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FSD Assignment - 01

Aim:- Develop responsive web design using HTML5, containing a form. Style the pages using CSS, use of tag selector, class selector & id selectors. Use inline, internal & external CSS, Apply Bootstrap CSS.

Objectives 1) To understand HTML tags.

2) To learn the styling of web pages using CSS.

3) To learn Bootstrap Front End Framework.

* Theory:-

Q1 Define Responsive Web Design (RWD), its primary goal?

Ans: Responsive Web Design is a design technique where websites automatically adjust their layout, images to fit any screen size. Primary goal: To provide a smooth, readable & user-friendly experience across all devices.

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

Ans: The `viewport` meta tag tells the browser how to control the page's dimensions & scaling.

Essential for RWD:-

→ sets the page width equal to the device's screen width.

→ Enables proper zooming & scaling.

→ Ensures media queries & layouts work as intended on mobile devices.

3) How does Bootstrap assist in creating a responsive layout, the concept of a grid system & how it adapts screen sizes?

Ans:- It is a front-end framework, that includes a responsive 12-column grid system.

- Uses predefined classes like, to define layout for each size.
- Automatically rearranges columns or stacks them vertically on smaller devices.

4) Differentiate between Tag, Class & ID Selectors.

Ans:- Tag Selector :- Targets all elements of certain HTML p {color: blue}.

Class Selector :- Targets elements with a specific class attribute, highlight & background : yellow;

ID Selector :- Targets one unique element with a specific id. # header {font-size: 20px};

5) Describe the three main ways to apply CSS to an doc.

Ans:-

- i) Inline :- Using style attribute in HTML tags.

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- ii) Internal :- Using <style> tag in the HTML <head>.

- iii) External :- Linking a .css file with <link> tag.

Aim:-

Develop a web application
Sessions, cookies, Don't
check for emptiness
special character required
for certain format of

- 1] To understand what
- 2] To learn basic functions
- 3] To learn how to

7) i) Explain the role of
tool for validating
checking for the presence
of Regular expression

Ans:- Roles: Search, and manipulate
define rules for validation

- ii) Suitability for Validation
- iii) Completely expressible
- iv) Effectively check

iii) Ex:-
if → Phone
→ Pass
C? = .

Cultures
one specific

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FOD Lab Assignment - 02 :-

Aim: Develop a web application using Java Script to implement Session, cookies, DOM. Perform validations such as checking for emptiness, only numbers for phone numbers, special character requirement for password, regular expressions for certain format of the fields etc. Use the mySQL database.

- 1) To understand what form validation is.
- 2) To learn basic functioning of DOM objects.
- 3) To learn how to apply various techniques to implement it.

Ques 1) Explain the role of regular expressions. Why are they a suitable tool for validating date formats like a phone number or checking for the presence of specific characters in a password?

Ans: Regular expressions (RegEx) are patterns used to match, search, and manipulate strings. They allow developers to define rules for valid input formats.

- with a specific rule.
- 2) Suitability for Validation:
 - i.) Compactly express rules (e.g.: phone number format, email format)
 - ii.) Efficiently check for specific patterns on character groups.

iii.) Ex:-
→ Phone No: /\d{10}/ → exactly 10 digits.
→ Password: /^(?=.*[A-Z])(?=.*[a-z]).{8,}\$/ →

ensures at least one uppercase, one digit, one special character and minimum length 8.

HTML <head>

<link> tag.

2) Explain the fundamental difference between a session cookie in the context of web application development & they work together to maintain a user's logged in state.

Ans:- Session:-

- Stored on the Server
- Identifies users with a unique session ID.
- Holds sensitive data securely (it's lost if not expired)

Cookie:-

- Stored on the Client
- Can persist data across sessions (ever)

* How they work together:-

- When a user logs in, the server creates a session & sends back a session ID stored in a cookie.
- On subsequent requests, the browser sends the cookie with the session ID → server retrieves the session & stays logged in.

3) What is the purpose of performing both client-side and server-side validation? Describe a scenario where relying solely on client-side validation could lead to a security vulnerability.

Ans:- → Client-side Validation:-

- i) Done in the browser using Java Script / HTML 5.
- ii) Improves user experience by catching errors early (e.g.: empty fields).

→ Server-side Validation:-

- i) Done on the server before processing data.
- ii) Essential for security since client-side validation can be bypassed.

Scenario:-

If a login form only checks the side, a malicious user could enter an invalid SQL injection into the database.

Provide a simple example with the DOM to demonstrate after a user clicks, so

```
<!DOCTYPE html>
<html>
<head>
    <title> DOM
</head>
<body>
    <form id=">
        <input type="text">
        <button type="button">
            </button>
        </form>
        <p id="message">
            doc.getElementById("message").innerHTML = "Hello World!";
        </p>
    </body>
</html>
```

<script>

doc.getElementById("message").innerHTML = "Hello World!";

</script>

</body>

</html>

When the user updates dynamically

i) Scenario:-

ii) If a login form only checks password length on the client side, a malicious user could disable JavaScript, a malicious user could disable JavaScript and submit an invalid SQL injection payload directly → compromise the database.

iii) Provide a simple example of how a JavaScript can interact with the DOM to dynamically change the content of a web page after a user action, such as a form submission.

Ans:-

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title> DOM Example </title>
```

```
</head>
```

```
<body>
```

```
<form id="myForm">
```

```
<input type="text" id="name" placeholder="Enter your name">
```

```
<button type="submit"> Submit </button>
```

```
</form>
```

```
<p id="message"></p>
```

```
<script>
```

```
doc.getElementById("myForm").addEventListener("submit", function(e){
```

```
e.preventDefault();
```

```
</script>
```

```
</body>
```

```
</html>
```

When the user enters a name and clicks submit, the `<p>` text updates dynamically, without reloading the page.

Stgretts

Q) Give the steps for connectivity from Front End using CSS JS to my SQL in short.

Ans:- i) Front end (HTML, JS) :- collect data using form

Q) Write the different features
Ans:- ① Light Weight & Inter.

ii) Send Request :- Use fetch() / AJAX to send data to

② Dynamic Typing & no n

iii) Backend (Node.js, PHP, Python, etc) :- Receive request connect to MySQL using drivers.

③ Event-Driven & Async/await.

iv) Database Query :- Perform INSERT, SELECT, UPDATE, DELETE on MySQL.

④ Object-Oriented :-

v) Send Response :- Backend sends results back to frontend.

⑤ DOM Manipulation

vi) Frontend Update :- Java Script updates the DOM to show response.

⑥ Cross-Platform

* FAQ's :-

Understand Sessions & building

i) Write 3 reasons why Form validations are important.

Ans Three reasons why Form validations are important

ii) Data Accuracy :- Ensures users enter data in the correct format (e.g. email, phone number).

iii) Security :- Prevents malicious inputs like SQL injection or cross-site scripting.

iv) User Experience :- Gives instant feedback and reduces errors before submission.

Q) Give an example of how to modify an attribute value using

Ans ``

`<script>`

`document.getElementById("myImg").setAttribute("src", "new.jpg")</script>`

3) Write the different features of Java Script?

Ans:- ① Light Weight & Interpreted → runs directly in browsers.

② Dynamic Typing - no need to declare variable types.

③ Event-Driven & Asynchronous → supports callbacks, promises, `async` / `await`.

④ Object-Oriented: Prototype-based inheritance.

⑤ DOM Manipulation:— Can dynamically update HTML (CSS).

⑥ Cross-Platform: works on all major browsers.

to show results/decision Understanding key concepts such as regular expressions, sessions & cookies, form validation, DOM manipulation for building secure efficient & user friendly applications.

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SQL injection

weak and reduces

an attribute value using
`jpg" alt="Image">`

`myImg").setAttribute("src", "new`

FSD Assignment - 03

Ques:- Design an interactive front end application using React by implementing templating using components, states and props, Class, Events. It must be responsive and scale across different platforms.

To develop a responsive, interactive front-end application using React.js that effectively demonstrates the fundamental concepts 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 templating with components, merging dynamic data with states and props, and handling user interactions with events, ensuring a seamless user experience across various devices and screen sizes.

Ans:- i) Explain the role of State and Props in React. How do they differ, and what is the primary purpose of each in managing data flow within a component-based application?

i.) State is internal, mutable data managed within a component. It changes over time (e.g., form inputs, counters) and triggers re-rendering.

ii.) Props are external, read-only values passed from parent to child, making components reusable.

iii.) Difference:- State = private and changeable, Props = external and immutable.

iv.) Together, they control data flow: props pass data down, state manages local changes.

2) What is React Component? Differentiate b/w a Component and a Functional component, and discuss advantages of using a functional component with respect to like use state and use Effect over a class.

- Ans:
- i) Component :- Reuse code & UI Block.
 - ii) Class Component :- Uses Class, State, with lifecycle methods.
 - iii) Functional Component :- Simple Function, good for & effects.
 - iv) Advantages:- Functional = simpler, cleaner, faster.

3) Describe the concept of "templating" using concepts in why is this approach considered superior to traditional web development methods that rely on Monolithic files?

Ans:- Templating with components means breaking into small, reusable units like Header, Footer, instead of one long HTML File.

- Advantages:
- i) Reusable across the app.
 - ii) Easier to maintain the app and scale.
 - iii) Encourages modular and organized development.
 - iv) UI updates dynamically when props are changed.

4) How do you handle user events in React (e.g., click)? Provide a simple code snippet to demonstrate an event handler is defined in a component and can be used to update the component's state.

- the Any:- → Events in React are handled by defining a function and attaching it to JSX attributes like onClick.
- When triggered, the handler updates state, and the UI re-renders.

```
function App () {
  const [ count, setCount ] = React.useState(0);
  const handleClick = () => setCount(count + 1);

  return (
    <div>
      <p>{count}</p>
      <button onClick={handleClick}>Click Me</button>
    </div>
  );
}
```

- Q) What is responsive web design, and why is it crucial for modern applications? Describe how you would implement a responsive design in a React application using CSS media queries or a CSS-in-JS library.
- Responsive Web Design makes UI adapt to different devices (mobile, tablet, desktop).
- Importance:- Improves accessibility, user experience and it's essential for mobile-first users.
- * Implementation:-
- CSS Media Queries: Define breakpoints for layouts.
 - CSS-in-JS (e.g. styled-components): Write adaptive styles inside components.

CSS - ~~width~~ px height px
@media min-width: 768px {
 container { width: 50%; }

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Lists

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Keys or
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FSO Lab Assignment - 04

Q1. Enhance web page developed in earlier assignment by rendering lists and Portals, Error Handling, Routers and style with React JS CSS also make it responsive design to scale well across PC, tablet and Mobile Phone.

Ques:- i) Enhance User Interface and Experience.

ii) Improve Application Robustness and Navigation.

Q2. How do List & Keys work in React?

Ans:- Lists in React are usually created using the map() function to render multiple components dynamically.

Keys are unique identifiers assigned to each list item to help React differentiate elements during updates.

They improve rendering efficiency by allowing React to re-render only changed elements, not the entire list.

A good practice is to use stable, unique IDs as keys to avoid rendering issues.

Q2) What is React Portal & when would you use one?

Ans:-

A portal allows you to render a component's into a DOM node that exists outside the component's hierarchy.

Syntax:- React DOM. createPortal (child, container)

Useful for:- i) Avoiding CSS overflow / positioning issues.

ii) Models, dialogs, tooltips, dropdowns.

Q3) Discuss the importance of Error Boundaries in React.

Ans:-

i) Error Boundaries wrap components in their catch Java Script errors in their child component tree.

ii) They prevent the entire app from crashing when an error occurs.

iii) They can show fallback UI instead of breaking the whole app.

iv) Crucial for production apps where stability & user experience matter.

Q4) How does React Router enable Single Page Application functionality?

Ans:-

React Router manages navigation without reload the page.

→ It uses the History API to update the URL keeping the app alive.

→ Components are rendered conditionally enabling seamless transitions.

→ supports nested routes, dynamic parameters, lazy loading for efficiency.

Q5) Explain the different ways to style elements.

i) Inline Styling Using the style attribute

CSS Style Sheets:- Importing regular, e.g. names.

CSS Modules:- Scoped styles using avoid naming conflicts.

- Components are rendered conditionally based on the route, enabling seamless transitions.
- Supports nested routes, dynamic parameters, redirects & lazy loading for efficiency.

Q5) Explain the different ways to style a React application.

Ans:-

- Inline Styling: Using the style attribute with objects.

CSS Style Sheets:- Importing regular, css files & applying class names.

CSS Modules:- Scoped styles using module.css files to avoid naming conflicts.

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FSD Lab Assignment - 05

Aim: Develop a responsive web design using Express framework on top of Node.js operations & deploy with MongoDB.

Objectives: 1) Develop a full stack Web Application.

2) Demonstrate Backend Development & Deployment.

Theory: Explain the working of Node.js with respect to its components.

Q1) What is the role of Express.js as a web framework for Node.js?

Ans: Provides a lightweight, fast & flexible web server built on top of Node.js.

i) Simplifies handling HTTP requests & responses.

→ Scheme-project

ii) Supports routing.

→ Handles efficiently.

iii) Middleware support for request processing.

→ Storage Integration

iv) Enables building RESTful API's & full-stack applications efficiently.

→ Ideal for app development.

v) Reduces boilerplate code compared to using pure

Q2) Explain the concept of CRUD operations in the context of a web application.

Ans:- CRUD stands for Create, Read, Update, Delete. The four basic operations of persistent storage.

- Create - Add new data
- Read - Retrieve data
- Update - Modify existing data.
- Delete - Remove data.

Q3) Why is MongoDB a suitable choice for this project?

- Ans:- → No SQL, document-oriented database → stores data in flexible JSON-like format.
- Schema-less design → easy to implement adapt to evolving project requirements.
- Handles large-scale, unstructured or semi-structured data efficiently.
- Strong integration with Node.js through the Mongoose library.
- Ideal for applications requiring real-time data & rapid development.

Q4] What steps are involved in deploying a Node.js & Express application?

Ans → Prepare app & set environment variables.

→ Choose host (Heroku, AWS, etc).

→ Install Node.js & dependencies.

→ Use PM2 for process management.

→ Set up reverse proxy (Nginx) & SSL.

→ Monitor & Maintain.

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