**1. Define SPA and its benefits**

* **SPA (Single-Page Application):**
  + A web application that loads a single HTML page and dynamically updates the content without reloading the entire page.
  + Uses JavaScript frameworks/libraries (like React, Angular, Vue) to handle routing and rendering.
* **Benefits of SPA:**
  + **Fast Performance:** Only necessary data is fetched; no full-page reload.
  + **Smooth User Experience:** Looks and behaves like a desktop app.
  + **Reduced Server Load:** After the first load, only API calls are made.
  + **Easy to Develop & Debug:** Especially with frameworks like React.

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

* **React:**
  + A JavaScript library developed by Facebook for building UI components.
  + Focuses on creating reusable components and efficiently updating the DOM using the **Virtual DOM**.
* **How it works:**
  + Components return JSX (JavaScript XML), which describes the UI.
  + React maintains a **Virtual DOM**, compares it with the real DOM (Diffing Algorithm), and updates only the changed parts (Reconciliation).

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

* **SPA (Single-Page Application):**
  + Loads one HTML page.
  + Content updates dynamically using JavaScript.
  + Faster navigation, no full-page reload.
  + Example: Gmail, Facebook.
* **MPA (Multi-Page Application):**
  + Each page is a separate HTML file.
  + Full-page reload happens on navigation.
  + Better for SEO by default.
  + Example: Traditional e-commerce sites, blogs.

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

* **Pros:**
  + High performance and faster interactions.
  + Desktop-like experience.
  + Reduced server requests.
  + Reusable front-end code with frameworks.
* **Cons:**
  + Initial loading can be heavy.
  + SEO optimization is harder (unless SSR used).
  + Requires JavaScript to function properly.
  + Can be complex for large applications if not managed well.

**5. Explain about React**

* React is:
  + **Component-Based:** UI is broken into independent, reusable pieces.
  + **Declarative:** Describe what UI should look like; React handles rendering.
  + **Efficient:** Uses Virtual DOM to update UI with minimal changes.
  + **Flexible:** Can be used for web, mobile (React Native), or even desktop.

**6. Define Virtual DOM**

* **Virtual DOM (VDOM):**
  + A lightweight JavaScript object representing the actual DOM.
  + React creates a Virtual DOM tree and compares it with the previous version (Diffing).
  + Only the changed parts are updated in the real DOM (Reconciliation).
  + **Benefit:** Improves performance and reduces unnecessary DOM manipulations.

**7. Explain Features of React**

* **JSX:** Combines HTML with JavaScript for easy UI creation.
* **Components:** Reusable, modular building blocks.
* **Virtual DOM:** Efficient rendering and UI updates.
* **Unidirectional Data Flow:** Data flows in one direction (parent to child).
* **Declarative UI:** Focus on “what to render,” not “how to render.”
* **React Hooks:** Enable state and lifecycle features in functional components.
* **React Native Support:** Build mobile apps using React principles.