### **1. Define SPA and its benefits**

SPA (Single Page Application) is a type of web application that loads a single HTML page and dynamically updates content as the user interacts with the app without reloading the page.

**Benefits:**

* Faster page transitions .
* Better user experience .
* Reduced server load .
* Smooth navigation using client-side routing .

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

React is a JavaScript library for building user interfaces, developed by Facebook. It focuses on creating reusable UI components.

**How React works:**

* React uses components to structure the UI.
* It maintains a virtual DOM .
* When data changes, React updates only the changed parts in the real DOM via reconciliation, improving performance.

### **3. Differences Between SPA and MPA**

**Single Page Application (SPA):**

* A SPA loads only one HTML page initially, and all further navigation happens without refreshing the entire page.
* It dynamically updates only the required part of the page, making it feel faster and more like a mobile app.
* In React, SPAs use React Router to switch between views without page reloads.

**Multi Page Application (MPA):**

* MPAs load a new HTML page from the server every time the user navigates to another page.
* Each page works independently, which makes it better for SEO and traditional websites like blogs or e-commerce.
* They are simpler to build but can feel slower due to full page reloads

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

**Pros:**

* Fast and responsive user experience.
* Reusable components and modular code.
* Easy state management .
* Reduced server load .

**Cons:**

* SEO challenges .
* Larger initial load .
* Requires client-side .
* More complex security handling.

### **5. Explain about React**

React is a component-based UI library for building interactive web applications. It emphasizes:

* Reusable components .
* Declarative UI .
* Unidirectional data flow .
* JSX .
* Virtual DOM for efficient rendering.

### **6. Define Virtual DOM**

The Virtual DOM is a lightweight, in-memory representation of the real DOM.

* React creates a virtual DOM tree when components render.
* When state changes, React compares the new virtual DOM with the old one.
* Only the changed parts are updated in the real DOM , improving speed and performance.

### **7. Features of React**

* **JSX**: Combines HTML and JavaScript for building UI.
* **Components**: Reusable and modular UI blocks.
* **Virtual DOM**: Fast UI updates.
* **Unidirectional Data Flow**: Predictable data handling.
* **React Hooks**: Functional components with state and lifecycle features.