React-1

**1. Define SPA and its benefits**

A **Single-Page Application (SPA)** is a web application or website that interacts with the user by dynamically rewriting the current page rather than loading entire new pages from the server. This approach provides a more fluid and responsive user experience.

**Benefits:**

* Faster load times after the initial page load.
* Seamless user experience without full-page refreshes.
* Reduced server load due to fewer requests.
* Easier debugging and testing using browser developer tools.

**2. Define React and identify its working**

**React** is a JavaScript library developed by Facebook for building user interfaces, particularly single-page applications where data changes over time. It enables developers to create large web applications that can update and render efficiently in response to data changes.

**Working:**

* React uses a virtual DOM to compare the previous and current state of the DOM.
* It identifies the minimal set of changes required and updates only the necessary parts of the actual DOM.
* This process is known as reconciliation and contributes to React’s high performance.

**3. Identify the differences between SPA and MPA**

| **Feature** | **SPA (Single-Page Application)** | **MPA (Multi-Page Application)** |
| --- | --- | --- |
| Page Reload | No reloads, content updates dynamically | Full page reloads on every user interaction |
| Performance | Fast after initial load | Slower due to frequent page loads |
| Development Complexity | More dependent on client-side frameworks | More server-side rendering and routing |
| SEO Optimization | Difficult without server-side rendering | Better SEO as pages are server-rendered |
| Navigation | Handled on the client-side | Each interaction leads to a new HTML page load |

**4. Explain Pros & Cons of Single-Page Application**

**Pros:**

* Improved user experience with faster interactions.
* Reduced server load due to fewer HTTP requests.
* Code reuse and better separation of concerns.

**Cons:**

* Initial loading time can be longer.
* SEO optimization is challenging.
* Requires JavaScript to be enabled on the client side.
* More complex front-end routing and state management.

**5. Explain about React**

React is a declarative, component-based JavaScript library used to build reusable UI components. It emphasizes efficient rendering and scalability in web applications. React focuses on creating dynamic and interactive user interfaces for web applications.

Key aspects include:

* Component-based architecture.
* Unidirectional data flow.
* JSX syntax for writing HTML elements in JavaScript.

**6. Define Virtual DOM**

The **Virtual DOM (VDOM)** is a lightweight, in-memory representation of the actual DOM. When changes occur in the application’s state, React updates the virtual DOM first. It then compares the new virtual DOM with the previous one and updates only the changed elements in the real DOM, enhancing performance.

**7. Explain Features of React**

Key features of React include:

* **JSX:** JavaScript syntax extension that allows writing HTML tags within JavaScript code.
* **Component-Based:** UI is broken into reusable components.
* **Virtual DOM:** Efficient rendering and updating of UI.
* **One-Way Data Binding:** Ensures controlled data flow.
* **Performance:** Fast and efficient updates to the UI.
* **React Native:** Enables development of mobile applications using React.

**Hands-on Lab Instructions Summary:**

To create and run your first React application:

1. **Install Node.js and NPM:** Download from <https://nodejs.org/en/download/>
2. **Install Create React App:**
3. npm install -g create-react-app
4. **Create a new app named "myfirstreact":**
5. npx create-react-app myfirstreact
6. **Navigate into the app folder:**
7. cd myfirstreact
8. **Open the folder in Visual Studio Code.**
9. **Modify App.js in the src folder:**  
   Replace the existing code with:
10. import React from 'react';
11. function App() {
12. return (
13. <div>
14. <h1>Welcome to the first session of React</h1>
15. </div>
16. );
17. }
18. export default App;
19. **Run the application:**
20. npm start
21. **Open a browser and go to** http://localhost:3000.