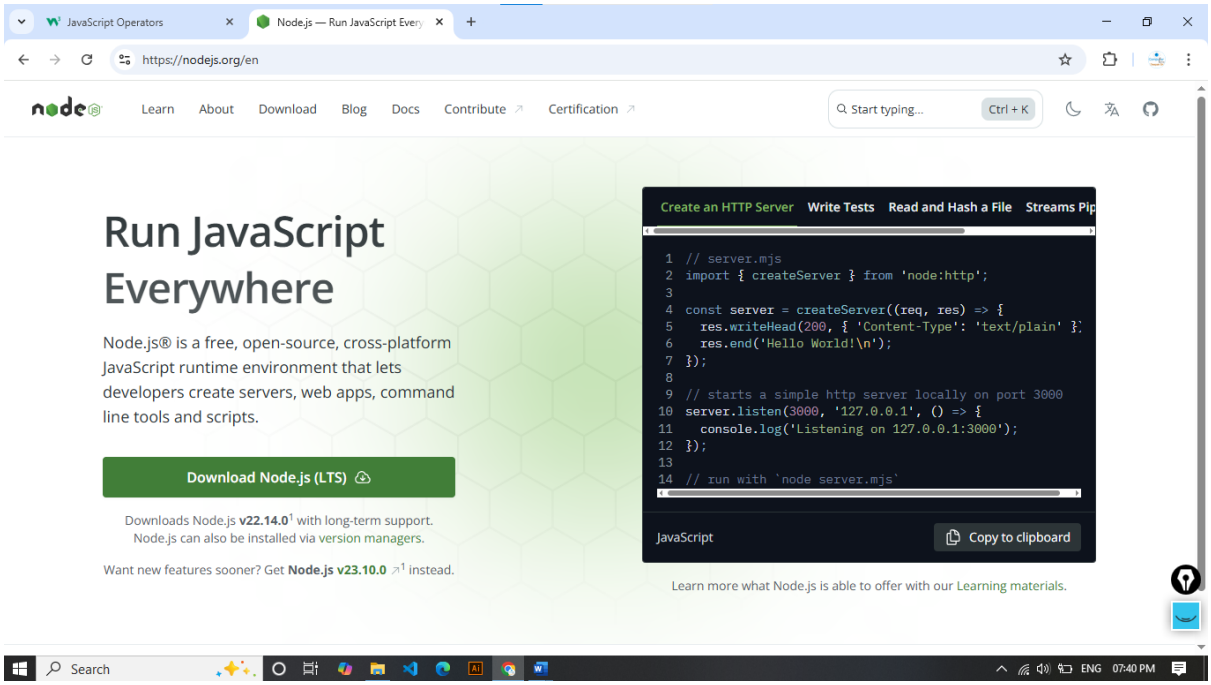
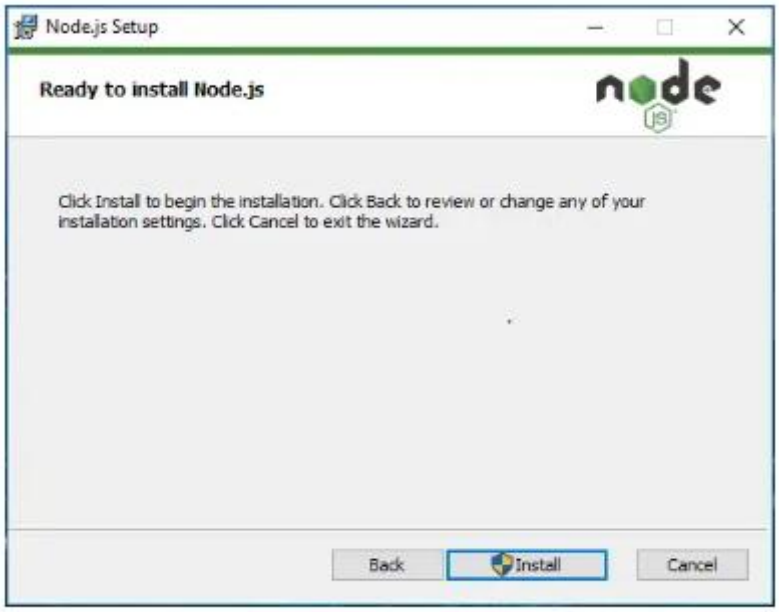
Introduction to React.js

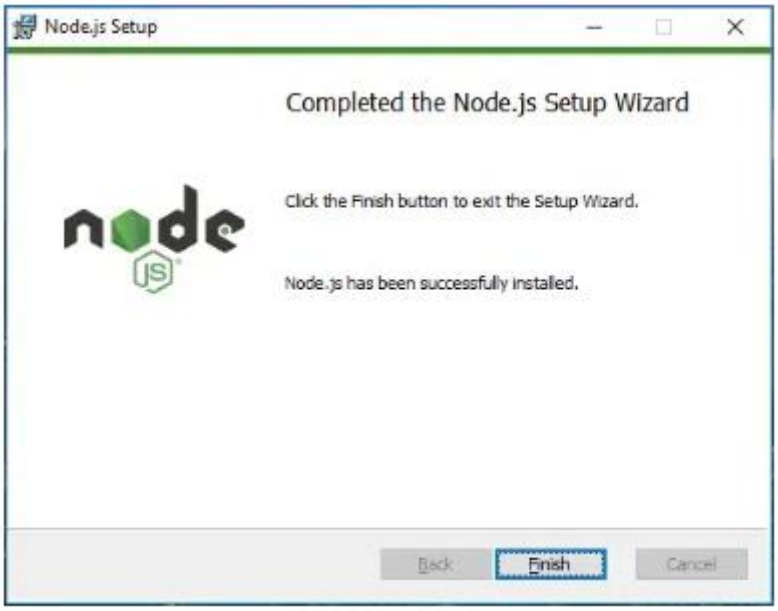
- React.js is a JavaScript library used for building user interfaces (UIs) and single-page applications.
- Created by **Jordan Walke** at **Facebook.**
- Most popular JavaScript library for frontend development.

How to Download and Install Nodejs





Finish the setup



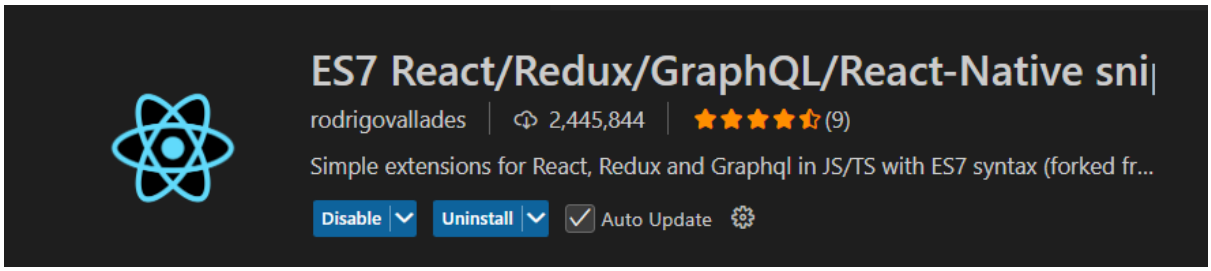
Nodejs Installation

Verify the Installation

- Type **node -v** and press Enter to check the Node.js version.
- Type **npm -v** and press Enter to check the npm version.
- Both commands should return version numbers, confirming successful installation.

Vscode Setup :

Download Extensions : **ES7 React/Redux/GraphQL/React-Native snippets**



learn before React

HTML

CSS

JAVASCRIPT

Create React App:

Create react app : npm create vite@latest

- Project name
- React
- Javascript
- cd <ProjectName>
- npm install
- npm run dev

Install Bun : **Bun is an npm-compatible package manager.**

npm i -g bun

create react app using bun

bun create vite

- Project name
- React
- Javascript
- cd <ProjectName>
- bun install
- bun dev

Error in Vscode

bun : File C:\Users\HP\AppData\Roaming\npm\bun.ps1 cannot be loaded because running scripts is disabled on this system. For more information, see

about_Execution_Policies at https:/go.microsoft.com/fwlink/?LinkID=135170.

At line:1 char:1

+ bun create vite

+ ~

+ CategoryInfo : SecurityError: (:) [], PSSecurityException

+ FullyQualifiedErrorId : UnauthorizedAccess fix this

Open windows powershell

1. Get-ExecutionPolicy
2. Set-ExecutionPolicy RemoteSigned -Scope CurrentUser
3. Get-ExecutionPolicy

Project Structure

- **node_modules**
  - This is the folder which contains all the **necessary libraries & dependencies by React.js.**
  - You can ignore this folder completely.
- **public**
  - This folder contains all **static files** like images, videos, fonts, etc.
- **src**
  - This **folder contains all source files** (The source directory—here your React components, JavaScript files, and CSS are stored).
  - **App.jsx**
    - The main React component that acts as the root component.
    - There is also App.css with it, which contains styles for this component.
  - **main.jsx**
    - This is the **entry point to our React.js project**, which renders the App component.

Naming

- **camelCase**
  - It is used for variables, functions/methods, properties inside objects, file names, etc.
  - Capitalization of each word **except the first** is done.
- **PascalCase**
  - It is used for component names, class names, types, etc.
  - Capitalization of **each word** is done.
- **snake_case**
  - It is not common in JavaScript but is used heavily in Python.
  - Each word is separated by "_" and is in **small letters**.
- **kebab-case**
  - It is common for file names, CSS classes, IDs, etc.
  - Each word is separated by **hyphen (-)**.

JSX & Rendering Elements :

What is JSX?

- JSX is a syntax extension for JavaScript, similar to HTML.
- It allows writing HTML elements inside JavaScript.

Components in React :

Components in React are reusable and independent pieces of code that render specific parts of a user interface. They act as building blocks, allowing developers to divide complex UIs into manageable and testable units

Types of Components

- Functional Components
- Class Components

Functional Component Example

```
Welcome() {
        return <h1>Welcome to React!</h1>;
}
export default Welcome;
```

React Fragments :

React Fragments are a feature that allow grouping multiple elements without adding an extra node to the DOM.

```
function MyComponent() {
return (
        <>
                <h1>Hello</h1>
                <p>World</p>
        </>
);
}
```

Props in React

What are Props?

- Props (short for properties) allow passing data between components.

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

 function App() {
      return <Greeting name="PIET" />;
     }
```

Handling Events in React

Event Handling in React

- Events in React are handled similarly to DOM events but follow a camelCase convention.
- Use the onClick, onChange, onSubmit, etc., attributes.

```
function ButtonClick() {
                function handleClick() {
                        alert("Button Clicked!");
                }
    return <button onClick={handleClick}>Click Me</button>;
 }
```

Hooks

React Hooks are functions that allow **functional components** in React to manage **state**, handle side effects, and access other React features without needing class components.

State in React

What is State?

- State is used to manage component data dynamically.

Example (Using useState Hook)

```
import { useState } from 'react';
function Counter() {
const [count, setCount] = useState(0);
 return (
<div>
<p>Count: {count}</p>
<button onClick={() => setCount(count + 1)}>Increment</button>
</div>
 );
}
```

Conditional Rendering in React

What is Conditional Rendering?

- Rendering components or elements based on conditions.
- Use if-else, ternary operators, or logical && operators.

```
function Greeting(props) {
    return props.isLoggedIn ? <h1>Welcome Back!</h1> : <h1>Please Sign In</h1>;
 }
```

Lists and Keys in React

Rendering Lists

- Use map() to render arrays dynamically.
- Use a unique key prop for better performance.

```
const items = ['Apple', 'Banana', 'Cherry'];
function ItemList() {
    return (
    <ul>
    {items.map((item, index) => (
    <li key={index}>{item}</li>
    ))}
    </ul>
    );
    }
```

Forms in React

Controlled Components

- Forms in React use **state** to control input values.
- onChange event updates state as the user types.

Example: Controlled Input

```
    import { useState } from "react";
    function Form() {
        const [name, setName] = useState("");
        return (
            <div>
            <input  type="text" value={name}
            onChange={(e) => setName(e.target.value)}  />
        <p>Hello, {name}!</p>
         </div>
    );
    }
```

Multiple Input Data Into One useState

In React, you can store multiple input values in a single useState object. This is useful when handling multiple form fields efficiently. Here's how you can do it:

Example:

```
import React, { useState } from "react";
const FormExample = () => {
 const [formData, setFormData] = useState({
  name: "",
  email: "",
  age: "",
 });

 // Handle change for all inputs
 const handleChange = (e) => {
  const { name, value } = e.target;
  setFormData((prevData) => ({
   ...prevData, // Spread previous state
   [name]: value, // Update specific field
  }));
 };

 // Handle form submission
 const handleSubmit = (e) => {
  e.preventDefault();
  console.log(formData); // Log or process form data
 };

 return (
  <form onSubmit={handleSubmit}>
   <input
    type="text"
    name="name"
    value={formData.name}
```

```
      onChange={handleChange}
      placeholder="Enter Name"
    />
    <input
      type="email"
      name="email"
      value={formData.email}
      onChange={handleChange}
      placeholder="Enter Email"
    />
    <input
      type="number"
      name="age"
      value={formData.age}
      onChange={handleChange}
      placeholder="Enter Age"
    />
    <button type="submit">Submit</button>
  </form>
 );
};

export default FormExample;
```

Explanation:

1. **useState({ name: "", email: "", age: "" })** - Stores multiple values in an object.
2. **handleChange** - Updates the corresponding field based on name attribute.
3. **setFormData(prevData => ({ ...prevData, [name]: value }))** - Ensures other fields are not overwritten.
4. **handleSubmit** - Prevents default form submission and processes data.

React-Icons

Installation (for standard modern project)

```
npm i react-icons
```

How to import and use icons in react components

```
import React from 'react'
import { FaFacebook } from "react-icons/fa";
function App() {
  return (
    <>
      <FaFacebook style={{color:"blue",fontSize:"70px"}}/>
    </>
  )
}
export default App
```

React Hooks

Common Hooks

- useState(): Manage state.
- useEffect(): Handle side effects.
- useContext(): Share state across components.

Example: useEffect Hook

```
import { useState, useEffect } from "react";
function Timer() {
  const [time, setTime] = useState(0);
  useEffect(() => {
    const interval = setInterval(() => setTime((prev) => prev + 1), 1000);
    return () => clearInterval(interval); // Cleanup
  }, []);

  return <p>Time: {time}s</p>;
}
```

React Router (Navigation in React)

What is React Router?

- React Router is used to handle navigation in a React app.
- It allows single-page applications (SPA) to have multiple views.

Installation

```
npm install react-router-dom
```

Basic Example

```
import { BrowserRouter as Router, Routes, Route, Link } from "react-router-dom";

function Home() {
  return <h2>Home Page</h2>;
}

function About() {
  return <h2>About Page</h2>;
}
function App() {
  return (
    <Router>
      <nav>
        <Link to="/">Home</Link> | <Link to="/about">About</Link>
      </nav>
      <Routes>
        <Route path="/" element={<Home />} />
        <Route path="/about" element={<About />} />
      </Routes>
    </Router>
  );
}

export default App;
```

Context API (State Management in React)

What is Context API?

- A built-in way to manage state without props drilling.
- Provides **global state management**.

Steps to Use Context API

1. Create a Context
2. Provide Context
3. Consume Context

Example: Using Context API

```
import { createContext, useContext, useState } from "react";
const UserContext = createContext();
function UserProvider({ children }) {
  const [user, setUser] = useState("Deepak");
  return <UserContext.Provider value={user}>{children}</UserContext.Provider>;
}
function DisplayUser() {
  const user = useContext(UserContext);
  return <h1>User: {user}</h1>;
}

function App() {
  return (
    <UserProvider>
      <DisplayUser />
    </UserProvider>
  );
}

export default App;
```

Fetching API Data in React

Using Fetch API

```
import { useEffect, useState } from "react";

function FetchData() {
  const [data, setData] = useState([]);

  useEffect(() => {
    fetch("https://jsonplaceholder.typicode.com/posts")
      .then((response) => response.json())
      .then((json) => setData(json));
  }, []);

  return (
    <div>
      <h2>Posts</h2>
      {data.slice(0, 5).map((post) => (
        <p key={post.id}>{post.title}</p>
      ))}
    </div>
  );
}

export default FetchData;
```

Axios for API Requests

Why use Axios?

- Simplifies HTTP requests.
- Handles errors better than Fetch API.

Installation

```
npm install axios
```

Example: Fetching API Data using Axios

```
import axios from "axios";
import { useEffect, useState } from "react";

function FetchUsers() {
  const [users, setUsers] = useState([]);

  useEffect(() => {
    axios.get("https://jsonplaceholder.typicode.com/users")
      .then((response) => setUsers(response.data))
      .catch((error) => console.error("Error fetching data:", error));
  }, []);

  return (
    <div>
      <h2>User List</h2>
      {users.map((user) => (
        <p key={user.id}>{user.name}</p>
      ))}
    </div>
  );
}

export default FetchUsers;
```