SUPERSET ID - 6364309

HANDSON DOC1

Theories:

Single-Page Application (SPA)

Definition

A Single-Page Application (SPA) is a web application that loads a single HTML page and dynamically updates content as the user interacts with the app, without requiring a full page reload. All necessary resources (HTML, CSS, JavaScript) are either fetched once at startup or loaded on demand, and routing within the app is handled client- side.

Benefits:

Seamless User Experience: Transitions between "pages" feel instantaneous since only parts of the page update.

Reduced Server Load: After the initial load, only data (usually via APIs) is requested from the server, not full HTML pages.

Easier State Management: Client- side frameworks can maintain application state (e.g., user authentication, UI state) more consistently.

Reusability of Components: UI components can be built once and reused across different views.

Rich Interactivity: Enables highly interactive, desktop- like experiences in the browser.

Multiple-Page Application (MPA) vs. SPA

Feature	SPA	MPA
Page Reloads	No full reload; content swaps dynamically	Full page reload on each navigation
Routing	Client-side routing (e.g., via History API)	Server-side routing; each URL corresponds to a server endpoint
Speed (after load)	Very fast interactions post-initial load	Slower; each navigation fetches entire page
SEO	Requires extra setup (e.g., server-side rendering)	Works out of the box with server-rendered pages
Initial Load Time	Longer (downloads JS framework & bundle)	Shorter; only required assets for that page
Development Model	Often decoupled frontend/backend	Tighter coupling; backend renders views/templates

Pros & Cons of Single- Page Applications

Pros: **Smooth UX:** No flicker or blank pages during navigation.

Efficient Data Usage: Only data is transferred; avoids redundant HTML/CSS.

Modular Frontend Architecture: Encourages component- based design.

Offline Support & Caching: Easier to implement service workers for offline mode.

Cons : SEO Challenges: Search engines may struggle without server- side rendering or prerendering.

- **Initial Bundle Size:** Can be large, leading to slower first- load times.
- **JavaScript Dependency:** If JS fails or is disabled, the app may not function.
- **Memory Leaks:** Long- running single page may accumulate unused resources.

React

Definition
React is an open- source JavaScript library for building user interfaces, maintained by Facebook. It focuses on the view layer (UI) of an application, enabling developers to create reusable, declarative components.

How React Works

- **Component-Based Architecture:** UI is broken into self- contained components (functions or classes) that manage their own state and render UI.
- **Unidirectional Data Flow:** Data flows down from parent to child components via props, making state changes predictable.
- **Reconciliation:** When state or props change, React computes the minimal set of updates needed to sync the UI with the data model.
- **Virtual DOM Diffing:** React maintains an in- memory Virtual DOM representation; it diffs this against the previous snapshot to batch and apply only necessary real DOM updates.

Virtual DOM

Definition
The Virtual DOM is a lightweight, in- memory representation of the actual DOM. Rather than manipulating the real DOM directly (which is slow), React first updates the Virtual DOM, computes the differences ("diff"), and then efficiently applies the minimal changes to the real DOM.

Key Features of React

- **JSX (JavaScript XML):** A syntax extension that allows writing HTML- like code within JavaScript, improving readability and component structure.
- **Reusable Components:** Encapsulate markup, styles, and behavior to promote DRY (Don't Repeat Yourself) principles.
- **Lifecycle Methods / Hooks:**
  - **Class Components:** `componentDidMount`, `shouldComponentUpdate`, etc.
  - **Functional Components:** Hooks like `useState`, `useEffect`, `useContext`, enabling state and side- effects.
- **Context API:** Allows sharing global data (e.g., theme, locale) without prop drilling.

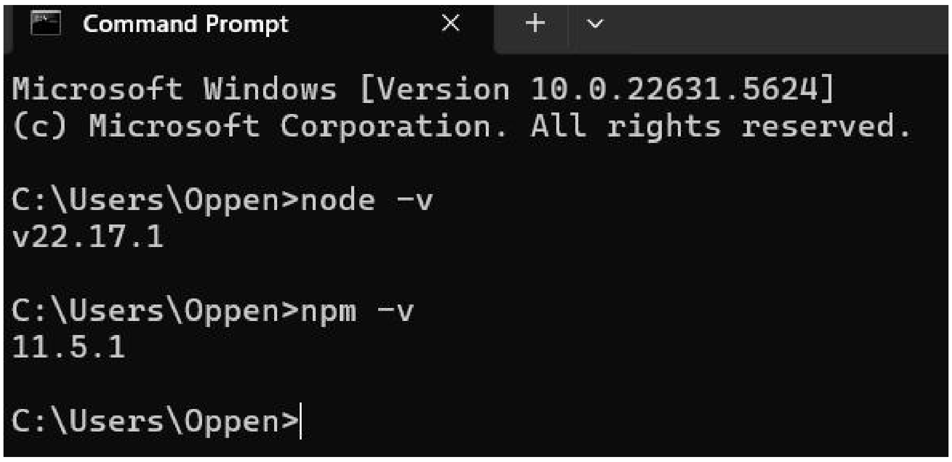
High Performance: Virtual DOM diffing, fiber architecture, and selective update batching.

Rich Ecosystem: Tools like React Router for routing, Redux or Context for state management, and a vast library of third- party components.

Server-Side Rendering (SSR) & Hydration: Frameworks like Next.js enable pre- rendering pages on the server for SEO and faster initial loads.

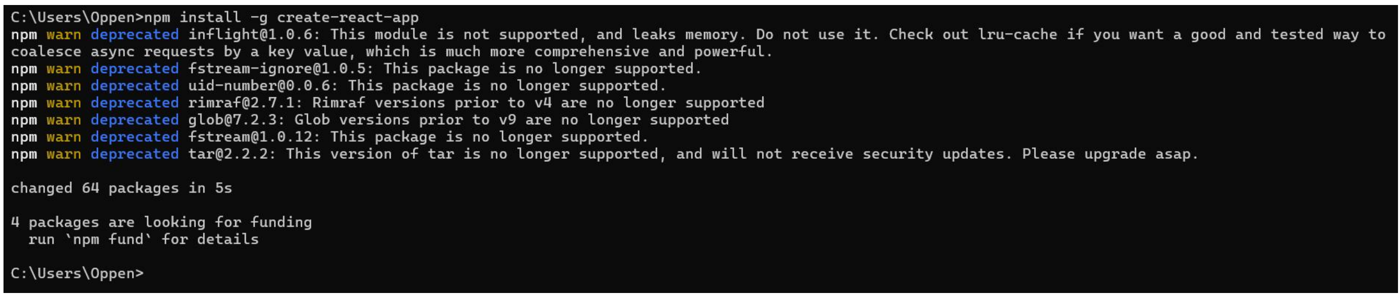
Work Done
Create a new React Application with the name "myfirstreact", Run the application to print "welcome to the first session of React" as heading of that page.

1. Nodejs and Npm was installed from the following link:
   https://nodejs.org/en/download/



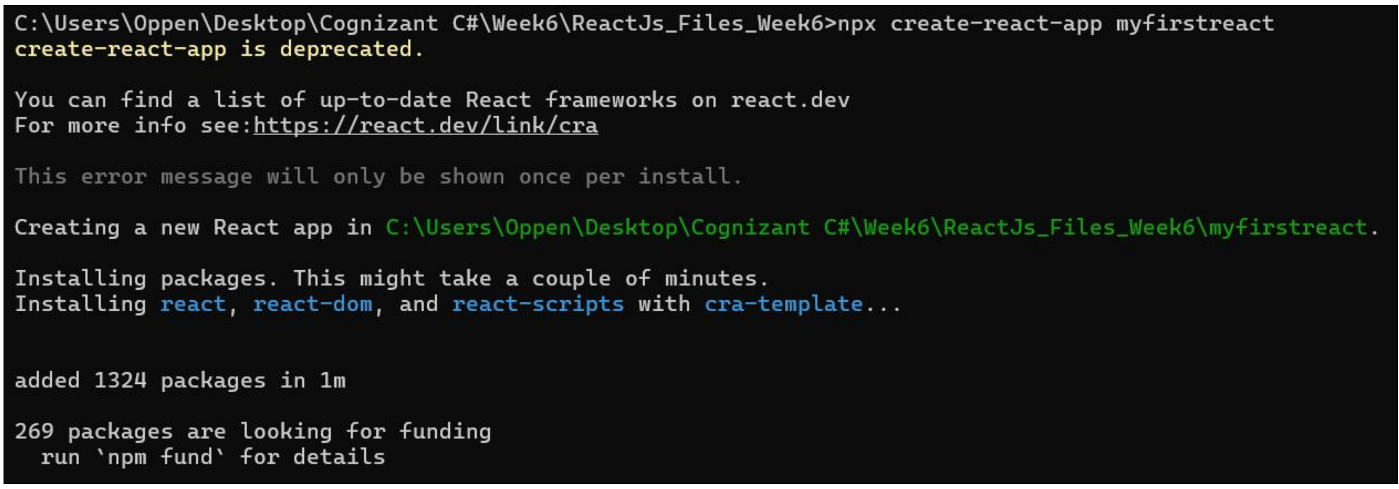
```
Command Prompt

Microsoft Windows [Version 10.0.22631.5624]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Oppen>node -v
v22.17.1

C:\Users\Oppen>npm -v
11.5.1

C:\Users\Oppen>
```

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



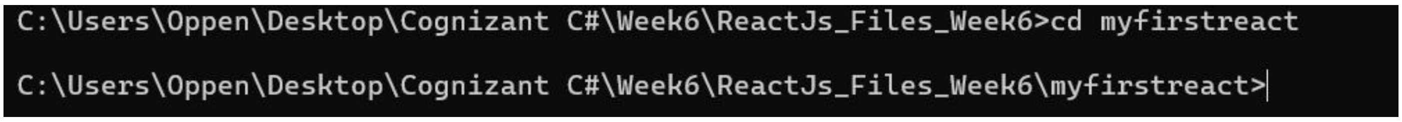
```
C:\Users\Oppen>npm install -g create-react-app
npm warn deprecated inflight@1.0.6: This module is not supported, and leaks memory. Do not use it. Check out lru-cache if you want a good and tested way to
coalesce async requests by a key value, which is much more comprehensive and powerful.
npm warn deprecated fstream-ignore@1.0.5: This package is no longer supported.
npm warn deprecated uid-number@0.0.6: This package is no longer supported.
npm warn deprecated rimraf@2.7.1: Rimraf versions prior to v4 are no longer supported
npm warn deprecated glob@7.2.3: Glob versions prior to v9 are no longer supported
npm warn deprecated fstream@1.0.12: This package is no longer supported.
npm warn deprecated tar@2.2.2: This version of tar is no longer supported, and will not receive security updates. Please upgrade asap.

changed 64 packages in 5s

4 packages are looking for funding
  run `npm fund` for details

C:\Users\Oppen>
```

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



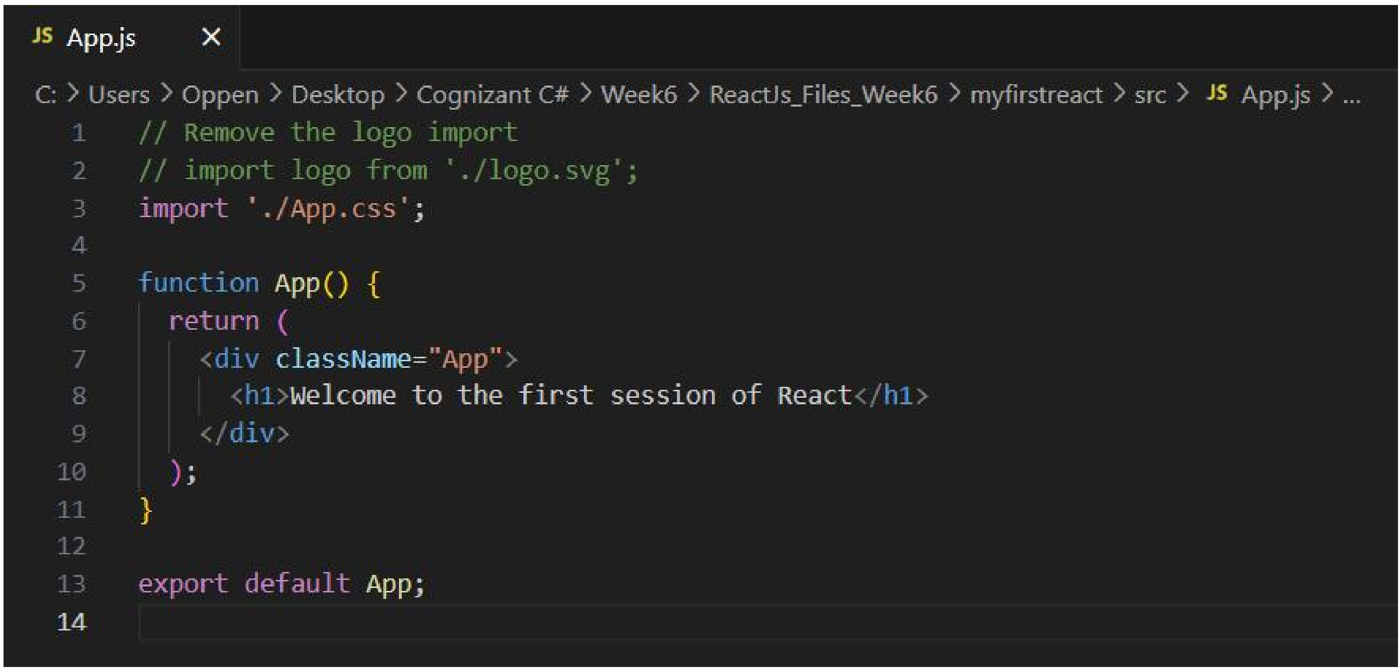
```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>npx create-react-app myfirstreact
create-react-app is deprecated.

You can find a list of up-to-date React frameworks on react.dev
For more info see:https://react.dev/link/cra

This error message will only be shown once per install.

Creating a new React app in C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\myfirstreact.

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


added 1324 packages in 1m

269 packages are looking for funding
  run `npm fund` for details
```

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



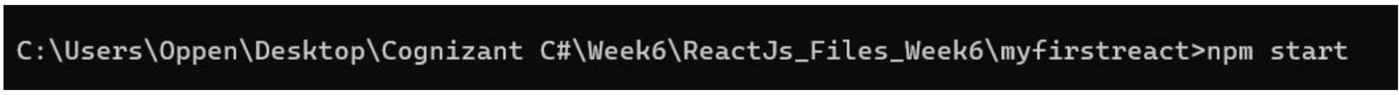
```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>cd myfirstreact

C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\myfirstreact>
```

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:


App.js
C: > Users > Oppen > Desktop > Cognizant C# > Week6 > ReactJs_Files_Week6 > myfirstreact > src > App.js > ...

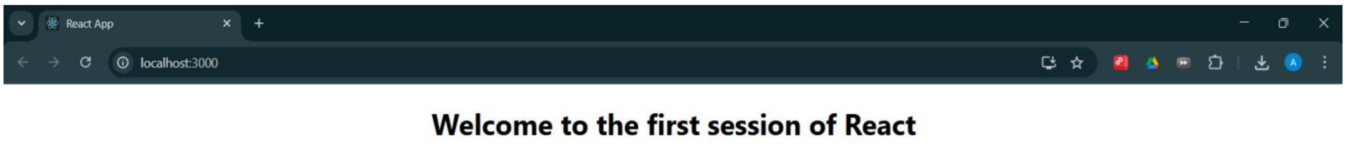
```
// Remove the logo import
// import logo from './logo.svg';
import './App.css';

function App() {
  return (
    <div className="App">
      <h1>Welcome to the first session of React</h1>
    </div>
  );
}

export default App;

```

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



```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\myfirstreact>npm start
```

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



Welcome to the first session of React

HANDSON DOC 2

1. React Components

Definition: React components are self- contained, reusable building blocks that encapsulate markup, logic, and styling for a part of the user interface.

Key Characteristics:

Encapsulation: Each component manages its own internal data (state) and exposes configuration via properties (props).

Reusability: Components can be composed and reused throughout an application.

Isolation: Changes in one component's state or logic do not directly affect others.

---

2. Components vs. Plain JavaScript Functions

Aspect	JavaScript Function	React Component
Invocation	Called explicitly in code	Rendered by React via JSX tags
Return Value	Any JavaScript value	A description of UI (JSX / Virtual DOM)
Side- Effect Handling	No built- in lifecycle hooks	Lifecycle methods (classes) or Hooks (functions)
Purpose	Encapsulate logic	Encapsulate UI structure + behavior

---

3. Types of React Components:

Class Components:

Implemented as ES6 classes extending `React.Component`.

Provide built- in lifecycle methods and a `constructor`.

Function Components:

Plain JavaScript functions (or arrow functions).

Use React Hooks (e.g., `useState`, `useEffect`) for state and side- effects.

4. Class Components:

Definition: Components defined by creating a class that extends `React.Component`.

Lifecycle Overview:

Mounting: `constructor()` → `render()` → `componentDidMount()`

Updating: `shouldComponentUpdate()` → `render()` → `componentDidUpdate()`

Unmounting: `componentWillUnmount()`

State Management:

Initialized in the `constructor`.

Updated via `this.setState()`, triggering re-renders.

5. Function Components

Definition: Components implemented as functions that accept `props` and return JSX.

Hooks: `useState` for local state. , `useEffect` for side-effects tied to render cycles.

Advantages: Simpler syntax, no need for constructors or explicit lifecycle methods.

Encourages cleaner, more declarative code.

6. Component Constructor

Context: Applies only to class components.

Purpose: Initialize internal `state`.

Bind event-handler methods to the component instance.

Signature:

```
constructor(props) {

 super(props);

  // this.state = { … };
  // this.method = this.method.bind(this);
}
```

Note: Must call `super(props)` before accessing `this`.

7. render() Function:

Role: Required in class components; defines what UI the component displays.

Characteristics:

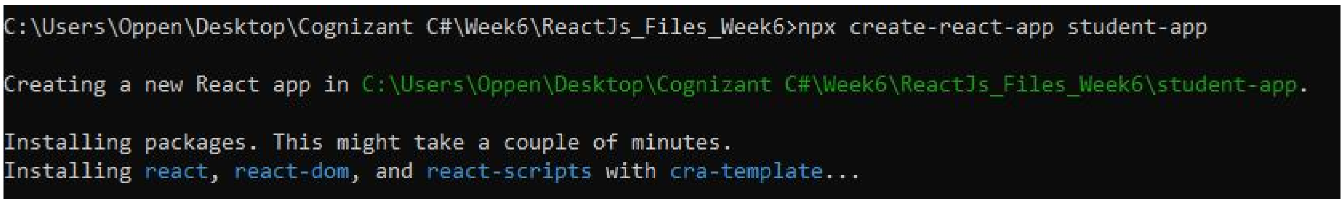
Pure: Should not produce side-effects or depend on external mutable variables.

Returns: JSX or `null` to describe the component's UI.

Execution: Invoked by React during mounting and upon state or prop changes, driving the reconciliation process that updates the actual DOM.

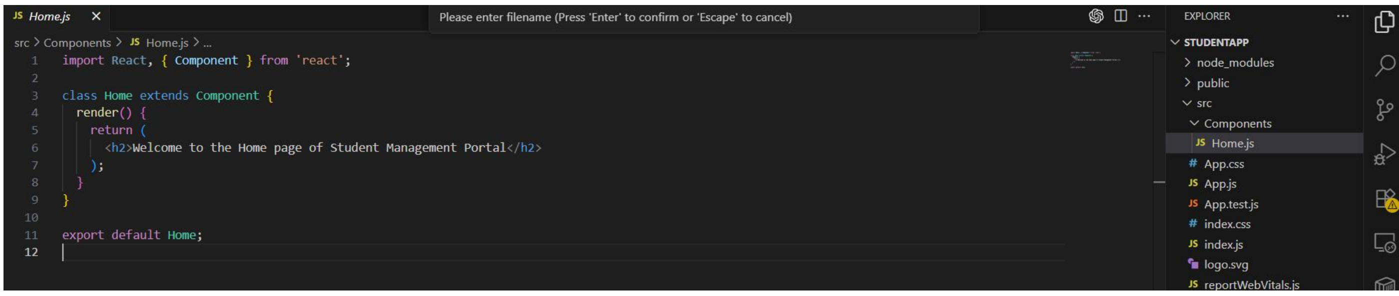
Create a react app for Student Management Portal named StudentApp and create a component named Home which will display the Message "Welcome to the Home page of Student Management Portal". Create another component named About and display the Message “Welcome to the About page of the Student Management Portal”. Create a third component named Contact and display the Message “Welcome to the Contact page of the Student Management Portal”. Call all the three components.

1. Create a React project named “StudentApp” type the following command in terminal of Visual studio:



```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>npx create-react-app student-app

Creating a new React app in C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\student-app.

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

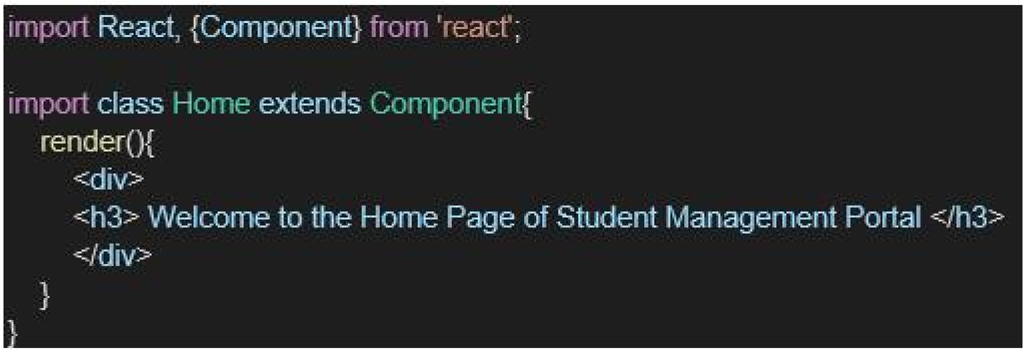
2. Create a new folder under Src folder with the name “Components”. Add a new file named “Home.js”



Please enter filename (Press 'Enter' to confirm or 'Escape' to cancel)

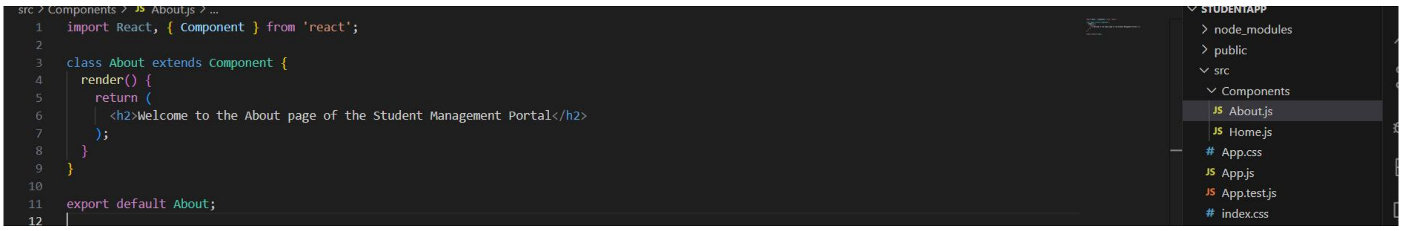
```
import React, { Component } from 'react';

class Home extends Component {
  render() {
    return (
      <h2>Welcome to the Home page of Student Management Portal</h2>
    );
  }
}

export default Home;
```

3. Type the following code in Home.js



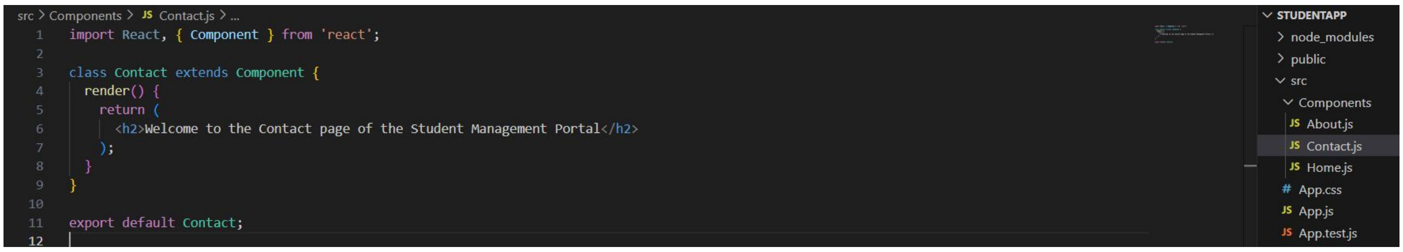
```
import React, {Component} from 'react';

import class Home extends Component{
   render(){
      <div>
      <h3> Welcome to the Home Page of Student Management Portal </h3>
      </div>
   }
}
```

4. Under Src folder add another file named “About.js”



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

class About extends Component {
  render() {
    return (
      <h2>Welcome to the About page of the Student Management Portal</h2>
    );
  }
}

export default About;
```

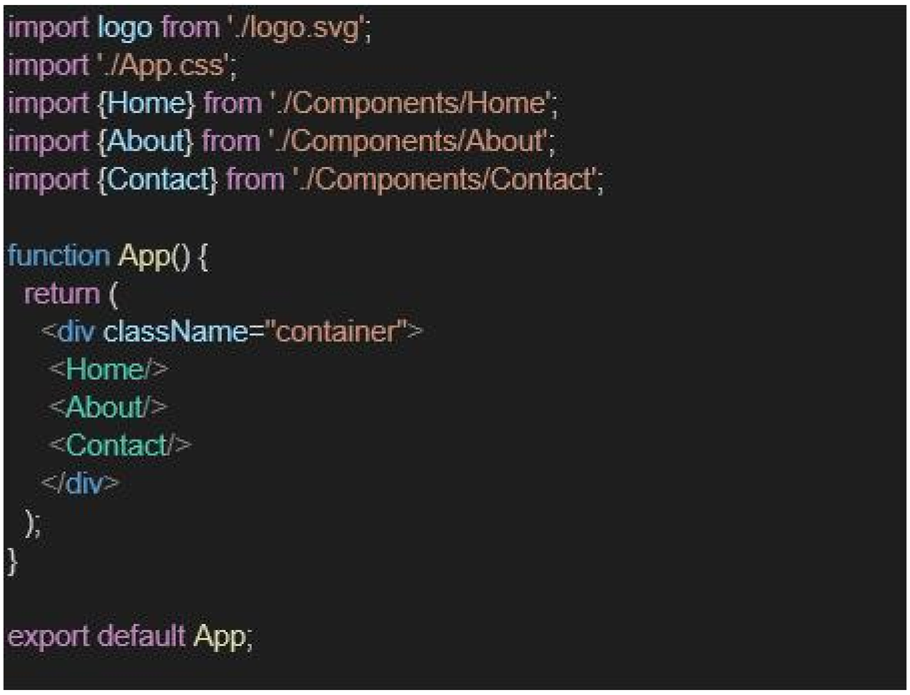
5. Repeat the same steps for Creating “About” and “Contact” component by adding a new file as ”About.js”, “Contact.js” under “Src” folder and edit the code as mentioned for “Home” Component.



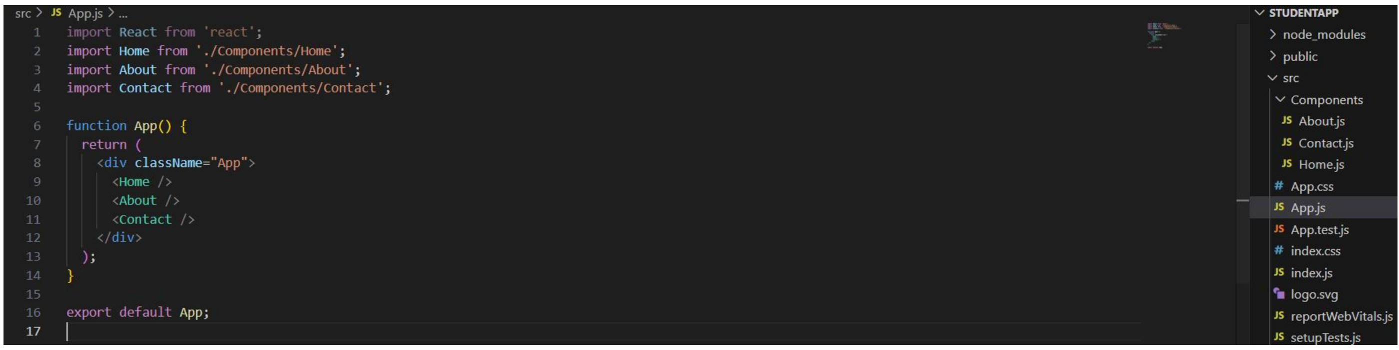
src > Components > Contact.js > ...

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

class Contact extends Component {
  render() {
    return (
      <h2>Welcome to the Contact page of the Student Management Portal</h2>
    );
  }
}

export default Contact;
```

6. Edit the App.js to invoke the Home, About and Contact component as follows:



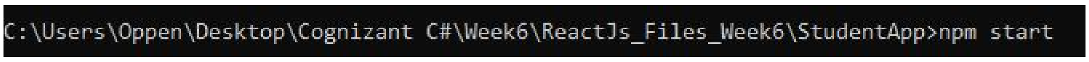
```
import logo from './logo.svg';
import './App.css';
import {Home} from './Components/Home';
import {About} from './Components/About';
import {Contact} from './Components/Contact';

function App() {
  return (
    <div className="container">
     <Home/>
     <About/>
     <Contact/>
    </div>
  );
}

export default App;
```



src > App.js > ...

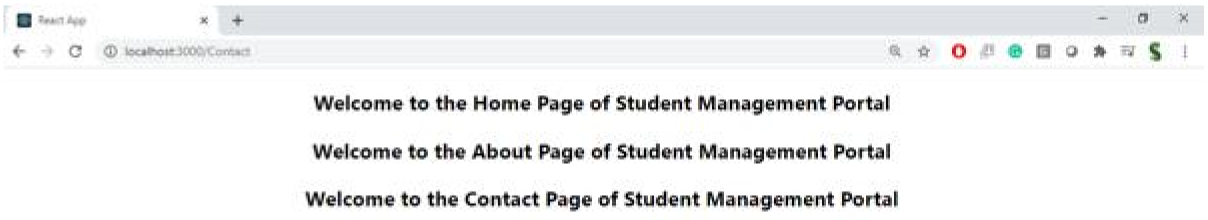
```
import React from 'react';
import Home from './Components/Home';
import About from './Components/About';
import Contact from './Components/Contact';

function App() {
  return (
    <div className="App">
      <Home />
      <About />
      <Contact />
    </div>
  );
}

export default App;
```

7. In command Prompt, navigate into StudentApp and execute the code by typing the following command:



```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\StudentApp>npm start
```

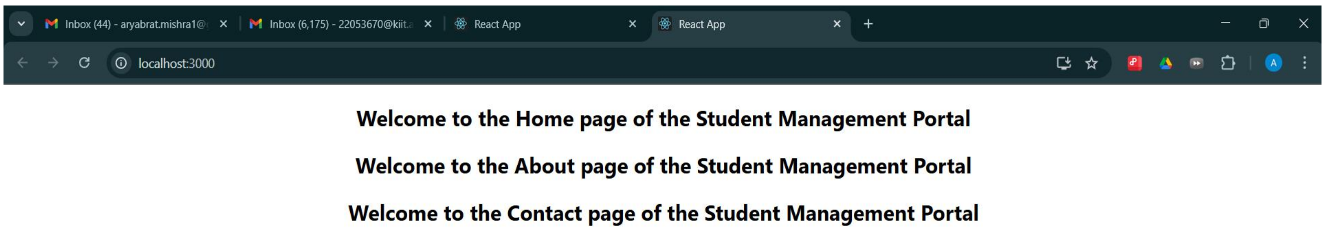
8. Open browser and type “localhost:3000” in the address bar:



Welcome to the Home Page of Student Management Portal

Welcome to the About Page of Student Management Portal

Welcome to the Contact Page of Student Management Portal



Inbox (44) - aryabrat.mishra1@
Inbox (6,175) - 22053670@kiit.
React App
React App
localhost:3000

Welcome to the Home page of the Student Management Portal

Welcome to the About page of the Student Management Portal

Welcome to the Contact page of the Student Management Portal

HANDSON DOC - 3

Theories

---

1. React Components
Definition:
A React component is a self-contained, reusable unit of UI that encapsulates its own structure (markup), behavior (logic), and styling. Components allow you to break complex interfaces into smaller, manageable pieces.

Key Characteristics:

Encapsulation: Manages its own state and accepts inputs ("props") from its parent.

Reusability: Can be composed together and reused throughout the application.

Isolation: Changes in one component do not directly affect others.

---

2. Differences Between Components and JavaScript Functions

Aspect	Plain JavaScript Function	React Component
Invocation	Called explicitly (e.g. fn())	Instantiated by React via JSX tags (<MyComp/>)
Return Value	Any JS value	JSX (UI description) or null
Side-Effect Handling	No built-in lifecycle	Lifecycle methods (classes) or Hooks (functions)
Purpose	Encapsulate logic	Encapsulate both UI & logic

---

3. Types of React Components:

Class Components

Defined as ES6 classes extending `React.Component`.

Provide built-in lifecycle methods and a `constructor`.

Function Components

Plain JavaScript functions (or arrow functions).

Use React Hooks (e.g., `useState`, `useEffect`) for state and side-effects.

---

4. Class Component
Definition:
A component defined by creating a class that extends `React.Component`.

Lifecycle Phases:

Mounting : `constructor()` → `render()` → `componentDidMount()`

Updating : `shouldComponentUpdate()` → `render()` → `componentDidUpdate()`

Unmounting :`componentWillUnmount()`

State Management:

Initialized in the `constructor`.

Updated via `this.setState()`, which triggers a re- render.

---

5. **Function Component**
Definition: A component implemented as a plain function that accepts `props` and returns JSX.

Hooks for State & Side- Effects:

`useState` — manages local state.

`useEffect` — handles side- effects tied to render cycles.

Advantages: Simpler syntax (no classes, constructors, or explicit lifecycle methods).

Encourages a more declarative style of coding.

---

6. **Component Constructor**
Context: Only in class components.

Purpose:

Initialize internal `state`.

Bind event- handler methods to the component instance if necessary.

Signature & Requirements:

```
constructor(props) {
  super(props);
  // initialize this.state
  // bind methods, if needed
}
```

`Note: Always call super(props) before accessing this`

---

7. render() Function
Role:

The required method in class components (and the function body in function components) that returns the UI's description.

Characteristics:

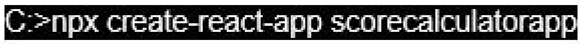
Pure: Must not produce side- effects; only reads from `this.props` and `this.state`.

Return Value: JSX (or `null`) that describes the component's UI.

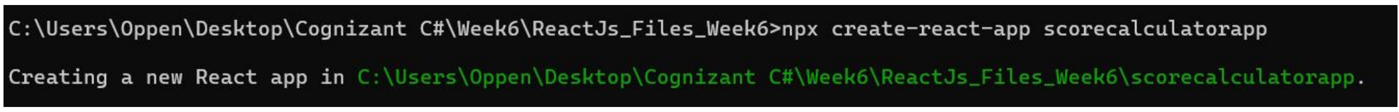
Invocation: Called on mounting and whenever props or state change, driving React's reconciliation of the real DOM.

Work Done

9. Create a React project named "scorecalculatorapp" type the following command in terminal of Visual studio:

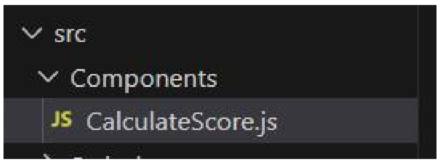


```
C:>npx create-react-app scorecalculatorapp
```

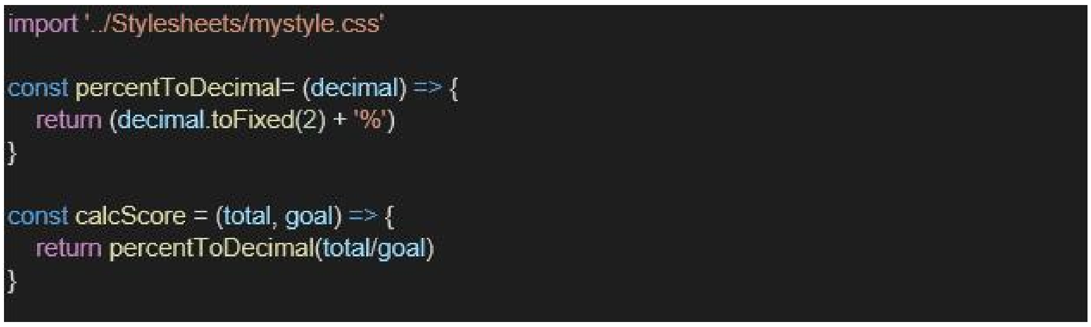


```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>npx create-react-app scorecalculatorapp

Creating a new React app in C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\scorecalculatorapp.
```

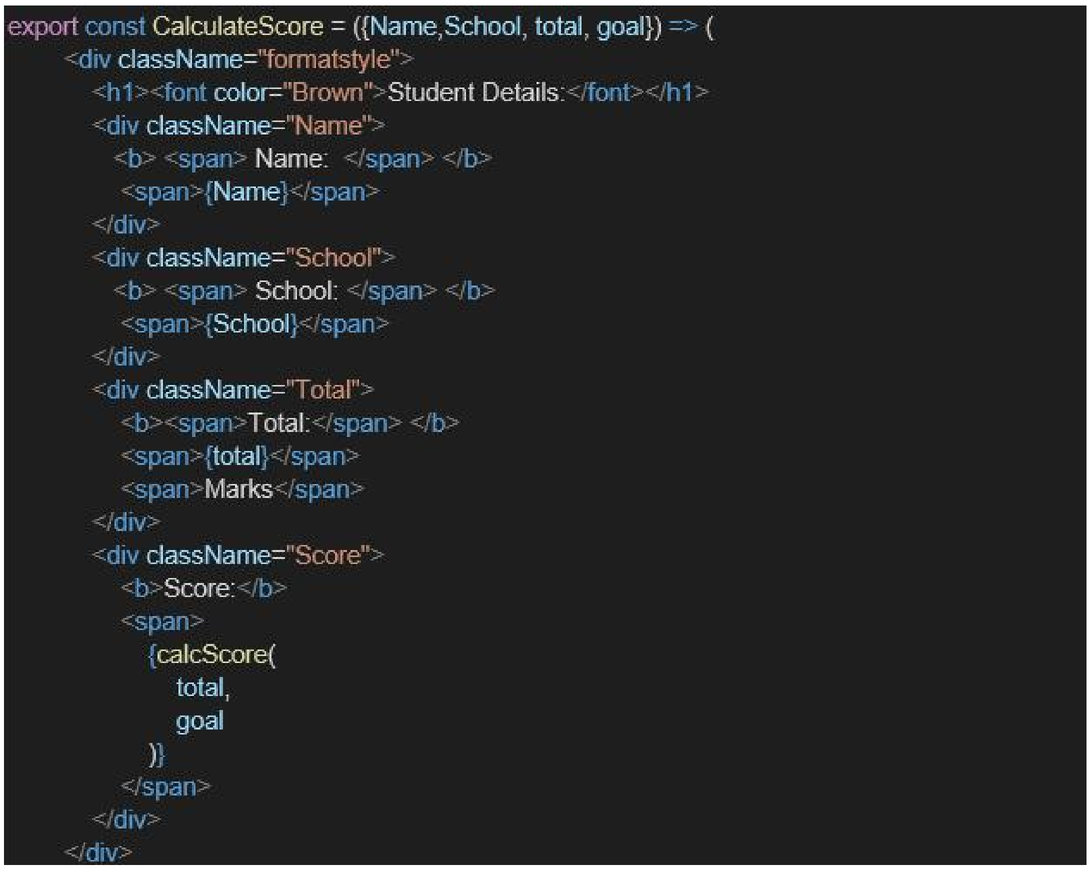
10. Create a new folder under Src folder with the name "Components". Add a new file named "CalculateScore.js"



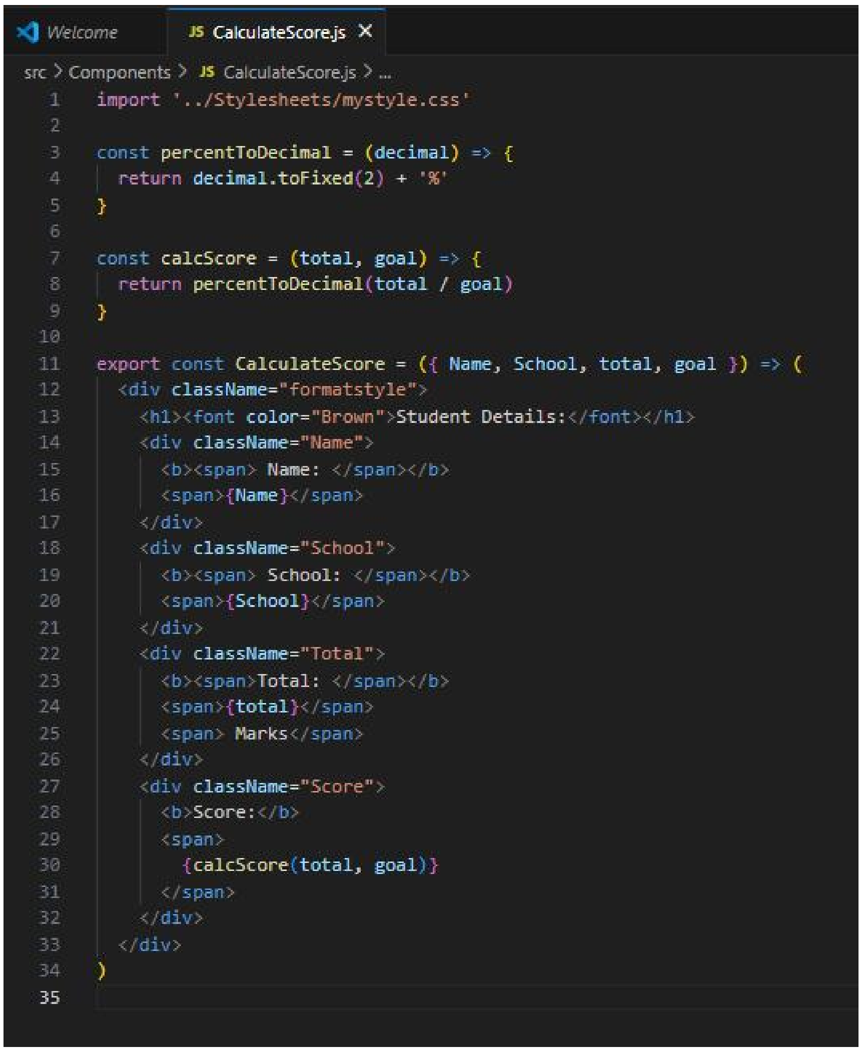
11. Type the following code in CalculateScore.js



```
import '../Stylesheets/mystyle.css'

const percentToDecimal= (decimal) => {
    return (decimal.toFixed(2) + '%')
}

const calcScore = (total, goal) => {
    return percentToDecimal(total/goal)
}
```

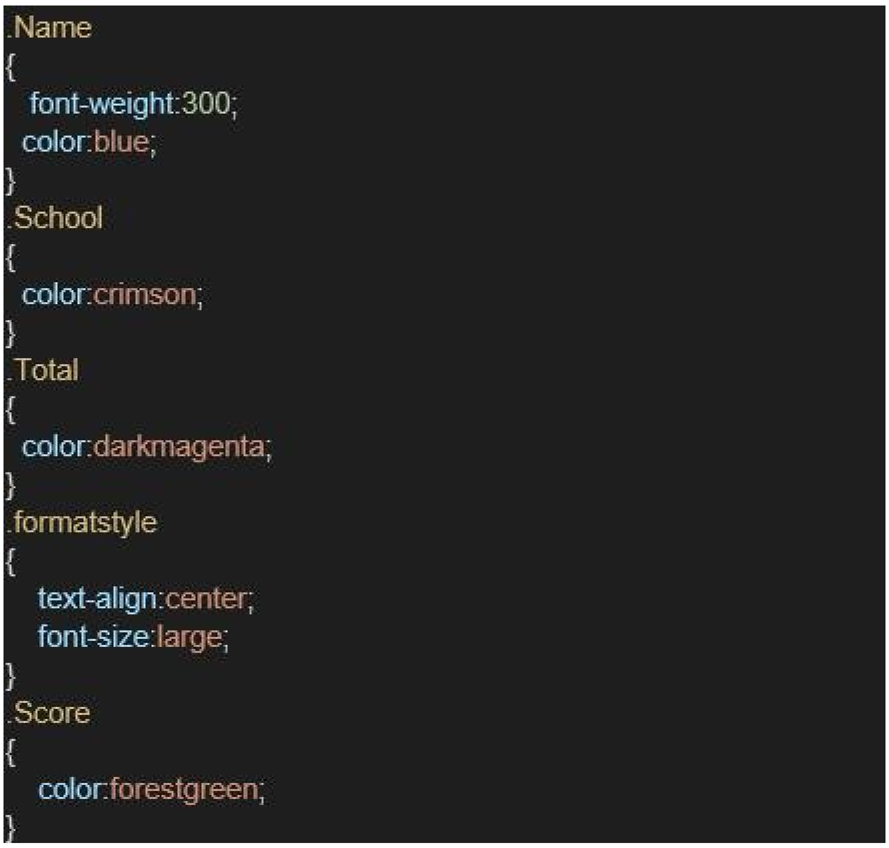


```
export const CalculateScore = ({Name,School, total, goal}) => (
    <div className="formatstyle">
      <h1><font color="Brown">Student Details:</font></h1>
      <div className="Name">
        <b> <span> Name:  </span> </b>
        <span>{Name}</span>
      </div>
      <div className="School">
        <b> <span> School: </span> </b>
        <span>{School}</span>
      </div>
      <div className="Total">
        <b><span>Total:</span> </b>
        <span>{total}</span>
        <span>Marks</span>
      </div>
      <div className="Score">
        <b>Score:</b>
        <span>
          {calcScore(
            total,
            goal
          )}
        </span>
      </div>
    </div>
```

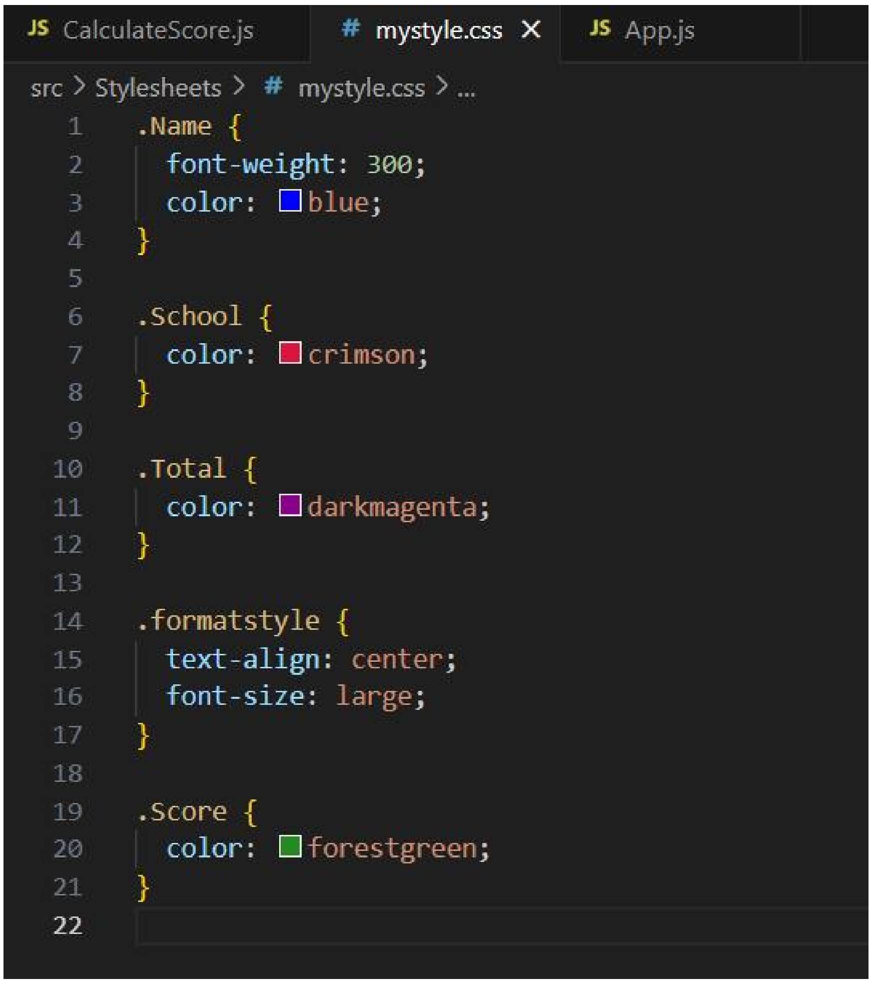


```
import '../Stylesheets/mystyle.css'

const percentToDecimal = (decimal) => {
  return decimal.toFixed(2) + '%'
}

const calcScore = (total, goal) => {
  return percentToDecimal(total / goal)
}

export const CalculateScore = ({ Name, School, total, goal }) => (
  <div className="formatstyle">
    <h1><font color="Brown">Student Details:</font></h1>
    <div className="Name">
      <b><span> Name: </span></b>
      <span>{Name}</span>
    </div>
    <div className="School">
      <b><span> School: </span></b>
      <span>{School}</span>
    </div>
    <div className="Total">
      <b><span>Total: </span></b>
      <span>{total}</span>
      <span> Marks</span>
    </div>
    <div className="Score">
      <b>Score:</b>
      <span>
        {calcScore(total, goal)}
      </span>
    </div>
  </div>
)

```

12. Create a Folder named Stylesheets and add a file named “mystyle.css” in order to add some styles to the components:



```
.Name
{
  font-weight:300;
 color:blue;
}
.School
{
 color:crimson;
}
.Total
{
 color:darkmagenta;
}
.formatstyle
{
   text-align:center;
   font-size:large;
}
.Score
{
   color:forestgreen;
}
```

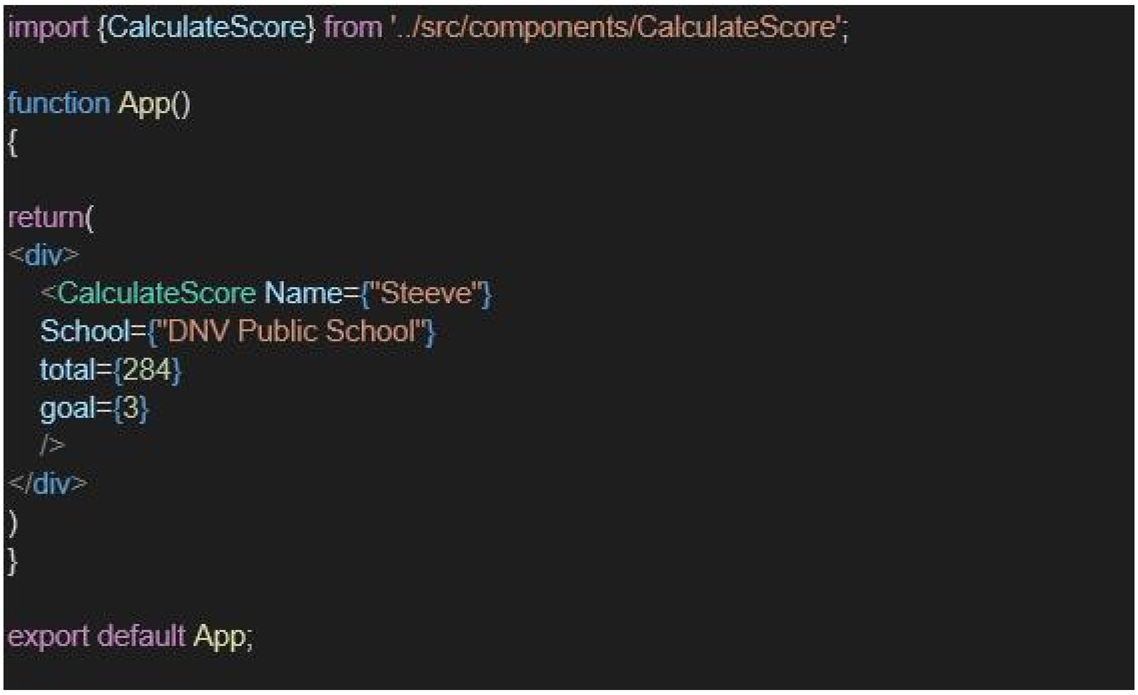


CalculateScore.js | mystyle.css | App.js

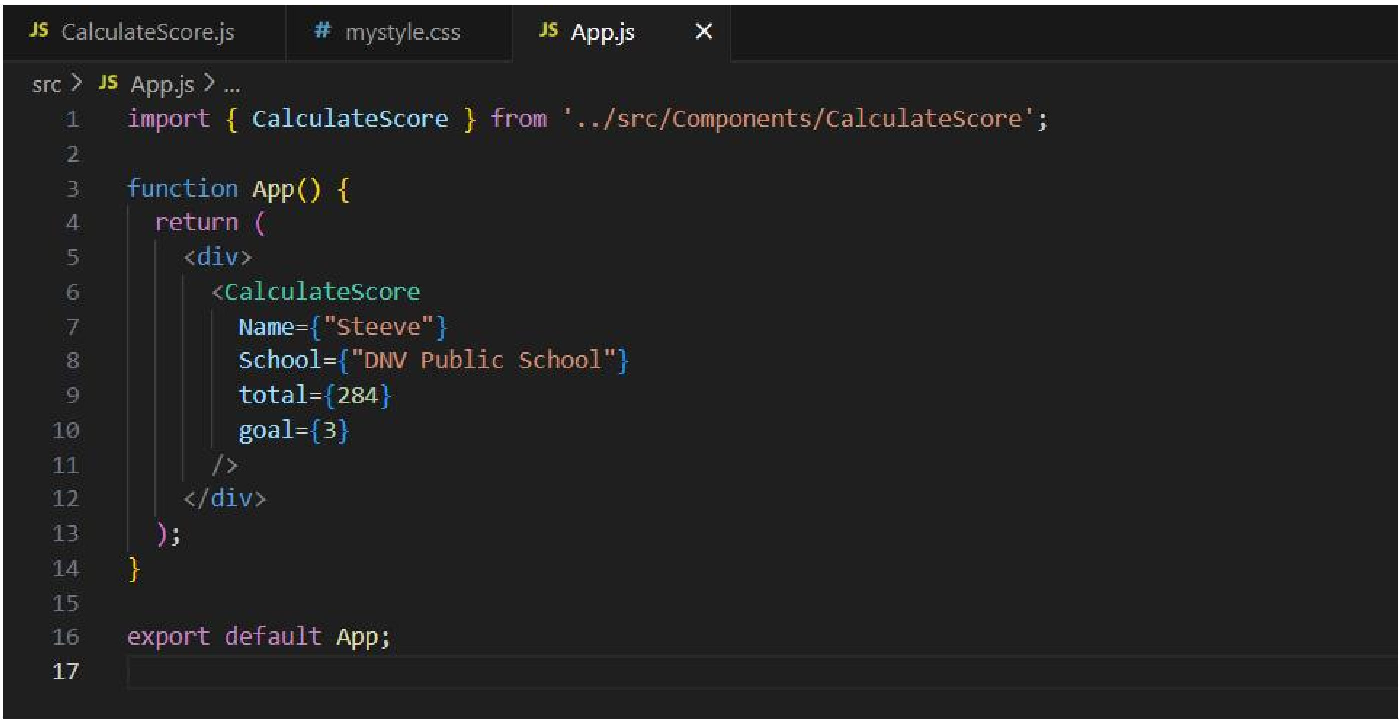
src > Stylesheets > mystyle.css > ...

```
.Name {
  font-weight: 300;
  color: blue;
}

.School {
  color: crimson;
}

.Total {
  color: darkmagenta;
}

.formatstyle {
  text-align: center;
  font-size: large;
}

.Score {
  color: forestgreen;
}
```

13. Edit the App.js to invoke the CalculateScore functional component as follows:



```
import {CalculateScore} from '../src/components/CalculateScore';

function App()
{

return(
<div>
  <CalculateScore Name={"Steeve"}
  School={"DNV Public School"}
  total={284}
  goal={3}
  />
</div>
)
}

export default App;
```



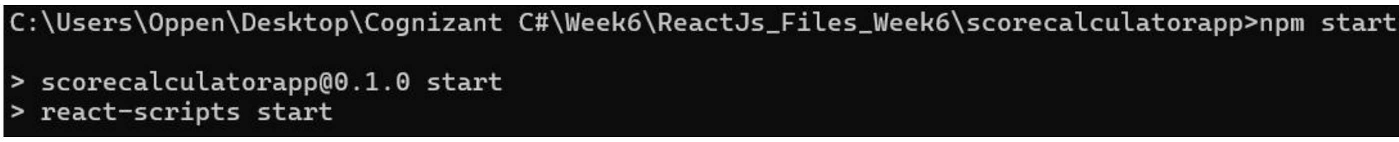
JS CalculateScore.js # mystyle.css JS App.js ×

src > JS App.js > ...

```
import { CalculateScore } from '../src/Components/CalculateScore';

function App() {
  return (
    <div>
      <CalculateScore
        Name={"Steeve"}
        School={"DNV Public School"}
        total={284}
        goal={3}
      />
    </div>
  );
}

export default App;
```

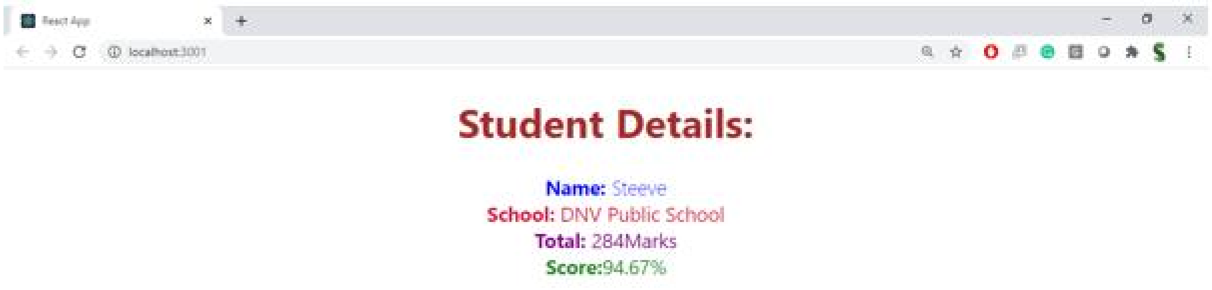
14. In command Prompt, navigate into scorecalculatorapp and execute the code by typing the following command:

```
C:\scorecalculatorapp>npm start
```



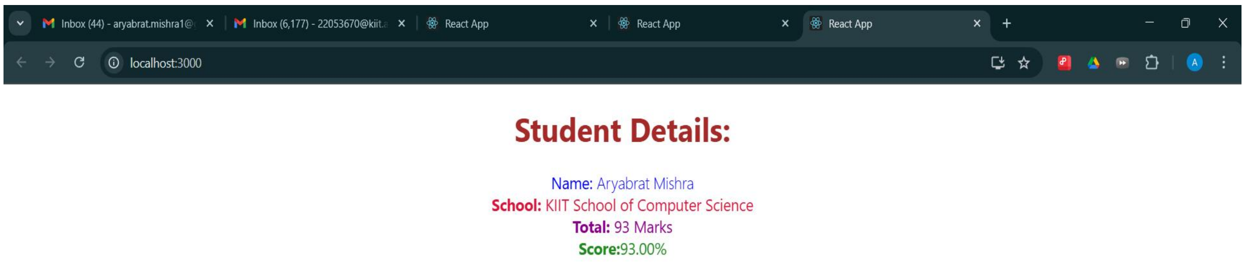
```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\scorecalculatorapp>npm start

> scorecalculatorapp@0.1.0 start
> react-scripts start
```

15. Open browser and type “localhost:3000” in the address bar:


React App
localhost:3001

Student Details:

Name: Steeve
School: DNV Public School
Total: 284Marks
Score:94.67%


Inbox (44) - aryabrat.mishra1@
Inbox (6,177) - 22053670@kiit.
React App
React App
React App
localhost:3000

Student Details:

Name: Aryabrat Mishra
School: KIIT School of Computer Science
Total: 93 Marks
Score:93.00%

HANDSON DOC 4

THEORIES :

React Component Lifecycle

1. Need and Benefits of Component Lifecycle

React components pass through distinct phases—mounting, updating, unmounting, and error handling—which expose "lifecycle" hooks. Leveraging these hooks delivers several advantages:

Controlled Side- Effects

Perform API calls, subscriptions, or timers at precise moments (e.g. only after the component is rendered).

Resource Management

Allocate resources (e.g. event listeners) when needed and clean them up to avoid memory leaks.

Predictable Initialization

Set up initial state or derive state from props in a single, centralized place.

Error Resilience

Catch rendering errors in child components and display fallback UI without breaking the entire app.

Performance Optimization

Prevent unnecessary re- renders via decision hooks (e.g. `shouldComponentUpdate`).

---

2. Lifecycle Hook Methods

React divides lifecycle hooks into four categories:

A. Mounting (initial insertion into the DOM)

```
constructor(props)

static getDerivedStateFromProps(props, state)

render()

componentDidMount()
```

B. Updating (on props or state change)

```
static getDerivedStateFromProps(props, state)
```

`shouldComponentUpdate(nextProps, nextState)`

`render()`

`getSnapshotBeforeUpdate(prevProps, prevState)`

`componentDidUpdate(prevProps, prevState, snapshot)`

C. Unmounting (removal from the DOM)

`componentWillUnmount()`

D. Error Handling

`static getDerivedStateFromError(error)`

`componentDidCatch(error, info)`

---

3. Sequence of Steps in Rendering a Component

When a class component is first rendered in an SPA, React executes these steps in order:

Constructor : Initialize internal `state` and bind methods.

getDerivedStateFromProps (if defined)

Sync state with incoming props.

Render : Produce a Virtual DOM tree based on `this.props` and `this.state`.

Commit Phase : React applies the Virtual DOM diff to the real DOM.

componentDidMount : Invoke post- render logic (e.g., data fetching, subscriptions).

Subsequent updates (due to new props or `setState`) follow the "Updating" hooks in their prescribed order, then re- commit via the real DOM.

Hands- On Lab Tasks

In this lab, you will deepen your understanding of React's lifecycle by implementing two key hooks in a class component:

Implement `componentDidMount()`

Purpose: Execute one- time setup tasks immediately after the component is inserted into the DOM (e.g., fetch remote data, start timers).

Key Steps (Theory):

Define `componentDidMount` within your class.

Within it, invoke side- effect logic (API calls, subscriptions).

Update component state as needed to trigger a re- render with fresh data.

Implement `componentDidCatch()`

Purpose: Act as an error boundary to catch JavaScript errors anywhere in the component tree below, log them, and render a fallback UI.

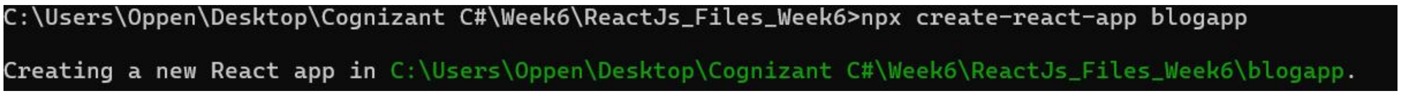
Key Steps (Theory):

Define `static getDerivedStateFromError` to update state when an error occurs.

Define `componentDidCatch` to perform error logging (e.g., send to an external monitoring service).

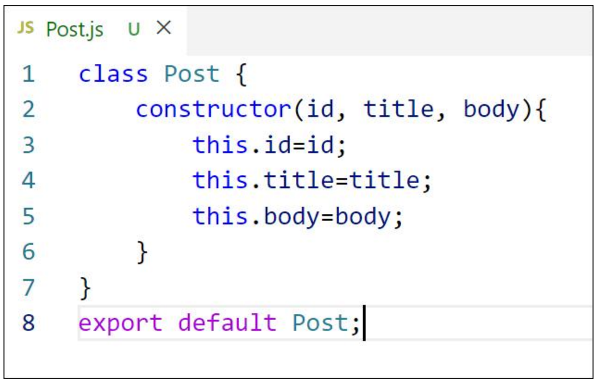
In `render()`, check for error state and return fallback UI if present.

1. Create a new react application using *create-react-app* tool with the name as "blogapp"



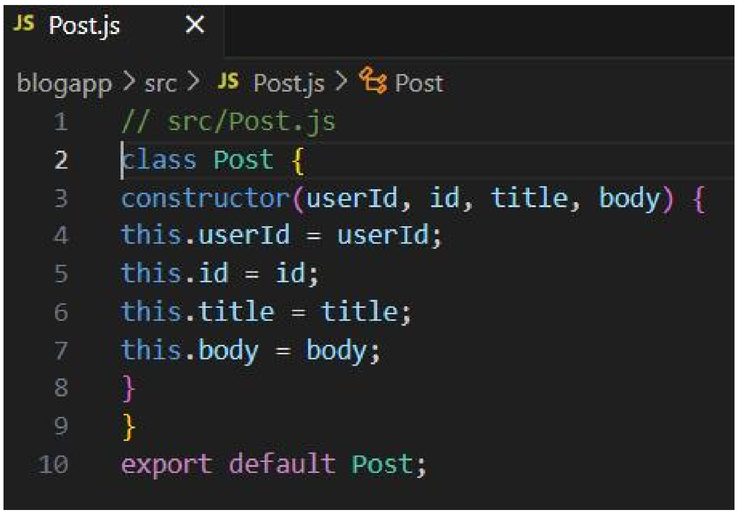
```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>npx create-react-app blogapp

Creating a new React app in C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\blogapp.
```

2. Open the application using VS Code
3. Create a new file named as **Post.js** in **src folder** with following properties



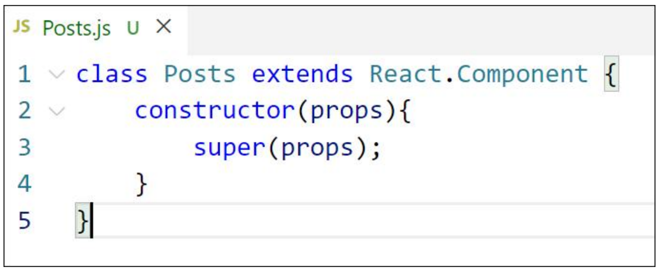
```
class Post {
    constructor(id, title, body){
        this.id=id;
        this.title=title;
        this.body=body;
    }
}
export default Post;
```

Figure 2: Post class



```
// src/Post.js
class Post {
constructor(userId, id, title, body) {
this.userId = userId;
this.id = id;
this.title = title;
this.body = body;
}
}
export default Post;
```

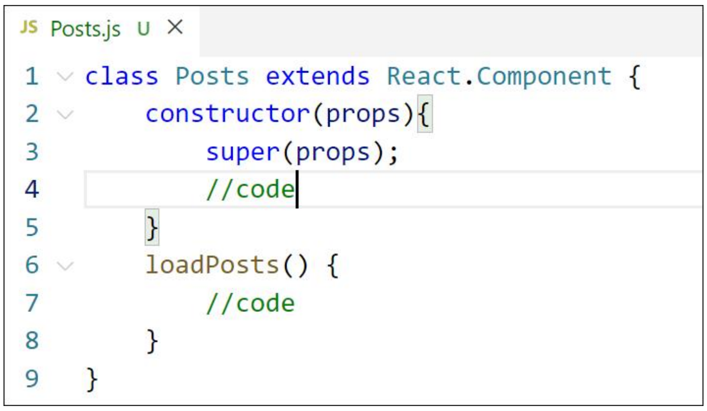
4. Create a new class based component named as **Posts** inside **Posts.js** file



```
class Posts extends React.Component {
    constructor(props){
        super(props);
    }
}
```

Figure 3: Posts Component

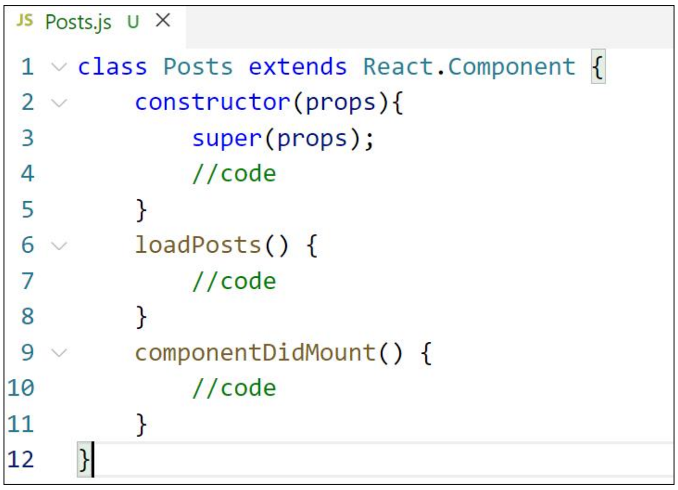
5. Initialize the component with a list of Post in state of the component using the constructor
6. Create a new method in component with the name as **loadPosts()** which will be responsible for using Fetch API and assign it to the component state created earlier. To get the posts use the url (https://jsonplaceholder.typicode.com/posts)



```
class Posts extends React.Component {
    constructor(props){
        super(props);
        //code
    }
    loadPosts() {
        //code
    }
}
```

Figure 4: loadPosts() method

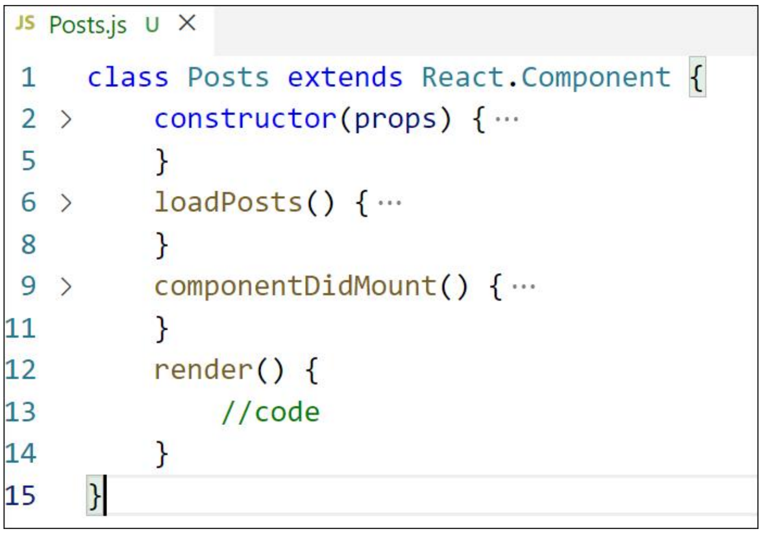
7. Implement the **componentDidMount()** hook to make calls to **loadPosts()** which will fetch the posts



```
class Posts extends React.Component {
    constructor(props){
        super(props);
        //code
    }
    loadPosts() {
        //code
    }
    componentDidMount() {
        //code
    }
}
```

Figure 5: componentDidMount() hook

8. Implement the **render()** which will display the title and post of posts in html page using heading and paragraphs respectively.

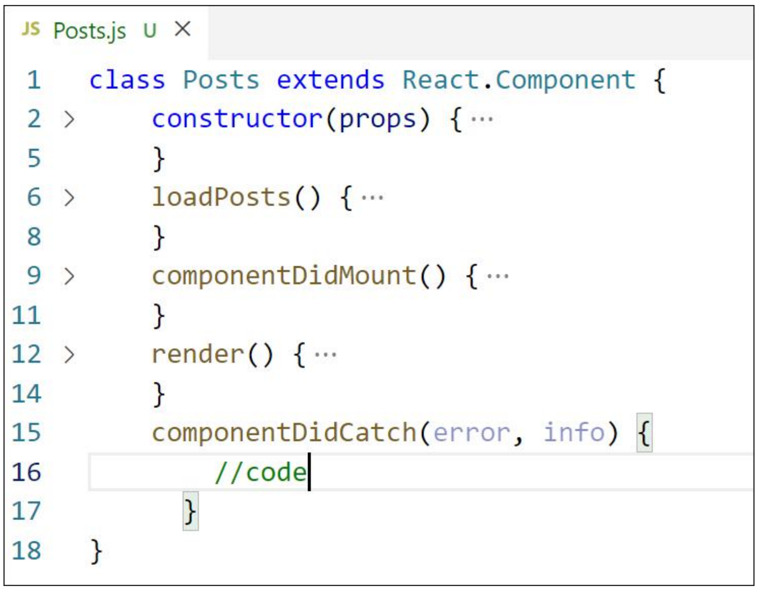


Posts.js U ×

```
class Posts extends React.Component {
    constructor(props) {⋯
    }
    loadPosts() {⋯
    }
    componentDidMount() {⋯
    }
    render() {
        //code
    }
}
```

Figure 6: render() method

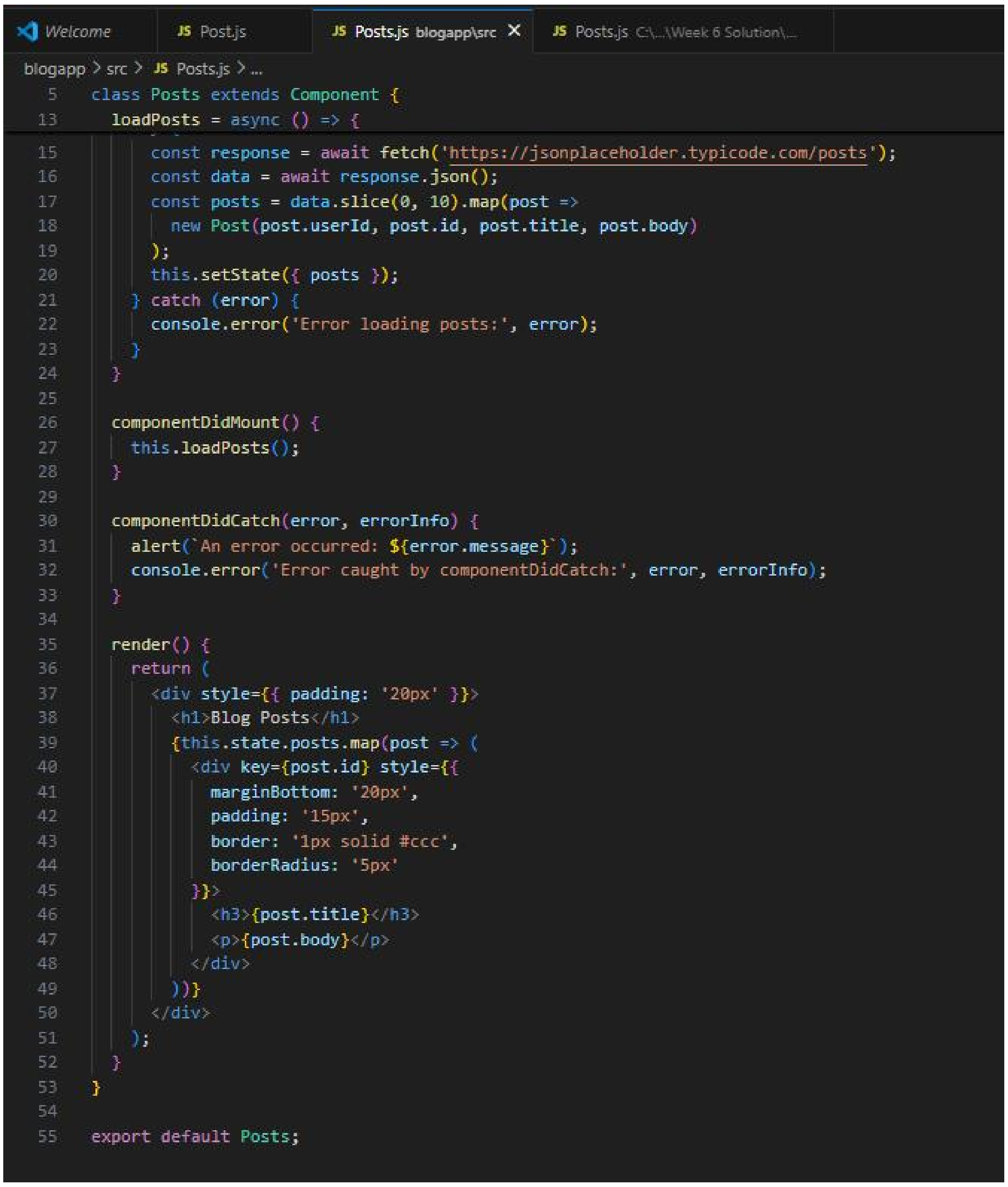
9. Define a **componentDidCatch()** method which will be responsible for displaying any error happing in the component as alert messages.



Posts.js U ×

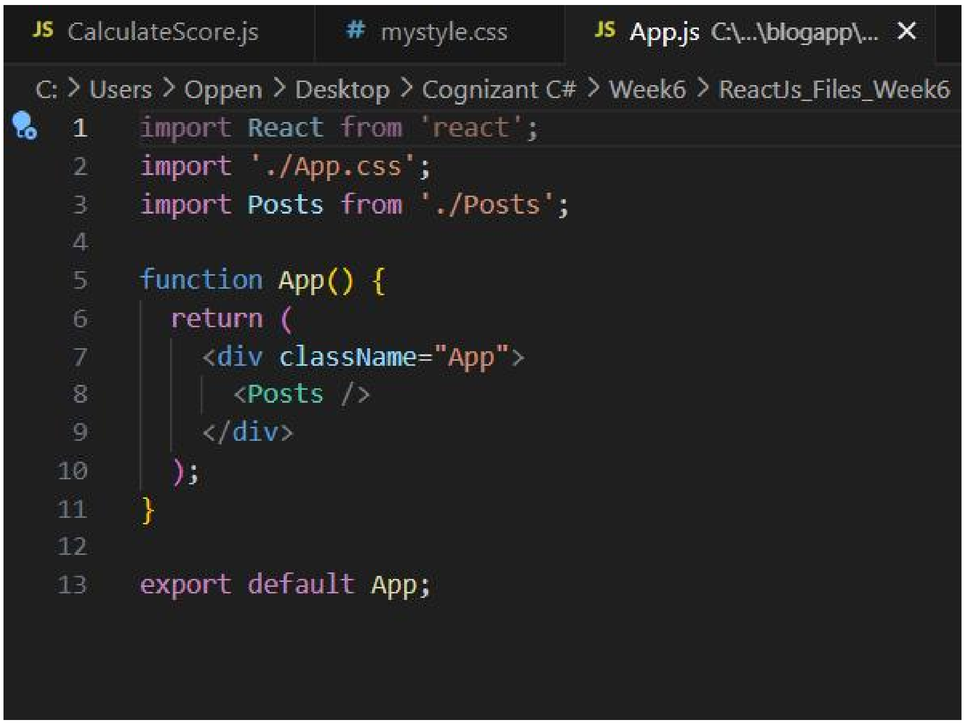
```
class Posts extends React.Component {
    constructor(props) {⋯
    }
    loadPosts() {⋯
    }
    componentDidMount() {⋯
    }
    render() {⋯
    }
    componentDidCatch(error, info) {
        //code
      }
}
```

Figure 7: componentDidCatch() hook


Welcome
Post.js
Posts.js blogapp\src
Posts.js C:\...\Week 6 Solution\...
blogapp > src > Posts.js > ...

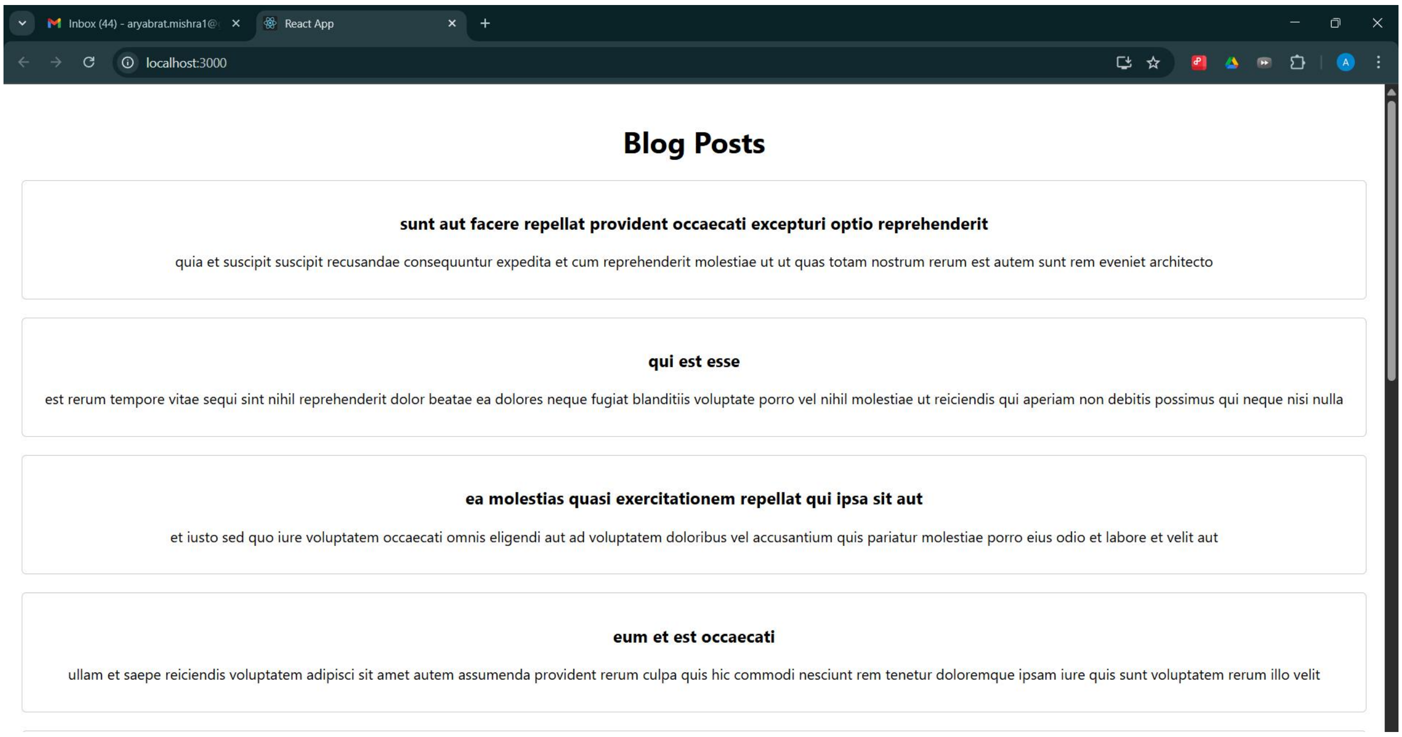
```
class Posts extends Component {
  loadPosts = async () => {
      const response = await fetch('https://jsonplaceholder.typicode.com/posts');
      const data = await response.json();
      const posts = data.slice(0, 10).map(post =>
        new Post(post.userId, post.id, post.title, post.body)
      );
      this.setState({ posts });
    } catch (error) {
      console.error('Error loading posts:', error);
    }
  }

  componentDidMount() {
    this.loadPosts();
  }

  componentDidCatch(error, errorInfo) {
    alert(`An error occurred: ${error.message}`);
    console.error('Error caught by componentDidCatch:', error, errorInfo);
  }

  render() {
    return (
      <div style={{ padding: '20px' }}>
        <h1>Blog Posts</h1>
        {this.state.posts.map(post => (
          <div key={post.id} style={{
            marginBottom: '20px',
            padding: '15px',
            border: '1px solid #ccc',
            borderRadius: '5px'
          }}>
            <h3>{post.title}</h3>
            <p>{post.body}</p>
          </div>
        ))}
      </div>
    );
  }
}

export default Posts;
```

10. Add the Posts component to App component.


CalculateScore.js
mystyle.css
App.js C:\...\blogapp\...
C: > Users > Oppen > Desktop > Cognizant C# > Week6 > ReactJs_Files_Week6

```
import React from 'react';
import './App.css';
import Posts from './Posts';

function App() {
  return (
    <div className="App">
      <Posts />
    </div>
  );
}

export default App;
```

11. Build and Run the application using *npm start* command.



Blog Posts

sunt aut facere repellat provident occaecati excepturi optio reprehenderit

quia et suscipit suscipit recusandae consequuntur expedita et cum reprehenderit molestiae ut ut quas totam nostrum rerum est autem sunt rem eveniet architecto

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HANDSON DOC 5

Theories :

1. Understanding the Need for Styling React Components

Why Style at the Component Level?

Encapsulation of Presentation

Keeps styles co-located with markup and behavior, making each component a self-contained unit.

Avoid Global Namespace Collisions

Traditional global CSS can lead to conflicting selectors; component-scoped styling prevents unintended overrides.

Enhanced Maintainability

When styles live alongside component logic, it's easier to trace and update the look-and-feel of individual UI pieces.

Dynamic & Themed UIs

Components often need to adapt their styling based on props or application theme; local styles enable fine-grained control.

Performance Optimizations

Bundlers can split out only the CSS actually used by each component, reducing overall stylesheet size and improving load times.

---

2. Working with CSS Modules and Inline Styles

A. CSS Modules

Definition:

A build-time technique that transforms `.css` files into scoped, locally-named class maps, ensuring style rules apply only to the importing component.

Key Characteristics:

Automatic Scoping: Class names are hashed (e.g. `Button_module__primary__a1b2c`) to avoid clashes.

Familiar Syntax: Write standard CSS (or preprocessors) without modifications.

Explicit Imports: Components import only the classes they use, making dependencies clear.

Benefits:

Strong encapsulation without moving away from plain CSS.

Easier code-splitting and tree-shaking of unused styles.

Considerations:

Requires build-step support (Webpack, Vite, etc.).

Global theming via CSS variables or shared module files.

B. Inline Styles

Definition:

Styling via the React `style` prop, passing a JavaScript object of CSS properties.

Key Characteristics:

Dynamic Values: Compute styles at render time based on props or state.

JavaScript-Centric: CSS properties in camelCase (`backgroundColor`, `fontSize`).

Benefits:

No external stylesheet or build configuration required.

Ideal for ad-hoc or highly dynamic styling (e.g., animations, conditional layouts).

Limitations:

Cannot leverage pseudo-classes (`:hover`) or media queries directly.

May lead to verbose markup when overused.

Less efficient for large, static style blocks.

Choosing Between CSS Modules and Inline Styles

Use **CSS Modules** for component-specific, static styles that benefit from full CSS feature set (selectors, media queries, pseudo-classes).

Use **Inline Styles** for small, dynamic adjustments driven by JavaScript logic (e.g., toggling visibility, computing dimensions at runtime).

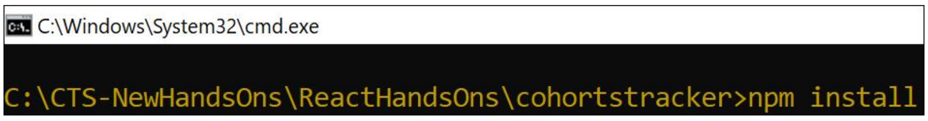
Work Done

My Academy team at Cognizant want to create a dashboard containing the details of ongoing and completed cohorts. A react application is created which displays the detail of the cohorts using react component. You are assigned the task of styling these react components.

Download and build the attached react application.

cohorttracker.zip

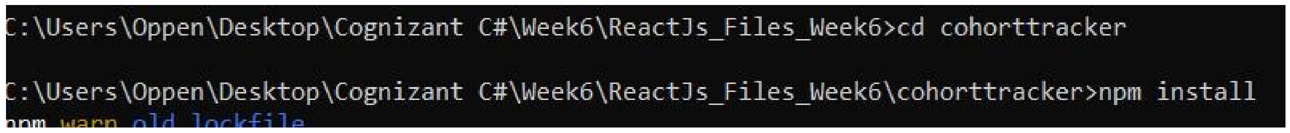
1. Unzip the react application in a folder
2. Open command prompt and switch to the react application folder
3. Restore the node packages using the following commands



```
C:\Windows\System32\cmd.exe

C:\CTS-NewHandsOns\ReactHandsOns\cohortstracker>npm install
```

Figure 1: Restore packages



```
C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6>cd cohorttracker

C:\Users\Oppen\Desktop\Cognizant C#\Week6\ReactJs_Files_Week6\cohorttracker>npm install
npm warn old lockfile
```

4. Open the application using VS Code

5. Create a new CSS Module in a file called "CohortDetails.module.css"

6. Define a css class with the name as "box" with following properties

    Width = 300px;

    Display = inline block;

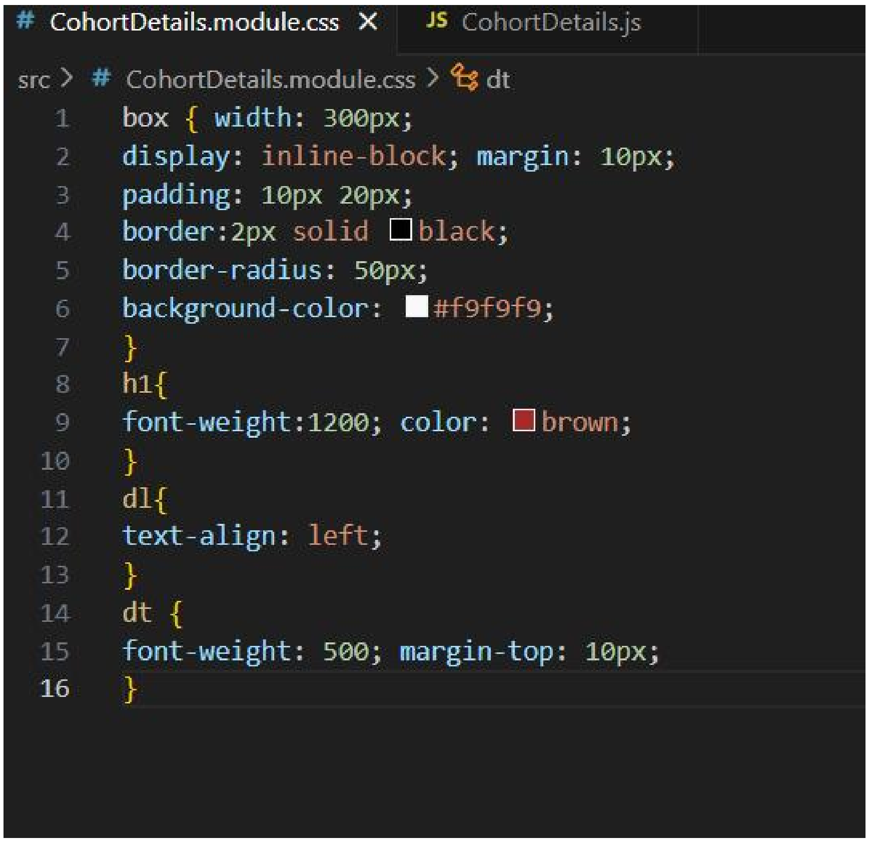
    Overall 10px margin

    Top and bottom padding as 10px

    Left and right padding as 20px

    1 px border in black color

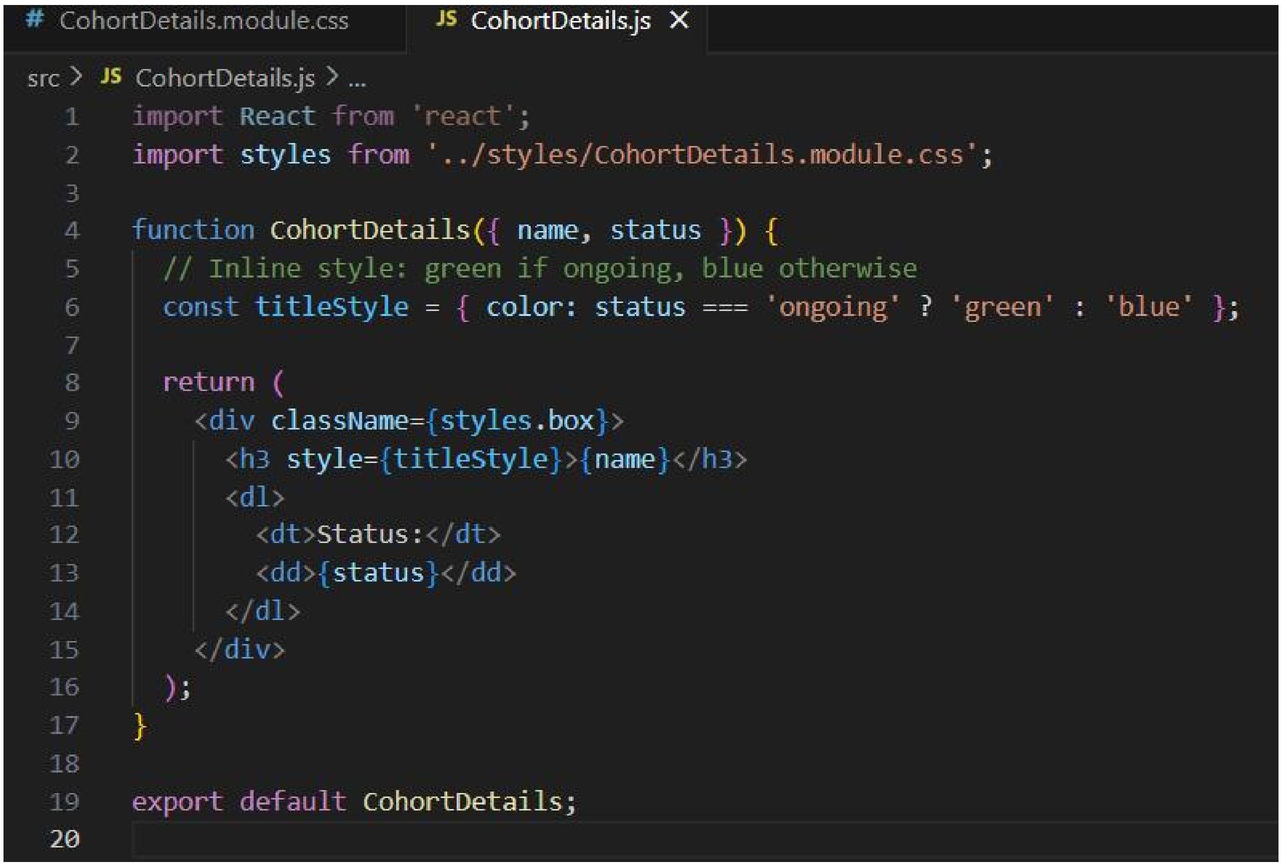
    A border radius of 10px



# CohortDetails.module.css ×
JS CohortDetails.js
src > # CohortDetails.module.css > dt

```css
box { width: 300px;
display: inline-block; margin: 10px;
padding: 10px 20px;
border:2px solid black;
border-radius: 50px;
background-color: #f9f9f9;
}
h1{
font-weight:1200; color: brown;
}
dl{
text-align: left;
}
dt {
font-weight: 500; margin-top: 10px;
}
```

7. Define a css style for html <dt> element using tag selector. Set the font weight to 500.
8. Open the cohort details component and import the CSS Module
9. Apply the box class to the container div
10. Define the style for <h3> element to use “green” color font when cohort status is “ongoing” and “blue” color in all other scenarios.



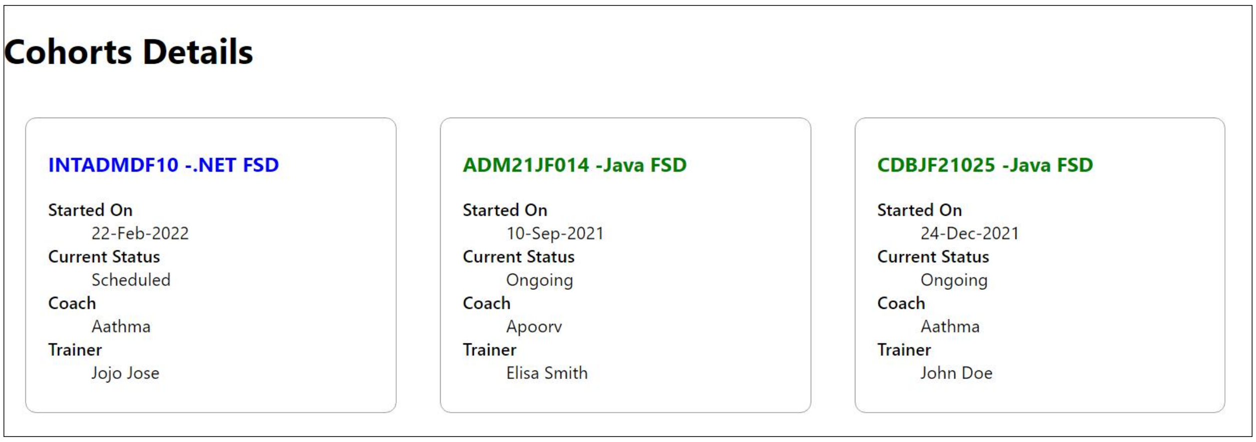
```javascript
import React from 'react';
import styles from '../styles/CohortDetails.module.css';

function CohortDetails({ name, status }) {
  // Inline style: green if ongoing, blue otherwise
  const titleStyle = { color: status === 'ongoing' ? 'green' : 'blue' };

  return (
    <div className={styles.box}>
      <h3 style={titleStyle}>{name}</h3>
      <dl>
        <dt>Status:</dt>
        <dd>{status}</dd>
      </dl>
    </div>
  );
}

export default CohortDetails;
```

11. Final result should look similar to the below image



Cohorts Details

INTADMDF10 -.NET FSD

Started On
22-Feb-2022
Current Status
Scheduled
Coach
Aathma
Trainer
Jojo Jose

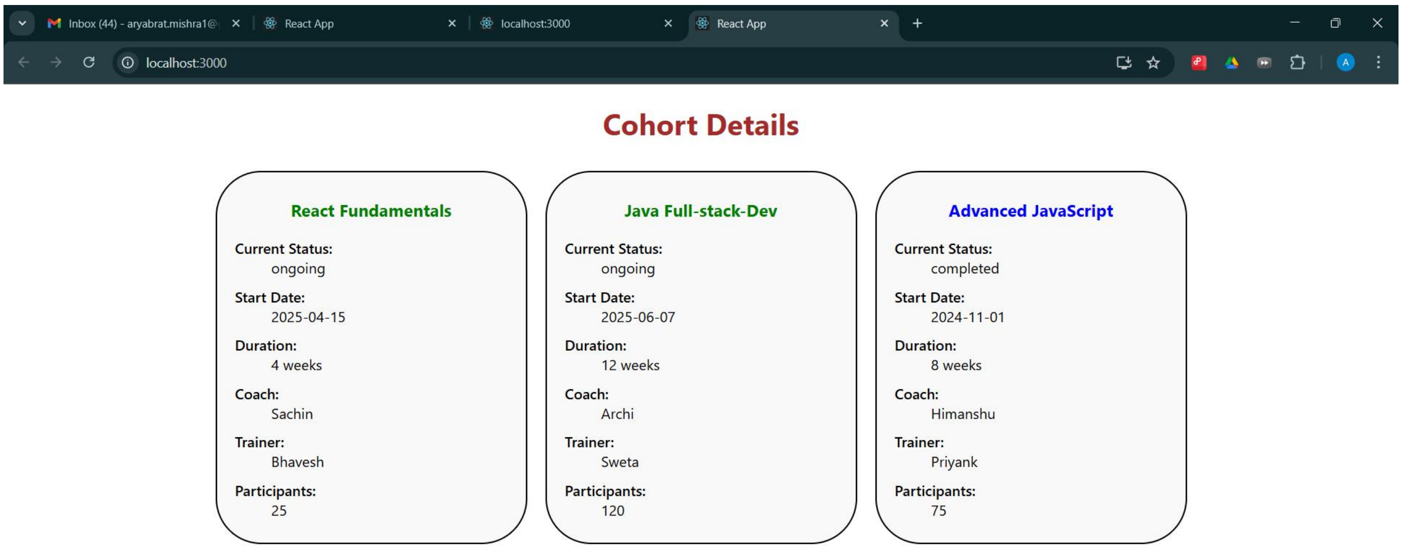
ADM21JF014 -Java FSD

Started On
10-Sep-2021
Current Status
Ongoing
Coach
Apoorv
Trainer
Elisa Smith

CDBJF21025 -Java FSD

Started On
24-Dec-2021
Current Status
Ongoing
Coach
Aathma
Trainer
John Doe

Figure 2: Final Result



Inbox (44) - aryabrat.mishra1@ | React App | localhost:3000 | React App

localhost:3000

Cohort Details

React Fundamentals

Current Status:
ongoing
Start Date:
2025-04-15
Duration:
4 weeks
Coach:
Sachin
Trainer:
Bhavesh
Participants:
25

Java Full-stack-Dev

Current Status:
ongoing
Start Date:
2025-06-07
Duration:
12 weeks
Coach:
Archi
Trainer:
Sweta
Participants:
120

Advanced JavaScript

Current Status:
completed
Start Date:
2024-11-01
Duration:
8 weeks
Coach:
Himanshu
Trainer:
Priyank
Participants:
75