Objectives

- Define SPA and its benefits

A Single-Page Application (SPA) is a web application that loads a single HTML page and dynamically updates the content as the user interacts with the app. Instead of loading new pages from the server, SPAs use JavaScript to render content on the client side.
Benefits:

1. Faster user experience: Only data changes are loaded, not entire pages, reducing wait times.
2. Smooth navigation: Transitions between views feel seamless, similar to desktop apps.
3. Reduced server load: Fewer full-page reloads mean less demand on the server

- Define React and identify its working

React is a JavaScript library developed by Facebook for building user interfaces, especially SPAs. It uses a component-based architecture, meaning UIs are broken into reusable components.
How It Works:

1. Components manage their own state and render UI pieces.
2. Uses a virtual DOM to efficiently update only the parts of the page that change, instead of reloading the whole page.

- Identify the differences between SPA and MPA

Aspect	SPA	MPA
Loading	Loads one page and updates content	Loads a new page on every interaction
Speed	Faster navigation after first load	Slower, as each click reloads a new page
Development	Often uses front-end frameworks	More traditional server-side rendering
SEO	Can be challenging, needs tweaks	Easier SEO out of the box

- Explain Pros & Cons of Single-Page Application

Pros:

1. Fast, responsive user experience.
2. Simplified development for interactive apps.
3. Better code reusability with components.

Cons:

1. Initial loading can be slower due to fetching all assets at once.

2. SEO optimization is more complex.
3. Might have issues with browser history and navigation.

- Explain about React

1) React is focused on creating interactive and efficient user interfaces. Its core concepts include:
2) Component-based structure.
3) Declarative programming (tell React what you want, not how to do it).
4) Unidirectional data flow for predictable results.

- Define virtual DOM

The Virtual DOM is an in-memory representation of the real DOM. React uses it to:

1) Track changes made by components.
2) Compute the most efficient way to update the browser DOM.
3) Batch and minimize DOM manipulations for performance.

- Explain Features of React

1. Component-based architecture: Build complex UIs from simple pieces.
2. JSX syntax: Write UI code with HTML-like syntax in JavaScript.
3. Efficient updates: Uses virtual DOM for optimal rendering.
4. Unidirectional data flow: Data flows from parent to child, making logic easier to trace.
5. Strong community and ecosystem: Lots of third-party libraries and support.

In this hands-on lab, you will learn how to:

- Set up a react environment
- Use create-react-app

Prerequisites

The following is required to complete this hands-on lab:

- Node.js
- NPM
- Visual Studio Code

Notes

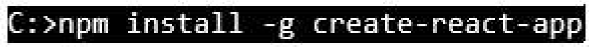
Estimated time to complete this lab: **30 minutes.**

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.

1. To create a new React app, Install Nodejs and Npm from the following link:

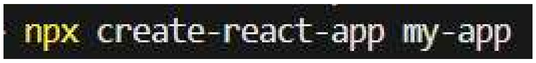
   https://nodejs.org/en/download/

2. Install Create-react-app by running the following command in the command prompt:



```
C:>npm install -g create-react-app
```

3. To create a React Application with the name of “myfirstreact”, type the following command:

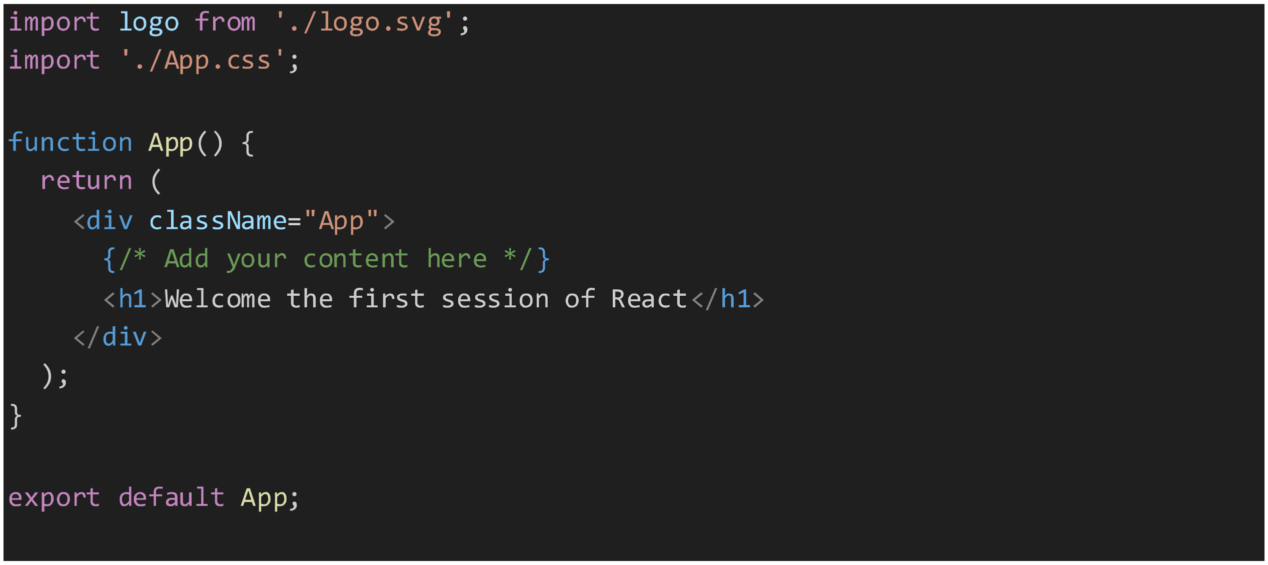


```
npx create-react-app my-app
```

4. Once the App is created, navigate into the folder of myfirstreact by typing the following command:

   npm start

5. Open the folder of myfirstreact in Visual Studio Code
6. Open the App.js file in Src Folder of myfirstreact
7. Remove the current content of “App.js”
8. Replace it with the following:

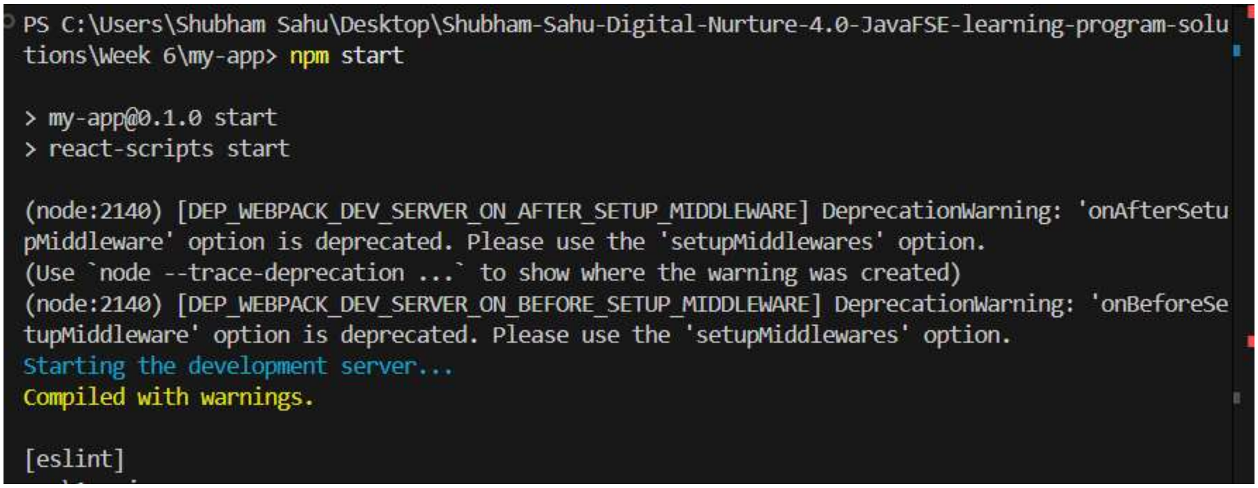


```
import logo from './logo.svg';
import './App.css';

function App() {
  return (
    <div className="App">
      {/* Add your content here */}
      <h1>Welcome the first session of React</h1>
    </div>
  );
}

export default App;
```

9. Run the following command to execute the React application:



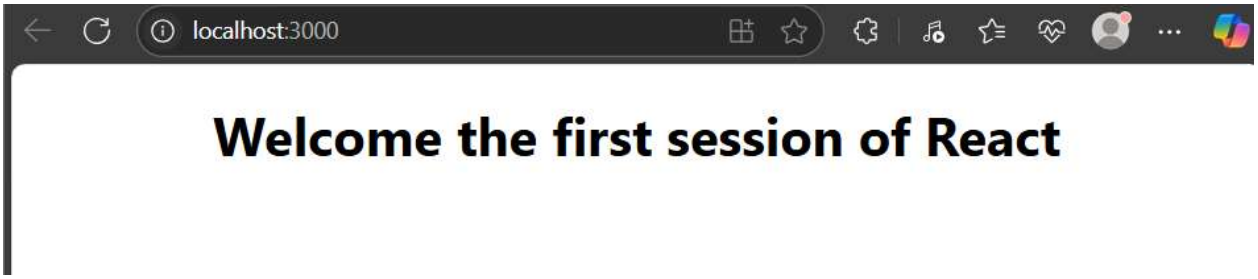
```
PS C:\Users\Shubham Sahu\Desktop\Shubham-Sahu-Digital-Nurture-4.0-JavaFSE-learning-program-solu
tions\Week 6\my-app> npm start

> my-app@0.1.0 start
> react-scripts start

(node:2140) [DEP_WEBPACK_DEV_SERVER_ON_AFTER_SETUP_MIDDLEWARE] DeprecationWarning: 'onAfterSetu
pMiddleware' option is deprecated. Please use the 'setupMiddlewares' option.
(Use `node --trace-deprecation ...` to show where the warning was created)
(node:2140) [DEP_WEBPACK_DEV_SERVER_ON_BEFORE_SETUP_MIDDLEWARE] DeprecationWarning: 'onBeforeSe
tupMiddleware' option is deprecated. Please use the 'setupMiddlewares' option.
Starting the development server...
Compiled with warnings.

[eslint]
```

10. Open a new browser window and type “localhost:3000” in the address bar



Welcome the first session of React