## **Objectives**

**Define SPA and its benefits**

A Single Page Application is a type of web application that loads a single HTML page and dynamically updates the content as the user interacts with the app. Instead of reloading the entire page, only specific sections are updates, providing a smooth and fast user experience.

**Benefits of SPA:**

1. Faster page loading after the initial load.
2. Seamless user experience with no full-page reloads.
3. Reduces server load by sending only the necessary data.
4. Easier to develop and maintain in the frontend and backend separately.
5. Ideal for mobile friendly and responsive web apps.

**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 update and render efficiently in response to data changes.

**How React works:**

React breaks the user interface into small reusable components. It uses a concept called Virtual DOM to efficiently manage and update the real DOM. When data changes, React updates the Virtual DOM, compares it with the previous version, and updates only the parts of the real DOM that changed. This makes the app faster and more efficient.

**Identify the differences between SPA and MPA**

|  |  |  |
| --- | --- | --- |
| **Feature** | **SPA (Single Page Application)** | **MPA (Multi Page Application)** |
| Page Loading | Loads one page and updates content dynamically | Loads a new page from the server each time |
| Speed | Fast after the first load | Slower due to full reloads |
| User Experience | Smooth, like a mobile app | Traditional navigation |
| SEO (Search Engine) | Limited SEO support without extra setup | Better SEO support |
| Development Focus | Mostly frontend | Balanced frontend and backend |

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

**Pros of SPA:**

1. Faster navigation after initial load.
2. Better user experience with dynamic content.
3. Reduces server requests and bandwidth usage.
4. Easy to manage frontend and backend separately.

**Cons of SPA:**

1. SEO optimization can be difficult.
2. Slower initial loading time.
3. Browser history and routing may require extra setup.
4. Security risks like cross-site scripting (XSS) need to be handled carefully.

**Explain about React**

React is an open-source JavaScript library used for building user interfaces, mainly for SPAs. It is developed and maintained by Facebook. React makes it easier to build interactive UIs using components, which are like building blocks of a webpage. It uses JSX, a syntax extension that lets you write HTML-like code within JavaScript.

React is popular because of its speed, reusability, and efficient way to updating the webpage using a virtual DOM. It is widely used in modern web development.

**Define virtual DOM**

The Virtual DOM is a lightweight, in-memory copy of a real DOM. It is used by React to improve performance.

When something changes in a React app (like user input or new data), React updates the virtual DOM first instead of updating the real DOM directly. It then compares the new virtual DOM with the old one (a process called diffing), and updates only parts of the real DOM that actually changed. This makes the app faster and more efficient.

**Explain Features of React**

Main features of React:

1. JSX: A syntax that allows writing HTML inside JavaScript.
2. Components: Reusable pieces of UI that make code easier to manage.
3. Virtual DOM: Improves performance by minimizing direct DOM updates.
4. Unidirectional Data Flow: Data flows in one direction, making it easier to track and debug.
5. Declarative UI: You describe what you want the UI to look like, and React takes care of the rest.
6. Hooks: Functions that let you use state and lifecycle features in functional components.
7. React Native: Enables developers to build mobile apps using the same concepts.

**Create a new React Application with the name “myfirstreact”, Run the application to print “welcome to the first session of React” as heading of that page.**

**Code:**

**App.js:**

function **App**(){

  return(

    <div>

      <h1>Welcome to the first session of React</h1>

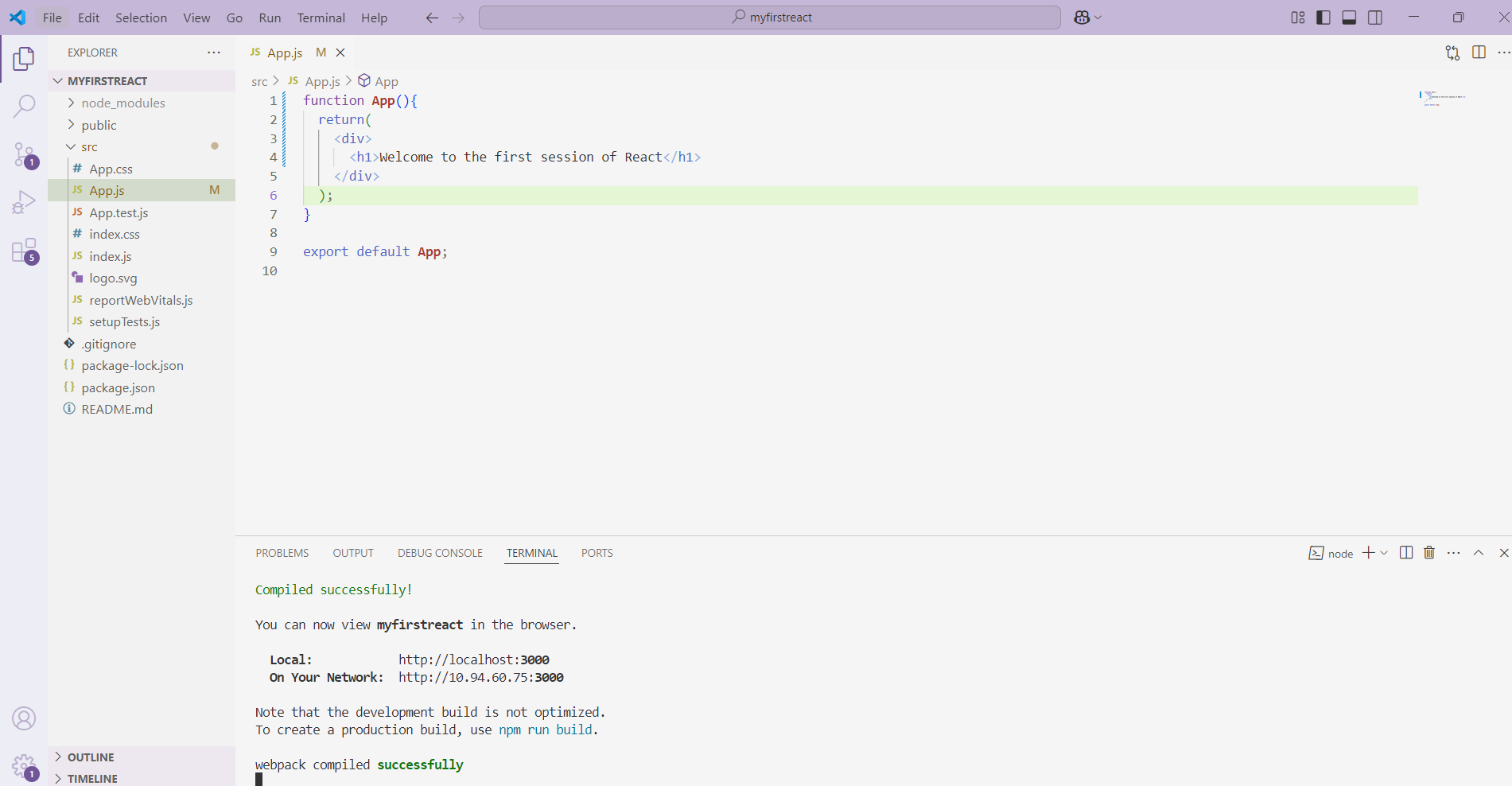
    </div>

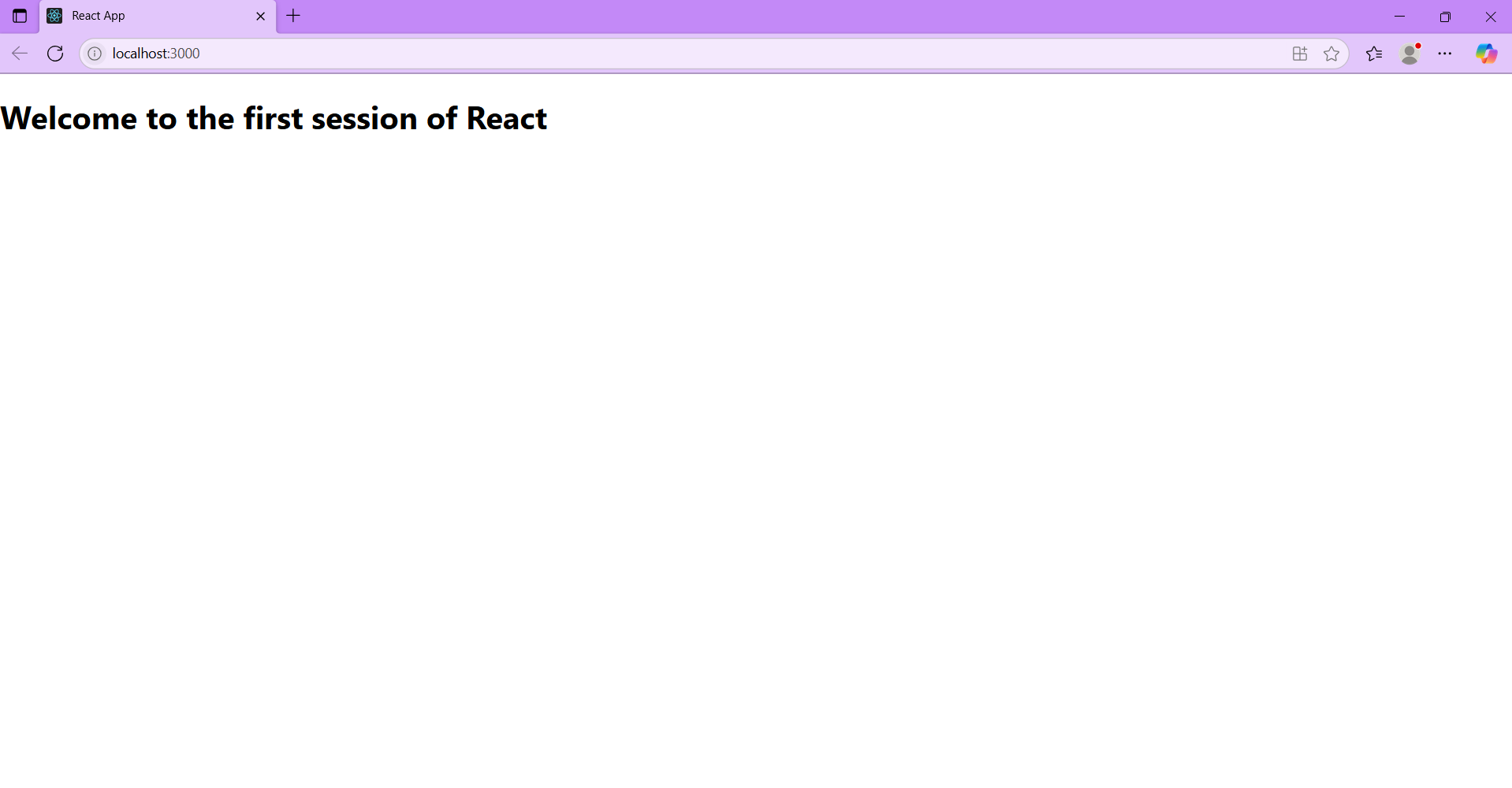
  );

}

export default **App**;

**Output:**

****

****