• **Define SPA and its benefits**

**Ans.** A Single‑Page Application is a web app that loads a single HTML page and dynamically updates content as the user interacts, rather than loading entirely new pages from the server.

**Benefits:**

1. Faster Interactions
2. Reduced Server Load
3. Smooth User Experience
4. Simplified Deployment

• **Define React and identify its working**

**Ans.** React is a JavaScript library for building UIs, maintained by Facebook and a large open‑source community. It focuses on constructing UI components and efficiently updating the DOM when data changes.

**Working:**

1. Reusable components managing its own state and properties.
2. Data flows from parent to child component via props.
3. It maintains a virtual DOM during updation.

• **Identify the differences between SPA and MPA**

**Ans.**

|  |  |
| --- | --- |
| **SPA** | **MPA** |
| Single Initial Load, subsequent navigation via Fetch. | Full page reloads on every navigation. |
| Smooth and Fast | Flashy and Slow |
| Needs server-side rendering. | SEO friendly out of the box. |
| Higher initial complexity | Simpler to start with |

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

**Ans. Pros:**

1. Responsiveness
2. Good UIs
3. Code Reuse

**Cons:**

1. Initial Long Load Time
2. SEO Challenges
3. Memory Leaks
4. Old Browser Compatibility

• **Define virtual DOM**

**Ans.** The Virtual DOM is a representation of the real DOM. When a component’s state changes:

* React creates a new Virtual DOM tree.
* It detects the changes/updates and applies those minimal updates to the real DOM.

• **Explain Features of React**

**Ans.**

1. **JSX Syntax:** Write HTML‑like code within JavaScript, making component structures more readable.
2. **Component Lifecycle:** Hooks let you tap into mounting, updating and unmounting phases.
3. **Declarative Rendering:** Describe UI based on state
4. **Context API:** Share data across the component tree without prop drilling.
5. **Rich Ecosystem:** Vast ecosystem of libraries for routing, testing, and more.
6. **Server-Side Rendering (SSR):** Through frameworks like Next.js, React apps can be pre‑rendered for performance and SEO.