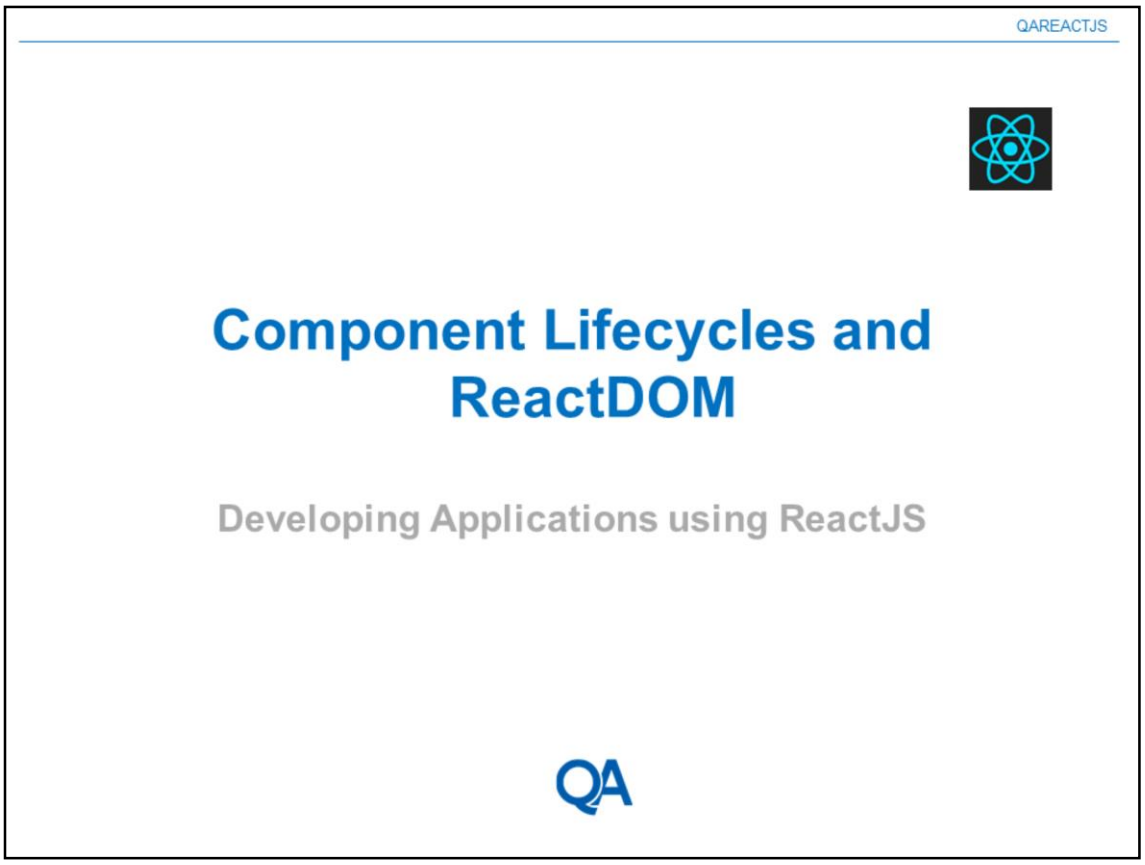

QAREACTJS
Component Lifecycles and ReactDOM
Developing Applications using ReactJS
QA

Objectives

- To understand the component lifecycle methods and when they are called
- To know how to use lifecycle methods
- To understand the ReactDOM package and its methods

The Component Lifecycle

- **Methods that can be overridden to run code at particular times in the process**
- **Along with `render()` there are three different types:**
  - Mounting
    - Called when an instance of component is being created an inserted into the DOM
  - Updating
    - Called when a component is being re-rendered, usually because of a change to props or state
  - Unmounting
    - Called when a component is being removed from the DOM
- **Some of these methods are prefixed with `will` indicating that they are called right before something happens**
- **Others are prefixed with `did` and are called right after something has happened**

The render() method

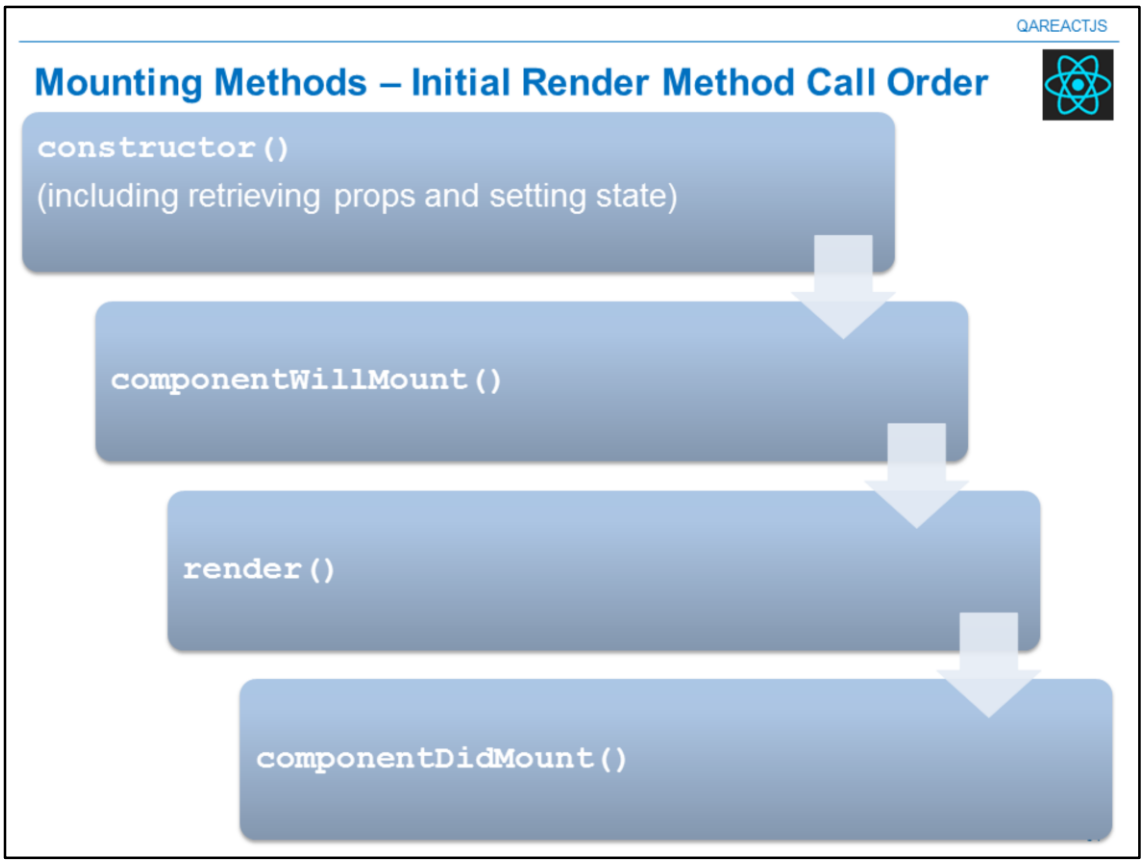
- **Method is required in all components and application will fail if not included**
- **Should examine `this.props` and `this.state` and return single React element**
  - Can be native DOM element or custom composite element
  - Can return null or false to indicate nothing to be rendered
- **Should not change component's state**
  - Returns same result each time it is called
  - Does not directly interact with browser
    - Browser interaction should be done within lifecycle methods

Mounting Methods

- **Called when an instance of a component is being created and inserted into the DOM**
  - `constructor()`
    - Constructor for a React component
    - Should have a call to `super(props)` before any other statement
      - Defines `this.props` in the constructor
    - Correct place to initialise state
      - If state is not initialised and methods are not bound, there is no need for a constructor

Mounting Methods

- **Called when an instance of a component is being created and inserted into the DOM**
  - `componentWillMount()`
    - Invoked immediately before mounting occurs
    - Called before `render()` so changes in state do not trigger re-rendering
    - Generally recommended to use a constructor instead
  - `componentDidMount()`
    - Invoked immediately after a component is mounted
    - Initialisation that requires DOM nodes should go here
    - Good place to instantiate request for data loads from remote endpoint
    - Setting state will trigger component re-rendering


QAREACTJS
Mounting Methods – Initial Render Method Call Order
constructor()
(including retrieving props and setting state)
componentWillMount()
render()
componentDidMount()

Updating Methods

- **Called when a component is being re-rendered after changes to props or state**
  - `componentWillReceiveProps(nextProps)`
    - Invoked before a mounted component receives new props
    - Can compare `this.props` and `nextProps` and perform state transitions, using `this.setState()` in this method
    - May be called even if props haven't changed
    - Not invoked if `setState()` is called

Updating Methods

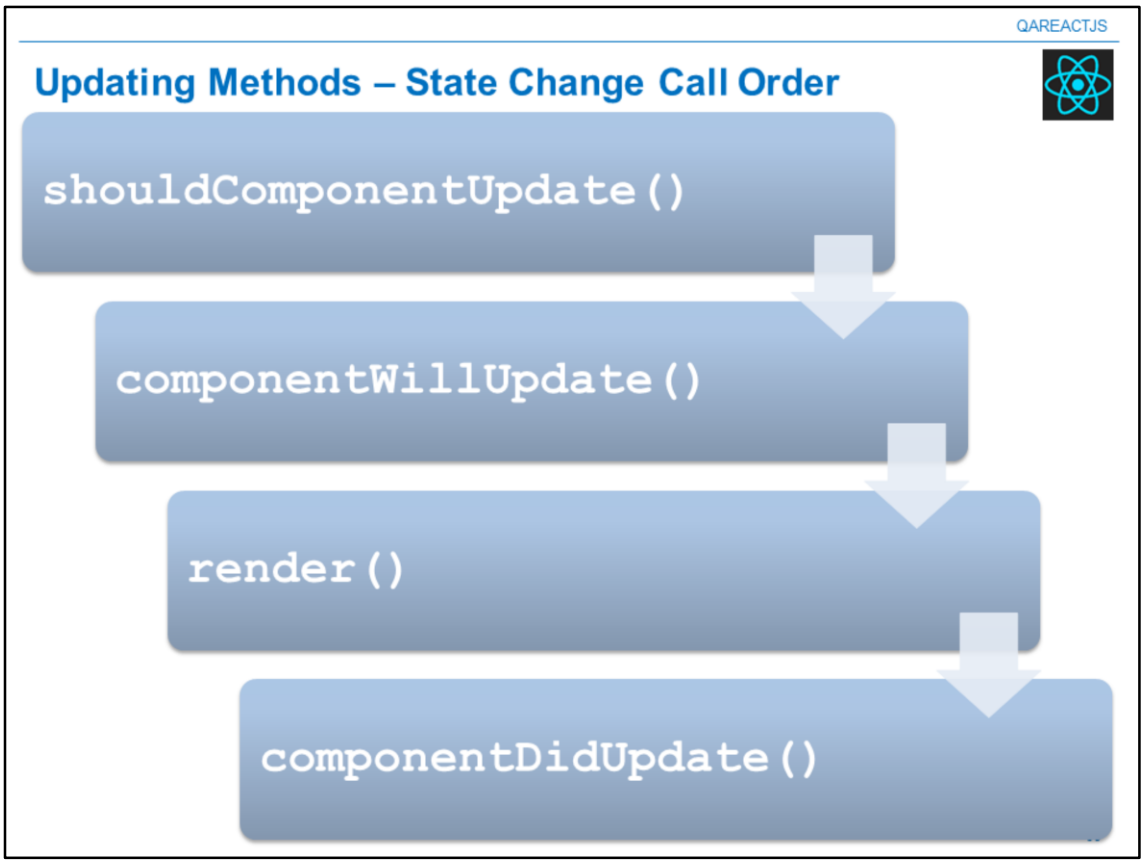
- **Called when a component is being re-rendered after changes to props or state**
  - `shouldComponentUpdate(nextProps, nextState)`
    - Lets React know if a component's output is not affected by current change in state or props
    - Default behaviour is to re-render on every state change
    - Invoked before rendering when new props or state are being received, defaulting to `true`
    - Not called for initial render or when `forceUpdate()` is used
    - Returning `false` doesn't prevent child components from re-rendering when *their* state changes
      - Does stop `componentWillUpdate()`, `render()` and `componentDidUpdate()` from being called

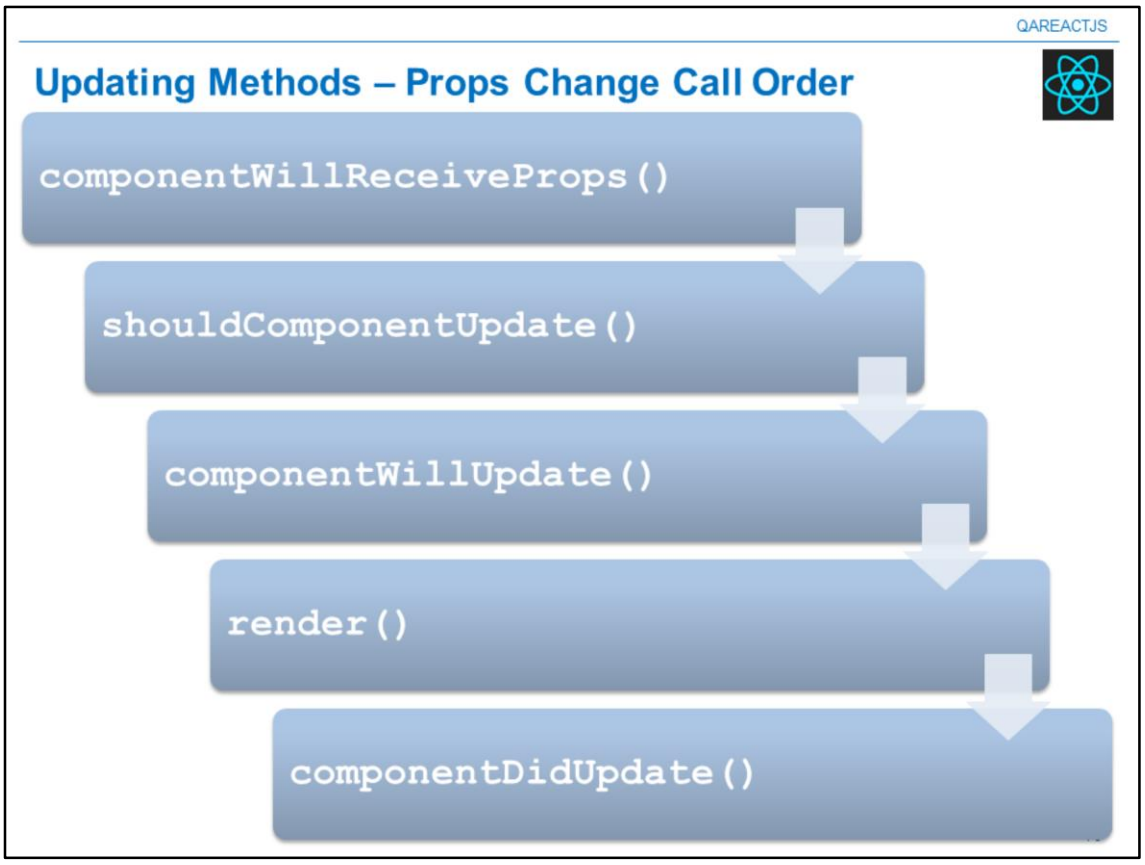
Updating Methods

- **Called when a component is being re-rendered after changes to props or state**
  - `componentWillUpdate(nextProps, nextState)`
    - Invoked immediately before rendering when new props or state are being received
    - Opportunity to perform preparation before an update occurs
    - Not called during the component's initial render
    - Cannot use `this.setState()` in this method
      - Updating state in response to a prop change should be done in the `componentWillReceiveProps()` method instead
    - Not invoked if `shouldComponentUpdate()` returns `false`

Updating Methods

- **Called when a component is being re-rendered after changes to props or state**
  - `componentDidUpdate(prevProps, prevState)`
    - Invoked immediately after an update occurs
    - Opportunity to operate on the DOM after a component update
    - Good place to do network requests
      - Compare current props to previous props as network request may not be necessary if props have not changed
    - Not called during the component's initial render
    - Not invoked if `shouldComponentUpdate()` returns `false`


QAREACTJS
Updating Methods – State Change Call Order
shouldComponentUpdate()
componentWillUpdate()
render()
componentDidUpdate()


QAREACTJS
Updating Methods – Props Change Call Order
componentWillReceiveProps()
shouldComponentUpdate()
componentWillUpdate()
render()
componentDidUpdate()

Unmounting Methods

- **Called when a component is being removed from the DOM**
  - `componentWillUnmount()`
    - Invoked immediately before a component is unmounted and destroyed
    - Opportunity to perform necessary cleanup, e.g. invalidating timers, cleaning up DOM elements created in `componentDidMount()`

React and the DOM

- **Strength of React is its relationship to the DOM**
  - JavaScript is very fast
  - DOM is very slow
- **React creates a copy of the DOM known as the 'Virtual DOM'**
  - Actual DOM only affected if changes in the Virtual DOM
  - Only changes elements in actual DOM changed in Virtual DOM
  - Means whole DOM is not re-rendered and therefore is much quicker
- **ReactDOM was split from the core library in React 0.14**
  - Provides `render()`, `findDOMNode()` and `umountComponentAtNode()` methods
  - Already seen and used the `render()` method in **main.js** several times

ReactDOM.render()

- ***DIFFERENT TO THE LIFECYCLE render() METHOD!***
- **Called with an element, container and optional callback**

```
ReactDOM.render(
      element,
      container,
      [callback]
)
```

- **Renders a React element into the DOM to the container and returns a reference to the component (or null)**
- **If element already exists it will only be updated if necessary**
  - DOM only mutated to reflect last React element if it needs to
- **Optional callback executed after the component is rendered or updated**

findDOMNode()

- **Called with a component argument to find**

```
ReactDOM.findDOMNode(component)
```

- **If component is mounted into DOM, returns corresponding native DOM element**
  - Useful for reading values out of DOM and performing DOM measurements
  - However, in most cases a 'ref' can be attached to DOM node avoiding use of findDOMNode
- **NOTE: Only works on mounted components**
  - Calling on component that is not yet mounted would cause exception to be thrown
  - Cannot be used on Functional Components
- **Use is generally discouraged due to problems with component abstraction**

unmountComponentAtNode()

- **Called with an argument of a component container**

```
ReactDOM.unmountComponentAtNode(container)
```

- **Removes a mounted React component from the DOM**
  - Cleans up its event handlers and state
  - If no component was mounted in the container, function call does nothing
  - Returns `true` if a component was unmounted and `false` if no component to unmount was found

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Exercise Time!

- **EG05 – Using Component Lifecycle Methods**