**3. React HOL**

1. Explain the Need and Benefits of Component Lifecycle

Need:

* React components go through phases — creation, update, and removal.
* We often need to run code at specific points (e.g., fetch data when component mounts, cleanup on unmount).
* Lifecycle methods allow us to hook into these phases and perform side effects (like API calls, timers, subscriptions).

Benefits:

* Control over when code runs (initialization, updates, destruction)
* Fetch data on load (componentDidMount)
* React to prop/state changes (componentDidUpdate)
* Clean up (event listeners, timers) in componentWillUnmount
* Performance optimization

2. Identify Various Lifecycle Hook Methods (in Class Components)

Lifecycle Phases and Hooks

| Phase | Method Name | Purpose |
| --- | --- | --- |
| Mounting | constructor() | Initialize state and bind methods |
|  | static getDerivedStateFromProps() | Sync state with props if needed |
|  | render() | Returns JSX to render |
|  | componentDidMount() | Runs once after component is added to DOM |
| Updating | shouldComponentUpdate() | Decide whether to re-render or not |
|  | render() | (Re-renders UI) |
|  | getSnapshotBeforeUpdate() | Capture some info (like scroll) before update |
|  | componentDidUpdate() | Runs after update is done |
| Unmounting | componentWillUnmount() | Cleanup (remove listeners, timers, etc.) |
| Error Handling | componentDidCatch() | Catch errors in children components |

3. Sequence of Steps in Rendering a Component

Mounting Phase (First Load):

1. constructor()

2. static getDerivedStateFromProps()

3. render()

4. componentDidMount()

Updating Phase (On State/Props Change):

1. static getDerivedStateFromProps()

2. shouldComponentUpdate()

3. render()

4. getSnapshotBeforeUpdate()

5. componentDidUpdate()

Unmounting Phase (Component Removal):

1. componentWillUnmount()

Functional Component Note:

In function components, lifecycle is handled using React Hooks like:

| Hook | Equivalent Class Method |
| --- | --- |
| useEffect(() => {}, []) | componentDidMount() |
| useEffect(() => {}, [props/state]) | componentDidUpdate() |
| useEffect(() => { return () => {} }, []) | componentWillUnmount() |