**MODULE 1**

**INTRODUCTION TO THE PROGRAM**

**Front-end, back-end and full-stack developer roles:**

Front end developer works on all part of the website that is visual to the user.

Main technology used: HTML, CSS, JavaScript

JavaScript is the most critical skill for front-end development.

A back end developer works on the parts of the website or the web app that the end users don’t see.

Responsible for creating and maintaining the functionality.

A full stack developer is someone who is equally comfortable with front end and back end technologies.

**HOW THE WEB WORKS**

**-** Network switch connects multiple devices and allows them to communicate with each other. The network switch can connect to other network switches and now two networks can connect. These network switches then connect to more network switches until you have something called interconnected network. This interconnected network is called the internet.

- When we use website or video streaming services on the internet, these are provided by computers called servers. Our devices are called clients. This is known as client-server model.

- The data travel through large undersea cables connecting the world’s networks. These cables can transfer huge volumes of data per second.

- A server is a computer that runs applications and services ranging from websites to instant messaging. It’s called a server because it provides a service to another computer and its user also known as the client.

- Typically stored in data centers.

- We will learn about web servers:

Website storage and administration.

Data storage.

Security.

Managing email.

- A web page is a document that displays images, texts, videos and other content in the web browser whereas a website is a collection of web pages that link together.

- A web browser is a software application that you use to browse



- The browser and server communicate using a protocol known as the Hypertext Transfer Protocol or HTTP.

- This exchange of information is made possible by something known as the request response cycle.

- Developers can launch website to the internet using something known as web hosting. Web hosting is a service where you place your website and files on the hosting companies web server.

- You are essentially renting the space in return for stable and secure storage.

- Types of hosting:

**Shared hosting:** You share the service processing power, memory and bandwidth with other websites that might slow your performance. This website is best for small website with small number of visitors.

**Virtual private hosting:** It’s a virtual server with dedicated CPU, memory and bandwidth resources. Your website is unlikely to be impacted by the performance of other VPS instances. It will be more expensive.

**Dedicated hosting:** A hardware server that is dedicated to you only. Will be more expensive than VPS hosting.

**Cloud hosting:** Your website is run in something called a cloud environment, which spans across multiple physical and virtual servers. If a physical or virtual server fails, your website will run on a different server and stay online. You can use as many resources without hardware limitation. This is how major of web application operate.

**CORE INTERNET TECHNOLOGIES**

**Introduction to Internet Protocols**

- IP addresses function much like addresses in a postal system that make it possible for packets of information to be delivered.

- IP packets include destination IP address and source IP address.

- Packet can get out of order, become damaged or corrupt or lost.

- Transmission Control Protocol can solve those issues.

- UDP solves the corrupt package issues. Suitable for voice call or live video call.

**Introduction to HTTP**

- Core operational protocol of the world wide web.

- Enables your web browser to communicate with a web browser that hosts a website.

- Request-response based protocol.

- HTTP requests consists of a method, path, version and headers.

- Most commonly used HTTP methods are: GET, POST, PUT and DELETE.



- Headers contain additional information about the request and the client that is making the request.

- Learn about status codes. (for e.g. 404 not found)

- HTTPS is a secure version of HTTP. It uses encryption for a secure connection.

READ READING PART FROM COURSERA APP

**INTRODUCTION TO HTML, CSS AND JAVASCRIPT**

- The web pages you visit everyday are based on three core technologies, HTML, CSS and JavaScript.

**OTHER INTERNET PROTOCOLS**

**-** Dynamic Host Configuration Protocol (DHCP)

- Domain Name System Protocol (DNS)

- Internet Message Access Protocol (IMAP)

- Simple Mail Transfer Protocol (SMTP)

- Post Office Protocol (POP)

- File Transfer Protocol (FTP)

- Secure Shell Protocol (SSH)

- SSH File Transfer Protocol (SFTP)

**WEBPAGES, WEBSITES AND WEB APPS**

**-** A typical web page is one single page that consists of HTML, CSS, JavaScript.

- A website is collection of web pages that link together under one domain name.

- A website can link to other website (Hyperlink)

- The key difference between a website and a web application is the level of interactivity and dynamic content. Website is more informative and web application is more interactive.

**DEVELOPER TOOLS**

- Most web browsers come equipped with a set of developer tools that allow developers to inspect their HTML, CSS and JavaScript code. Also, to trace HTTP request to the web server, investigate performance issues and review web page security.

- Right click on the web page and Inspect.

- Console tab logs JavaScript logs and errors from your web application.

- Sources tab shows all the content resolved for the current page. (Includes HTML, CSS, JavaScript, Images, Videos)

- The performance tab shows what the web browser is doing over time.

- The memory tab displays the part of your code that are consuming the most resources.

- Elements tab can be used to inspect the documents, HTML elements and their properties.



**FRAMEWORKS AND LIBRARIES**

- Some of your build problems have already been solved.

- Main key processes are already developed and contained in framework and libraries that are used in software development every day.

- Libraries are reusable pieces of codes that can be used by your application.

- Framework on the other hand provide a structure for developers to build with.



- Most frameworks use many libraries. The libraries that the framework uses can be used for your application. If you wish, your application can also use other libraries.

**API AND SERVICES**

- API stands for application programming interface.

- Set of functions and procedures for creating applications that access the features or data of an operating system, application or other service.

**WHAT IS AN IDE?**

- Am IDE (Integrated development environment) is software for building applications.

- It’s just like an text editor but instead of writing documents, you are writing code

**MODULE 2**

**WHAT IS HYPER TEXT MARKUP LANGUAGE?**

- Hypertext is text which contains links to other text.

- Markup refers to tags and elements used within a document.

- HTML is simply a text file with specific structure that consists of elements and tags.

- HTML files usually have a dot HTML suffix. ( for instance, when you visit a website, the first page that is returned to the browser is often called index.html)

- The current version of HTML is HTML5.

**HTML DOCUMENTS**

- You don’t need web to view HTML documents. (You can view them locally on your browser without needing a server to host it)

- Check project inside Module 2. You will find notes within the code.

**SIMPLE HTML TAGS**

- Headings allow you to display titles and subtitles on your web page

<h1> <h2>....<h6>

- Paragraphs contain text content. <p> </p>

- Line breaks <br> should be specified because line breaks in paragraphs are ignored by HTML.

- Strong tags can be used to indicate that a rage of text has importance.   
<strong> Don’t feed him chocolate. </strong>

- Bold tags can be used to draw the reader’s attention to a range of text.

<b>Red</b>

- Emphasis tags can be used to add emphasis to text.

Wake up <em> now </em> !

- Italics tags can be used to offset a range of text.

<i>HTML</i> stands for Hyper Text Markup Language.

- Emphasis tag and Italics both will have same visual effect in the web browser. The only difference is the meaning.

- Lists

<ul>

<li>...</li>

<li>...</li>

</ul>

- Div tags

<div> .. </div>

**<!-- This is a comment -->**

**LINKING DOCUMENTS**

**-** To link different webpages together use Anchor Tags. Create hyperlinks to link pages together.

<a href="location.html">Our location</a>

**ADDING IMAGES TO A WEBPAGE WITH HTML**



- Location of the image should be stated.

- Although there are various ways to specify the dimensions of an image, in this lesson its done from HTML.



Two attributes; width and height are added.

- It is a good practice to add a short description for images. It helps improve accessibility for people using assistive touch and can also improve search engine rankings. You can add image descriptions with the alternative text attribute also known as the alt attribute .

Example:

alt=”A pasta salad”

The alt text is not displayed anywhere on the site but will be read by assistive technologies such as screen readers.

**USE HTML TO WORK WITH DATA IN TABLES**

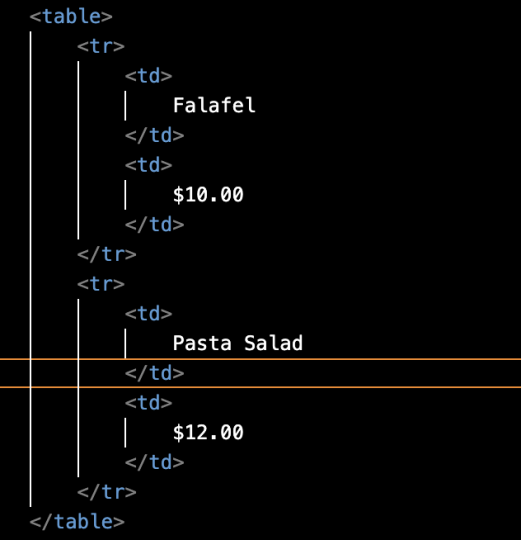
**-** Allow you to neatly organize content in rows and columns.

- Websites almost always have information that needs to be organized in a way that makes it quick and easy to read. For example, the schedule of an event, available sizes of clothing items, or the specs of a camera.

- Use <table> tag. And follow with table row <tr> tag.

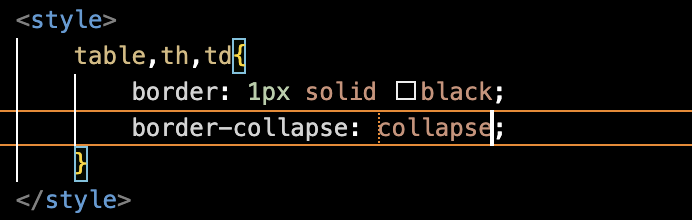
- Inside table row tag, add table data <td> tag.

- Table data tafs define the contents of table cells.



- To put a header on the top of the table use table header <th> tag inside a table row <tr> tag.

- CSS can be added to improve the styling of the table.



**WHAT ARE FORMS?**

**-** One of the functionalities that makes online shopping possible is HTML forms. Without them, you wouldn't be able to enter credit card details during checkout.

- Forms are not only limited to e-commerce, when you log into your favorite website, you do it using a form.

- Forms also have an optional form attribute called action. Actions specifies the URL or path that the form should submit the request to.

- When the action attribute is not specifies, it submits the request to the same path as the current web page.

- There are two HTTP methods to submit the form data, GET and POST.

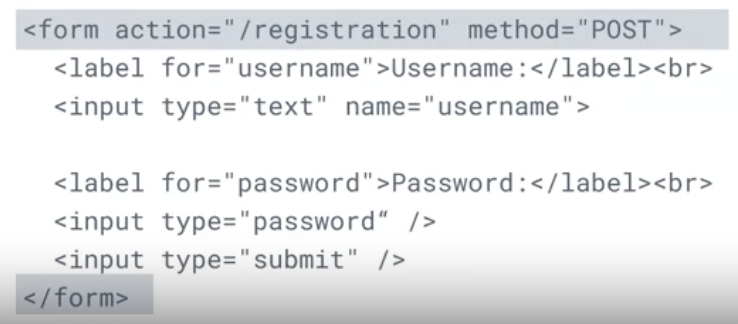
- The GET HTTP method retrieves information from the server. The POST HTTP method sends data to the server.

- The fields in a form are specified by input tags. Note that the input tag does not need a closing tag.

- Text input type displays a text field on the web page. Text box on its own isn’t very user friendly so a label above it should be added. By adding the label tag, the form will now display the word user name above the input text field.

- HTML also has an input type specif for passwords that will mask the user’s input data. The username will be visible and the password will be masked.

- A button is also added so that the user can submit the form.



- To add checkboxes to a form, use the checkbox input type. Each box can be checked or unchecked. You use the name and value attributes to configure how the data is sent to the server.



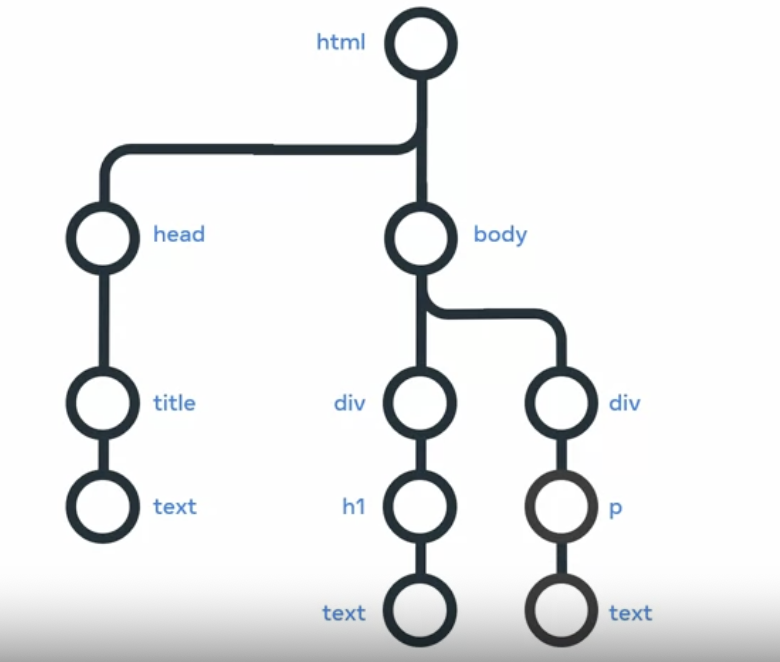
- Radio buttons are like check boxes except only one button can be checked in on the group. Checking one radio button will unchecked all the other radio buttons. There are also other types of inputs such as the number, email and file upload types. However, some input fields do not use the input tags. For instance the multi line text field. The text input type is only for single line text content.

- To allow users to enter multiple lines of text, text area tag is used.

**INTRODUCTION TO THE DOM**

**(Document Object Model)**

- An HTML document must be represented in a certain way, so that JavaScript code can query and update it, to do this we use the document object model.



- All the elements in the HTML file are represented as objects in the document object model.

- Web pages typically have hundreds of elements, more the elements more complex the DOM.

- You as a developer can use JavaScript to access and modify the DOM to make your web pages dynamic.

- Many JavaScript libraries and frameworks rely on the DOM, one of these libraries is the react library.

**WEB ACCESSIBILITY**

**-** You need to build a website in a certain way to improve accessibility.

- Access by everyone regardless of disability is an essential aspect of the web.

- Web accessibility aims to allow people with disabilities to understand navigate and interact with websites. A common misunderstanding is that it refers to visual disabilities but in fact it includes all disabilities that affect interaction with websites such as audio and visual disabilities, cognitive and neurological disabilities and specifications and supporting resources for accessibility. These are considered international standards for web accessibility.

- Screen reader software can read the content of websites and everything that is happening on the device. Screen readers are used not only by blind and vision impaired users but also by those with reading or learning difficulties.

- Speech recognition software can also turn spoken words into computer commands or dictate inputting text. This is useful for people who may not be able to use a mouse of keyboard due to physical or neurological disabilities, subtitles and video scripts and videos provide assistance to those with audio and visual disabilities.

- It is a good practice to think of accessibility from the beginning of a project, it is a lot harder to rework the project to be accessible later on.

- For example having text that is not contained within proper tags like paragraph or heading tags makes it harder for assistive technologies to interact with the content.

- Using multiple line breaks to break up text and add space also presents barriers to accessibility.

**CSS BASICS**

**SELECTING AND STYLING**

- A declaration block starts with a left curly bracket and ends with the matching right curly bracket. In between these curly brackets are the style declarations.

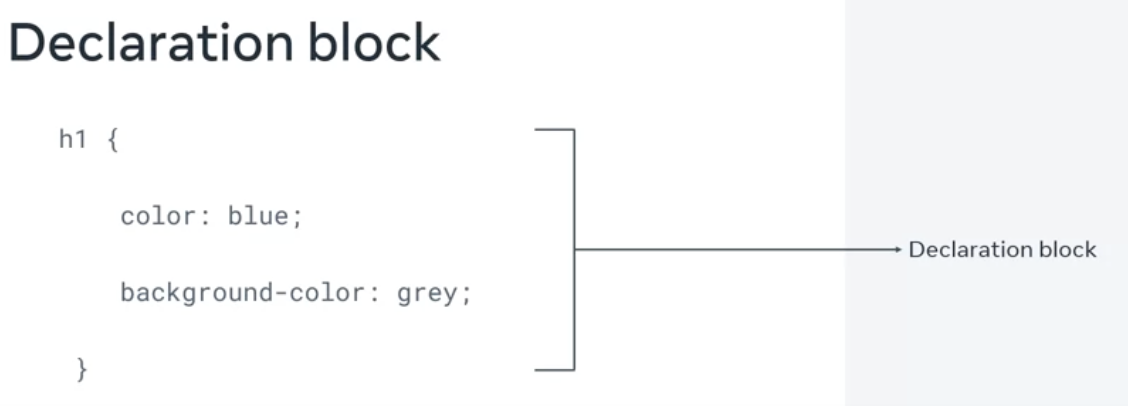


- Selector indicates which HTML element or elements we want to style. For example, you can create a rule that uses the h1 selector to change the color of all heading one tags in a web page ro gray.



(In this case, h1 is the selector, color is property and gray is the value of the property)

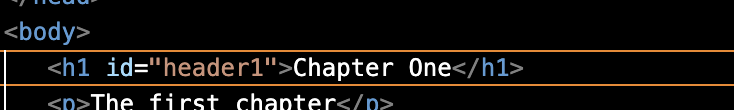
- Declaration block





- Adding CSS file and linking it to the HTML file.

- To only edit a single element (h1 in this example), an id attribute can be added.





- CSS has a set of hierarchy rules which dictate which rule will apply to an element.

- Learn about different type of selectors in CSS.

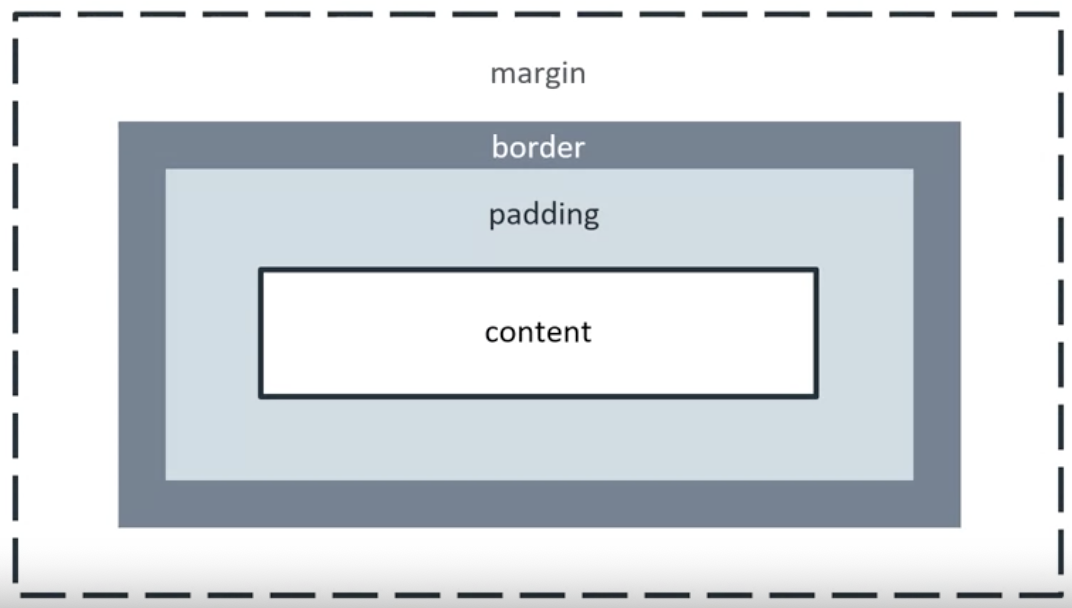
( Element Selectors, ID Selectors, Class Selectors, Element with Class Selector, Descendant Selectors, Child Selectors)

There are many other CSS selectors available to style your web page.

**BOX MODEL INTRODUCTION**

**-** When an HTML document and CSS style sheet are downloaded, the web browser needs to know how to display the elements on the screen. To do this, it allocates a rectangle or box to each element. CSS rules are applied to the boxes of the elements. This is known as the box model.

- Every box consists of four parts. The content, the padding, the border and finally the margin.



- The content is the actual content of the element, like the text or the image. It’s size is known as the content width and content height.

- The padding extends the content size. It’s size is known as the padding box width and the padding box height. The thickness is determined by padding-top, padding-bottom, padding-left and padding-right.

Padding Box Width = Content Width + Padding left-side + Padding right-side

Padding Box Height = Content Height + Padding top-side + Padding bottom-side

- The border goes around the padding and content. It’s size is known as the border box-width and border-box height.

You can set different types of borders, such as solid border or a dash border.

Border Box Width = Padding width + Border left-side + Border right-side

Border Box Height = Padding height + Border top-side + Border bottom-side

- The margin extends the bordering area to separate the element from it’s neighboring elements. It’s size is known as the margin box width and margin box height.

Margin Box Width = Border Box width + margin left-side + margin right-side

Margin Box Height = Border Box height + border top-side + border bottom-side

**DOCUMENT FLOW - BLOCK VS INLINE**

**-** The web browsers normal way of calculating the position of HTML elements on the screen is called document flow.

- By default, nearly all HTML elements are organized into one of two categories namely in block and in line elements.

- A block level element will occupy the full horizontal width of its parent element and the vertical height of its content.

- Each block level element will have a new line before and after. Therefore, multiple block level elements will stack on top of each other like a stack of boxes.

- In line elements only occupy the width and height of their content. They don’t appear on a new line, hence the name in line.

- Multiple in line elements can form a row of elements.

- While coding in HTML, you need to be able to recognize and use block elements. Some example of block level elements include the tags, div form and heading.

- You also need to be familiar with common in line elements. These include the tags anchor, image, input label, bold, italics, emphasis and span.

- You can make a block level element an inline element using CSS.



**ALIGNMENT BASICS**

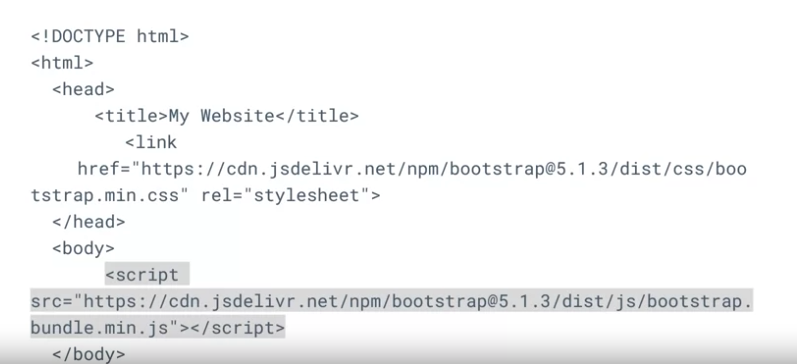
**-** Reading from MODULE 2 CSS Basics.

**MODULE 3**

**WORKING WITH LIBRARIES**

**-** You can build your website from scratch or you can use code that other developers created.

- One popular library you can use to develop user interfaces is the bootstrap library.



- For bootstrap you need to add CDN link to CSS style-sheet inside the <head> and add JavaScript CDN inside the <body> using <script> element.

- A package manager is a tool that automatically downloads and installs dependencies. We also refer to dependencies as packages.

- A package manager also provides the capability to publish your own packages.

- The most common package manager for front end development is the Node Package Manager or NPM.

**INTRODUCTION TO RESPONSIVE DESIGN**

**-** The size of a good website can so easily adjust between devices like laptops and mobile phone. That is responsive design.

- Responsive design means that a web page can automatically stretch or shrink depending on the screen its displayed on.

- Responsive design is a set of three practices that allows a website to automatically change its visuals. (To respond based on the device it is displayed on.)

- It is a combination of three techniques; flexible grids, fluid images and media queries.

- A break-point is the point at which a website’s content and layout will adapt to provide the best possible user experience.

**GETTING STARTED WITH BOOTSTRAP**

**-** Bootstrap is a collection of pre-written code chunks in CSS and JavaScript.

- The first element to add when setting up a Bootstrap website is the container elements.

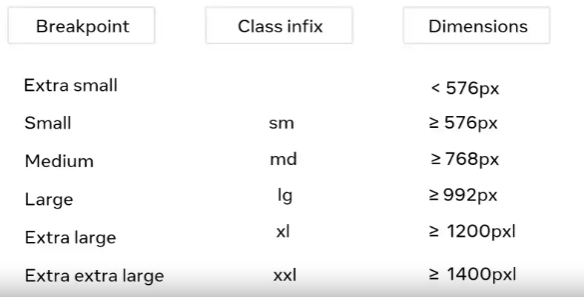
- An example code using bootstrap is given below:

- Bootstrap classes are used in the tags to incorporate bootstrap.



**USING BOOTSTRAP STYLES**

- Breakpoints are the triggers in bootstrap for how your layout changes across device or viewpoint sizes.



- There is no class infix for extra small because it is the default breakpoints in Bootstrap CSS rules. (Bootstrap is mobile first)

-

- List of modifiers available in bootstrap:



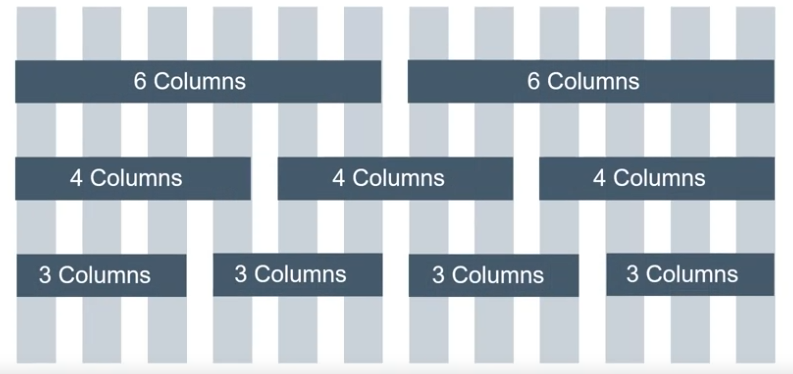
**BOOTSTRAP GRID**

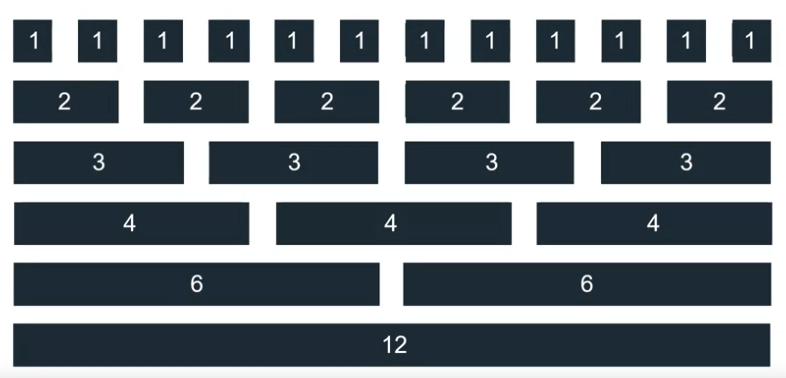
**-** Building a website using responsive design requires a responsive grid and responsive breakpoints. Bootstrap provides both of these as part of its library.

- The bootstrap grid system helps us to create web page layouts through a series of rows and columns that house our content.

- For the grid, bootstrap uses a 12 column grid system that can be fluid or fixed.

- The bootstrap grid system always has a container, rows and columns. The container is the root element of your grid.





**LAB**



**BOOTSTRAP COMPONENTS**

**-** Bootstrap includes a pre made set of UI elements and styles to help you build your website.

Ranging from alert messages to navigation menus. These are called bootstrap components.

**OTHER CSS FRAMEWORKS**

**-** Foundation : For building user interfaces similar to Bootstrap. It can be used to style content for sending via email.

- Pure.css : Also for building user interfaces. It is designed to be minimal in file size. Smaller file size improves loading times for web pages as there is less data to transfer from the web server.

- Tailwind CSS : Framework provides many CSS classes with a single purpose.

- UIKit : Lightweight CSS framework featuring a small set of responsive components. Its simple design allows developers to easily customize the style rules and visuals.

- MVP.css : A small CSS library that automatically styles HTML elements without needing to apply CSS classes to them. The library aims to allow a developer to quickly prototype a user interface without worrying about the final design, while still being visually appealing.

**INTRODUCTION TO REACT**

**-** When you open a website, a web server sends the website’s content to your browser. The content can be static or dynamic.

- Static content is files that the server transfers just as they are stored on the web server, such as videos or images.

- Dynamic content is generated when the HTTP request is made. For example, the content may be generated based on input from a user, or when you visit a news website, it would be based on current date.

- Application server perform more complex processing than web servers. For instance, they have to run the application logic, communicate with the database, and check permissions.

- Web server uses a process called caching. Instead of generating content dynamically for every request, if the content is requested again, the web server can immediately send this cached version instead of generating content dynamically for every request. Caching means the web server keeps a copy of dynamic content.

**SINGLE PAGE APPLICATIONS (SPA)**

**-** If you are thinking of building a web app, you probably want a user-friendly, mobile-friendly experience. Then you should consider using single-page applications of SPAs to build a unique, speedy and engaging experience for your users.

- Before the advent of JavaScript frameworks, most websites were implemented as multi-page applications. But this makes traditional applications resource intensive to web servers because sending entire web pages for every request consumes excessive bandwidth and uses CPU time to generate dynamic pages.

**WHAT IS REACT?**

- React is focused on working with components, which makes it simple to build functional user interfaces on web and mobile.

- Developers use React to develop single page applications and you can also develop mobile applications with React native.