**Define SPA and Its Benefits**Single Page Application (SPA) is a web app that loads a single HTML page and dynamically updates content without full page reloads.  
Benefits:

* Faster user experience after the initial load
* Reduced server requests
* Smooth, app-like navigation
* Better offline capabilities
* Lower bandwidth usage

**Define React and Identify Its Working**React is a JavaScript library for building user interfaces using a component-based, declarative approach.  
Working:

* You define UI as components that manage their own state.
* React builds a Virtual DOM (an in-memory tree of UI elements).
* On state or props change, React diffs the new Virtual DOM against the previous one.
* It applies only the minimal DOM updates needed to sync with the real browser DOM.

**Identify the Differences Between SPA and MPA**

|  |  |
| --- | --- |
| SPA (Single Page Application) | MPA (Multi Page Application) |
| Loads one HTML page; dynamic content updates | Loads separate HTML pages per route |
| App-like navigation, no full page reloads | Full page reloads on each navigation |
| Higher initial load time; faster thereafter | Lower initial load time; slower transitions |
| Requires client-side routing | Server-side routing |
| More complex SEO setup | SEO-friendly by default |

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

Pros

* App-like UX with no full page reloads
* Reduced server bandwidth after initial load
* Faster interactions and smoother navigation

Cons

* Longer initial load time
* SEO requires extra configuration
* Heavier reliance on JavaScript; may not work if disabled

**Explain About React**React is a UI library developed by Facebook that lets you build encapsulated, reusable components to construct complex interfaces. It follows a declarative paradigm and leverages a Virtual DOM for high performance.

**Define Virtual DOM**Virtual DOM is an in-memory representation of the real DOM. React uses it to determine the most efficient way to apply UI changes by diffing old and new Virtual DOM trees and batching updates to the real DOM.

**Explain Features of React**

* Component-Based: Build UIs with encapsulated, reusable pieces
* Declarative: Describe what the UI should look like; React handles updates
* Virtual DOM: Efficient updates by diffing and patching
* JSX: JavaScript syntax extension for writing HTML-like code in JS
* Unidirectional Data Flow: Predictable state management
* Ecosystem: Rich set of tools (React Router, Redux, etc.)