**Hands-on in this document**

**Objectives**

**1. Explain the need and Benefits of component life cycle**

The component lifecycle in React refers to the sequence of events/methods that happen from the time a component is created (mounted) to the time it's removed (unmounted).

**Need for Lifecycle Methods:**

* To control behavior at specific stages of a component (e.g., when it loads, updates, or exits)
* To fetch data, set timers, or interact with the DOM at the right moment
* To optimize performance and avoid unnecessary re-renders

**Benefits:**

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| --- | --- |
| **Benefit** | **Description** |
| **Controlled Updates** | **You can decide what should happen when props/state change** |
| **Performance Optimization** | **Avoid re-rendering with methods like shouldComponentUpdate()** |
| **Cleanup Tasks** | **Use componentWillUnmount() to clear timers or subscriptions** |
| **API Calls/Data Fetching** | **Use componentDidMount() to fetch data after the component mounts** |
| **Fine-Grained Control** | **Gain full control over component behavior in each lifecycle phase** |

**2. Identify various life cycle hook methods**

React provides lifecycle hook methods mainly for class components (function components use hooks like useEffect() instead).

**Lifecycle Phases and Methods**

**Mounting Phase (Component is created and inserted into the DOM):**

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| --- | --- |
| **Method** | **Purpose** |
| **constructor()** | **Initialize state and bind methods** |
| **static getDerivedStateFromProps()** | **Sync props to state (rarely used)** |
| **render()** | **Returns JSX to render UI** |
| **componentDidMount()** | **Runs after component is mounted; used to fetch data or interact with DOM** |

**Updating Phase (Triggered when props or state change):**

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| --- | --- |
| **Method** | **Purpose** |
| **static getDerivedStateFromProps()** | **Update state based on new props** |
| **shouldComponentUpdate()** | **Return true/false to allow/prevent re-render** |
| **render()** | **Re-render UI** |
| **getSnapshotBeforeUpdate()** | **Capture info (e.g., scroll position) before DOM update** |
| **componentDidUpdate()** | **Invoked after DOM updates** |

**Unmounting Phase (Component is removed from DOM):**

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| --- | --- |
| **Method** | **Purpose** |
| **componentWillUnmount()** | **Cleanup tasks like clearing timers or subscription** |

**3. List the sequence of steps in rendering a component**

**When a React component renders (especially a class component), it goes through the following steps:**

**1. constructor() *(only in class components)***

**Initializes component state and binds methods.**

**2. getDerivedStateFromProps() *(optional)***

**Syncs props to state before rendering.**

**3. render()**

**Returns JSX that describes what should be rendered on the screen.**

**4. componentDidMount()**

**Called once after the component is added to the DOM (good for API calls or DOM access).**

**Output :**

