

REACT

BASICS TO ADVANCED

1. Introduction to React

- What is React?
- Key Features of React
- Single Page Application (SPA) Concepts
- Advantages of using React
- Setting up the Development Environment
 - Installing Node.js and npm
 - Installing create-react-app
- Understanding JSX
 - Embedding Expressions in JSX
 - JSX vs HTML

2. Components in React

- Types of Components: Function vs Class Components
- Creating a Functional Component
- Creating a Class Component
- Component Composition
- Props (Properties)
 - Passing and Receiving Props
 - Default Props and PropTypes
- Component Lifecycle (Class-based Components)
 - componentDidMount, componentDidUpdate, componentWillUnmount

3. State Management

- Understanding State in React
- Using useState Hook (Functional Components)
- Updating State
- Working with Complex State
- Lifting State Up
- State vs Props

4. Handling Events

- Adding Event Handlers
- Synthetic Events in React
- Passing Arguments to Event Handlers
- Conditional Rendering
 - Using if Statements and Ternary Operators
 - && Operator for Conditional Rendering

5. Working with Forms

- Controlled Components
- Uncontrolled Components
- Handling Form Submissions
- Handling Multiple Inputs
- Validating User Input

6. Lists and Keys

- Rendering Lists in React
- Understanding Keys in React
- Using the map() Function to Create Elements
- Dynamically Rendering Data

7. Refs in React

- What are Refs?
- Creating Refs in Class Components
- Using useRef in Functional Components
- Forwarding Refs
- Accessing DOM Elements with Refs

8. React Router

- Introduction to React Router
- Setting Up React Router
- Defining Routes
- Using Link and NavLink
- Nested Routes
- Programmatically Navigating (using useNavigate)
- Route Parameters

9. Context API

- Understanding Context API
- Creating and Using Contexts
- Passing Data Using Context
- Context API vs Props Drilling
- Using useContext Hook

10. Hooks in React

- Introduction to React Hooks
- useState Hook (State Hook)
- useEffect Hook (Effect Hook)
 - Component Side Effects (Data Fetching, Subscriptions)
 - Cleanup Function in useEffect
- useRef Hook (Reference Hook)
- useMemo Hook (Memoization)
- useCallback Hook (Caching Callbacks)
- Custom Hooks (Creating Your Own Hooks)

11. Advanced State Management with Redux

- Introduction to Redux
- Redux Architecture and Concepts (Actions, Reducers, Store)
- Setting up Redux in a React App
- Dispatching Actions
- Connecting React Components to Redux
- Redux Middleware (Thunk, Saga)
- Debugging with Redux DevTools
- Combining Reducers

12. Styling in React

- CSS Modules
- Inline Styling
- Styled Components
- Using Libraries like classnames
- Dynamic Styling Based on Props or State

13. React Performance Optimization

- Understanding React Rendering
- React.memo and PureComponent
- Using useMemo and useCallback for Optimizations
- Lazy Loading Components with React.lazy and Suspense
- Code Splitting with Webpack

14. Testing in React

- Introduction to Testing React Components
- Unit Testing with Jest
- Component Testing with React Testing Library (RTL)
 - Rendering Components
 - Simulating Events
 - Testing Asynchronous Code
- Snapshot Testing with Jest
- End-to-End Testing with Cypress

15. Working with APIs

- Fetching Data from APIs (using fetch or axios)
- Handling Asynchronous Operations
- Error Handling
- Using useEffect for Data Fetching
- Working with REST APIs
- Introduction to GraphQL with Apollo Client

16. Routing & Navigation in React

- Introduction to Client-Side Routing
- Setting up Routes using react-router-dom

- Navigating Between Pages
- Handling Route Parameters
- Protected Routes and Authentication

17. Deploying React Applications

- Building the React App for Production
- Deploying to Static Hosting Services (Netlify, Vercel)
- Deploying to a Web Server (Apache, Nginx)
- Environment Variables in React
- Optimizing React Apps for Performance
- Service Workers and PWA (Progressive Web App)

18. React with TypeScript

- Introduction to TypeScript in React
- Setting up TypeScript with React
- Typing Props and State in Components
- Using TypeScript with Hooks
- TypeScript with Redux

19. React Native (Optional)

- Introduction to React Native
- Setting up a React Native Environment
- React Native Components
- Navigation in React Native
- Fetching Data in React Native

20. Final Project

- Building a Full-Stack Application with React
- Connecting to a Backend (Node.js, Firebase, or others)
- Implementing Authentication and Authorization
- State Management with Context API or Redux
- Deploying the Application

This table of contents offers a structured learning path that covers React basics to advanced topics, including performance optimizations, testing, and deployment strategies. It can be adapted based on the learner's goals and experience.