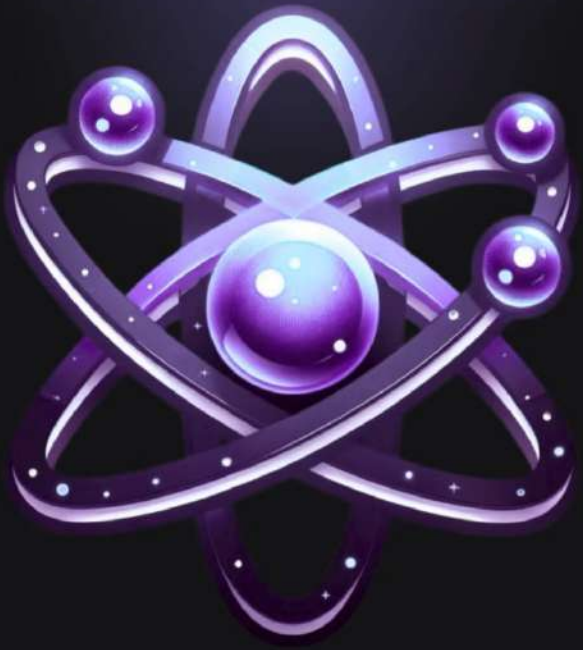
React.js
CHEAT SHEET



Basic Concepts

JSX - JavaScript XML. Allows writing **HTML structures** in JavaScript files using XML-like syntax.

Components - Independent, reusable pieces of UI. Can be **functional** or **class-based**.

Props - Short for **properties**, these are read-only inputs to components that define attributes or configuration.

State - **Holds data** that might change over the **lifecycle of a component**. Used in class components and functional components via the useState hook.

Components

Functional components and class components are two ways to build components in React, each with its distinct characteristics:

- **Class Components**: Before the introduction of Hooks in React 16.8, this was the only way to create components with state and access lifecycle methods. They require using the **class** keyword to extend **'React.Component'** and offer a more verbose syntax.

```
class Welcome extends React.Component {
  render() {
    return <h1>Hello, {this.props.name}</h1>;
  }
}
```

- **Functional Components**: Initially used for stateless components (presentational components), the introduction of Hooks has enabled the use of local state, side effects, and other React features, making functional components almost universally preferred for their concise syntax and ease of maintenance.

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

While class components provide all React features via an object-oriented syntax, functional components with Hooks are now favored for their simplicity and expressiveness.

Creating Components

- **Functional Component with State:**

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

function Counter() {
  const [count, setCount] = useState(0);

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

- **Class Component with State and Lifecycle Methods :**

```
class Counter extends React.Component {
  constructor(props) {
    super(props);
    this.state = { count: 0 };
  }

  componentDidMount() {
    // ComponentDidMount: Code to run after component mounts
  }

  componentDidUpdate() {
    // componentDidUpdate: Code to run after updating occurs
  }

  componentWillUnmount() {
    // componentWillUnmount: Cleanup before component unmounts
  }

  render() {
    return (
      <div>
        <p>You clicked {this.state.count} times</p>
        <button onClick={() => this.setState({ count: this.state.count + 1 })}>
          Click me
        </button>
      </div>
    );
  }
}
```

Hooks

- **useState**

```
const [state, setState] = useState(initialState);
```

- **useEffect**

```
useEffect(() => {
  // Side effects here
  return () => {
    // Cleanup (optional)
  };
}, [dependencies]);
```

- **useContext**

```
const value = useContext(MyContext);
```

- **useReducer**

```
const [state, dispatch] = useReducer(reducer, initialArg, init);
```

- **useCallback**

```
const memoizedCallback = useCallback(() => {
  // Your callback function
}, [dependencies]);
```

- **useMemo**

```
const memoizedValue = useMemo(() => computeExpensiveValue(a, b), [a, b]);
```

- **useRef**

```
const myRef = useRef(initialValue);
```

- **useTransition**

```
const [isPending, startTransition] = useTransition();
```

Conditional Rendering

Inline If with Logical && Operator:

```
{condition && <Component />}
```

Inline If-Else with Conditional Operator:

```
{condition ? <Component1 /> : <Component2 />}
```

Lists and Keys

Rendering Multiple Components

```
{data.map((item) => <Component key={item.id} item={item} />)}
```

Handling Events

```
<button onClick={handleClick}>Click me</button>
```

Lifting State Up

Sharing state between components by moving it to their closest common ancestor.

Context API

Used to pass data through the component tree without having to pass props down manually at every level.

Fragments

Used to group a list of children without adding extra nodes to the DOM.

```
<React.Fragment>
  <ChildA />
  <ChildB />
</React.Fragment>
```

Higher-Order Components (HOC)

A function that takes a component and returns a new component, used for reusing component logic.

Forwarding Refs

Used to pass refs down to child components.

```
const FancyButton = React.forwardRef((props, ref) => (
  <button ref={ref} {...props}>
    {props.children}
  </button>
));
```

Concurrent Features in React 18 and beyond

- Automatic batching: React 18 automatically batches more state updates.
- Suspense: Lets your components “wait” for something before they can render, making it easier to split code and manage loading states.
- useDeferredValue, useTransition: For managing transitions and prioritizing resource loading.

Education
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This cheatsheet covers **foundational concepts** and **common hooks** in React development.

Remember, React and its ecosystem are vast, and continuous learning and practice are key to mastering it.