1. ReactJS-HOL

# • Define SPA and its benefits

SPA (Single-Page Application):  
A Single-Page Application is a web application or website that dynamically rewrites the current page with new data from the server, instead of loading entire new pages.  
  
Benefits:  
- Faster loading after initial load  
- Seamless user experience (no full-page reloads)  
- Better performance with client-side routing  
- Efficient data usage using APIs  
- Easier to turn into mobile apps using frameworks like React Native

# • Define React and identify its working

React:  
React is an open-source JavaScript library developed by Facebook for building user interfaces, especially single-page applications where data changes frequently.  
  
Working:  
- React breaks the UI into reusable components  
- Uses JSX (JavaScript + HTML syntax)  
- Implements a virtual DOM for efficient rendering  
- Uses state and props to manage and pass data  
- Utilizes React Router for SPA navigation

# • Identify the differences between SPA and MPA

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| --- | --- | --- |
| Feature | SPA (Single-Page Application) | MPA (Multi-Page Application) |
| Navigation | Uses JavaScript for routing | Reloads full pages |
| Speed | Faster after initial load | Slower due to full page reloads |
| Development Complexity | Easier with frameworks like React | More complex for dynamic data |
| SEO | Challenging without server-side rendering | Easier due to static pages |
| Example | Gmail, Facebook | Amazon, Flipkart |

# • Explain Pros & Cons of Single-Page Application

Pros:  
- Faster and smooth user experience  
- Reduces server load  
- Easier to manage UI components  
- Reusable components  
  
Cons:  
- Poor SEO if not optimized  
- JavaScript-dependent  
- Initial loading may be slow  
- Browser history & analytics are complex

# • Explain about React

React is:  
- A component-based JavaScript library  
- Used to build fast and scalable UIs  
- Supported by a large community  
- Often used with Redux, React Router, and other tools  
- Focuses on the View part of MVC

# • Define virtual DOM

Virtual DOM:  
A virtual DOM is a lightweight JavaScript object that mirrors the real DOM. When the state of an object changes, the virtual DOM updates only that specific object in the real DOM instead of reloading the whole DOM.  
  
Benefits:  
- Faster rendering  
- Efficient updates using “diffing” algorithm  
- Improves performance of dynamic web apps

# • Explain Features of React

- JSX: JavaScript + XML  
- Component-Based: Break UI into independent components  
- Virtual DOM: Efficient rendering  
- Unidirectional Data Flow: Makes code predictable  
- Hooks: Manage state and lifecycle in functional components  
- Reusable Components: Clean and modular code  
- Large Ecosystem: Supported by Redux, Router, etc.