

Introduction to React

Learning Objectives

Discover what React is and the problems it solves when designing UIs and web applications. Get your first hands-on experience with React. Discover the create-react-app utility that generates a React development toolchain for an incredible developer experience.

Topics

- What is React?
- Hello React
- Using the create-react-app

Hands-On

- Build an app that allows the user to key in text which it reverses and displays on the UI instantaneously.

Components

Learning Objectives

Gain an insight into components, the building blocks of a React application. Learn about the two main types of components that you can build with React including a conceptual look at state and event listeners. Discover JSX, an HTML like syntax that allows you to express your UI within a React component.

Topics

- What are Components?
- Types of Components
- JSX

Hands-On

- Create a class component that lets you type text in a `<textarea>` field while it displays word and character counts that update as you type
- Create a Card component that one often sees on social media platforms
- Write a component that acts as a list item in a UI that renders list of books

State and Props

Learning Objectives

- Learn about state which allows you to describe changes to your UI using data.
- Learn about the fundamentals of the Hooks API that lets you incorporate state in a Function component.
- Understand how to use props as conduits that allow you to pass data from a parent to a child component.
- Learn to debug props using type checking.

Topics

- What is State?
- Stateful Function Components with Hooks
- What are props?
- Type Checking with Prop Types

Hands-On

- Create a toggle button for a hypothetical space-craft's guidance system panel
- Build a simple theme switcher using state in a function component using the Hooks API
- Work on a component called UserCard which has to accept data using props
- Implement prop type checks in the UserCard component we built earlier

Rendering Lists

Learning Objectives

Learn to render lists of components using the map() method. Understand the importance of the 'key' attribute. Learn to use the fragments feature for rendering multiple top level components

Topics

- Using the map function to render lists
- The "key" attribute
- Using Fragments

Hands-On

- Use the map function to render lists of components using an Array of movies and set all important 'key' prop
- Implement the Fragment operator in a React Component instead of an enclosing div element

Components Revisited

Learning Objectives

- Understand the lifecycle of a component and how it can be harnessed.
- Learn to integrate side effects such as fetching data from an API, in a React component. Learn to deal with side effects that require cleanup, such as using Timers. Understand React's SyntheticEvent system.
- Learn about managing errors gracefully using Error Boundaries.

Topics

- Lifecycle of a Component
- Side effects and Lifecycle
- Managing cleanup
- Events
- Error Management

Hands-On

- Implement the componentDidMount lifecycle method to bring in data from a mock weather service
- Implement the componentDidUpdate lifecycle method to update the data
- Implement componentWillUnmount lifecycle function to tear down the timer instance in an app
- Work with events to set state properties
- Implement an Error Boundary component to intercept errors in child components

Building Forms

Learning Objectives

Learn to build form elements that are controlled by React. Learn to fetch form data directly from the DOM. Implement debouncing and other techniques to efficiently handle multiple form elements.

Topics

- Controlled Form Components
- Uncontrolled Form Components
- Handling inputs efficiently
- Project - Building a currency converter

Hands-On

- Turn an input element into a controlled component
- Implement refs to pull and set data to DOM elements when needed

Render Props and Higher Order Components

Learning Objectives

Implement shared logic using render props. Learn to reuse component logic using the HOC pattern.

Topics

- Render Props
- Higher Order Components

Hands-On

- Create a Currency-Converter component that implements render props to provide the result which is then rendered on the screen
- Build a higher order function that empowers our App component with tools to fetch currency rates after conversion

Portals

Learning Objectives

Learn to render children in a DOM node that is outside of the parent's DOM hierarchy. Understand how event bubbling works with Portals.

Topics

- Introduction to Portals
- Event bubbling in Portals

Hands-On

- Work with Portals to render a dialog box component in a DOM element other than the root div where the React app is mounted

Global and Shared Data

Learning Objectives

Understand the nuances of data flow in a React application, and the issues with sharing global data using props in a deeply nested application. Learn and understand all about the Context API that lets you share global data without using props.

Topics

- Unidirectional Data Flow
- Challenges with Props
- The Context API

Hands-On

- Instantiate a context, and provider and consumer components to trickle data down to the component hierarchy

Hooks in Focus

Learning Objectives

Get an introduction to the Hooks API and the motivation behind them. Learn to incorporate stateful properties in a function component using the useState() hook. Learn to ingest data from a Context provider using hooks and to implement the useReducer() hook. Finally, learn to write your own hook.

Topics

- Understanding Hooks
- The useState hook
- Side effects using the useEffect hook
- The useContext hook
- The useReducer hook
- Writing your own hook

Hands-On

- Build a PowerTags component that can be used to dynamically add/remove tags or keywords
- Use the useEffect function to fetch data from a stock app
- Implement the useContext hook to consume data from a context provider
- Use the useReducer hook to offload state management and define actions and their resulting state changes

- Build a custom hook named ‘useGeoLocation’ which accesses the HTML5 GeoLocation API
- to continually fetch the latitude and longitude of the user’s location

Routing in a React App

Learning Objectives

Understand Routing in a React application, and learn about Dynamic Routing and Setup React Routers. Implement nested routing and use query parameters. Learn to protect routes from unauthenticated access.

Topics

- Routing in a React application
- Routing with React Router
- Nested Routes and Parameters
- Protecting Routes

Hands-On

- Integrate React router in a project that features multiple sections
- Incorporate nested routing on the /books route so that details of books
- Protect a route from unauthenticated access

Code Splitting

Learning Objectives

Learn to optimize your production bundle by implementing code splitting using dynamic imports and the Suspense API. Learn to implement code splitting, lazy loading and suspense when working with React Router.

Topics

- Code splitting and Suspense
- Route Based Code Splitting and Lazy Loading

Hands-On

- Implement React.lazy and Suspense to load two components when needed
- Implement React.lazy and Suspense when working with React Router

Isomorphic React

Learning Objectives

Understand the need for server-side rendered apps. Learn to setup a Node.js (Express) server for rendering React apps on the server. Build a toolchain using Webpack and Babel to compile React code on the server and for the client.

Topics

- Server-Side Rendering
- SSR with React - Setup and Server
- SSR with React - The Toolchain

State Management using Redux

Learning Objectives

Understand the need for a dedicated state management solution and discover Redux. Take your first steps with Redux as you install, setup and connect it to a React application. Learn to build action creators and add mutation logic in the reducer for the Catalog component.

Next, you will learn to use the `connect()` higher order function to interface React components with the store. You will be able to build action creators and complex state mutation logic for the Cart component. Learn to use Redux hooks and implement optimizations for performance. Also learn to implement middleware, async action creators and data persistence.

Topics

- State Management and Redux
- Setting up Redux
- Actions and Reducer for the Catalog
- Using the `connect()` higher-order function
- Actions and Reducer for the Cart
- Using Redux Hooks
- Implementing Middleware and Persistence

Testing Components

Learning Objectives

Understand the role of testing in application development. Learn to use Jest with test-utils from the React-DOM library for writing unit and integration tests. Next, learn to write tests using Jest and the React Testing Library. Finally, learn about React Testing Library, a framework for testing React Components.

Topics

- Introduction to Testing
- Using Jest with Test Utils from React-DOM
- Using Jest with the React Testing Library
- Using Jest with Enzyme