# 1. ReactJs HOL

## Define SPA and its benefits

SPA stands for Single-Page Application. It is a web application that interacts with the user by dynamically rewriting the current page rather than loading entire new pages from the server.  
  
Benefits:  
- Faster navigation and response time  
- Reduced server load  
- Seamless user experience  
- Efficient data transfer using APIs

## Define React and identify its working

React is a JavaScript library developed by Facebook for building user interfaces, especially for single-page applications. It allows developers to create large web applications that can change data, without reloading the page.  
  
Working:  
- Components: React apps are built using components.  
- JSX: JavaScript XML is used to write HTML within JavaScript.  
- Virtual DOM: React updates only the changed parts of the DOM.

## Identify the differences between SPA and MPA

SPA (Single-Page Application):  
- Loads a single HTML page and updates content dynamically.  
- Faster interaction and navigation.  
- Better suited for dynamic platforms.  
  
MPA (Multi-Page Application):  
- Loads a new HTML page for every request.  
- Slower due to full-page reloads.  
- Better for SEO and large-scale websites like e-commerce.

## Explain Pros & Cons of Single-Page Application

Pros:  
- Fast and responsive  
- Efficient use of bandwidth  
- Smooth user experience  
  
Cons:  
- Poor SEO (unless handled properly)  
- Initial load may be heavy  
- Complex state management

## Explain about React

React is a front-end JavaScript library used for building user interfaces. It follows a component-based architecture and allows developers to build reusable UI components. React uses a virtual DOM for efficient updates and supports unidirectional data flow.

## Define virtual DOM

Virtual DOM is a lightweight JavaScript object that represents the real DOM. React creates a virtual DOM and updates it when the state changes. Then it compares it with the previous version (diffing), and applies only the necessary updates to the real DOM.

## Explain Features of React

- Declarative UI: Makes the code more predictable and easier to debug  
- Component-Based: Build encapsulated components that manage their own state  
- Virtual DOM: Improves performance by minimizing real DOM manipulations  
- JSX: Syntax extension that allows mixing HTML with JavaScript  
- One-way Data Binding: Ensures unidirectional flow of data  
- Strong Community Support