**Define SPA and its benefits**

A Single Page Application (SPA) is a web application or website that loads a single HTML page and dynamically updates the content without reloading the entire page. Instead of fetching new pages from the server every time the user navigates, it uses JavaScript to render new content on the same page. The key benefits of SPAs include faster load times after the initial load, smoother user experience due to reduced page refreshes, and better performance because only necessary data is exchanged with the server. SPAs are ideal for dynamic applications like dashboards, email clients, and social media platforms.

**Define React and identify its working**

React is an open-source JavaScript library developed by Facebook for building user interfaces, particularly for single-page applications. It allows developers to create reusable UI components, making code more modular and maintainable. React works by creating a virtual DOM (a lightweight copy of the actual DOM), which it uses to efficiently update and render components. When a component’s state or props change, React calculates the differences between the current and previous virtual DOM, and updates only the changed parts of the real DOM, resulting in faster and more efficient rendering.

**Identify the differences between SPA and MPA**

SPAs and MPAs (Multi-Page Applications) differ in how they manage page navigation and content rendering. In SPAs, all content is loaded dynamically within a single page, which enhances speed and provides a seamless user experience. On the other hand, MPAs consist of multiple HTML pages; each user interaction triggers a full page reload, making them more suitable for large-scale, content-heavy applications like e-commerce sites. While SPAs reduce server load and improve responsiveness, MPAs are generally better for SEO and provide clearer navigation structures.

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

The primary advantages of SPAs include fast navigation, reduced server load, and a smoother, app-like experience for users. They are ideal for dynamic and interactive applications. Additionally, SPAs require fewer full-page reloads, which can enhance performance and reduce bandwidth usage. However, SPAs also have downsides. They may face challenges with search engine optimization (SEO) because content is dynamically rendered, making it harder for search engines to index. SPAs can also have a larger initial load time and may require more client-side coding and security considerations.

**Explain about React**

React is a declarative, component-based JavaScript library used for building modern user interfaces. Its core philosophy is to break down the UI into smaller, reusable components that manage their own state. React simplifies the process of building interactive and dynamic web applications by allowing developers to focus on what the UI should look like at any given point, and it handles the DOM updates efficiently. It’s widely adopted due to its flexibility, ecosystem, and performance advantages, especially in SPAs and large-scale front-end applications.

**Define virtual DOM**

The Virtual DOM (Document Object Model) is a programming concept used in React to optimize rendering performance. It is a lightweight copy of the actual DOM that exists in memory. When a change occurs in a React component (due to a state or prop update), React updates the virtual DOM first. Then it compares the new virtual DOM with the previous one (a process called “diffing”) and calculates the minimal number of changes needed. These changes are then efficiently applied to the real DOM, making updates faster and smoother compared to directly manipulating the real DOM.

**Explain Features of React**

React offers several powerful features that make it a popular choice for front-end development. Some key features include: a component-based architecture that encourages reusability and maintainability; JSX (JavaScript XML), which allows developers to write HTML-like syntax directly in JavaScript; unidirectional data flow, which simplifies data management and debugging; and a virtual DOM that ensures high performance. Additionally, React supports hooks for state and lifecycle management in functional components and integrates well with modern tools, libraries, and frameworks in the JavaScript ecosystem.

**Create a new React Application with the name “myfirstreact”, Run the application to print “welcome to the first session of React” as heading of that page.**

**Index.js :-**

import React from 'react';

import ReactDOM from 'react-dom/client';

import './index.css';

import App from './App';

import reportWebVitals from './reportWebVitals';

const root = ReactDOM.createRoot(document.getElementById('root'));

root.render(

  <React.StrictMode>

    <App />

  </React.StrictMode>

);

reportWebVitals();

**App.js :-**

import React from 'react';

function App() {

  return (

    <div>

      <h1>Welcome to the first session of React</h1>

    </div>

  );

}

export default App;

Output :-



