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This is a NTCC report written by Mr. Sumit Gupta.

Topic: Front-End Development

Topics included

What is Web Development

Web Development is the kind of progress-based coding or programming that licenses website full handiness to fulfill the owner's necessities. It deals with the non-arranging portions of making websites including coding and creating its markup.

Web development is exhaustively associated with making websites for working with internet or intranet. This fuses web-designing, web-content development, client side writing and network security plans.

Making basic web pages to complicated web-based applications, social networking applications, and computerized business-based applications that's what web progression is all about..

It has the following hierarchy:

1. Client-Side Coding
2. Server-Side Coding
3. Data technology

Details about Website

->What is a website?

A website is a collection of web pages and content with a common domain name that are hosted on at least one web server. The WORLD WIDE WEB (WWW) is made up of all publicly acknowledged web sites.

->What is a web browser?

Websites can be accessed on a variety of systems, including computers, laptops, cellphones, tablets, and other smart applications. A web browser is a software application that allows these devices to access the website. Chrome, Mozilla, Safari, and Firefox are examples of web browsers

->What is a Web Server?

On the World Wide Web, a web server is a software that can manage client requests. It hosts one or more websites and handles HTTP and other protocols networking requests. It keeps a record of web pages and delivers them to users based on their request. Hyper Text Transfer Protocol (HTTP) is used to communicate between the client and the server (HTTP).

-> Working of a Website:

When we type a web URL into our browser, the browser contacts the DNS server to get the exact location of the website's server. Then it sends an HTTP request message to the server for a client-side copy of the webpage. If the server authorizes the request, the website's files are sent to the browser in a series of data packets. The browser then combines the little data packets all into a small website and presents it to us.

Parts of Web Development

Web development can be divided into two parts Front End development and Back End Development. They both are equally important for developing a website. A coder who knows both back End and Front-End development is called a "Full Stack" Developer.

The details about Front End and Back End Development is discussed below-:

->Front End Development:

Front-end web development, commonly referred to as client-side development, is the method of constructing HTML, CSS, and JavaScript for a website or Web application such that a user can see it and interact with it directly. When viewers open a website, the purpose is for the information to be presented in an easy-to-read and relevant way.

Front end languages:

- ➢ **HTML**
- ➢ **CSS**
- ➢ **Java Script**

->Back End Development:

The Back End is responsible for the website's essential functionality and is kept secret from the user for their security. Back-end developers are concerned that users should be unaware of what is going on with the website. The website becomes more dynamic when it has a back-end.

When people connect with the Back End of a website, it is easier for the creators to engage with users for the website's primary goal. The Back End is responsible for keeping a database of various users and assisting them in completing tasks using tools and services provided by back-end programmers. The back-major end's goals are to engage people with the website and to keep the database up to date for various purposes.
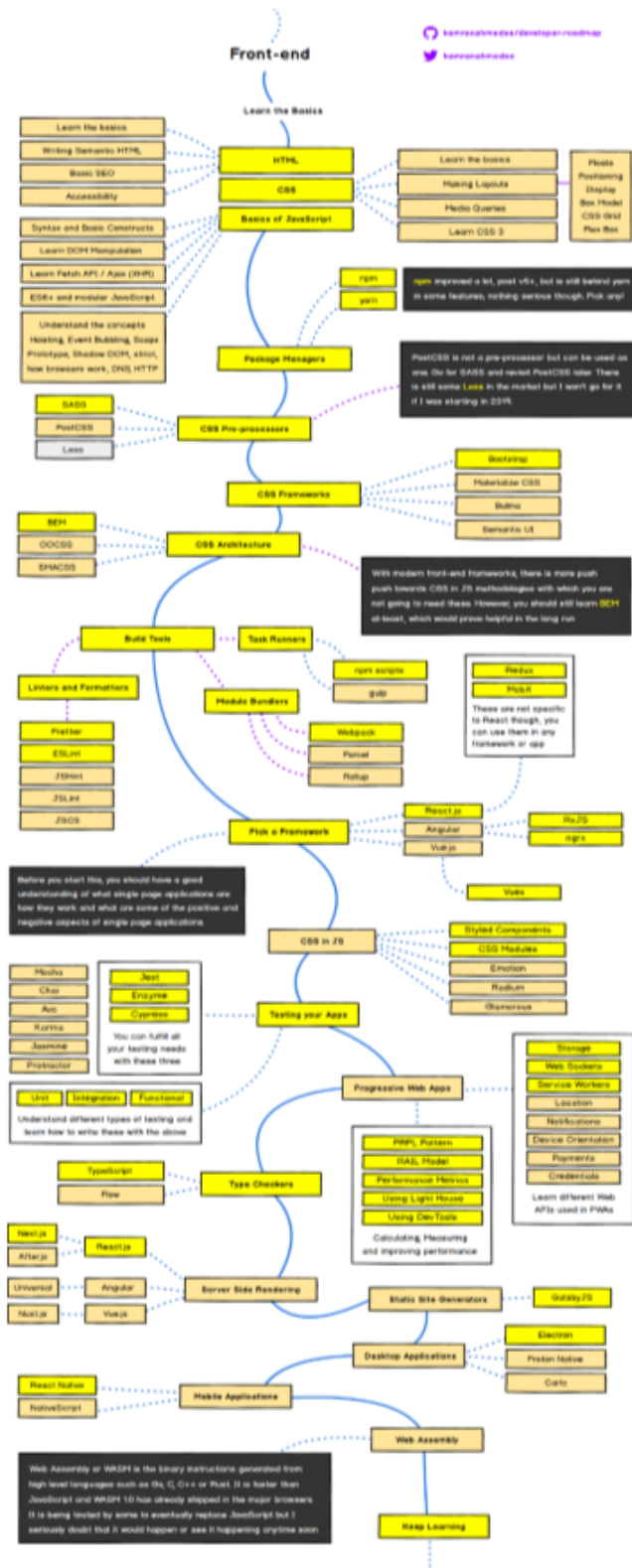
Back End languages:

➢ **PHP**

➢ **Ruby**

➢ **Python**

➢ **.Net**

Detail talks about Front End Development

->**What is Front End Development**

Front-end web development is the development of a user side development of a website or a Web Application using JavaScript, HTML and CSS, it allows users to see the website or use the web application and directly interact with them. There is a continuous development in this field hence a developer should keep a track of all the changes and improvements.

The goal of website design is to guarantee that when users visit the site, they view material in an easy-to-read and relevant format. The developer should keep in mind that the user uses different kind of devices and or web browser now-a-days hence the developer should keep this in mind and create a web site that is supported on all the web browsers, devices, screen type, resolution and hence should be platform independent.

Front-end

Learn the Basics

Learn the basics
Writing Semantic HTML
Basic SEO
Accessibility

HTML
CSS
Basics of JavaScript

Learn the basics
Making Layouts
Media Queries
Learn CSS 3

Floats
Positioning
Display
Box Model
CSS Grid
Flex Box

Syntax and Basic Constructs
Learn DOM Manipulation
Learn Fetch API / Ajax (XHR)
ES6+ and modular JavaScript

Understand the concepts
Hoisting, Event Bubbling, Scope
Prototype, Shadow DOM, strict,
how browsers work, DNS, HTTP

npm
yarn

npm improved a lot, post v5+, but is still behind yarn
in some features, nothing serious though. Pick any!

Package Managers

PostCSS is not a pre-processor but can be used as
one. Go for SASS and revisit PostCSS later. There
is still some Less in the market but I won't go for it
if I was starting in 2019.

SASS
PostCSS
Less

CSS Pre-processors

CSS Frameworks

Bootstrap
Materialize CSS
Bulma
Semantic UI

BEM
OOCSS
SMACSS

CSS Architecture

With modern front-end frameworks, there is more push
push towards CSS in JS methodologies with which you are
not going to need these. However, you should still learn BEM
at-least, which would prove helpful in the long run

Build Tools
Task Runners

npm scripts
gulp

Redux
MobX

These are not specific
to React though, you
can use them in any
framework or app

Linters and Formatters

Module Bundlers

Prettier
ESLint
JSHint
JSLint
JSCS

Webpack
Parcel
Rollup

Pick a Framework

React.js
Angular
Vue.js

RxJS
ngrx

Vuex

Before you start this, you should have a good
understanding of what single page applications are
how they work and what are some of the positive and
negative aspects of single page applications.

CSS in JS

Styled Components
CSS Modules
Emotion
Radium
Glamorous

Mocha
Chai
Ava
Karma
Jasmine
Protractor

Jest
Enzyme
Cypress

You can fulfill all
your testing needs
with these three

Testing your Apps

Storage
Web Sockets
Service Workers
Location
Notifications
Device Orientation
Payments
Credentials

Learn different Web
APIs used in PWAs

Unit **Integration** **Functional**

Understand different types of testing and
learn how to write these with the above

Progressive Web Apps

PRPL Pattern
RAIL Model
Performance Metrics
Using Light House
Using Dev Tools

Calculating, Measuring
and improving performance

TypeScript
Flow

Type Checkers

Next.js
After.js

React.js

Universal

Angular

Nuxt.js

Vue.js

Server Side Rendering

Static Site Generators

Gatsby JS

Electron
Proton Native
Carlo

Desktop Applications

React Native
NativeScript

Mobile Applications

Web Assembly

Web Assembly or WASM is the binary instructions generated from
high level languages such as Go, C, C++ or Rust. It is faster than
JavaScript and WASM 1.0 has already shipped in the major browsers
It is being touted by some to eventually replace JavaScript but I
seriously doubt that it would happen or see it happening anytime soon

Keep Learning

-> <u>Web Development through HTML, CSS and JavaScript:</u>

A website is saved on a server, which is a computer in its own sense. The index.html file is used to save the homepage. This index.html page is sent when a browser requests a website and is then executed by the browser.

• HTML provides a web page organization and governs how and where the page's elements will display.

• CSS is used to give our website design and formatting such as colour scheme, image, margin, space, dimension, layout, and so on.

• Java Script is used to make web pages more lively and to add special effects such as visualisations, rollovers, and rollouts, along with other features. It is used in the development of both the front and back ends.

-> <u>Introduction to HTML:</u>

HTML stands for Hypertext Markup Language and is the standard markup language for creating web pages. HTML files can be read by web browsers and converted into visual or audible web pages. HTML is a markup language, not a programming language since it technically represents the structure of a webpage as well as appearance cues.

1) **Features of HTML:**
   - HTML files are written in ASCII code so that the user can design his page by using any text editor as well as a web browser.
   - HTML is not case sensitive.
   - HTML is platform independent.
   - HTML is made up of numerous "tags" that tell the browser how to display any HTML element within desired manner, such as layout, background, headings, and text on a web page.
   - HTML permits us to surf the internet, which is only mainly owing to the Hypertext concept. Hypertext refers to other web pages or text, and if a user clicks on it, the user will be taken to the mentioned web page.

2) **HTML tags:** The base of HTML and XHTML documents is defined by the <html> tag in HTML. The <html> tag alerts the browser that the document seems to be in HTML format. It, along with the<!DOCTYPE> tag, serves as the second outer container for everything in an HTML document. Starting and ending tags are required for the <html> element. In simpler words HTML tags are pre-reserved words encased in a pair of angle brackets (< >) that specify how our web browser should format and display material or content. If <div> is the initial tag, then </div> is the ending tag.

Syntax-: <html> HTML Contents... </html>

```
<!DOCTYPE html>
<!-- html tag starts here -->
<html>

        <body>

            <h1>GeeksforGeeks</h1>
            <h2><html> Tag</h2>

        </body>

</html>
<!-- html tag ends here -->
```

Few of the basic HTML tags are:

- <html> -> is the root element
- <head> -> is for the document heading
- <title> -> is for our web page's title
- <body> ->is for our web page's content
- <p> -> it's a paragraph tag for including a paragraph
- <a> -> it's an anchor tag for including links in our web pages, etc.

-> CSS Introduction:

CSS is a style sheet language for describing the appearance and styling of a document authored in a markup language. Although it is most generally used to alter the style of HTML and XHTML web pages and user interfaces, the language may be applied to all types of XML document, including plain XML, SVG, and XUL. CSS is a cornerstone technology used by most websites to produce

visually attractive webpages, user interfaces for online apps, and user interfaces for many mobile applications, alongside HTML and JavaScript.

1) Styling of HTML using CSS:

CSS can be applied to HTML elements in three different ways:

- Inline CSS: This is CSS that is applied to an HTML element as an attribute. It is the most significant.
- Embedded or Internal CSS: This is CSS that is written within the same HTML file. It is used to define the Style of a single HTML page. It has a lower precedence than the one before it.
- External CSS: This CSS is written in a separate file and then referenced in an HTML document. It is used to define the style of more than one HTML page. It is the least significant.
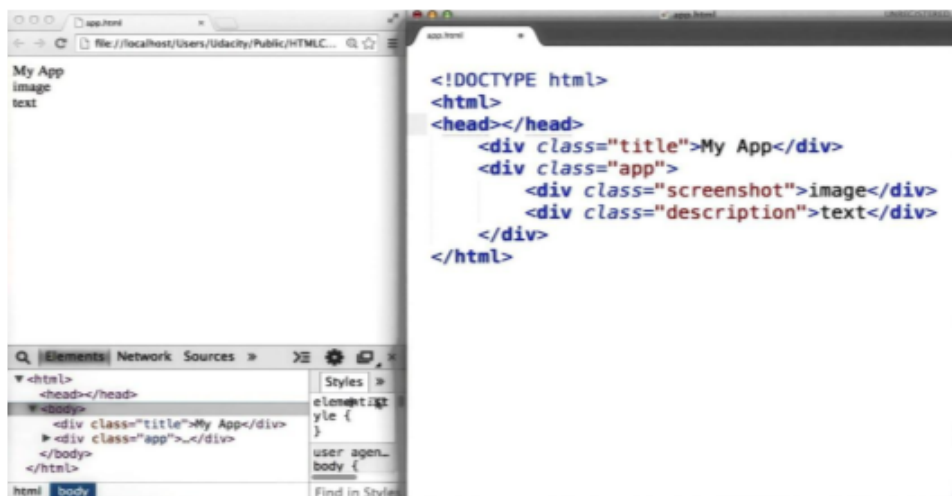
2) Advantages of CSS:

- Saves time: CSS reduces the amount of time it takes to complete a task. We only need to write CSS once, and the same CSS sheet can be used on various HTML pages. Secondly, we don't need to write HTML attributes every time we use CSS. As a result, fewer lines of code mean faster processing.
- Multi-Device Compatibility: CSS has special features that allow us to build responsive websites. A responsive website is one that fits to several devices such as desktops, laptops, smartphones, tablets, and other mobile devices.
- Quick and easy to maintain: CSS files are simple to keep up with. If we need to modify the styling of elements across the board, we can simply change the CSS instead of updating the styling of each element separately.
- Better styles: CSS offers a considerably larger set of characteristics than HTML does. As a result, we can give our web pages a far nicer look than HTML by using CSS.

-> Introduction to JavaScript:

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JavaScript is a dynamic, interpreted object-oriented programming language that can be used to make web pages interactive. JavaScript is capable of running on both the client and the server's system.

When we visit a website, we, or the client, request it from another computer that has the webpage stored on it (also known as the server). After that, the server delivers a bunch of files to our device (HTML, CSS, and possibly some JavaScript files). So, this is how we communicate with the website; JavaScript is used by the majority of websites, and it is accepted by all modern web browsers without the need for plug-ins.

1) **JavaScript as a client-scripting Language:**
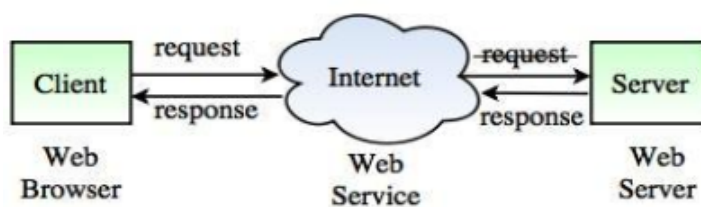
Fig. Client-Side Scripting

The most popular application of JavaScript is as a client-side scripting language. This entails embedding JavaScript code into an HTML page. When a user requests an HTML page that contains JavaScript, the script is transmitted to the browser, and the browser decides what to do with it.

Because the script is embedded in the HTML page, anybody who visits it will be able to see and copy it. Nonetheless, this openness is, in my opinion, a significant benefit, because the flip side is that you may see, analyse, and utilise whatever JavaScript you come across on the internet.

JavaScript can be used in situations other than web browsers.

2) **Advantages of JavaScript:**
- Fast and Ease of use: As a client-scripting language, JavaScript is much easier to understand and use. Furthermore, it is extremely quick because its code can be implemented immediately rather than waiting for a response from the server.
- Interpreted: Since JavaScript is an interpreted language, it can be executed without the need for a compiler.
- Platform independent: Any web browser that supports JavaScript may comprehend and

interpret JavaScript code. As a result, it is platform flexible.

- Effortless Testing and Debugging: Since JavaScript code is translated line by line, errors are highlighted along with the line number, making it simple to correct and rerun.

-> **Web Assembly**

1) **Web Assembly as an alternative client-scripting Language:**

Web Assembly is a new kind of code that can be executed in contemporary web browsers and offers a number of new capabilities as well as significant speed improvements. It's not meant to be written by hand; instead, it's meant to be an efficient compilation target for source languages like C, C++, Rust, and others.

This has enormous ramifications for the web platform since it allows code written in different languages to run on the web at near-native speeds, as well as client programmers that couldn't previously run on the web.

2) **Advantages of Web Assembly:**
   o The World Wide Web Consortium's (W3C) open web standard
   o Small file sizes and high performance
   o Ideal for surfing on a mobile device
   o In theory, even virtual reality apps might run in a browser.
   o There is no requirement to learn a new programming language.
   o Web apps may now be written in C, C++, and Rust.
   o All of the main browser makers support it.
   o There are no restrictions for users.

->**Brief information about Search Engine Optimization**

Search engine optimization is the art and science of getting websites to rank higher in search engines such as Google (SEO). Because search is one of the most popular ways for people to get information online, ranking higher in search engines can result in more traffic to a website.

Paid advertising frequently appear at the top of the results page in Google and other search engines, followed by ordinary results, or what search marketers refer to as "organic search results." To distinguish organic search traffic from sponsored search traffic, SEO traffic is commonly referred to as "organic search traffic." Paid search is also known as search engine marketing (SEM) or pay-per-click advertising.

->Importance of Front-End Development

1.Initial Appearances

A company's homepage is typically its first impression as well as its first engagement with clients in an increasingly web-based world. The website's programmers must consider this while devising an effective front end development approach. The website's beauty is insufficient on its own. It must be appealing to the sort of client the firm intends to attract, and it must provide exactly what these customers require right away. It represents the company's profile in the same way as a first encounter does, giving it a crucial first impression.

2.Purpose of Business

Even if a focused development strategy produces a user-friendly, inviting online experience, it will not completely assist a company unless it also communicates the company's actual purpose. When customers see a website's design and visuals, they should not be confused. Instead, they should connect with it right away and learn what they can do with it. In a market where attention spans are dwindling year after year, the use of HTML, JavaScript, and other development technologies is critical in crafting this concise yet powerful message.

3.Branding that works

With powerful, well-planned branding, effective websites connect in with corporate logos, goods, designs, and all other elements. The importance of front end development in expressing this identity to clients cannot

be overstated. To assist people readily identify a business's website with their items elsewhere, it must use the same or comparable colours, language, and images. It establishes these relationships both online and offline, allowing customers to stay loyal to their favourite companies through easy familiarity. For the same reason, branding icons and trademarks are crucial to the appearance and feel of a business website.

4.Confidence and trust

Customers are unlikely to return to a website that has run-time faults, bad visuals, HTML difficulties, and other issues on a regular basis. When a customer's confidence is betrayed, a business loses money as well as the promise of loyal customers who will tell their friends and family about the product. A well-planned and consistently clean layout, as well as structured, clear visuals, help a firm look professional and trustworthy, with clients expecting good service and ease of use.