

FSD Assignment 01

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* Aim: Develop a responsive web design using HTML5, containing a form. style the pages using CSS. Use of tag Selector, class Selector and id Selector. Use inline, internal and external CSS. Apply Bootstrap CSS.

* Objectives :-

- 1) To understand HTML Tags
- 2) To learn the styling of web page.
- 3) To learn Bootstrap Front end Framework.

* Theory :

Q1) Define Responsive Web design [RWD]. What is its primary goal?

=> Responsive web design (RWD) is an approach to web design that enables websites to adapt to different screen sizes, devices and orientations. The primary goal of RWD is to provide an optimal user experience, regardless of how users access the website.

Q2) Explain the role of the `<meta name="viewport">` tag. Why is this tag essential for RWD?

⇒ The `<meta name="viewport">` tag plays a crucial role in responsive web design by controlling the zooming scaling of web pages on mobile devices. This tag is essential for RWD because it allows developers to define the width and scaling of the viewport, ensuring that the website is displayed correctly on different devices. Without this tag, mobile devices may zoom out the website to fit the screen making it difficult to read and navigate.

Q3) How does bootstrap assist in creating a responsive layout? Discuss the concept of a grid system and how it adapts to different screen sizes?

⇒ Bootstrap is a popular frontend framework that assists in creating responsive layouts through its grid system. The grid system is based on a 12-column layout that adapts to different screen sizes and devices.

• Grid System = Bootstrap's grid system uses a combination of rows and columns to create a flexible and responsive layout. The grid system includes several classes such as .container, .row and .col- n , which can be used to define the width and behaviour of elements on different screen sizes.

• Adapting to different screen sizes: Bootstrap's grid system uses media queries to apply different styles based on the screen size. This allows developers to create responsive layouts that work well on different devices.

Q) Differentiate between Tag class and ID selectors.

\Rightarrow Tag selectors	Class Selectors	ID selectors
1) <code>element{style}</code>	<code>.class{style}</code>	<code>#id{style}</code>
2) Apply styles to all elements of a particular type.	Applies styles to specific elements that have a particular class	Apply styles to a single element with a unique id

3) lowest specificity

4) Can be applied to all elements of a particular type

medium specificity

Can be applied to multiple elements

High specificity

Should be applied only on one element

Q5) describe 3 main ways to apply CSS to a HTML document?

=> 1) Inline CSS : directly in HTML element style attribute.

2) Internal CSS : Inside a <style> tag in <head> section of HTML document.

3) external CSS : linking an external .css file with tag.

FSO Assignment 02

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* Aim

Develop a web application using JAVA script to implement sessions, cookies, DOM. Perform validations such as checking for emptiness, only numbers for phone numbers. Use the MySQL database.

* Objective :

- To understand what form validation is.

- To learn basic functioning of DOM objects

- To learn how to apply various tech to implement it.

* Theory :

a) Explain the role of regular expressions. Why are they a suitable tool for validating data formats like a phone no of checking for the presence of special character in a password?

⇒ Regular expressions are patterns used to match specific sequences of characters in

characters in text. They are suitable for validating formats like phone no or passwords because they are precisely defined rules and quickly check if input matches these rules, ensuring data correctness and security.

(Q2) Explain the fundamental difference b/w a session and a cookie in the context of web development. How do they work together to maintain a user's logged in state?

* Session - stored on the server, holds user data securely during their visit; lasts until logout or timeout.

* Cookie - stored on the client browser, small data like session ID; persists across visits depending on the settings.

* Together - Cookies store a session ID, which the server uses to retrieve session data.

(Q3) What is the process of performing both client side and server side applications?

Ans: Client Side Validation : provides immediate validation and reduces server load.

• Server Side validation - Ensures security & data integrity since client side checks can be bypassed.

Q) Provide a simple example of how a Javascript can interact with the DOM to dynamically change the content of the webpage after a user action such as form submission.

Ans \Rightarrow

```
<form id = "myform">
<input type = "text" id = "name">
<button type = "submit"> submit </button>
</form>

<div id = "message"> </div>
<script>
document.getElementById('myform')
.addEventListener('submit', function() {
  c.presentDefault();
})
```

```
const name = document.getElementById('name').value;
document.getElementById('message').textContent = 'Hello' + name + '!';
```

Q5) Give the steps for connectivity for frontend using HTML/CSS/JS to MySQL

⇒ Frontend (HTML/CSS/JS) connects to MySQL via a backend server (Node.js, PHP, etc.).

- 1) Create backend API
- 2) Connect Backend to MySQL
- 3) Frontend sends request
- 4) Backend queries MySQL
- 5) Return data to frontend.

FAQs

1) List 3 reasons why validation is important?

⇒ 1) It ensures data accuracy
2) It improves user experience
3) Enhancement in security.

2) Give example on how to modify an attribute value using DOM?

⇒ `document.getElementById('mylink').setAttribute('href', 'https://www.example.com');`

3) What are the different features of Java Script?

- ⇒ 1) client side scripting
2) dynamic types
3) event - driven .

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FSD Assignment 03

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* Aim:

Design an interactive frontend application using react by implementing templating using components, state and props, class, events. It must be responsive to scale across different platforms.

* Objectives:

To develop a responsive, interactive frontend application using React. This effectively demonstrates the fundamental concept of component-based architecture, state management, and event handling. The application will serve as a practical exercise in building a scalable user interface by implementing components managing dynamic data with states, ensuring a seamless user experience across various devices and screen sizes.

* Theory :

i) Explain the role of state and props in React. How do they differ & what is the primary purpose of each in managing data flow within a component-based application.

⇒ i) State represents mutable data controlled by a component, allowing dynamic updates using 'useState' or 'useEffect'.

ii) Props are immutable inputs passed from parent to child components for data sharing.

iii) State manages internal changes; props ensure data flow between components, prompting promoting reusability & predictable UI updates.

?) What is a React component? Differentiate b/w a class component & a functional component, and discuss the advantages of using a functional component with hooks like useState and useEffect over a class component?

⇒ A React Component is a reusable UI Block - Class components use ES6 classes lifecycle methods while functional components use functions with hooks like useState & useEffect. Functional components

are simpler, easier to test, consume less memory & improve performance through cleaner syntax & better readability.

Q3) describe the concept of 'templating using Components' in react. Why is this approach considered superior to traditional web development methods that rely on monolithic HTML files?

⇒ Templating in React uses small, reusable components instead of large HTML files. Each component manages its own structure & logic, promoting modularity and easier maintenance. Unlike monolithic HTML, this approach ensures faster rendering, better scalability & efficient updates via React's virtual DOM system.

Q4) How to handle user events in React? Provide a simple code snippet to demonstrate how an event handler is defined in a component & how can it be used to update the component's state.

⇒ React handles events using camelcase syntax and function
ex :- `function App() {
 const [count, setCount] = useState(0);
 return <button onClick={() => setCount(count+1)}>
 count
</button>
}`

here the onClick event triggers state update, re-rendering the component with new data.

- Q5) What is responsive web design, & why is it crucial for modern applications? Describle how you would implement a responsive design in React application using CSS media queries or a CSS-in-JS library?
- ⇒ Responsive designs ensure the app adjusts to screen sizes. It's vital for accessibility and user experience on all devices. In React, responsiveness can be achieved using CSS media queries or CSS-in-JS libraries like styled-components or Emotion. Libraries like styled-components or Emotion provide adaptive layouts and flexible component styling.

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* Aim:

Enhance web page developed in earlier assignment by rendering lists & Portals, Error Handling, Routers and style with React CSS also make it a responsive design to scale well across PC, Table & mobile phone.

* Objectives:

- Enhance User Interface & Experience.
- Improve Application robustness & Navigation.

* Theory:

⇒ How do lists & Keys work in React?

⇒ list render multiple similar components using array data with map(). Each element needs a unique key prop for efficient DOM updates. Keys help React identify changed, added, or removed items, improving rendering performance and maintaining component state consistency.

⇒ What is a React Portal and when would you use one?

→ react portal allows rendering a component's children into a DOM node outside its parent hierarchy. It's useful for modals, tooltips, and pop-ups that need to visually break out of container boundaries while preserving React's event bubbling system.

3) Discuss the importance of Error Boundaries in React.

→ Error boundaries catch JavaScript errors in component trees, preventing the whole app from crashing. Implemented using class components with `ComponentDidCatch` or `getDerivedStateFromError`, they display feedback UIs, improving user experience and debugging in production environments.

4) How does React Router enable Single Page Application (SPA) functionality?

→ React Router enables navigation without full page reloads, maintaining a single page structure. It maps URLs to components, dynamically rendering views. This provides a seamless, fast, app-like user experience by updating only relevant parts of the page.

5) Explain different ways to style a React application?

React apps can be styled using CSS stylesheets, inline styles, CSS modules, styled-components (CSS-in-JS), Tailwind CSS, SASS, or external UI libraries like Material-UI and Bootstrap.

Q4) Explain different ways to style a React application?

⇒ different ways to style a React application are:

- 1) Inline styles: Quick & simple but not scalable.
- 2) CSS stylesheets: Traditional method global styles, can lead to conflicts.
- 3) CSS modules: Scoped, locally unique class names, avoiding conflicts.
- 4) Styled Components: CSS-in-JS, dynamic states within components
- 5) Emotion: Another CSS-in-JS solution with high performance.
- 6) Tailwind CSS: utility first, predefined classes for faster development.

FSD lab assignment 05

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* Aim:

Develop a responsive web design using Express framework to perform CRUD operations and deploy with Node JS use MongoDB.

* Objectives:

- Develop a full stack web application.
- Demonstrate Backend development and Deployment Proficiency.

* Theory:

Q) What is the role of express JS as a Web framework for Node.js?

Ans) Express JS is a minimal flexible web framework for Node.js that simplifies the creation of server side applications. It provides robust tools for handling routing, middleware and HTTP requests, allowing developers to quickly build & scale web apps with minimal boilerplate code.

2) Explain the concept of CRUD operations in the context of a web application?

⇒ CRUD stands for:

- 1) Create
- 2) Read
- 3) Update
- 4) Delete

These functions define basic functionalities for managing data in web applications. They allow users to add new records, retrieve existing data, modify records, and delete them, forming the foundation for database interaction in most applications.

3) Why MongoDB a suitable choice for this project?

⇒ MongoDB is a NoSQL database known for its scalability, flexibility, and ease of use. It stores data in JSON-like format, making it a great fit for projects requiring dynamic schemas. Its horizontal scaling and integration with Node.js make it ideal for high traffic rapidly evolving applications.

(a) What steps are involved in deploying a Node.js and Express application?

→ Deploying involves several steps: choose a hosting provider (eg. AWS, Heroku), configure the environment, set up a database, upload project files, set environment variables, and configure web server to handle traffic and proxy requests.

