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Assignment - 01

AIM - Develop responsive web design using HTML5, containing a form. Style the pages using CSS. Use of tag selector, class selector & id selector. Use Inline, Internal & External CSS.

OBJECTIVES :-
1) To understand HTML tags.
2) To learn the styling of web pages.
3) To learn Bootstrap Front End.

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">` tag. Why is this essential for RWD?

Ans. The viewport meta tag tells the browser how to control the pages dimensions & scaling.

Essential for RWD:-

- Sets the page width equal to the devices screen width

- Enables proper zooming & scaling.
- Ensures media queries & layout work as intended on mobile devices.

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

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

- Uses pre-defined classes like, to define layout per screen size.
- Automatically re-arranges 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 specific id.
`#header {font-size: 20px;}`

Q5. Describe the three main ways to apply CSS to an HTML doc.

Ans. Inline :- Using style attribute in HTML tags.

Internal :- Using <style> tag in the HTML <head>,

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

Conclusion :- Thus, learned about various HTML tags and their scope, syntax and usage, and to know about bootstrap, various methods of CSS styling and hence, implemented a responsive web design.

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Assignment -02

AIM :- To develop a web application using JavaScript that implements sessions, cookies, and DOM manipulations, along with form validations for fields like username, email, phone number, and password. The backend uses MySQL database connectivity.

OBJECTIVES :-

1. Understand form validation concepts.
2. Learn basic DOM object manipulation.
3. Apply various techniques for client-side validations and database integration.

THEORY :-

1) Role of Regular Expressions (Regex)

• Regex are patterns for matching strings, useful for validating formats like phone numbers, passwords or emails by enforcing rules on characters.

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

Ans.

- Cookies are small pieces of data stored on the client side, used to remember user preferences or

identifiers.

- (ii) Sessions store user data on the server, identifier by a session ID usually stored in a cookie.

Together, they maintain user login states securely by keeping sensitive data server-side (sessions) while using cookies for identification.

- 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 provides instant feedback and reduces server load.
 - Server-side validation ensures security by validating data regardless of client manipulation.

Relying only on client-side validation can be bypassed by attackers, leading to security risks such as SQL injection or data corruption.

- 4) Provide a simple example of how a Java Script script can interact with the DOM to dynamically change the content of a web page after a user action, such as a form submission?

Ans.

```
<p id="msg">Hello </p>
<button onclick="changeText()"> Click Me </button>
```

```
<script>
function changeText() {
    document.getElementById("msg").innerHTML =
        "Text changed";
}
</script>
```

57) Give the steps for connectivity from Front end using HTML CSS JS to MySQL?

- Ans.
- Create HTML form to collect data.
 - Use JavaScript/AJAX to send data to server.
 - Server-side script (Node.js, PHP, etc.) receives data.
 - Server-side script connects to MySQL database.
 - Insert or query data in MySQL.
 - Send response back to Frontend.

FAQ's :-

1. Write 3 reasons why Form validations are important.

- Ans. Three Reasons why form validations are important:-
- Prevent submission of incomplete or incorrect data.
 - Improve user experience with instant feedback.
 - Enhance security by avoiding malicious inputs.

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Q. Give an example of how to modify an attribute value using DOM

Ans. Example To Modify Attribute Using DOM:-

```
document.getElementById('myImage').setAttribute  
('src', 'newImage.jpg');
```

Q. What are the different features of JavaScript?

Ans Features of JavaScript:-

- Client-side scripting language.
- Dynamic typing.
- Event-driven programming.
- DOM manipulation capability.
- Supports object-oriented and functional programming.

Conclusion:-

This assignment demonstrates the importance of client-side form validation, efficient DOM manipulation using JavaScript, and integration of jQuery for enhanced interactivity.

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Assignment - Q3

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AIM :- Design an interactive front end application using React by implementing templating using components, states & props, class, events. It must be responsive to scale across different platforms.

OBJECTIVE :- To develop a responsive, interactive front-end application using React.js effectively. Demonstrating component based architecture, state management & event handling with scalable UI components, dynamic data via states & props & seamless user interactions across devices.

THEORY :-

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

Ans. State :- Represents mutable data owned & managed by a component. It allows components to create dynamic & interactive UI's by updating themselves with state changes.

Props :- Short for 'properties', props are read-only inputs passed from a parent component to child, enabling data-sharing across components.

Difference :- State is optional & changeable, while props are external & immutable together, they enable unidirectional data flows in react.

Q2. What is a React Component? Differentiate between a class component & a functional component & discuss the advantages of using a functional component with hooks like useState & useEffect over a class component.

Ans. Component : A reusable, independent piece of UI in React.
Class Component : Defined using classes, use this state & lifecycle methods.

Functional Component : Defined as functions use hooks like useState & useEffect for state & lifecycle management.

Advantages of functional + hooks :- Cleaner syntax, less boilerplate, better performance, easier to test & modern React development favors hooks over classes

Q3. Describe the concept of "templating using components" in React. Why is this approach considered superior to traditional web development that rely on monolithic HTML files?

- Breaks UI into reusable, modular components.
- Superior to monolithic HTML → improves reusability, scalability & maintainability.

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

Ans. Handlers defined as functions; update state using :-
`useState`.

`import React, {useState} from "react";`

`function Counter() {`

`const [count, setCount] = useState(0);`

`return (`

`<div>`

`<p> {count} </p>`

`<button onClick={() => setCount(count + 1)}>Inc</button>`

`</div>`

`);`

Q5. What is responsive design, why is it crucial for mobile applications? Describe how you would implement a responsive design in a React application using CSS media queries or a CSS in JS library.

Ans. • Ensures it adapts to all screen sizes / devices.
• Implement using CSS media queries or CSS in JS.

Eg:-

`@media (min-width: 600px) {`

`div { font-size: 10px; }`

`}`

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Assignment -04

AIM - Enhance web page developed in earlier assignment by modifying lists & portals. Error handling, Router & style with React CSS also make it a responsive design to scale well across PC, Tablet & Mobile Phone.

OBJECTIVES -

- Enhance UI & Experience.
- Improve Application Robustness & Navigation.

THEORY :-

Q1. 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, ID's as keys to avoid rendering issues.

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

Ans A portal allows you to render a component's children into a DOM node that ~~selves~~ exists outside the parent component's hierarchy.

Syntax :- ReactDOM.createPortal(child, container)

Useful For:-

- Avoiding CSS overflow/positioning issues.
- Modals, dialogs, tooltips, dropdowns.

Q3) Discuss the importance of Error Boundaries in React?

Ans.

- Error Boundaries are React components that catch JavaScript errors in their child component tree.
- They prevent the entire app from crashing when an error occurs.
- They can show a fallback UI instead of breaking the whole app.
- Crucial for production apps where stability & user experience matter.

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

- Ans.
- React Router manages navigation without reloading the page.
 - It uses the History API to update the URL while keeping the app alive.
 - Components are nested conditionally based on the state, enabling seamless transitions.
 - Supports nested routes, dynamic parameters, and lazy loading for efficiency.

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

Ans. In-line Styling :- Using the style attribute with objects

CSS StyleSheets :- Importing regular CSS files & applying class names.

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

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Assignment - 05

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AIM - Develop a responsive web design using Express Framework to perform CRUD operations & deploy with Node JS use MongoDB.

OBJECTIVE:-

- 1) Develop a Full-Stack Web Application
- 2) Demonstrate Backend Development & Deployment Proficiency

THEORY:-

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

- Ans.
- Provides a lightweight, fast & flexible web framework built on top of Node.js.
 - Simplifies handling HTTP requests & responses.
 - Supports routing.
 - Middleware support for request processing.
 - Enables building RESTful APIs & full stack applications efficiently.
 - Reduces boilerplate code compared to using Node.js

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

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

Syntax:- ReactDOM.createPortal (child, container)

Useful for:- • Avoiding CSS overflow/positioning issues.

• Models, dialogs, tooltips, dropdowns.

Q3.) Discuss the importance of Error Boundaries in React?

Ans. • Error Boundaries are React components that catch JavaScript errors in their child component tree.

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

• They can show a fallback UI instead of breaking the whole app.

• Crucial for production apps where stability & user experience matter.

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

- Ans
- React Router manages navigation without reloading the page.
 - It uses the History API to update the URL while keeping the app alive.
 - Components are rendered conditionally based on the route, enabling seamless transitions.
 - Supports nested routes, dynamic parameters, and exports for lazy loading for efficiency.

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

Ans. Inline Styling :- Using the style attribute with objects.

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CSS StyleSheets :- Importing regular .css files & applying class names.

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

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