Week 3

❖ Working with Libraries :

- APIs are interact of data with your code provided by frameworks and libraries
- Libraries and Frameworks are referred to be dependencies because they are used for calling the API that runs the website
- Bootstrap is a popular library use to develop user interfaces
- Bootstrap can be included in a webpage by just use link tag that has href attribute and rel attribute to announce that you use stylesheet

✓ Ex :

```
<link
href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3
/dist/css/bootstra
p.min.css" rel="stylesheet">
```

- Bootstrap also provides a JavaScript library that enables enhanced functionality
  - ➢ Drop down
  - ➢ Tooltips

✓ Ex :

```
<script
src="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/js/boots
trap.
bundle.min.js"></script>
```

- It has the same link of CSS Bootstrap but the difference you change the CSS to JavaScript code

Week 3

- Dependencies can depend on libraries and frameworks this is called dependency tree

- Dependency tree can vary and get different versions and types to setup all this and configure them we use **Package Manager**

- package manager is a tool that automatically downloads and installs dependencies(packages)
    - provides the capability to publish your own packages
    - downloads the specified version you need so you cannot get a conflict
    - The most common Packet manager is NPM(Node Packet Manager)
- To add the downloaded data we get by package manager we use bundling tool
- Bundler is used to combine the data of package in a single file
- Most common bundlers :
    - Gulp
    - Webpack

- Responsive websites are websites that stretch and shrink depends on the screen that displayed on and this occurred by :
    - CSS media queries and screen resolutions
    - classified fluid images
    - fixed and fluid grids
- resolution known by the number of pixels that is usually expressed as the number of horizontal pixels multiplied by the number of vertical pixels

Week 3

- these pixels by new high resolutions screens group the physical ones together to display one logical pixel gives smoother images and text
- Firstly to make the website response by the change of resolution is **Flexible Grids** and contain :
  - Columns : the most of website content part
  - Gutters : the space between the columns
  - Margins : the spaces between the content and the left and right edges of the screen

✓ Note : we use percentage value instead of pixels and flexible grids to adjust depending on the screen size

- Secondly , Fluid images: we use it by setting the image size 100% so it can shrink when column shrink and still the same size when the column stretched out so it can't be pixelated
- Finally , Media queries : part of CSS that allow developers :
  - Query the display size
  - Orientation
  - aspect ratio to conditionally apply CSS rules

✓ Ex :

```
@media screen and (max-width: 600px) {
  body {
    color: red;
  }
}
```

- In the example above (max-width: 600px) it's called a breakpoint

Week 3

- Breakpoint : is the point at which a website's content and layout will adapt to provide the best possible user experience
- Breakpoint can function in different ways across three different grids :
  - Fixed grid
    - Fixed grid has a fixed column width with flexible margin
    - Fixed content with that doesn't change in a specific breakpoint range while the flexible margins occupy the remaining space on screen
  - Fluid or fullwidth grids
    - Fluid columns with fixed gutters and side margins
    - flexible content with that goes edge to edge as per the screen size
    - columns either grow or shrink to adapt to the available space
  - Hybrid grid
    - A mix between the fluid and fixed grid

❖ Bootstrap Framework

- Bootstrap is often described as a way to "build fast, responsive sites" and it is a "feature-packed, powerful, and extensible frontend toolkit

- Bootstrap is a library of CSS and JavaScript code that you can combine to quickly build visually appealing websites.

Week 3

- Bootstrap comes with multiple components for very fast construction of multiple components, or parts of components.

- Responsive grid : allow web pages to adapt their layout and content depending on the device in which they are viewed

- Bootstrap is very popular amongst developers as it saves development time and provides a way for developers to build visually appealing prototypes and websites

- Bootstrap has quite a large CSS library built by Bootstraps developers using thousands of use cases

- The way that CSS library works by using classes in fixes and it is used for responsive breakpoints in bootstrap grid

- Responsive breakpoints are the triggers in bootstrap for how your layout changes across device or viewpoint sizes example :

Responsive breakpoint	Class infix	Range
Extra small	No need, the default mode	< 576 pixels wide
Small	SM	≥576pixels
Medium	MD	≥768
Large	LG	≥992
Extra Large	XL	≥1200
Extra extra large	XXL	≥1400

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- Bootstrap provides a range of modifiers for its components and utilities, making it easy to customize elements like buttons, alerts, cards, navigation bars, and more

- Bootstrap generates it by combining base classes and modifiers, you can create a consistent and visually appealing design for your website while leveraging the power and convenience of Bootstrap's pre-built styles

✓ Ex :

```
Default Bootstrap button
<button class="btn">Default Button</button>

Button with a primary modifier
<button class="btn btn-primary">Primary Button</button>
```

- Bootstrap modifiers can be vary and Here is a list of modifiers available in Bootstrap :
  - Primary
  - Secondary
  - Success
  - Info
  - Warning
  - Danger
  - Light
  - Dark

- In nutshell bootstrap modifiers add a CSS class to change the visual style of components

Week 3

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

- Bootstrap grid uses a 12 column grid system that can be fluid or fixed and

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

❖ Intro to React

- Websites mostly can be static or dynamic content
- Static content : files that the server transfers just as they are stored on the web server
  - Videos
  - Images
- Dynamic content : generated when http request is made it can made based on input from user or when you visit a news website would be based on the current data
- Dynamic server happens by a process between **web server** and **application server**
- The application server generates the dynamic content which web server sends it to the user's browser
- Application servers performs more complex processing than web servers like :
  - run the application logic
  - communicate with the database
  - check permissions
- Application servers have a limited capacity so web servers help them in using a process called caching

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- Caching means the web server keeps a copy of dynamic content instead of creating content dynamically for every request

- Most of websites today uses SPAs(single-page applications) because using traditional multiple-pages consumes excessive bandwidth and uses CPU time to generate dynamic pages

- A SPA allows the user to interact with the website without the application needing to download entire new web pages

- SPA rewrites the current web page as the user interacts with it

- SPA has two approaches two serving code and resources :

  - Bundling: when the browser requests the application, the server returns and loads all necessary HTML, CSS, and JavaScript immediately

  - Lazy loading (code splitting): the browser requests the application and the server returns only the minimum HTML, CSS, and JavaScript needed to load the application

- SPA has two methods for delivering resources
  - Delivering all resources immediately
    - the single-page application must include the views for every page on initial load
  - delivering resources dynamically as required
    - the single-page application requests the views as required and stores views in the browser for subsequent requests

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

- React is a library in JavaScript allows developers write less codes in website maintain it easier and simplifies testing

- Developers use react to develop the interface of a website so react is used in conjunction with other JavaScript libraries during development

- The key concept behind React is that it allows you to define components that you can combine to build a web application

- A component is basically a small piece of user interface, such as a music player or photo gallery

- Components model allows you to do several things such as :
  - developing and testing parts of their application in isolation
  - reuse components across multiple sections of the application as well

- React isn't an MVC framework: is a library for building composable user interfaces. It encourages the creation of reusable UI components which present data that changes over time.

- React doesn't use templates: approaches building user interfaces differently by breaking them into components.

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Week 3

- React uses a real, full-featured programming language to render views, which we see as an advantage over templates for a few reasons:

  - JavaScript is a flexible, powerful programming language with the ability to build abstractions. This is incredibly important in large applications.

  - By unifying your markup with its corresponding view logic, React can actually make views easier to extend and maintain.

- React updates are dead simple it goes through basic steps to keep the website up-to-date :
  - When your component is first initialized, the render method is called, generating a lightweight representation of your view

  - a string of markup is produced and injected into the document. When your data changes, the render method is called again

  - In order to perform updates as efficiently as possible, we diff the return value from the previous call to render with the new one and generate a minimal set of changes to be applied to the DOM.

✓ This process called reconciliation

Week 3

- Reconciliation : when React creates his own virtual DOM which is the same as browser DOM and it adds the updates in it
- So React uses the virtual DOM to update the browser DOM by checking if virtual matches the browser in components

- Sometimes adding many elements in one event can cause slow performance and could be more expensive

- React developers created a way called “React Fiber Architecture” to solve the slow performance issue

❖ Component Hierarchy

- Every react application has at least one component called Root component or app component

- App components then added to other components to build out a tree structure of components that make up the application

❖ Alternative to React

- Lodash
  - ➢ provides common logic
  - ➢ Used to list items and sort them for react
  - ➢ Round numbers like 3.14 to 3
- Luxon
  - ➢ helps you work with dates and times

Week 3

- Redux
  - helps you manage your application state
  - has advanced features such as undo and redo
- Axios
  - helps to simplify sending HTTP requests and processing the response
  - provides advanced features allowing you to cancel requests and to change data received from the web server before your application uses the data
- Jest
  - provides reporting utilities
  - helps the developer in automated tests