





1. ReactJS-HOL

1. Define SPA (Single-Page Application) and Its Benefits

SPA (Single-Page Application) is a web application that dynamically rewrites the current page with new data from the web server, instead of loading entire new pages.

Benefits of SPA:

-  **Faster Navigation:** Only data is fetched, not full HTML pages.
-  **Improved User Experience:** Feels more like a desktop app.
-  **Reduced Server Load:** Only API requests are made.
-  **Efficient Caching:** Once loaded, resources can be reused.

2. Define React and Identify Its Working

React is a JavaScript library developed by Facebook for building user interfaces, especially for SPAs. It allows developers to build reusable UI components.

How React Works:

- React maintains a **virtual DOM**.
- When data changes, React:
 1. Re-renders the component virtually.
 2. Compares the virtual DOM with the real DOM (diffing).
 3. Applies only the changes (patching) to the real DOM.
- This results in **fast updates** and **efficient rendering**.

3. Identify the Differences Between SPA and MPA

Feature	SPA	MPA (Multi-Page Application)
Page Reload	No full reload	Full reload on every navigation
Performance	Fast after initial load	Slower due to full page reloads
Development	Frontend-heavy (API-based)	Backend-heavy (renders full pages)
URL Handling	Managed by JavaScript (History API)	Native browser navigation
SEO	Harder (needs SSR or prerender)	Easier due to server-rendered HTML
Examples	Gmail, Facebook, Twitter	Amazon, Wikipedia, e-commerce sites

4. Explain Pros & Cons of Single-Page Application

Pros:

- Fast and responsive user experience.
- Smooth transitions and animations.
- Reduces server load (only APIs hit).
- Reusable frontend code.

Cons:

- Initial load can be heavy.
- SEO optimization is more complex.
- Browser history and navigation issues if not handled properly.
- Security risks like XSS if not managed well.

5. Explain About React

React is a declarative, component-based library used for building dynamic web interfaces. It encourages building encapsulated components that manage their own state and compose them to make complex UIs.

- Developed by **Facebook**.
- Open-source and widely used.
- Enables **one-way data binding** and **component-based architecture**.
- Works well with tools like Redux, React Router, etc.

6. Define Virtual DOM

Virtual DOM is a lightweight, in-memory representation of the real DOM.

Purpose:

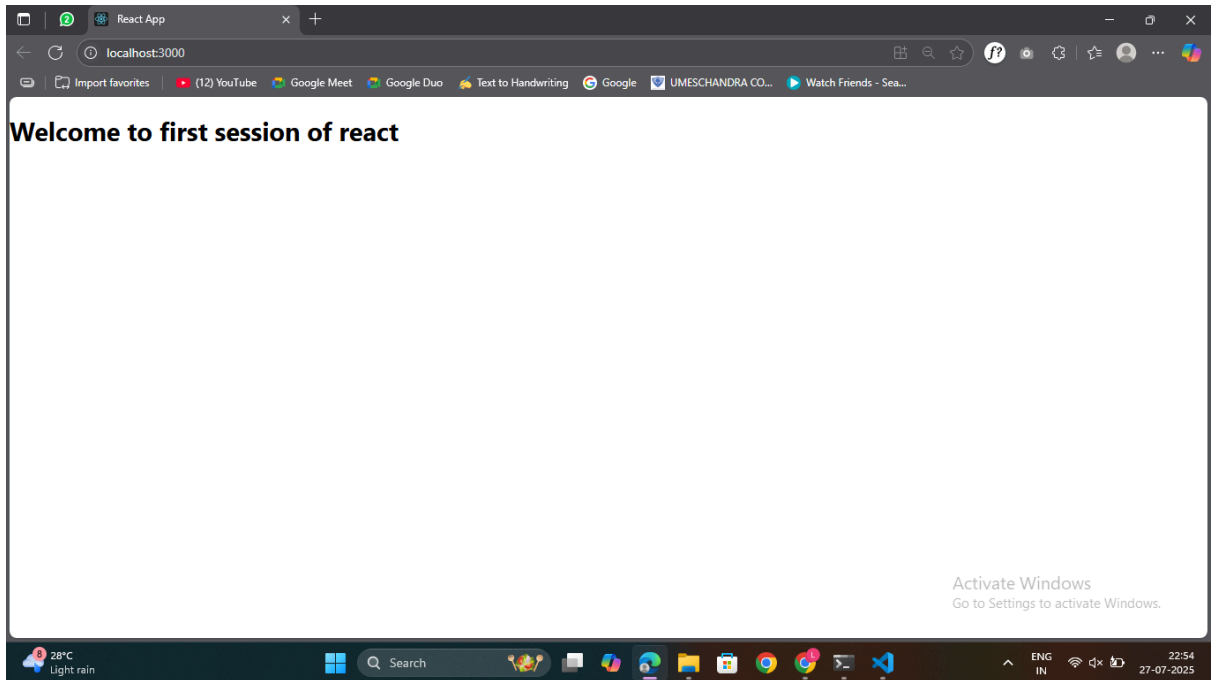
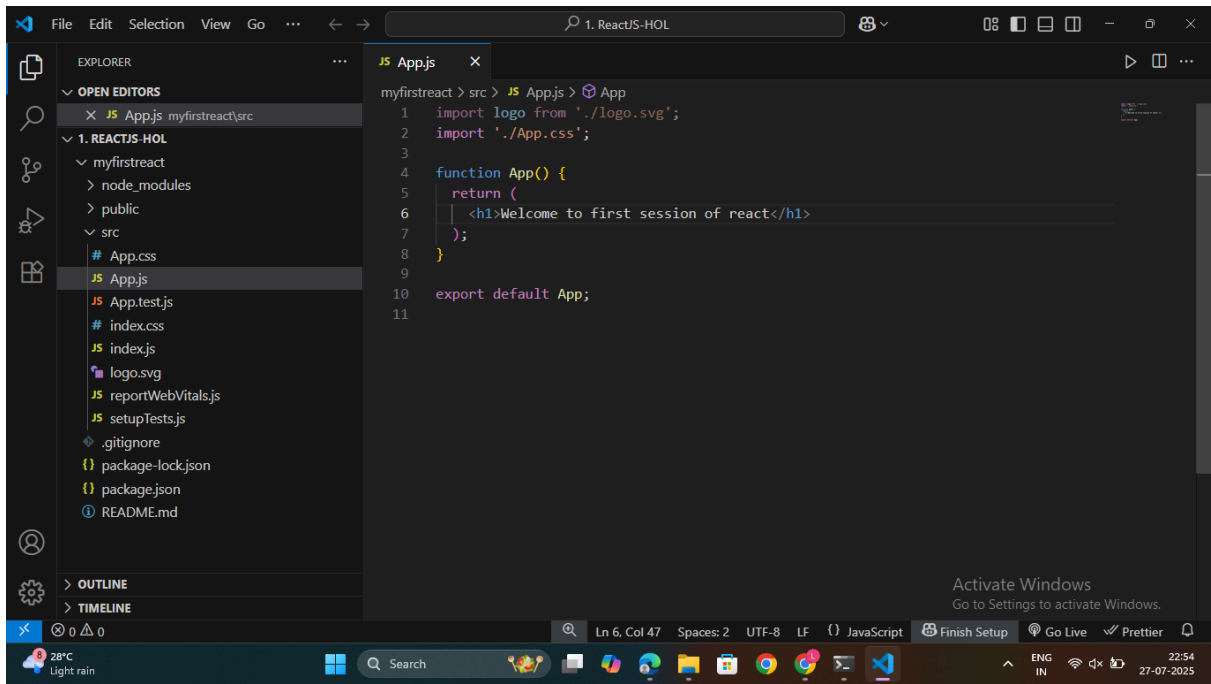
- React uses it to detect what exactly changed in the UI.
- It compares the current virtual DOM with the previous version (diffing).
- Then updates the real DOM selectively (patching).

This approach increases performance and efficiency of UI updates.

7. Explain Features of React

Key Features:

1. **JSX (JavaScript XML)** – Allows writing HTML-like syntax inside JavaScript.
2. **Component-Based Architecture** – Reusable and modular components.
3. **Virtual DOM** – Efficient rendering.
4. **One-Way Data Binding** – Predictable and controlled data flow.
5. **Hooks** – Functional components with state and side effects.
6. **High Performance** – Minimal DOM manipulation.
7. **Strong Community & Ecosystem** – Lots of libraries and tools.



2. ReactJS-HOL

1. Explain React Components

React components are the building blocks of a React application. Each component represents a part of the UI and can be reused across the app.

A component:

- Can be a **function** or a **class**
- Accepts **props** (input)
- Returns **JSX** (UI)

2. Differences Between Components and JavaScript Functions

Feature	JavaScript Function	React Component
Purpose	General logic and calculations	Defines a piece of UI
Returns	Any value (number, string, object)	JSX (or <code>null</code>)
Used With JSX	No	Yes
Lifecycle Methods	No	Yes (Class Components)
React Hooks Support	No	Yes (Function Components)

3. Identify the Types of Components

There are **two main types** of React components:

1. **Class Components**
2. **Function Components**

4. Explain Class Component

A **class component** is a JavaScript ES6 class that extends `React.Component`.

Structure:

```
import React, { Component } from 'react';

class Welcome extends Component {
  constructor(props) {
    super(props);
    this.state = { message: "Hello" };
  }

  render() {
    return <h1>{this.state.message}, {this.props.name}</h1>;
  }
}
```

Key Features:

- Has a **constructor** to set up **state**
- Must define a **render()** method to return JSX
- Can use **lifecycle methods** like `componentDidMount`, `componentDidUpdate`, etc.

5. Explain Function Component

A **function component** is a simple JavaScript function that returns JSX.

Structure:

```
function Welcome(props) {
  return <h1>Hello, {props.name}</h1>;
}
```

Features:

- Simpler and shorter syntax
- Can use **React Hooks** (e.g., `useState`, `useEffect`)
- No need for `this` keyword

6. Define Component Constructor

The **constructor** is a special method in **class components** used to:

- Initialize **state**
- Bind methods to the component

Example:

```
constructor(props) {  
  super(props);  
  this.state = { count: 0 };  
}
```

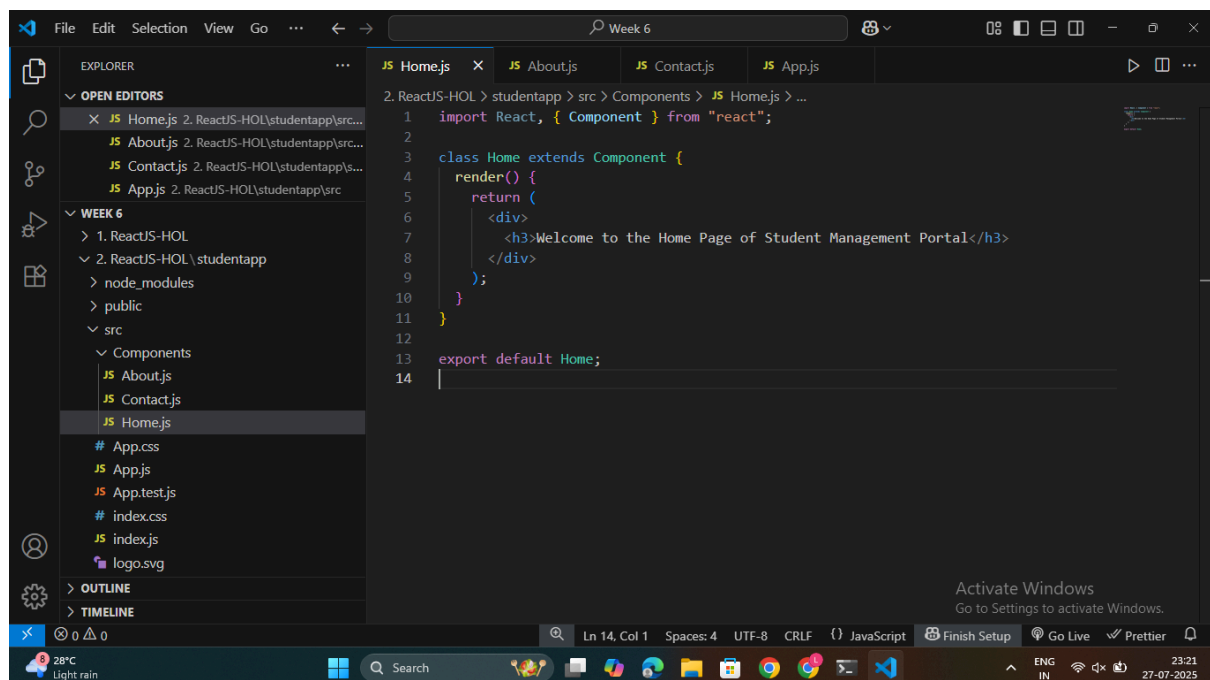
7. Define **render()** Function

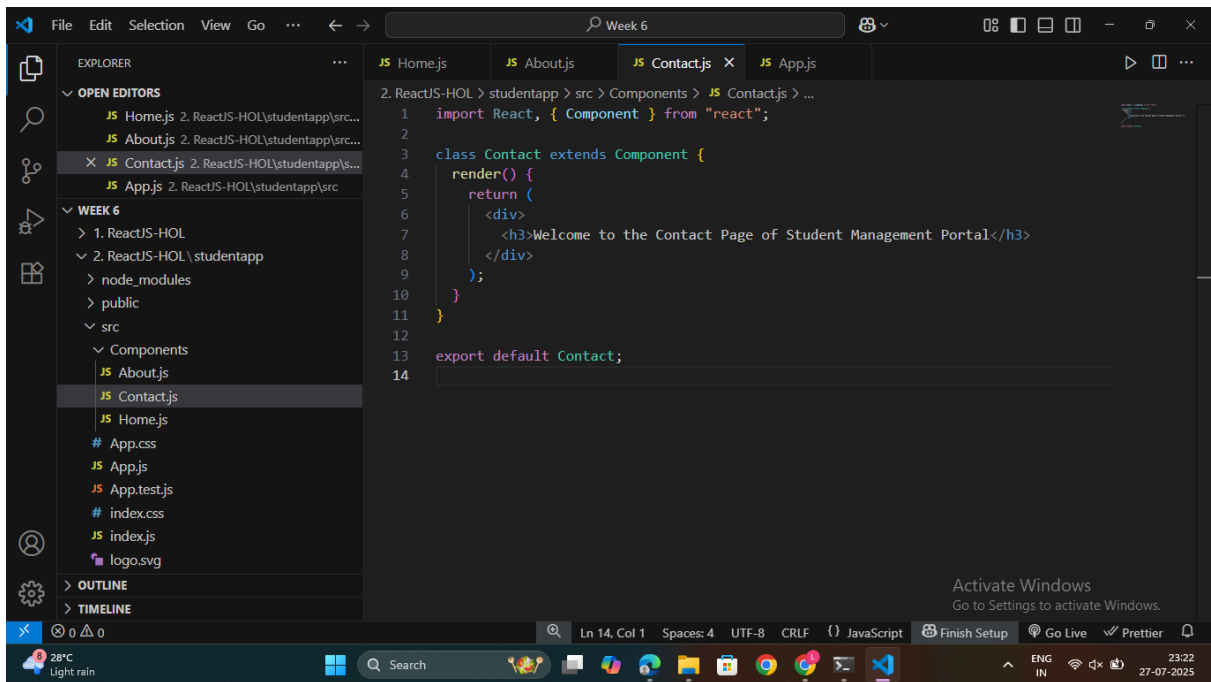
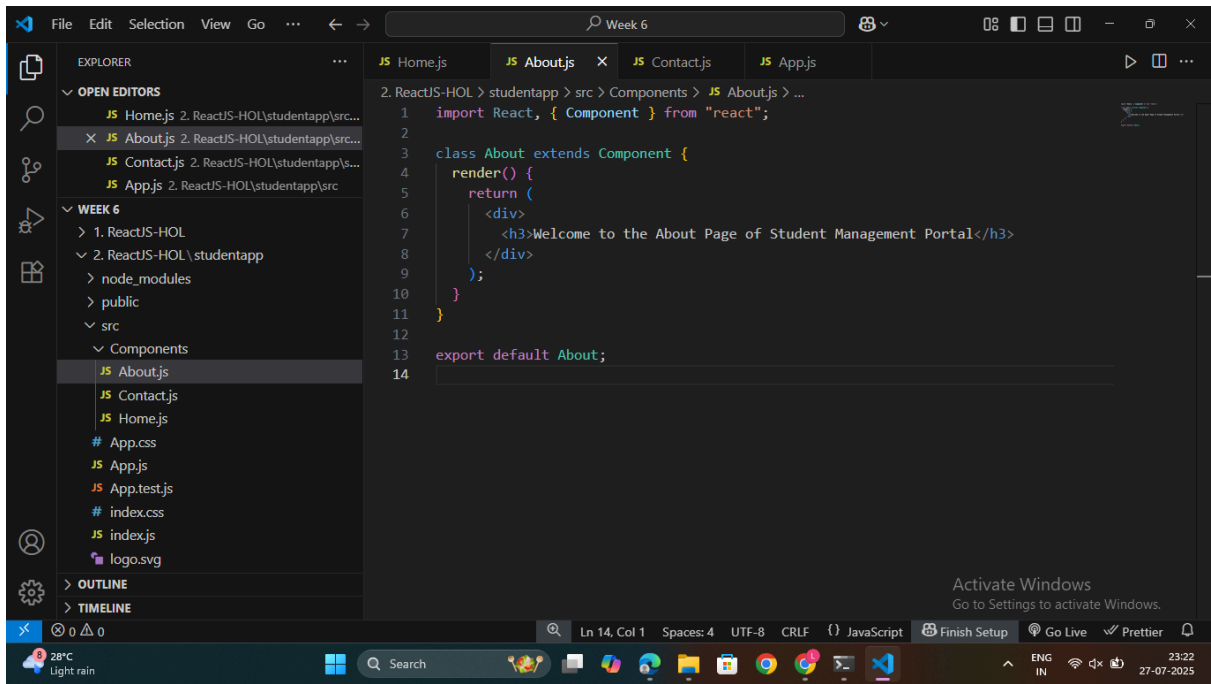
The **render()** method is **required** in every class component.

- It returns the **JSX** to display on the screen.
- Called automatically when the component is rendered or updated.

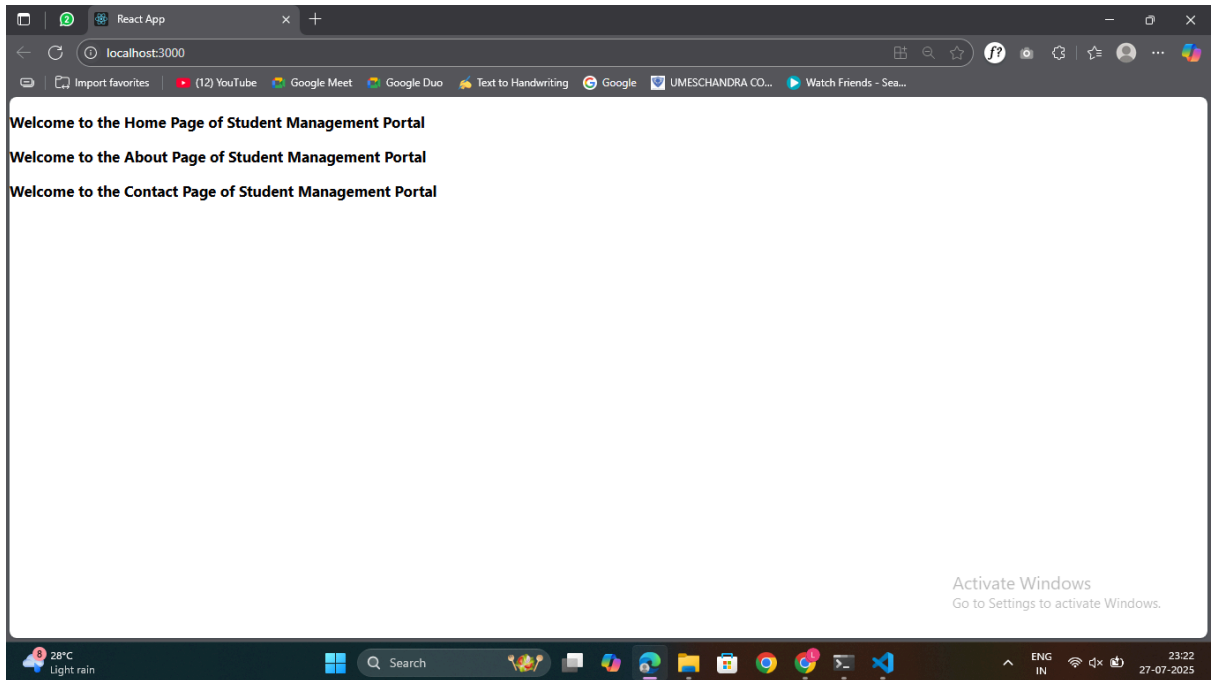
Example:

```
render() {  
  return <div>Hello, {this.props.name}</div>;  
}
```






```
1 import './App.css';
2 import Home from './Components/Home';
3 import About from './Components/About';
4 import Contact from './Components/Contact';
5
6 function App() {
7   return (
8     <div className="container">
9       <Home />
10      <About />
11      <Contact />
12    </div>
13  );
14 }
15
16 export default App;
17
```



3. ReactJS-HOL

1. Explain React Components

React components are the core building blocks of a React application. They are independent, reusable pieces of UI. Each component returns a portion of JSX that describes how a section of the UI should appear.

Think of them like custom HTML elements:

```
<Header />, <Footer />, <Profile />
```

2. Differences Between Components and JavaScript Functions

Feature	JavaScript Function	React Component
Purpose	Perform logic or return values	Build UI using JSX
Return Type	Any data (string, number, object)	JSX (UI code)
Used in React	No	Yes
Lifecycle Methods	No	Yes (in class components)
Hooks Usage (e.g. useState)	No	Yes (in function components)

3. Types of Components in React

There are **two types** of components:

1. **Class Components**
2. **Function Components**

4. Explain Class Component

A **class component** is a JavaScript ES6 class that extends `React.Component`.

Example:

```
import React, { Component } from 'react';

class Welcome extends Component {
  render() {
    return <h1>Hello, {this.props.name}</h1>;
  }
}
```

Key Features:

- Has access to **state** and **lifecycle methods** (`componentDidMount`, `componentDidUpdate`, etc.)
- Requires a **render()** method that returns JSX
- Uses `this.props` and `this.state`

5. Explain Function Component

A **function component** is a simpler way to write components using plain JavaScript functions.

Example:

```
function Welcome(props) {
  return <h1>Hello, {props.name}</h1>;
}
```

Key Features:

- Shorter and cleaner syntax
- Can use **Hooks** (e.g. `useState`, `useEffect`) to manage state and side effects
- No need for `this` keyword

6. Define Component Constructor

The **constructor** is used only in **class components**. It initializes **state** and binds methods.

Example:

```
constructor(props) {  
  super(props);  
  this.state = { message: "Hello" };  
}
```

- `super(props)` is required to use `this.props`
- You can also bind event handlers here

7. Define `render()` Function

The `render()` method is **mandatory** in class components. It defines **what should be displayed** on the screen.

Example:

```
render() {  
  return (  
    <div>  
      <h2>Welcome to React!</h2>  
    </div>  
  );  
}
```

It gets called **automatically** when:

- The component is first rendered
- `state` or `props` change

File Edit Selection View Go ... Week 6

EXPLORER

OPEN EDITORS

- CalculateScore.js 3. ReactJS-HOL\score...
- mystyle.css 3. ReactJS-HOL\scorecalcula...
- App.js 3. ReactJS-HOL\scorecalculatorap...

WEEK 6

- 1. ReactJS-HOL
- 2. ReactJS-HOL
- 3. ReactJS-HOL\scorecalculatorapp
 - node_modules
 - public
 - src
 - Components
 - CalculateScore.js
 - Stylesheets
 - mystyle.css
 - App.css
 - App.js
 - App.test.js
 - index.css
 - index.js
 - logo.svg

OUTLINE

TIMELINE

```
3. ReactJS-HOL > scorecalculatorapp > src > Components > JS CalculateScore.js > [0] default
11 export const CalculateScore = ({ Name, School, total, goal }) => (
12   <div className="Total">
13     <span>Total: </span></div>
14   </div>
15   <div className="Score">
16     <span>Score: </span>
17     <span>{calcScore(total, goal)}</span>
18   </div>
19 </div>
20 );
21 export default CalculateScore;
```

Ln 38, Col 31 Spaces: 4 UTF-8 CRLF {} JavaScript Finish Setup Go Live Prettier

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File Edit Selection View Go ... Week 6

EXPLORER

OPEN EDITORS

- CalculateScore.js 3. ReactJS-HOL\score...
- mystyle.css 3. ReactJS-HOL\scorecalcula...
- App.js 3. ReactJS-HOL\scorecalculatorap...

WEEK 6

- 1. ReactJS-HOL
- 2. ReactJS-HOL
- 3. ReactJS-HOL\scorecalculatorapp
 - node_modules
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 - mystyle.css
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 - App.js
 - App.test.js
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 - index.js
 - logo.svg

OUTLINE

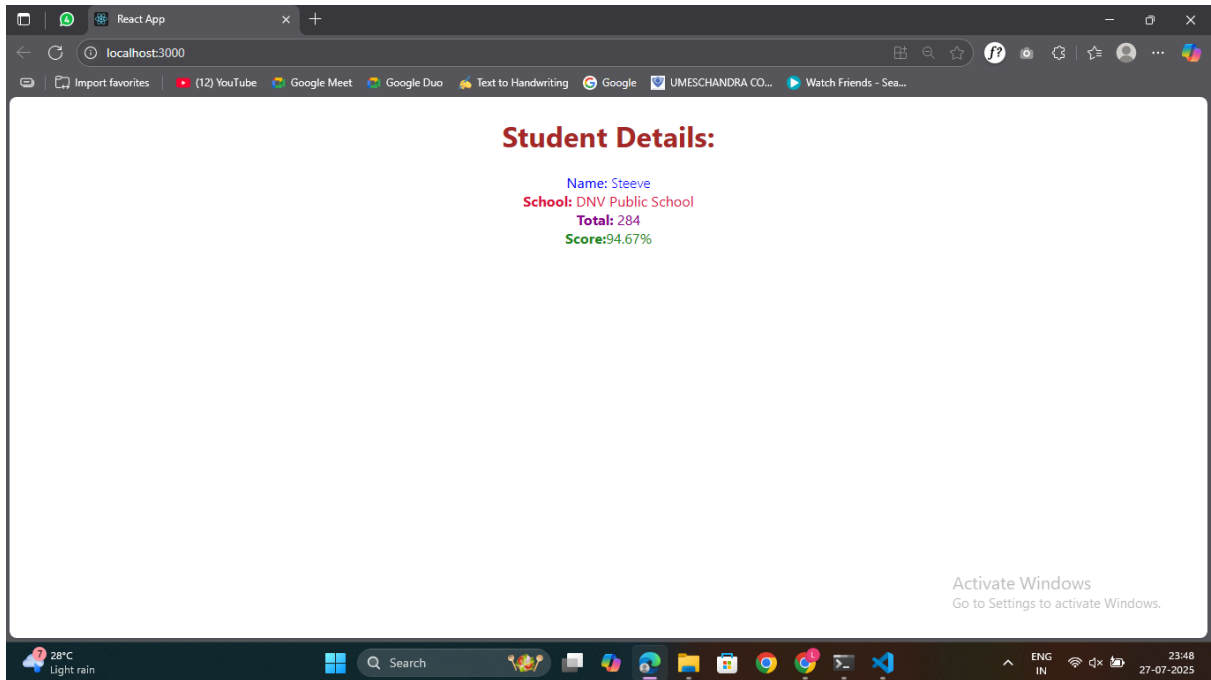
TIMELINE

```
3. ReactJS-HOL > scorecalculatorapp > src > Stylesheets > # mystyle.css > ...
1 .Name {
2   font-weight: 300;
3   color: blue;
4 }
5
6 .School {
7   color: crimson;
8 }
9
10 .Total {
11   color: darkmagenta;
12 }
13
14 .formatstyle {
15   text-align: center;
16   font-size: large;
17 }
18
19 .Score {
20   color: forestgreen;
21 }
22
```

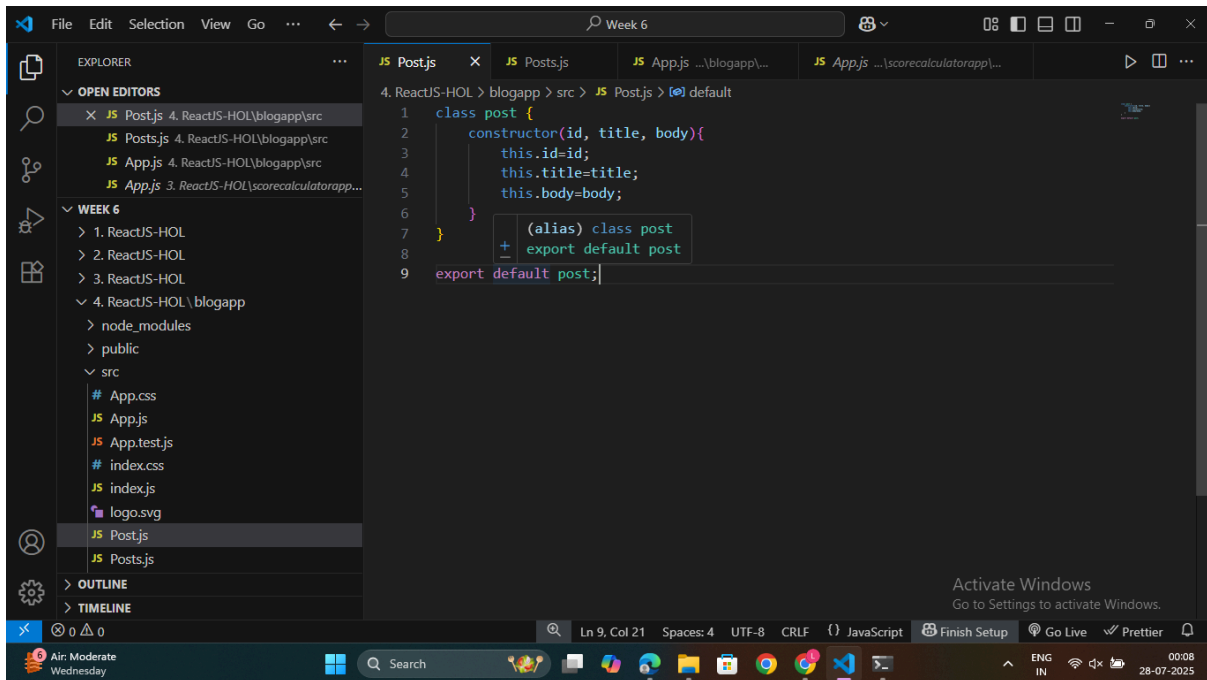
Ln 22, Col 1 Spaces: 4 UTF-8 CRLF {} CSS Finish Setup Go Live Prettier

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```
3. ReactJS-HOL > scorecalculatorapp > src > JS Appjs > ...
1  import { CalculateScore } from './Components/CalculateScore';
2
3
4  function App() {
5    return (
6      <div>
7        <CalculateScore
8          Name={"Steeve"}
9          School={"DNV Public School"}
10         total={284}
11         goal={3}
12       />
13     </div>
14   );
15 }
16
17 export default App;
```



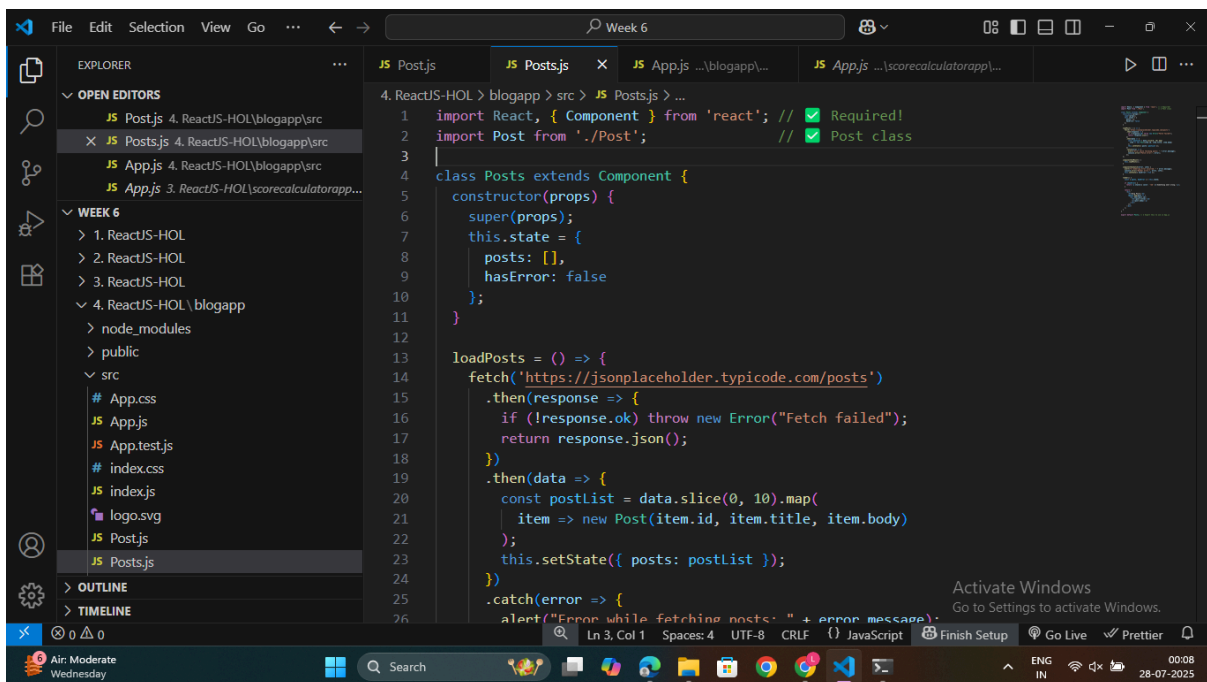
4. ReactJS-HOL



The screenshot shows the VS Code editor with the Explorer sidebar on the left. The Explorer shows the project structure for '4. ReactJS-HOL', including a 'blogapp' directory with 'src' and 'public' subdirectories. The 'src' directory contains files like 'App.css', 'App.js', 'App.test.js', 'index.css', 'index.js', 'logo.svg', 'Post.js', and 'Posts.js'. The 'Post.js' file is open in the editor, showing the following code:

```
1 class post {
2   constructor(id, title, body){
3     this.id=id;
4     this.title=title;
5     this.body=body;
6   }
7 }
8 (alias) class post
9 export default post;
```

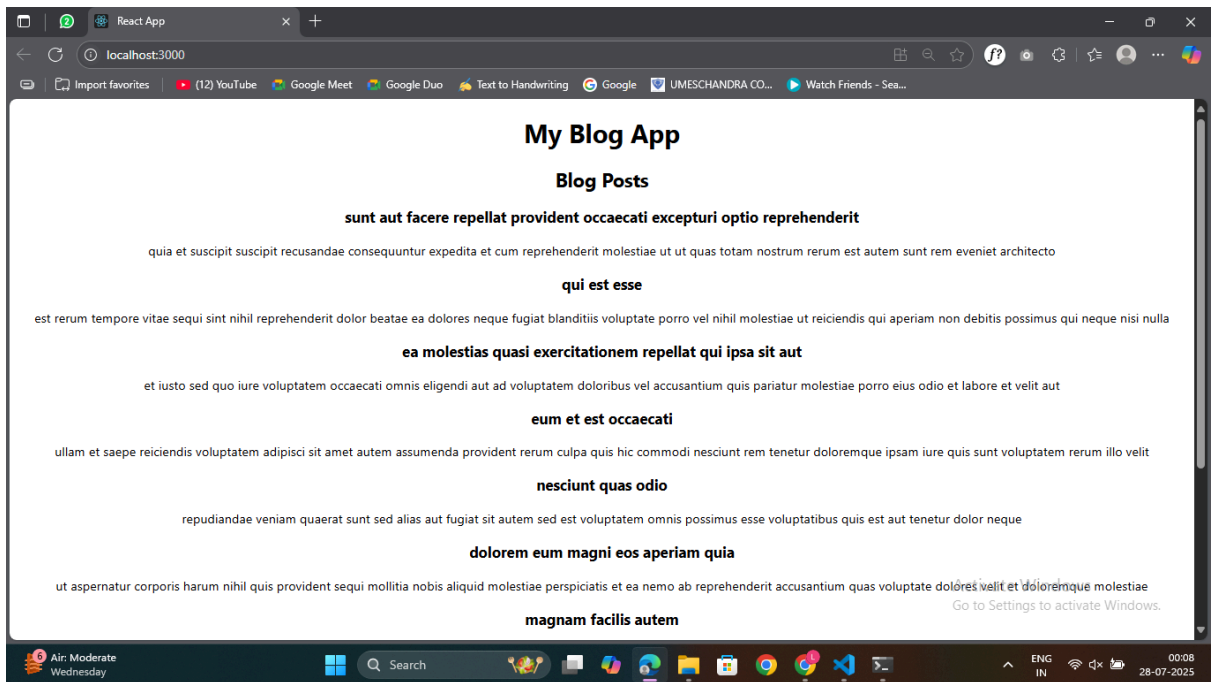
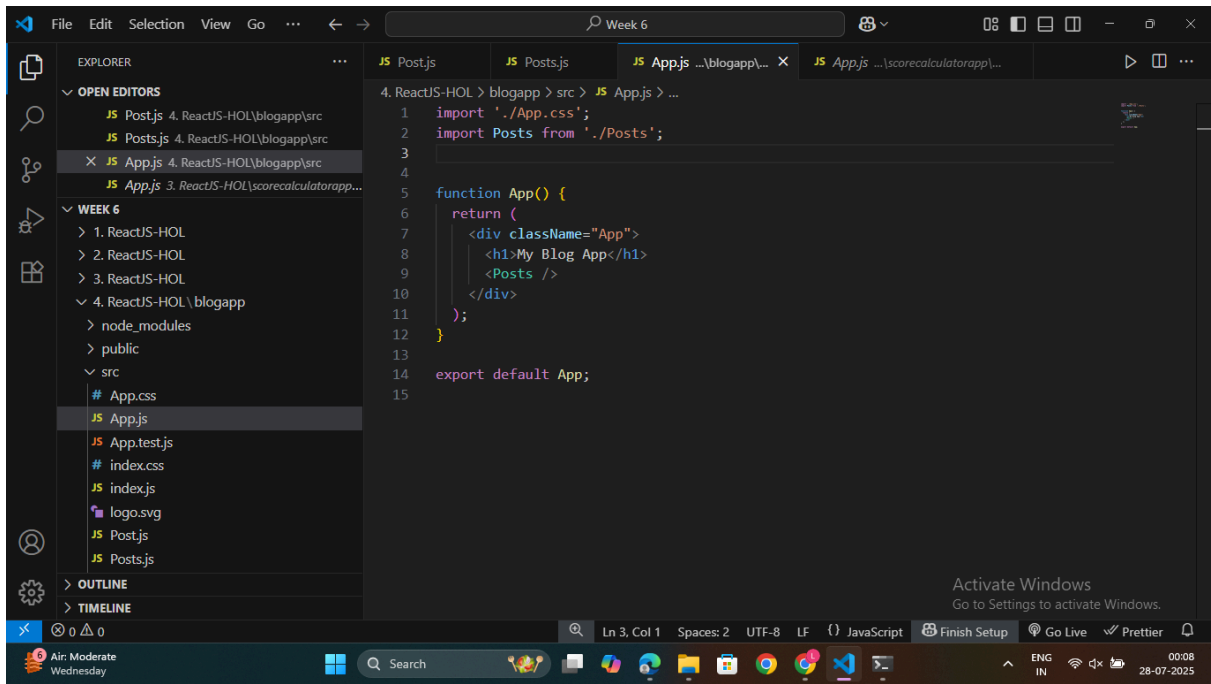
The status bar at the bottom indicates the file is 'Post.js' at line 9, column 1, with 4 spaces, UTF-8 encoding, and CRLF line endings. The bottom right corner shows a 'Finish Setup' button and a 'Go Live' button.



The screenshot shows the VS Code editor with the Explorer sidebar on the left. The Explorer shows the project structure for '4. ReactJS-HOL', including a 'blogapp' directory with 'src' and 'public' subdirectories. The 'src' directory contains files like 'App.css', 'App.js', 'App.test.js', 'index.css', 'index.js', 'logo.svg', 'Post.js', and 'Posts.js'. The 'Posts.js' file is open in the editor, showing the following code:

```
1 import React, { Component } from 'react';
2 import Post from './Post';
3
4 class Posts extends Component {
5   constructor(props) {
6     super(props);
7     this.state = {
8       posts: [],
9       hasError: false
10    };
11  }
12
13  loadPosts = () => {
14    fetch('https://jsonplaceholder.typicode.com/posts')
15      .then(response => {
16        if (!response.ok) throw new Error("Fetch failed");
17        return response.json();
18      })
19      .then(data => {
20        const postList = data.slice(0, 10).map(
21          item => new Post(item.id, item.title, item.body)
22        );
23        this.setState({ posts: postList });
24      })
25      .catch(error => {
26        alert("Error while fetching posts: " + error.message);
27      });
28  }
29 }
```

The status bar at the bottom indicates the file is 'Posts.js' at line 26, column 1, with 4 spaces, UTF-8 encoding, and CRLF line endings. The bottom right corner shows a 'Finish Setup' button and a 'Go Live' button.



5. ReactJS-HOL

I am unable to download the react .zip file as it is missing in the document, so I will be building it from scratch

```
Windows PowerShell
PS C:\Users\anish\Desktop\JAVA FSE round 2\Week 6\5. ReactJS-HOL> npx create-react-app cohortstracker

Creating a new React app in C:\Users\anish\Desktop\JAVA FSE round 2\Week 6\5. ReactJS-HOL\cohortstracker.

Installing packages. This might take a couple of minutes.
Installing react, react-dom, and react-scripts with cra-template...

added 1323 packages in 2m
269 packages are looking for funding
  run 'npm fund' for details

Installing template dependencies using npm...
added 17 packages, and changed 1 package in 10s
269 packages are looking for funding
  run 'npm fund' for details
Removing template package using npm...

removed 1 package, and audited 1340 packages in 3s
269 packages are looking for funding
  run 'npm fund' for details
9 vulnerabilities (3 moderate, 6 high)
To address all issues (including breaking changes), run:
  npm audit fix --force
Run 'npm audit' for details.

Activate Windows
Go to Settings to activate Windows.
```

```
Windows PowerShell
PS C:\Users\anish\Desktop\JAVA FSE round 2\Week 6\5. ReactJS-HOL> cd cohortstracker
PS C:\Users\anish\Desktop\JAVA FSE round 2\Week 6\5. ReactJS-HOL\cohortstracker> code .
PS C:\Users\anish\Desktop\JAVA FSE round 2\Week 6\5. ReactJS-HOL\cohortstracker> npm start

> cohortstracker@0.1.0 start
> react-scripts start

(node:2892) [DEP_WEBPACK_DEV_SERVER_ON_AFTER_SETUP_MIDDLEWARE] DeprecationWarning: 'onAfterSetupMiddleware' option is deprecated. Please use the 'setupMiddlewares' option.
(Use 'node --trace-deprecation ...' to show where the warning was created)
(node:2892) [DEP_WEBPACK_DEV_SERVER_ON_BEFORE_SETUP_MIDDLEWARE] DeprecationWarning: 'onBeforeSetupMiddleware' option is deprecated. Please use the 'setupMiddlewares' option.
Starting the development server...
Compiled successfully!

You can now view cohortstracker in the browser.

  Local:            http://localhost:3000
  On Your Network:  http://192.168.56.1:3000

Note that the development build is not optimized.
To create a production build, use npm run build.

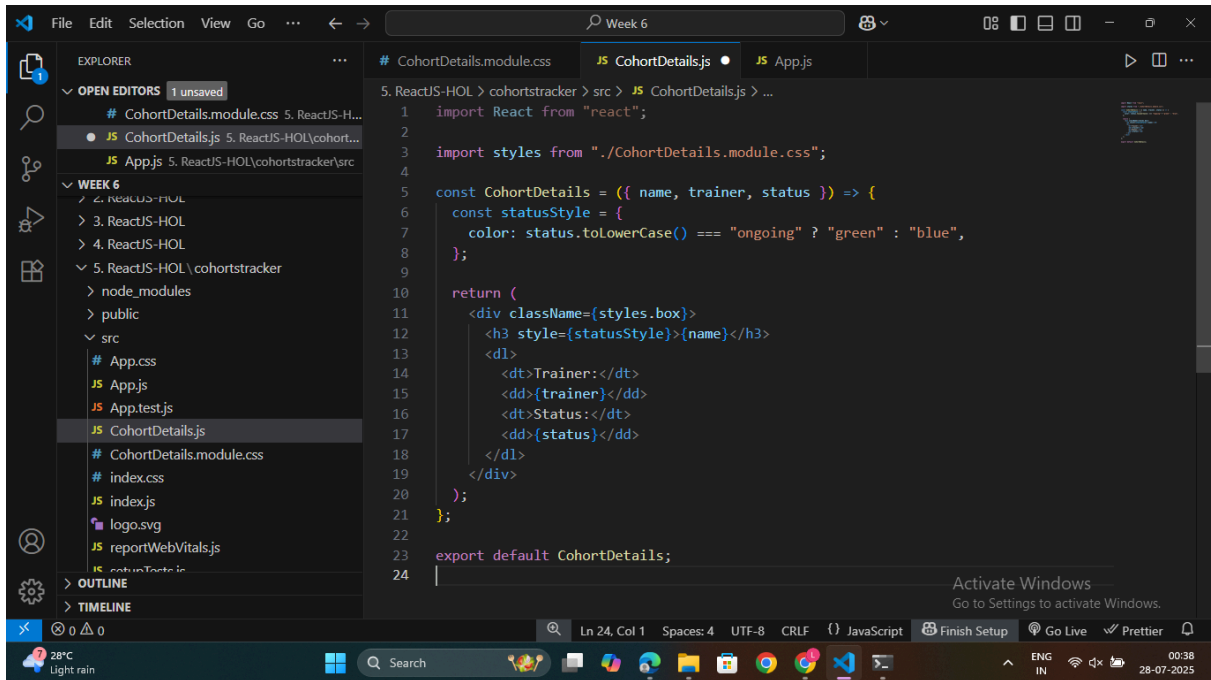
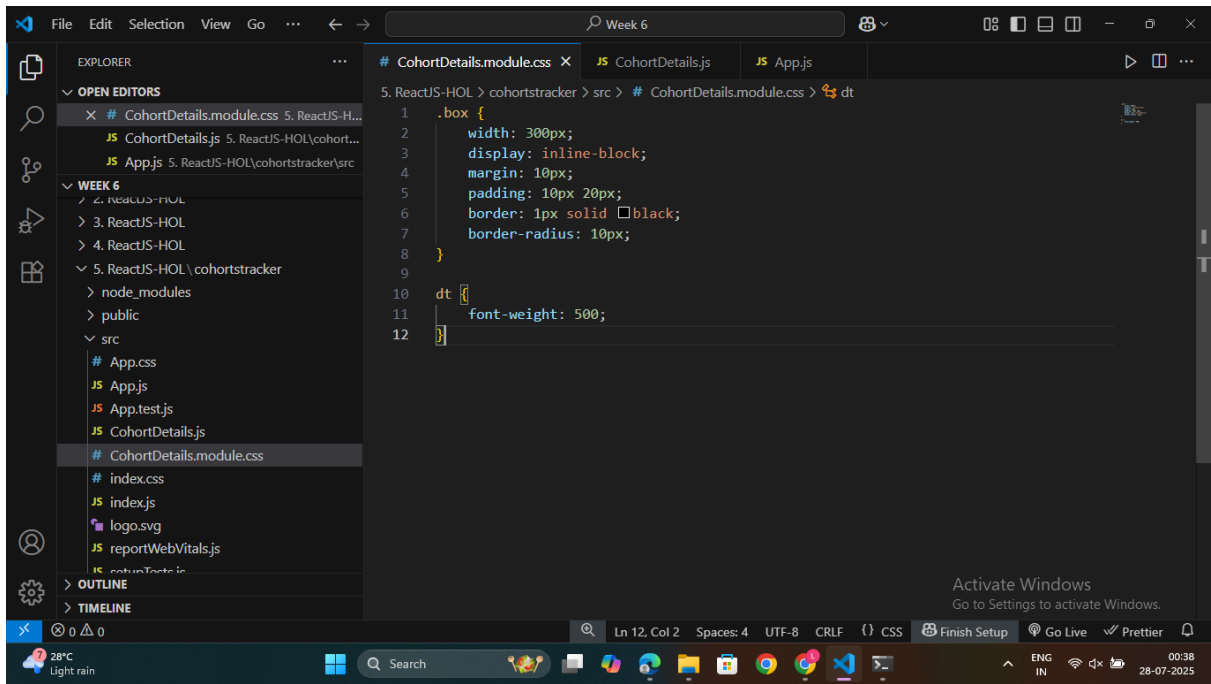
webpack compiled successfully
Compiling...
Compiled successfully!

You can now view cohortstracker in the browser.

  Local:            http://localhost:3000
  On Your Network:  http://192.168.56.1:3000

Note that the development build is not optimized.
To create a production build, use npm run build.

Activate Windows
Go to Settings to activate Windows.
```



```
1 import React from "react";
2
3 import CohortDetails from "../CohortDetails";
4
5 function App() {
6   return (
7     <div>
8       <CohortDetails
9         name="React Bootcamp"
10        trainer="John Doe"
11        status="ongoing"
12      />
13
14      <CohortDetails
15        name="Java Spring Batch"
16        trainer="Jane Smith"
17        status="completed"
18      />
19    </div>
20  );
21 }
22
23 export default App;
```

