



# Code **React Sweetly**

A Beginner-Friendly Guide to Build and Deploy  
Modern Apps with React

OLUWATOBI SOFELA



# Code React Sweetly

## A Beginner-Friendly Guide to Build and Deploy Modern Apps with React

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# Introduction

## Welcome to Code React Sweetly!

React is one of the most powerful and widely used libraries for building user interfaces with JavaScript. From small components to large-scale front-end and full-stack applications, React gives you the flexibility to create interactive, efficient, and modern features.

But learning React can feel overwhelming. With so many new terms, patterns, and frameworks like Next.js in the mix, it's easy to feel lost.

That's why this book focuses on React itself without unnecessary distractions. Once you've mastered React at its core, you'll have the confidence to use it with or without frameworks to build anything you can imagine.

## Why This Book Is Different

This isn't a book about theory alone. The fastest way to learn React is by building and that's precisely what you'll do here.

Each chapter covers an essential concept and then demonstrates how to apply it in hands-on examples and projects. By the end, you'll understand React because you wrote code, solved problems, and built working applications.

Think of this book not as a tutorial, but as a launchpad to get you out of "tutorial hell" and into shipping real-world projects.

## The Roadmap

Your main project in this book will be a shopping cart application. This practical, scalable app ties together React's core concepts. If that sounds intimidating, don't worry; this book provides the tools you need to make the process enjoyable and approachable.

Along the way, you'll also build smaller, focused projects to reinforce your skills and deepen your understanding.

## The Tools

To ensure a smooth learning experience, this book utilizes specific versions of dependencies. It's best to stick with these versions. That way, you'll stay focused on mastering the concepts rather than debugging surprises caused by newer releases.

Once you've completed the book, you'll be ready to upgrade, experiment, and even troubleshoot when things inevitably break—that's where the real growth happens.

## What You Should Already Know

You'll get the most value out of this book if you're familiar with:

- JavaScript fundamentals (variables, functions, arrays, objects)
- Basic CSS for styling
- HTML basics for structure

If you've ever written a small JavaScript file or built a simple “Hello World” website, you're ready.

## A Personal Note

If you ever get stuck, have questions, or just want to share your progress, I'd love to hear from you. You can reach me at [contact@codesweetly.com](mailto:contact@codesweetly.com) or on Twitter at [@oluwatobiss](https://twitter.com/oluwatobiss).

## Let's Begin!

By the time you finish this book, you'll have the skills and confidence to build, style, and deploy real-world React applications.

So, open up your code editor, roll up your sleeves, and let's dive in.

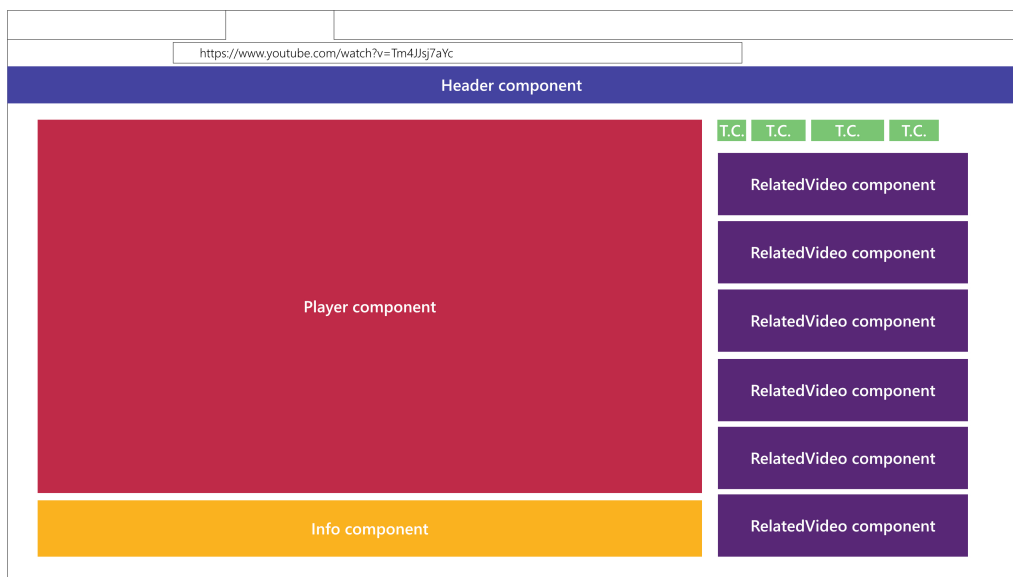
We'll start with the foundation: What React is, why it exists, and how to use it effectively.

# Getting Started with React

React is a component-based JavaScript library for efficiently building user interfaces (UI).

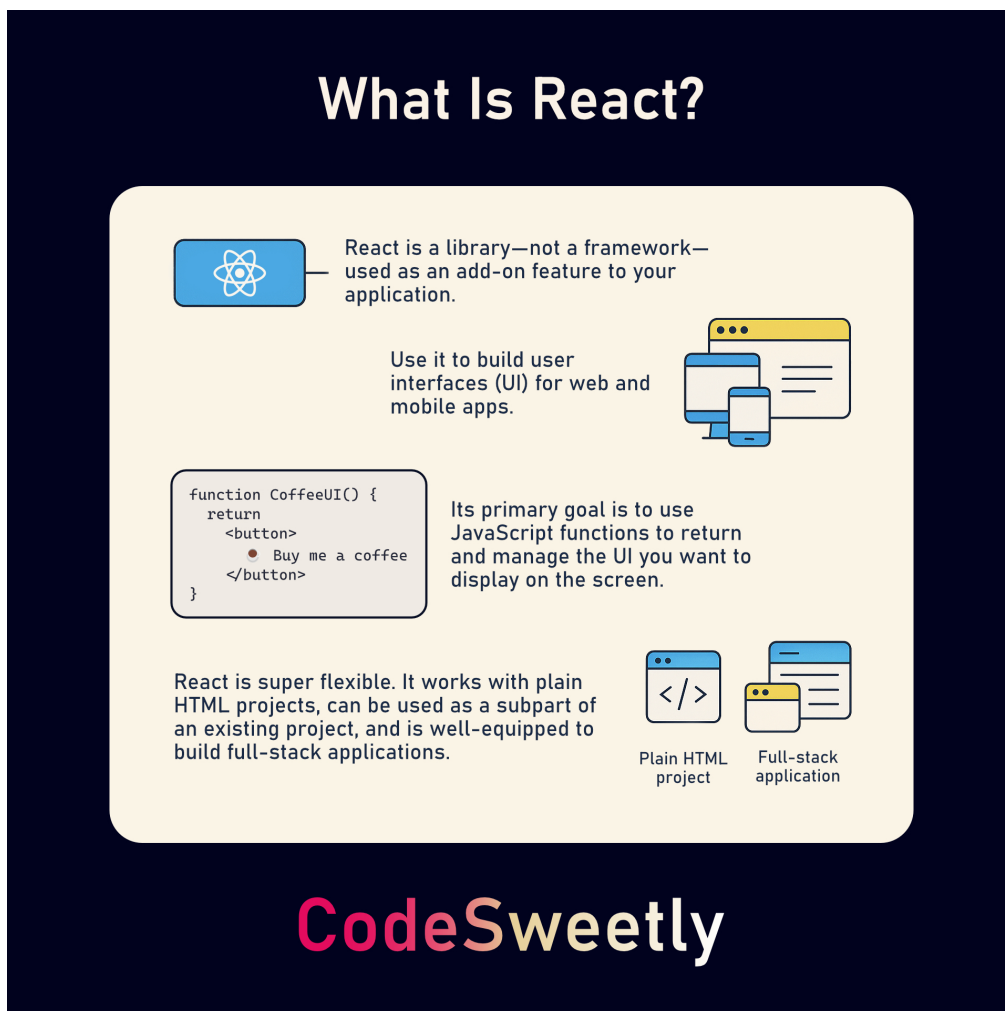
No matter how massive or miniature your project may be, React is well-suited to help you develop any web application efficiently.

Developers primarily use React to build independent, reusable components that can be combined with other isolated user interfaces to create highly scalable applications. For instance, the image below illustrates the individual components of YouTube's video player page.



**Figure 1.** The YouTube video player page is illustrated as a combination of independent components.

In other words, React helps build complex UIs from small, isolated components that can easily be reused in multiple applications. Each independent component tells React the exact element you want to display on screen.



**Figure 2.** The super flexible JavaScript library for modern frontend and full-stack app development

The image above illustrates React as a highly adaptable library that uses JavaScript functions to build user interfaces for both mobile and web-based applications. Let's discuss the points highlighted in the image.

## Why the “React” Name?

The name stems from the idea that React renders your UI and reacts to events in the user interface it has rendered on screen.

## Is React a Framework?

No, React is a [library—not a framework](#). React serves only as an add-on feature to your application. It is not designed to be used as an app's primary support system.

## Is React Only for Web Development?

No, you don't just use React on the web. For instance, [ReactDOM](#) helps build web applications, and [React Native](#) helps build mobile applications.

## Can React be used for full-stack applications?

Absolutely. React is super flexible. You can use it in simple HTML projects, integrate it into existing code, or build complex full-stack applications. Its adaptability makes it suitable for a wide variety of development scenarios.

## What's the Primary Goal of React?

React's primary goal is for you to use [JavaScript functions](#) to return and manage the UI (HTML element) you want to render (display) on the screen. For instance, consider the following:

**Figure 3. :**

---

```
1 function DonationUserInterface() {  
2   return <button>Buy me a coffee</button>;  
3 }
```

---

The JavaScript function above is a [React component](#) that returns the UI (HTML button element) we want to display on screen and manage with React. In fact, let's implement the `DonationUserInterface` component on a live website using only HTML and JavaScript – no frameworks.

## Adding React Component to a Website

Follow the steps below to add a donation UI component to a live HTML website.

## Creating a new project directory

**Figure 4. :**

---

```
1 mkdir codesweetly-donation-ui-001
```

---



You can use any name you prefer. In this guide, we'll use codesweetly-donation-ui-001 for demonstration.

Afterward, navigate to your project directory using the command line.

**Figure 5. :**

---

```
1 cd path/to/codesweetly-donation-ui-001
```

---

## Creating a DOM container

To add a React component to a webpage, you first need to specify the section of the page where you want to insert the UI. So, create an HTML page:

**Figure 6. :**

---

```
1 touch index.html
```

---

Afterward, open the new file and add the following code:

**Figure 7. index.html**

---

```
1 <!DOCTYPE html>
2 <html lang="en-US">
3   <head>
4     <meta charset="utf-8" />
5     <meta name="viewport" content="width=device-width, initial-scale=1" />
6     <title>CodeSweetly Donation UI</title>
7   </head>
8   <body>
9     <!-- A div container (the DOM node) created for React to manage -->
10    <div id="donation-ui"></div>
11  </body>
12 </html>
```

---

The snippet above created a DOM node (`<div>` element)—inside which we want React to display and manage a donation user interface. In other words, the `<div>` represents the website’s section you want React to manage.

**Note**

- The `div`’s `id` attribute is the reference we would later use in a JavaScript file to find the container and tell React to insert a donation UI.
- Although most developers use a `<div>` tag as the DOM container, you can use other HTML elements like the `<main>` tag.
- You can have multiple DOM containers anywhere inside the `<body>` element.
- A DOM container is usually left empty as React will overwrite its content.

## Importing React, Babel, and your component

Use script tags to load React, Babel, and your component into your project’s HTML page.



**Figure 8. index.html**

```
1 <!DOCTYPE html>
2 <html lang="en-US">
3   <head>
4     <meta charset="utf-8" />
5     <meta name="viewport" content="width=device-width, initial-scale=1" />
6     <title>CodeSweetly Donation UI</title>
7     <!-- Load the React Library -->
8     <script src="https://unpkg.com/react@18/umd/react.development.js"></script>
9     <!-- Load the ReactDOM API -->
10    <script src="https://unpkg.com/react-dom@18/umd/react-dom.development.js"
11      ↪ ></script>
12    <!-- Load the Babel Compiler -->
13    <script src="https://unpkg.com/@babel/standalone/babel.min.js"></script>
14  </head>
15  <body>
16    <div id="donation-ui"></div>
17    <!-- Load your React component -->
18    <script type="text/babel" src="DonationUserInterface.js"></script>
19  </body>
</html>
```

The snippet above used the first three script tags to load React, ReactDOM, and Babel from [unpkg.com](https://unpkg.com).

At the same time, we used the fourth script tag to import our donation component (which we will create in the following section).

### Note

- The react package is a library containing React's core functionality for creating React components.
- The ReactDOM API provides the required [methods](#) to use React with the DOM.
- [Babel](#) is a compiler for transforming React code into plain JavaScript because browsers, by default, do not understand React syntaxes.
- The type="text/babel" attribute tells Babel to automatically execute and convert the DonationUserInterface.js script from React code into plain JavaScript.
- The setup above is recommended for learning React only. Don't use it for public projects (production environment). You will learn how to set up React for production later in this book.

- The scripts will not work if your internet or unpkg.com's server is down. So, if nothing renders on-screen, enter each script's src URL in your browser to confirm if the server responds successfully.

## Creating your component

Create a `DonationUserInterface.js` JavaScript file inside the same folder in which your HTML file is located.

**Figure 9. :**

```
1 touch DonationUserInterface.js
```

Then, paste the following code inside the JavaScript file you've just created:

**Figure 10. DonationUserInterface.js**

```
1 function DonationUserInterface() {  
2   const [donate, setDonate] = React.useState(false);  
3  
4   function createUserInterface() {  
5     if (donate) {  
6       return (  
7         <p>  
8           <a href="https://www.buymeacoffee.com/codesweetly">Support page</a>.  
9           Thank you so much!  
10          </p>  
11        );  
12      }  
13      return <button onClick={() => setDonate(true)}>Buy me a coffee</button>;  
14    }  
15    return createUserInterface();  
16  }  
17  
18  const root = ReactDOM.createRoot(document.getElementById("donation-ui"));  
19  root.render(<DonationUserInterface />);
```

The snippet above does the following:

1. Defines a component named `DonationUserInterface`.

2. Initializes the component's state (built-in object) with the Boolean value `false`.
3. Programs the component to return a paragraph element if the state's `donate` variable is `true`. Otherwise, it should return a button element.
4. Creates a `ReactDOMRoot` object instance for the `donation-ui` HTML element you want React to manage. Afterwards, it assigns the newly created instance to the `root` variable.
5. Uses the object instance's `render()` method to display the `DonationUserInterface` component inside the root `donation-ui`.

## Configuring a local server

HTML files containing [ES modules](#) work only through `http://` and `https://` URLs, not locally via a `file://` URL.

Since we previously used the `type="text/babel"` attribute to convert the `DonationUserInterface.js` JavaScript file to an ES module, we need a local server, like [Live Server](#) or [Server](#), to load the HTML document via an `http://` scheme. Let's install `Server` so we can use it for this project.

## Installing the `Server` local server

**Figure 11. :**

```
1 npm i server@4.0.2 -D
```



- `i` is the shorthand notation for `install`.
- The `-D` flag is the shorthand notation for `--save-dev`.

## Running your app

After installing `Server`, use it to start your app from your terminal:

**Figure 12. :**

```
1 npx server --browse --reload
```

**Note**

- Close the server using + on Windows or + on Mac.
- --browse: Opens the browser once the server starts.
- --reload: Reload the browser whenever you update the project's files.
- You can also add the server command to the "scripts" field of your project's package.json file:

**Figure 13. package.json**

```
1 {  
2   "scripts": {  
3     "start": "server --browse --reload"  
4   },  
5   "devDependencies": {  
6     "server": "^4.0.2"  
7   }  
8 }
```

By so doing, you can run your app from your terminal like this:

**Figure 14. :**

```
1 npm run start
```

And that's it! You've successfully added a React component to a live website using a JavaScript function to render a donation UI on screen!



You can display components in multiple sections of your HTML page.

## Why Use HTML Inside JavaScript?

Are you asking why we are writing HTML inside JavaScript? Well, that HTML-like code is called JSX. Learn about it in the next chapter.

# JSX

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## Can React Work Without JSX?

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### Example 1: Creating React element with JSX

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### Example 2: Creating React element with regular JavaScript

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## What Is `React.createElement()`?

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## How to Use JSX

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## Use JSX like any JavaScript expression

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## Wrap multi-line JSX in parentheses

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## Wrap expressions in curly braces

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## Use camelCase to name attributes

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## Close empty JSX tags properly

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## A React component can return only a single element

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## Time to Practice with JSX

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## The solution

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# Components

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## Syntax of a React component

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## What Exactly Are Props in React?

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## How to Invoke React Components

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### Invoking components without props

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### Invoking components with props

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## Invoking components with nested content

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## Invoking components with variables

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## Invoking components with the dot notation

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# How to Display a Component Inside a Browser's DOM Node

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### 1. Create a new `ReactDOMRoot` object instance

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### 2. Display your component inside the root object instance

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### 3. Enable strict mode

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## Important Things to Know About React Components

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### 1. Use the Pascal case naming convention for your components

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#### React component tag example

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#### HTML component tag example

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### 2. Bracket notation expressions do not work as React component tags

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### 3. Bracket notation expressions in variables work as React component tags

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### 4. Make your components pure

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**Example 2: Pure React component**

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### 4. Create the BlogPost component

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### 5. Create the Header component

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### 7. Create the Post component

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### 8. Import your extracted components into the BlogPost.js file

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### 9. Run your application

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## The checkbox app without reusable components

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## Each React Element in an Array Needs a Unique Key

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## How to Add Unique Keys to Each React Element in an Array

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## Not recommended way to assign keys to an array of React elements

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## Best way to assign keys to an array of React elements

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## Essential Things to Know About Assigning Keys

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## Set each array element's key while creating the array

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### Example 2: Correct placement of the key prop

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## React does not pass keys to components

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## Always generate the keys outside your components

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### Example 1: Incorrect place to generate the key prop

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### Example 2: Correct place to generate the key prop

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## Types of Event Handlers

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## What Is an Inline Event Handler in React?

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### Example: Using a named function as an inline event handler

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### Example: Using an anonymous function as an inline event handler

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### Example: Using an arrow function as an inline event handler

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## What to know about inline event handlers

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## What Is a Referenced Event Handler in React?

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### Example: Using a named function as a referenced event handler

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### Example: Using an anonymous function expression as a referenced event handler

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### Example: Using an arrow function as a referenced event handler

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## What to know about referenced event handlers

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## How to Use Arguments with a Component's Event Handler

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### 1. Inline event handler wrapping

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### 2. Referenced event handler binding

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## How to Access an Event Object in React

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### Example 1: Referenced event handler

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### Example 2: Referenced event handler binding

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### Example 3: Inline event handler

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## The Syntax of React Fragments

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## Why Use React Fragments?

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### Example: Use the explicit React Fragment as a wrapper

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## What Exactly Is the `useState()` Function?

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## Syntax of the `useState()` Hook

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## Example 1: Call the `useState` Hook without an `initialState` argument

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## Example 2: Call the `useState` Hook with an `initialState` argument

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## Why Does useState() Return an Array?

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### Example 1: Using bracket notation to access a component's state

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### Example 2: Using array destructuring to access a component's state

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## How to Update a Component's State

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## How to Reset a Component's States

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### Example 1: The manual way to reset a component's states

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### Example 2: The key prop technique of resetting a component's states

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## Important Things to Know About React State

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### 1. Always modify a state with the setter function

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### 2. A set function call affects only the next rendering process

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### 3. For successive state updates, pass a function into your state's setter method

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**Example 1: Using the state variable successively in the ongoing rendering to update a component's state**

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**Example 2: Using updater functions successively in the ongoing rendering to update a component's state**

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### 4. A function component's setter function does not auto-merge a new state into the existing one

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**Example 2: Using a spread operator to merge a function component's states**

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**Example 3: Using spread operator to merge a function component's state array data types**

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**5. You can call `useState()` multiple times**

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**6. Each component invocation has a completely isolated state**

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**7. State is a private feature of the component declaring it**

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**8. A parent component can share its states with its children**

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## 9. A component, initializer, and updater function run twice in strict and development mode

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### Example 1: Using an impure updater function to update a state

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### Example 2: Using a pure updater function to update a state

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# React Trigger vs. Render vs. Commit vs. Paint

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## What Exactly Is the useRef() Function?

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## Syntax of the useRef() Hook

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## Example 2: Call the useRef Hook with an initialValue argument

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## How to use the dot notation to access a ref object's value

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### Syntax

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## How to use the square bracket notation to update a ref object's value

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## Important Things to Know About Accessing and Updating React Refs

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### Dot vs. square brackets notation

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### Never read or write a ref's current property during rendering

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### React updates refs immediately

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## How to Use React Refs to Manage DOM Nodes

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### 1. Declare a ref variable with `null` as the initial value

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### 2. Assign the ref object as the value of your JSX element's ref attribute

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## How Does Updating `ref . current` Affect the Ref Hook's State Object?

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### 2. Non-primitive data types are passed by reference to variables

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# Variables vs. Refs vs. States

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## How Do Variables Work in React?

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## Tips on Using Variables, Refs, and States in React

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## How to Know the Effects That Do Not Require Any Cleanup

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## Effect's body vs Effect's cleanup function

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## Syntax of the Effect Hook

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## What is a reactive value in React?

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## Example of a non-reactive JavaScript function

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## How to run Effects only on mount, and if the component's reactive values change

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## Effect Hooks are best for connecting components with external systems

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## Remove unnecessary reactive objects and functions from the dependency array

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## **Why does the dependency array view functions and objects declared in a component's body as changed items on every render?**

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## **Static objects and functions are best declared outside your component**

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## **Dynamic objects and functions are best declared inside your Effect Hook**

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## Using the `action` form prop to implement an uncontrolled form component in React

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### **`action=URL`: Handling form submission with a URL**

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### **`action={function () { ... }}`: Handling form submission with a client function**

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### **`action={async function () { "use server" }}`: Handling form submission with a server function**

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## What to know about the `action` prop

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### **`value` prop is valid for hidden fields**

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### **You can pass arguments to the action handler**

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### Progressive enhancement of the form component

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## Using the `formAction` button prop to implement an uncontrolled form component in React

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### `formAction=URL`: Handling form submission with a URL

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### `formAction={function () { ... }}`: Handling form submission with a client function

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### `formAction={async function () { "use server" }}`: Handling form submission with a server function

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**Example: HTML textarea component**

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**Example: Controlled textarea component**

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**Example: Uncontrolled textarea component**

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### **Example: HTML select component**

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### **Example: Uncontrolled select component**

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## **Using one event handler for multiple controlled components is permitted**

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## **Uncontrolled vs. controlled form component**

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## **A form in React can have both controlled and uncontrolled components**

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## Time to Practice with React Forms

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## 2. Styles scope

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## 3. Composition

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### Example: Composing rulesets with regular CSS style sheets

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### Example: Composing rulesets with CSS modules

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### Example: All `composes` declarations must come before other rules

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### Example: Composing classes with a single `composes` declaration

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## Using a CSS-in-JS Library to Style React Elements

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## 2. Stage and Commit Any Recent Changes

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## Example: Create a context object

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## How to Use the Value of a Context Object

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## The syntax of the useContext Hook

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### Example: Consume a context object's value

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## How to Configure a Parent Component to Provide a Context Value to All Its Descendant Components

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### The syntax of the context provider

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### Example: Provide context value to descendant components

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## How to Override the Context Value Provided to a Child Component

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### Example: Override a pre-defined context

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## **Example: useContext reads only the providers above its calling component**

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### **2. Create and export your context objects**

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### **3. Provide context value to a component tree**

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### **4. Consume the context value in a descendant component**

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## 9. Create an About Component

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## 10. Install React Router

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## 11. Create an AppRoutes Component

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## Route

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### Splat path segment

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### Types of <Route> components

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**Basic <Route> component**

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**Catch-all <Route> component**

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**Nested <Route> component**

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**Index <Route> component**

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**Layout <Route> component**

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**Prefix <Route> component**

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**Other common props accept**

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**caseSensitive**

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**useLocation**

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**First, create an Error.js file**

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**Secondly, create the Error component**

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**Thirdly, add a catch-all Route to your <BrowserRouter> component**

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## 13. Render `<AppRoutes>` as the App's Root Component

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### 5. Setting up a GitHub remote repository

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### 6. Uploading your local Git directory to the remote repo

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### 7. Signing in or signing up on the Vercel website

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### 8. Deploying your project to Vercel's server

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### 9. Testing the multi-page app on the live website

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## Time to Practice Building a Multi-Page-Like React Application

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# Adding Static Analysis Tools

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## Project Configuration

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### Create a new project directory

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### Create a package.json file

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### Install React and ReactDOM

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## TypeScript Configuration

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### Install TypeScript and type definitions

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## Configure the TypeScript compiler

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## Specify the type-checking command

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## Develop the project's React component

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## Type-check your code

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## Add static type definitions to your code

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## Run the type-check script

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## Create the entry script

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## Create the web page

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## Run your application

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## Optional: Run multiple scripts at the same time

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## ESLint Configuration

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## Initialize ESLint's configuration

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## Lint your code

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## Configure `eslint-plugin-react` to auto-detect the app's React version

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## Configure `eslint-plugin-react` to support the new JSX transform

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## Add a `rel="noreferrer"` to the anchor element

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## Re-lint your code

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## Customize ESLint rules

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## Specify the files ESLint should ignore

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## Prettier Configuration

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## Install Prettier and `eslint-config-prettier`

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## Set up the app's Prettier formatting rules

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## Specify the files Prettier should ignore

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## Check if your files are formatted

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## Format unformatted files

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## And That's It!

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## Optional: Configure VS Code to Auto-Format and Lint Your Code

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### 1. Install the ESLint and Prettier VSCode extensions

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## 2. Configure VS Code to use Prettier to auto-format on save

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# Testing React Components

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## What's the Difference Between a Test Runner and a React Component Testing Tool?

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## Get the Right Node and NPM Version

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## Create a New Directory for Your Project

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## Create a package.json File

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## Install React and ReactDOM

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## Configure Your Test Environment

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## Specify Jest as Your App's Test Runner Tool

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## Initialize ESLint's Configuration

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## Install ESLint's Test Plugins

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## JavaScript Guide to Test React Components

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## Integrate ESLint with the test plugins

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## Import `jest-dom`'s matchers

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## Install the code compiler

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## Configure Babel to compile your code

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## Configure Jest to set up `jest-dom` before running tests

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## Configure Jest's testing environment

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## Create the app's test script

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## Write your test case

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## Develop a React component

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## Run the test

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## Create the entry script

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## Create the web page

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## Install the app's module bundler

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## Configure Parcel to ignore Babel

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## Run your application

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## Refactor the test code

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## Refactor your React component

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## Rerun the test

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## TypeScript Guide to Test React Components

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## Configure the TypeScript compiler

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## Install the Jest transformer

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## Configure Jest to compile TypeScript files

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## Configure Jest to set up `jest-dom` before running tests

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## Configure Jest to read TypeScript configuration files

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## Configure Jest's testing environment

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## Optional: Configure Parcel to use the TypeScript compiler

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## And that's it!

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## Useful Resources

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# Epilogue

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## What Next?

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## Keep Growing

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## One Last Favor

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## Final Words

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