontend Technology

Whatever is these infront of us
visual representation of any application is User Interface

So, what are those technologies?

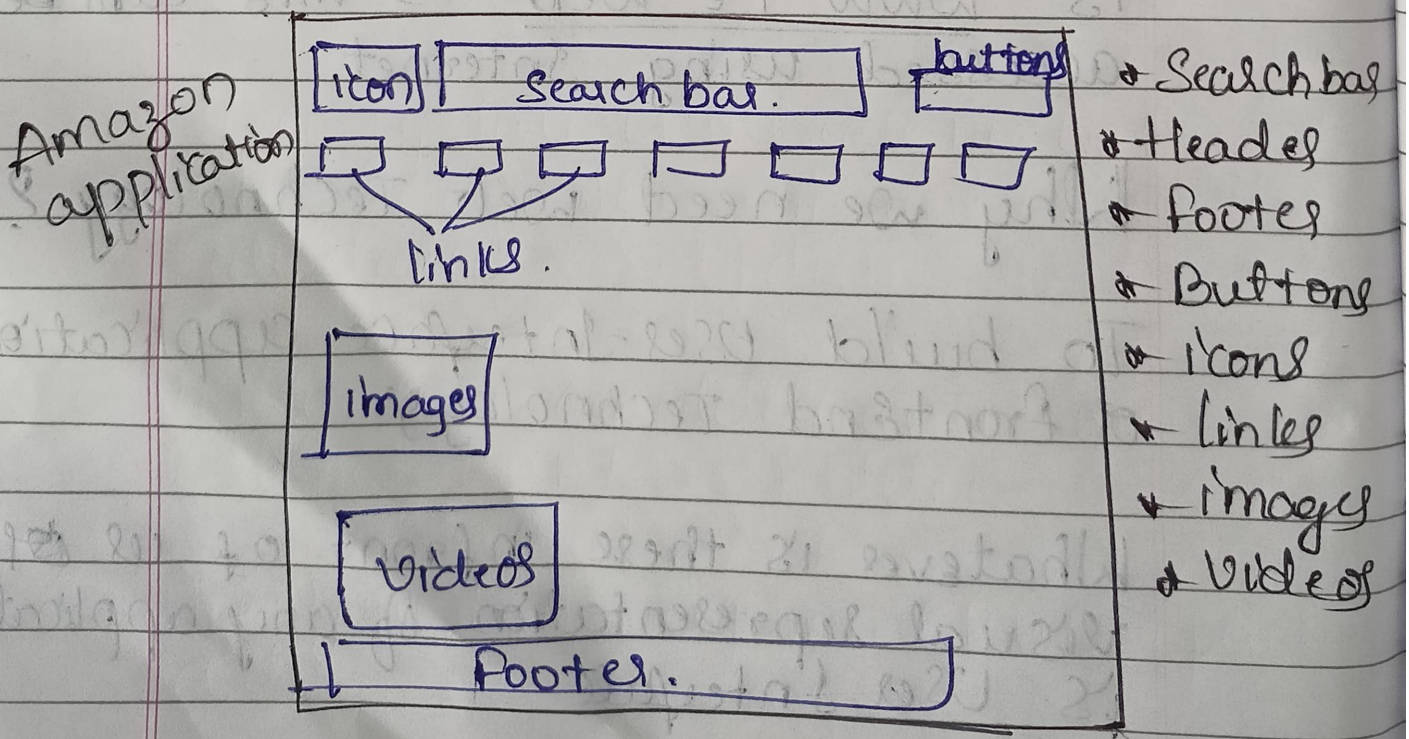
- HTML
- CSS — Tailwind, Bootstrap } Framework of CSS
- Javascript
- React J.S.

For ex:- If i considers Amazon as an application, whatever you are able to see in front of you, it's a user interface (images, searchbar, icon, texts.)

Now, what is this HTML, CSS, J.S

→ These are the technologies to build web applications

Where is it in application?



All these are HTML.

For ex: If i consider a Home → Door, walls, ceiling, Pillars, windows together form a home → That means it defines a structure of home

i.e HTML is used to give structure to web application

Now an application without design, color does not look good for that we use CSS.

Just like color, design for home Applications like Amazon, for the existing structure adding styling to it is CSS.

What if the application is ~~plain~~ completely white without colors & what if images are not aligned

So, using CSS we add styling, designing, aligning, animation

* It decides how HTML Elements should be displayed, & also help HTML structure & an application to be responsive web page.

What is responsive?
Any application which adjusts & align itself within the screen size & any device
Ex: Adjusting it's Elements within in mobile, Tablet, laptop screen size

For that we need to write media queries in CSS

Now, we can build non-interactive web application using HTML, CSS

In Amazon application if i add a phone to cart, automatically it gives response to you by adding it to the cart & it calculates the amount also → you create an item in cart
=> CREATE

* You update or increase no. of quantity to 2 → Now amount is automatically calculated → Update

* Now, you can delete an item if you do not want → Delete

i.e You can perform CRUD operation also.

This whole this is functionality
=> Creating a Dynamic & interactive web application is possible using Javascript.

Now, why we need React J.S (framework of Javascript)

* [framework - Collection of libraries]
[libraries -> Collection of pre written codes, where in you copy paste it]

* React J.S -> enhance the speed of programming building web application, Designing could be responsive & faster & easier

## WEB TERMINOLOGIES

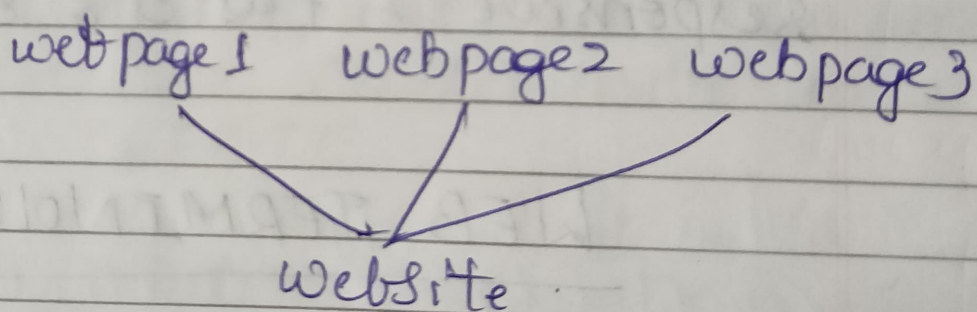
(1) Browser - Software applications used to access & view websites.
Ex: Google chrome, Mozilla firefox, Microsoft Edge, Safari

(2) Client -> One who receives the service Ex: Browser

(3) WWW → Collection of all the web resources & applications in the form of links & documents

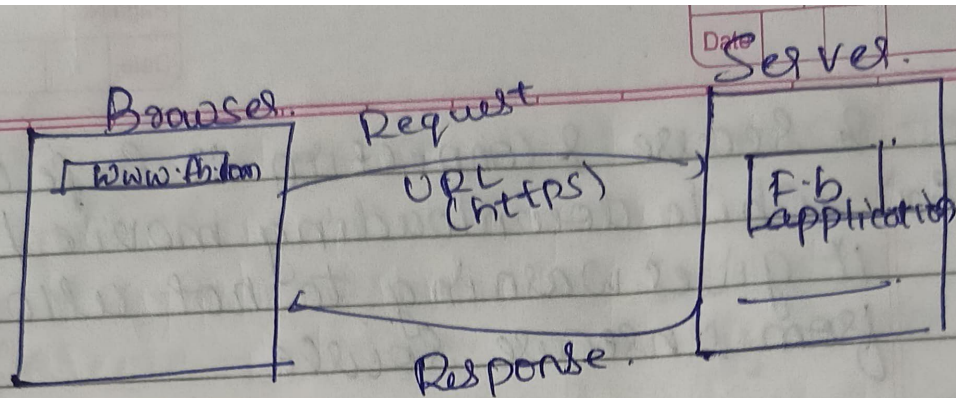
(4) Webpage → Documents in the form of links that you see using web browsers.
ex: In Flipkart application → Electronics, Clothing → all these are pages
(2) Instagram → About, Settings, Security are different webpages.

(5) Website → Collection of all these webpages → ex: Instagram (whole of application is website.




website is like a Book
webpages are pages (part of Book)

(6) Webserves → collection of all these website or Serves that Store, proces & delivers these application to Client in the form of Response.
ex: Apache, Nginx




where in the applications are already deployed in Server, it just sends whenever browser request.

(7) Ip address → Internet protocol
* It is a set of rules & regulation
* Unique numerical identifiers for devices made up of four numbers ranging from 0.0.0.0 to 255.255.255.255

Ex:- Wherever you are staying that is Ip address - unique address of your device
- IPV4 (less capacity)
- IPV6 (more capacity)

(Learn types of protocols like FTP PPP, SFTP)

(8) HTTP/HTTPS → Hyper Text transfer protocol secure
* It is used to send/receive data between website & browser
* It is encrypted → Security of data → protecting sensitive data
* Ie It follows rules while you Exchange data, whether data is safe

& Secure & connection is safe or not.
Ex: While downloading movie from Telegram it gives warning to not allow download from unsecure source.

(9) URL → Uniform Resource locator

Unique identifies to locate resource of your application on internet
* Each & every application has different URL
* Location of an application

https://www.amazon.in/deals1?ref=nav

Scheme
Domain name
Path
Query string
Parameter

Scheme → Security guidelines
www → world wide access of that application
amazon → application (destination)
.in → India → Top level domain
path → In amazon → Deal section is the particular path
Query/String → separator
parameters → extra information about application

Ex: you want to send a parcel to Jspiders

* Scheme -> Service (Postal kind of Security Service)
* Domain name -> mumbai thane.
* For some port no. will also be there -> Zip code
* path -> Jspiders building
* parameter -> 1st floor -> Specific & Extra information.

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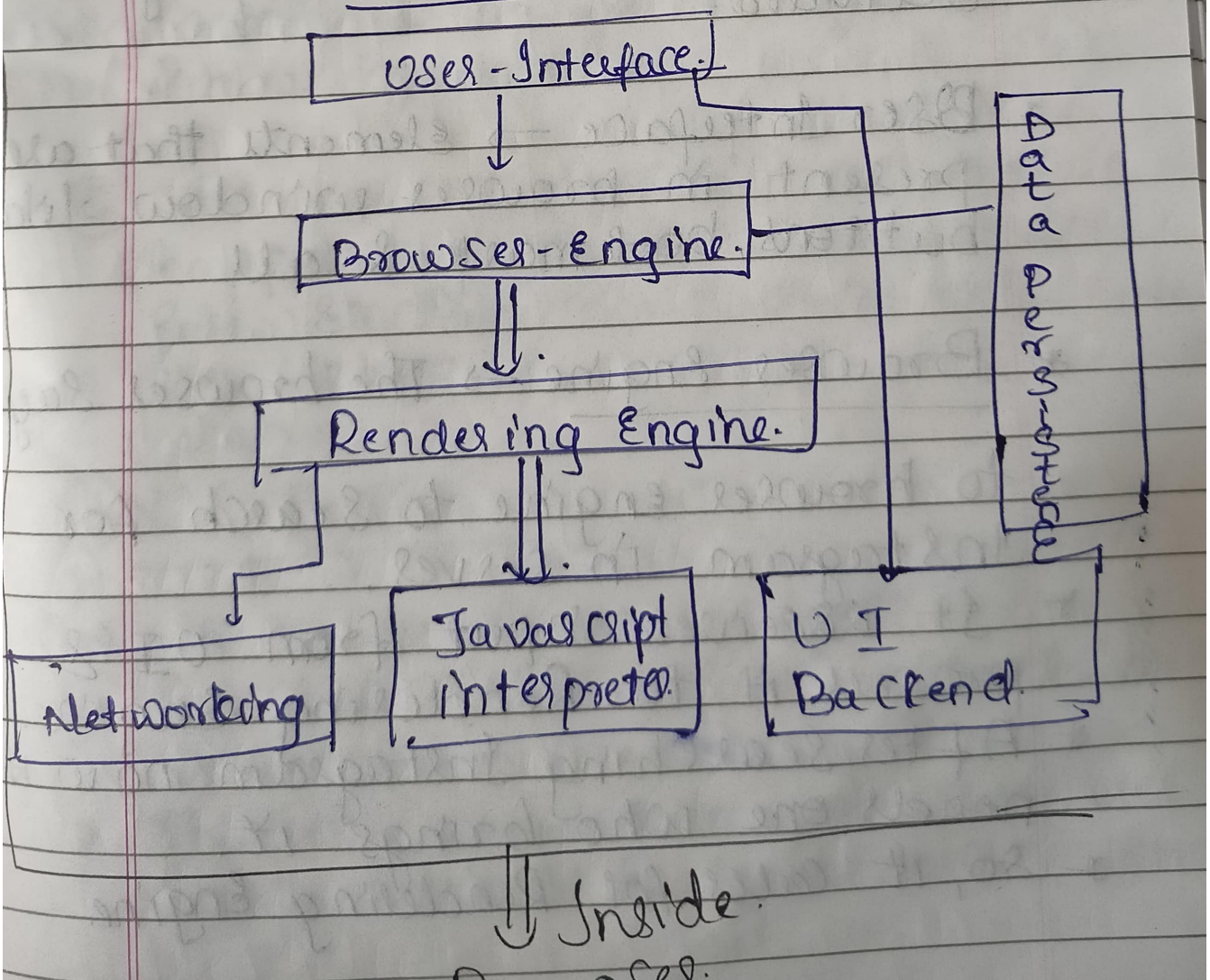
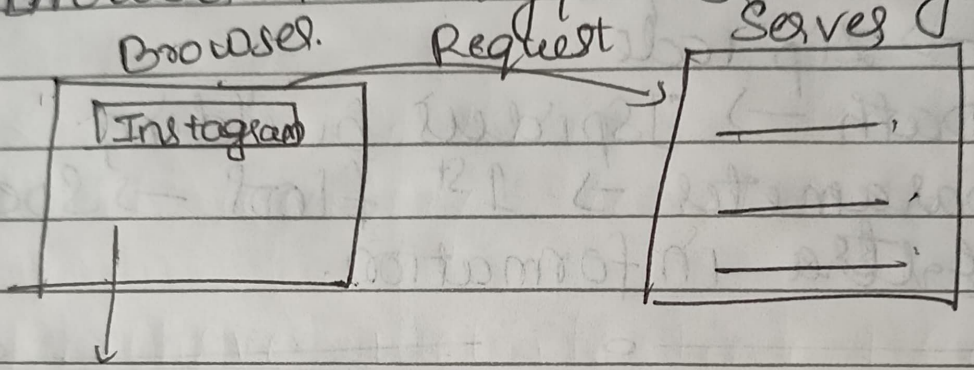
## Browser Components




Inside Browser.

Each & Every browsers has browsers components whether it's Google, UC browser, Internet explorer. Everything

Whenever you type something on browser i.e Type Instagram




Components present in browser gets activated.

* User Interface → Elements that are present in browser window like buttons, bookmark & all
* Browser Engine → The browser says to browser engine to search for Instagram in server.
* It receives input from UI & process it to Rendering Engine.
* After searching Instagram now it needs one who brings it.
* So, it calls for Rendering Engine.

(3) Rendering Engine.

* Rendering engine → It displays requested content
* It interprets only HTML & CSS codes & form a layout for it & gets it to Browser Engine
* But one more person is remaining i.e Javascript.
* Rendering Engine will call for Javascript Interpretes.

(4) Javascript Interpretes →

* Only interprets JS code in a website & brings it & gives it to Rendering engine.

(5) Networking → While all this is happening networking makes sure exchanging of data is secure i.e HTTPS

(6) UI Backened

* It is like basic widgets like Select box, Input box & Checkbox
  ☐ I accept terms & conditions
* This is a users data given from users end so, this will be stored in UI backened

Ex:- In Amazon application → Redmi phone adding filters → Redmi amount → 10,000 to 20,000

* Filter is added for personalisation of product → This data is from users end & this will also be stored in UI Backened.

(7) Data persistence → Browsers need locally stored memory.

* Whichever website, link, URL you are visiting it should be stored in local history of your browser.

Ex:- Amazon application (website) clicking on Redmi phone is link → This will be in Data persistence.

* If you visit facebook → That link will be stored locally.
* Like your cookies (Temporary stored data)

Explanation → type amazon on browser → So suddenly browsers says to browser Engine to get amazon application Browser Engine searches it (it only search) on Server.

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Rendering Engine -

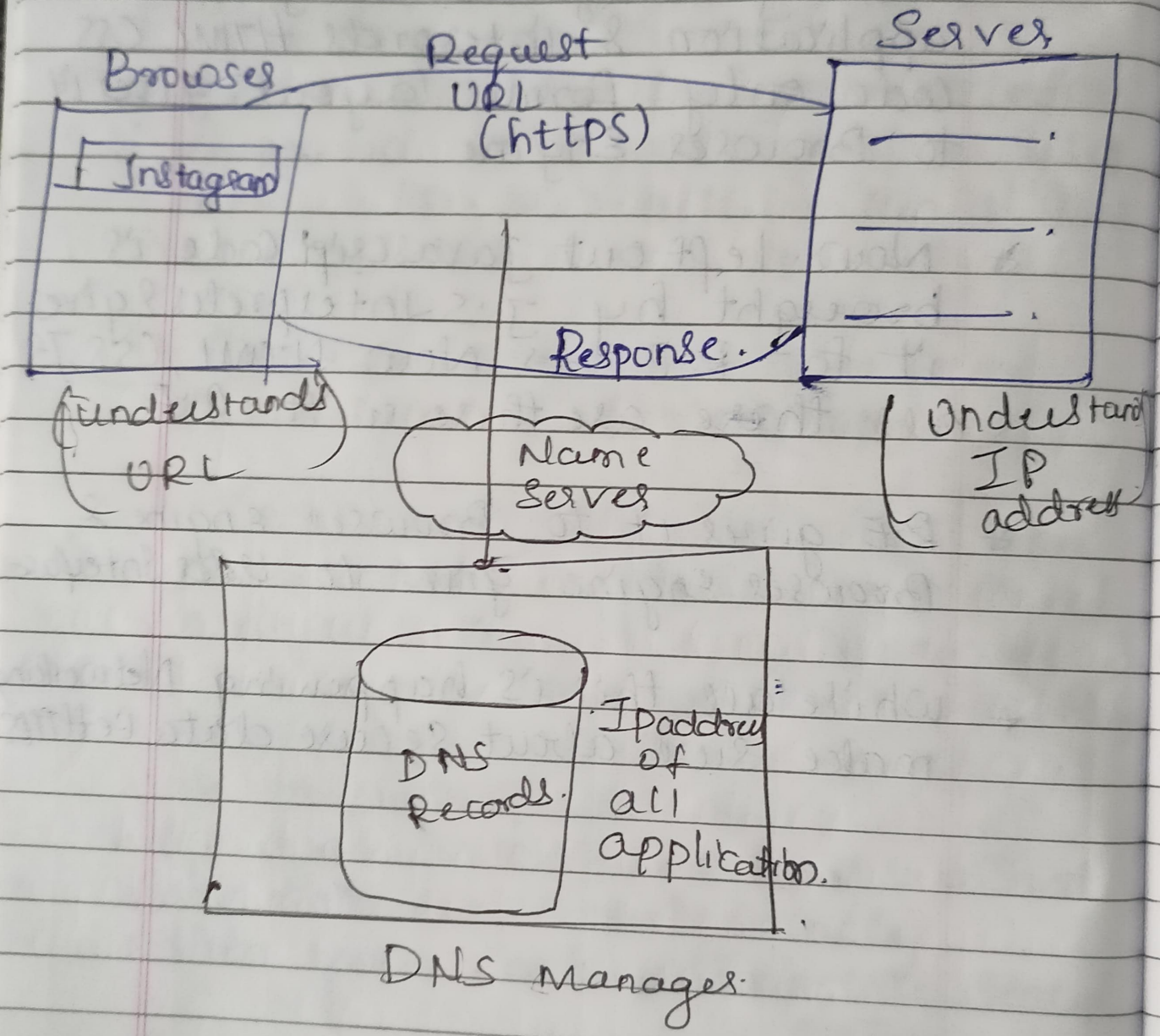
- Now Browser Engine says to R·E to bring Amazon & R·E goes to application & interprets HTML CSS code only forms layout gives it to Browser Engine

- Now left out Javascript code is brought by J·S Interpreter & gives it to R·E → Now HTML, CSS, JS all these are there with R·E

- R·E gives it to Browser engine & Browser engine gives to UI Interface

- While all this is happening Networking make sure about secure data i.e HTTPS

# How web works




* So, Type Instagram on Browser & the request is sent to Server But the Server understand only 1 language that is IP address

But the request from Browser is sent in the form of URL (https) while browser understands only URL

Now we need a translator or a person who understands both the language;

So, we have somebody called DNS → Domain name Server (which is like a phonebook) which keep track of domain name & IP address

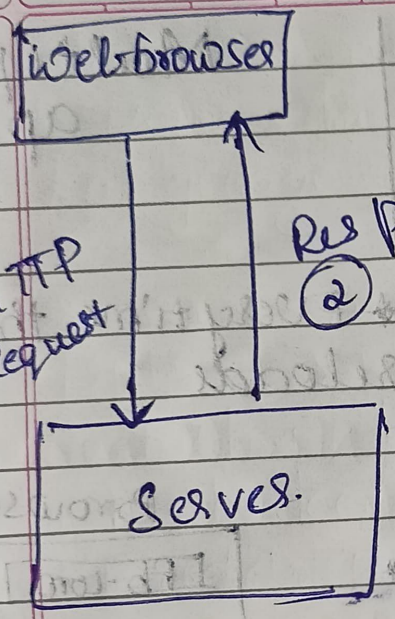
- DNS → has Ipaddress of all application.
- Now the URL (https) from browser goes to Name Server i.e www.Instagram.com
- Name Server → which asks the DNS manager (which has a records of applications & Ipaddress
- ~~DNS~~ Name Server search for IP address in DNS records & translates Domain name (~~Facebook~~ Instagram) to Ipaddress i.e 222.111.555

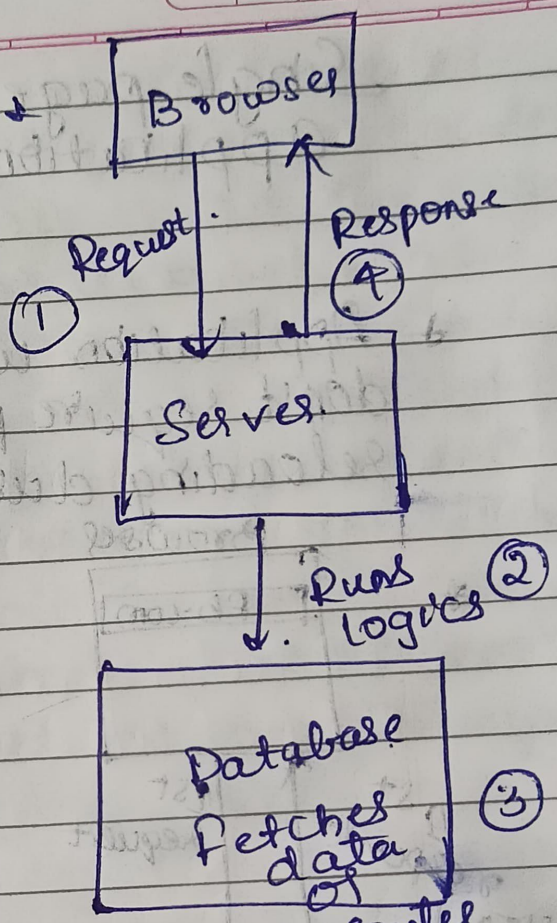
Remember: Name Server takes only Domain name from URL → www.Instagram.com
↳ This will be translated to Ip address

Now, the Name Server will send back the Ipaddress of Instagram to brauser.

* And browser sends request to Server again.
  www.222.111.555.com & receives response from Servs.

| Static webpage | Dynamic webpage |
|---|---|
| * Static pages which remains same for all until developer changes it manually | * These pages where information is different for different people & also user can change something |
| Ex: Wikipedia, Byju's or any other educational website resume sites | Ex: E-commerce website like Amazon, myntra, Instagram |
| * User cannot interact | * User can interact with it. |
| * Here user cannot change anything | * For example user can change login credentials, settings, applying filters for products & feed for Instagram changes for all |



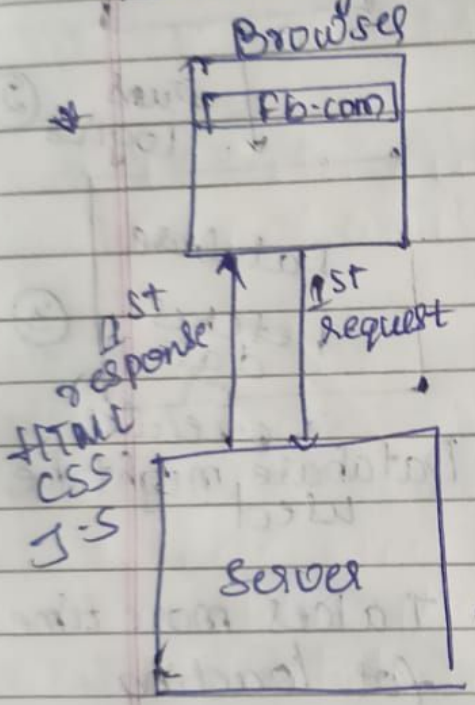

* Do not have
* No Database
* Takes less time to load
* Languages used are HTML, CSS, J.S
* Cost of designing & time is less
* Less secure

* Database might be used
* Takes more time for loading
* Here AJAX, ASP are used
[AJAX → Collection of web technique to load pages instead of whole application]
* More complex in building it.
* Prone to hacking

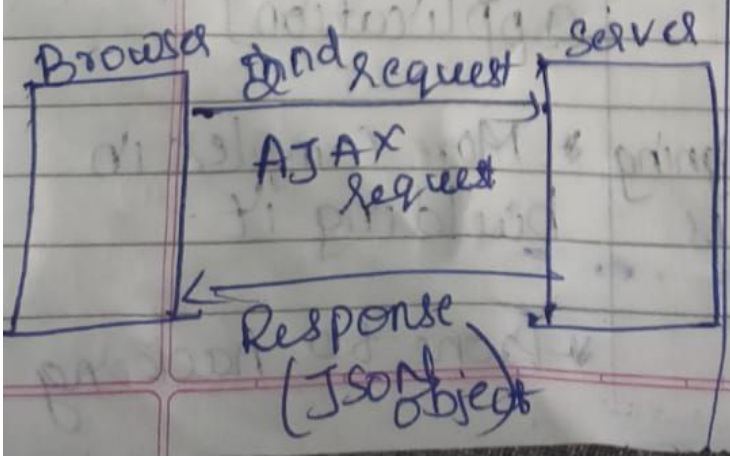
Date

## Single page application

- Application which don't require page reloading during use

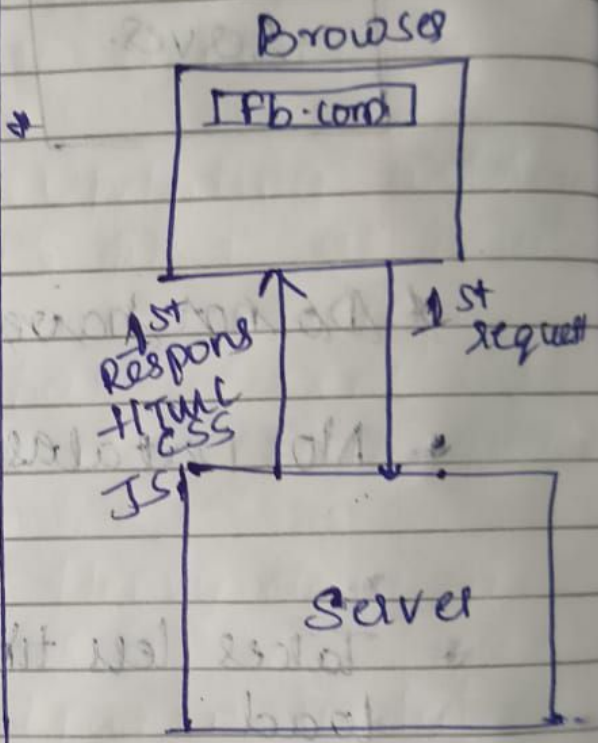



- When browser sends request for 1st time response it's in the form of HTML, CSS & JS.

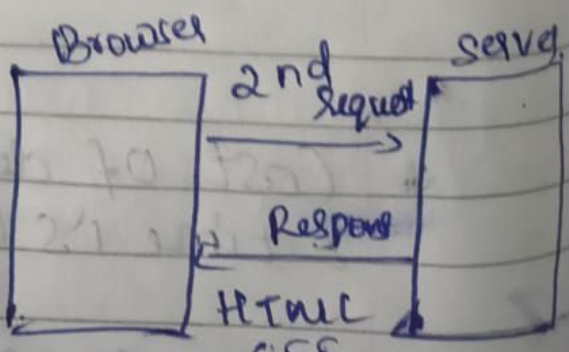



## Multi page application

- Every time the page reloads




- Same



Page No.
Date

- Does not hit the server multiple times
- After the 1st page loads all interaction with the server happens through AJAX request (which will only ask for particular page to load & not entire application)
- The Response is in the form of JSON object (Stores data)
- Then uses this stored data whenever it needs
  ex:- Fb, Twitter, Insta, Gmail
- SEO → Search engine optimization
  → It faces issue with SEO
- Takes less time to load but initial load is more.
- Angular, Vue, React, Ember are used.

- After 1st request & 2nd request of multiple request the response will be HTML, CSS, J.S only
- It hits the server for every request
- Entire application will be loaded every time request is sent
  ex:- Amazon, Newyork times, eBay
- When it comes to Search Engine Optimization it does not face any issue
- Initial load is fast but after that takes more time to load
- performance is slow compare to SPA
- HTML, CSS, J.S, React, jQuery

| | |
|---|---|
| * But is less secure cross site scripting is an issue<br>* Attackers can take advantage & hack | * Less security issues |
| * Takes time but less than MPA | * Needs more time to develop |
| * Updating website is not an issue | * Updating website is an issue because each & every page has different URL & it's challenging |
| * These kind of applications give lot of load to users browsers & not server side. | * Heavy data at the server side since only 1 page is loaded at the browsers for once |

Date

## Search Engine Optimization

* It is for the website visibility in search engine results pages
* It helps search engine or browsers engine to understand a website's content & helps users find it when searching
* Based on that your pages & website ranks ~~higher~~ are provided

Here, In SPA & MPA.

* As user when you use MPA as it is built using multiple pages & has different URL so, the google searches & hits the server everytime & SEO notes the URL everytime so, it notes down multiple time making MPA website rank higher while SPA ranks lower.

## Cross-Site Scripting (XSS)

-> Type of injection given at browser side script sending malicious scripts & gives authority to change the codes at clientside