day1

Introduction

React Js Is a Javascript LIbrary for building frontend application or UI The main reason to use it is it's reusable ui components

Advantages of ReactJS

- Reusable Components
- Open source
- Efficient and Fast
- Works in Browser
- Vast Community

How ReactJs works

- Creates a Virtual Dom
- This Guy checks all the time what has changed with it's past self with the present code and change only them
- So the other things don't change
- So the application acts as a single page application(working without reloading)
-

day2

React Requirements:-

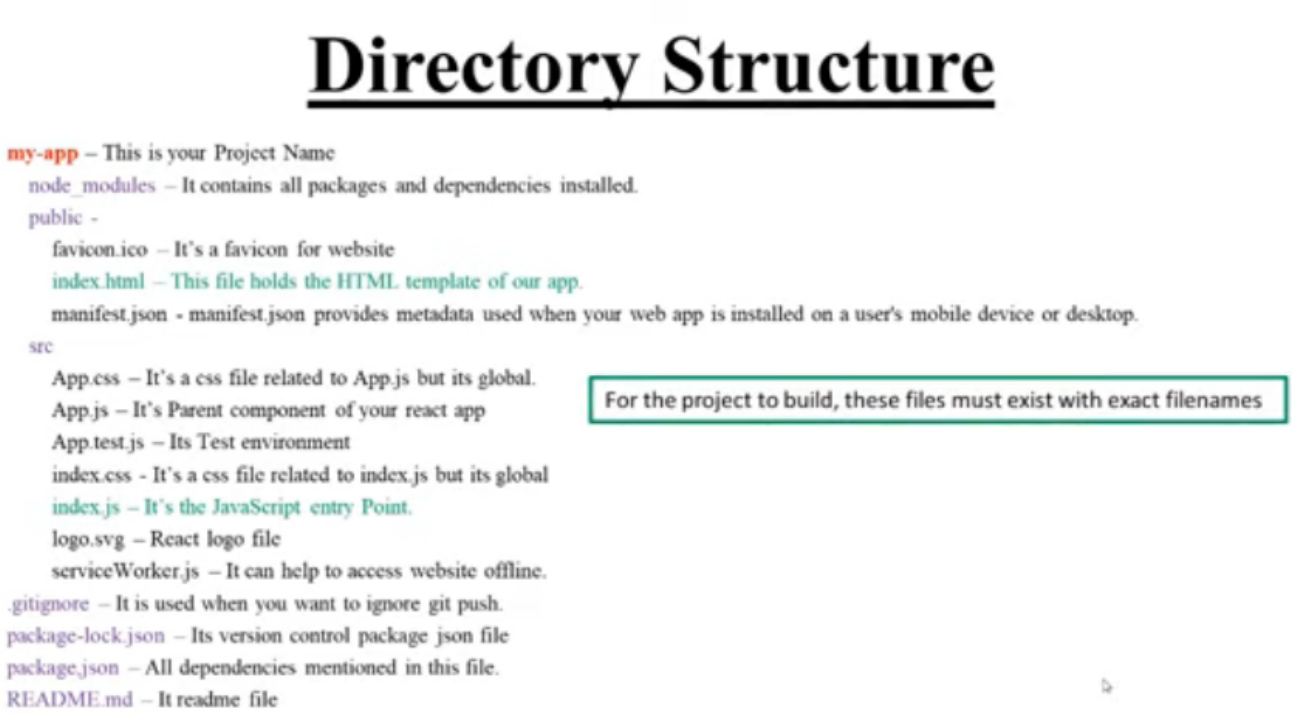
- NPM:- It is a js packagemanager. It is used to take advantages of third party packages and easily install or update them.
- Webpack:- It is a static moule bundler for modern js application. When webpack processes the application , it internally builds a dependency graph which maps every modelue the project needs and generates one or more bundles
- Babel - It's a toolchain that is mainly used to convert ecmascript code into backward compatible versiob of js in currecnt and older browsers.

How to create react application without using babel webpack,cdn links and jsx

- React.createElement(type,props,children)

    - type-> type of html element or component
    - props -> properties of the object
    - children -> anything need to be put between the dom elements
- render() -> It is the only required method in a class component . It examines this.props and this.state . it returns one of the following types:
    - React elements -> these are created via jsx
    - array and fragments -> React can't return multiple elements together so they use arrays.
- ReactDOM.render(element,DOMnode)->
    - element:- which element u want to render
    - DOMnode:- where u want to render
    - Ex:-
      ReactDom.render(< App />, document.getElementById("root"));

React directory structure



> Public folder's content doesn't get bundled , They are just copied while making stuff

day3

Create First app

- `npx create-next-app@latest` >I have no clue
- `npm create vite@latest`

render method, createElement method and ReactDom render method

render() Method

The render() method is the only required method in a class component. It examines this.props and this.state .

It returns one of the following types:

React elements – These are created via JSX(Not required).

For example, and <App /> are React elements that instruct React to render a DOM node, or another user-defined component, respectively.

Arrays and fragments - It is used to return multiple elements from render.

Portals – It is used to render children into a different DOM subtree.

String and numbers - These are rendered as text nodes in the DOM.

Booleans or null - It renders nothing. (Mostly exists to support return test && <Child /> pattern, where test is boolean.)

Note - The render() function should be pure, meaning that it does not modify component state, it returns the same result each time it's invoked, and it does not directly interact with the browser.

React Element

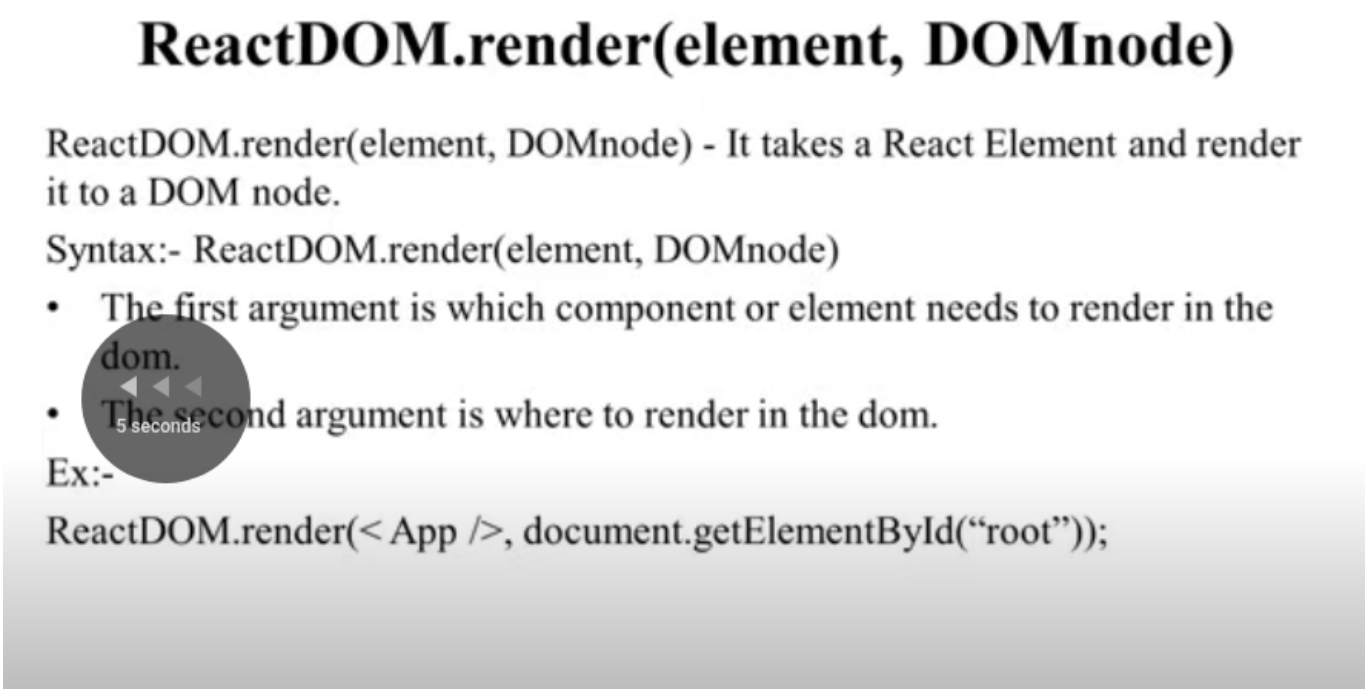
You can create a react element using React.createElement() method but there is a easy way to create element via JSX.

Using createElement() Method

```
React.createElement("h1", null, "Hello GeekyShows");
```

Using JSX

```
<h1>Hello GeekyShows</h1>
```

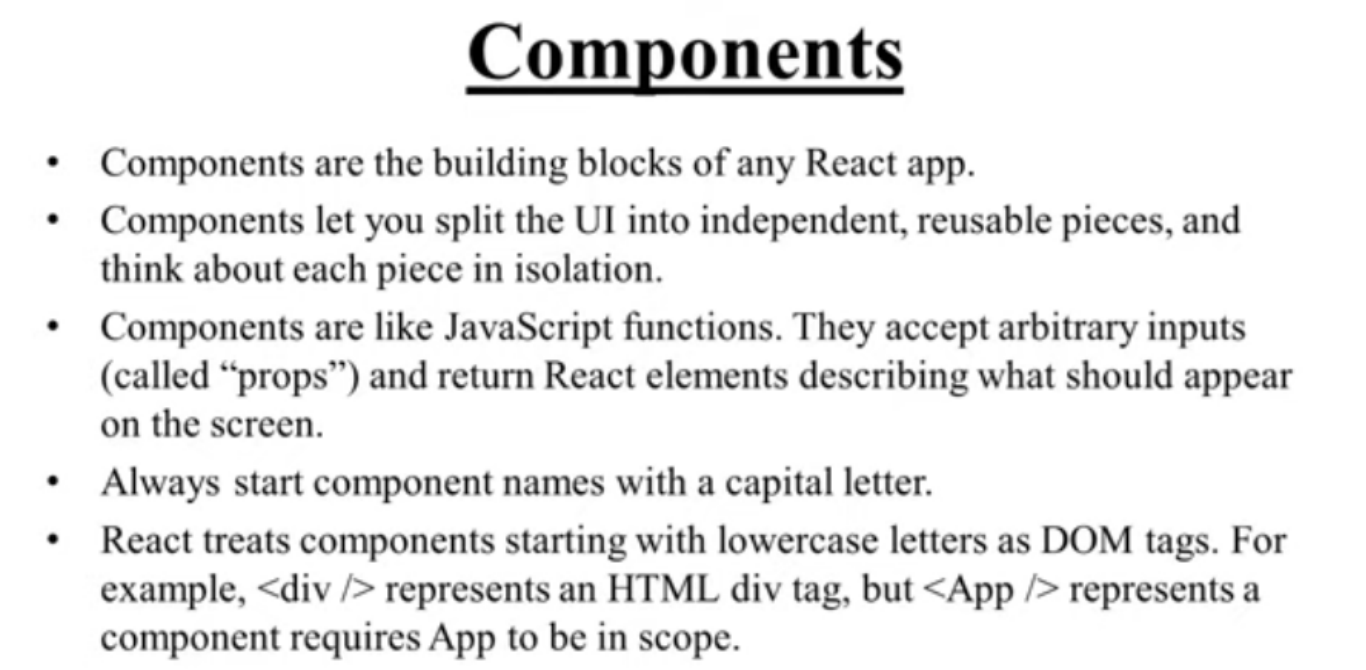


Fragments

it is used to group a list of children without adding extra nodes to the dom

- <></>
- <React.Fragment></React.Fragment>

Components



day4

Compose Components in ReactJS

- Did last day

differece between functional and class Component

- Use functional components if we are writting a presentational component which doesn't have it's own state or needs to access a lifecycle hook. You cannot use setState() in your component because FUnctional Components are pure Javascript function.

  > **Note**:- After 16.8 update it has useState and UseEffect and other hhoks to manage state and lifecycle logic

- Class Components Definition: ES6 classes that extend React.Component and must have a render() method returning JSX.

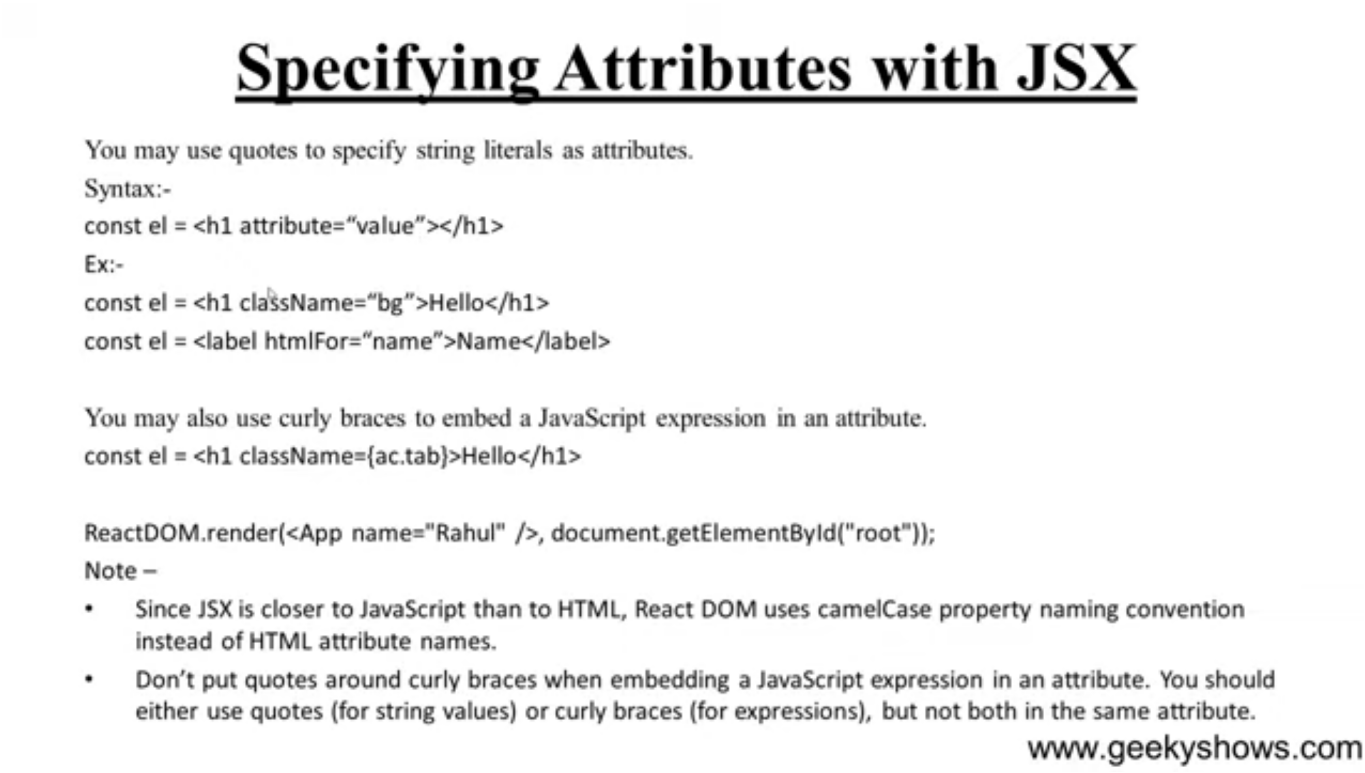
  State: Can use this.state and this.setState() to manage state.

  Lifecycle Methods: Support built-in lifecycle methods like componentDidMount(), componentDidUpdate(), etc.

JSX

JSX stands for JavaScript XML. It is a extension to JavaScript. Jsx is a preprocessor step that XML syntax

It produces React Element It is easier to understand in {} we have to use them for writting js directly! alt text



Props

- It is the jsx attributes
- > **Note** -> Each element name should be in capital Letter
- In class based components we have to use this.props. to acess them

PropType

- It is used to make sure the type of the properties
  - At first Installation

    ```
    npm install --save prop-types
    ```

  - then

    ```
    import PropTypes from 'prop-types';
    Student.propTypes ={
        name: PropTypes.string
    }

    Student.propTypes ={
        name: PropTypes.string.isRequired // It is for is required
    logic means u can't pass null
    }
    Student.defaultProps ={
        name: "<default value>"
    }
    ```

day5

✅ Children in JSX

- In **JSX**, any content placed between an opening and closing tag is passed to the component as a special prop called `props.children`.
  - Example:

    ```
    <Student>Hello, I’m a child!</Student>
    ```

✅ Functional Component Example

```jsx
import React from "react";

const Student = (props) => {
  return <div>{props.children}</div>;
};

export default Student;
```

✅ Class Component Example

```jsx
import React, { Component } from "react";

class Student extends Component {
  render() {
    return <div>{this.props.children}</div>;
  }
}

export default Student;
```

✅ State in React

State is used to manage dynamic data in a component. It is **private** to the component and determines how the component renders and behaves.

❌ Outdated Statement:

> ~~We can create state only in class components.~~ ✅ **Correct:** With the introduction of **Hooks**, we can now create state in **functional components** as well.

✅ 3 Ways to Declare State

1️⃣ Functional Component with `useState` (Modern – Recommended)

```jsx
import React, { useState } from "react";

const Student = (props) => {
  const [name, setName] = useState("Rahul");
  const [roll, setRoll] = useState(props.roll);

  return (
    <div>
```

```
      {name} - {roll}
    </div>
  );
};

export default Student;
```

2️⃣ Class Component – Directly Inside Class (Old but Valid)

```
import React, { Component } from "react";

class Student extends Component {
  state = {
    name: "Rahul",
    roll: this.props.roll,
  };

  render() {
    return (
      <div>
        {this.state.name} - {this.state.roll}
      </div>
    );
  }
}

export default Student;
```

3️⃣ Class Component – Inside Constructor (Older Style)

```
import React, { Component } from "react";

class Student extends Component {
  constructor(props) {
    super(props);
    this.state = {
      name: "Rahul",
      roll: this.props.roll,
    };
  }

  render() {
    return (
      <div>
        {this.state.name} - {this.state.roll}
      </div>
    );
```

```
  }
}

export default Student;
```

- When the component class is created, the constructor is the first method called, so it's the right place to add state.
- The class instance has already been created in memory, so you can use *this* to set properties on it.
- When we write a constructor, make sure to call the parent class' constructor by super(props)
- When you call super with props. React will make props available across the component through this.props

Event Handling

The actions to which JavaScript can respond are called Events.

Event Handling

Handling events with React elements is very similar to handling events on DOM elements. There are some syntactic differences:

- React events are named using camelCase, rather than lowercase.
- With JSX you pass a function as the event handler, rather than a string.

In HTML

```
<button onclick="handleClick()">Click Me</button>
```

In React

```
<button onClick={handleClick}>Click Me</button>          // Function Component
```

> now this works kinda different in js . it behaves differently depending on the situations. **If in interview they ask to implement this without implementing it using arrow function**

```jsx
import React, { Component } from "react";
class Student extends Component {
  constructor(props) {
    super(props);
    this.handleClick = this.handleClick.bind(this);
  }
  handleClick() {
    console.log("Button Clicked", this);
  }
  render() {
    return (
      <div>
        <h1>Hello Event</h1>
        <button onClick={this.handleClick}>Click Me</button>
      </div>
    );
  }
}
```

- ✅ Mouse Events

Event	Description
`onClick`	User clicks on an element
`onDoubleClick`	User double-clicks on an element
`onMouseDown`	Mouse button is pressed
`onMouseUp`	Mouse button is released
`onMouseEnter`	Cursor enters an element (no bubbling)
`onMouseLeave`	Cursor leaves an element (no bubbling)
`onMouseMove`	Mouse is moved over an element
`onMouseOver`	Mouse is over an element or its children
`onMouseOut`	Mouse leaves an element or its children

- ✅ Keyboard Events

Event	Description
`onKeyDown`	Key is pressed down
`onKeyPress`	Key is pressed (deprecated, use `onKeyDown`)

Event	Description
`onKeyUp`	Key is released

- ✅ Form Events

Event	Description
`onChange`	Value of input/textarea/select changes
`onInput`	User input in text field
`onSubmit`	Form submission
`onReset`	Form reset
`onInvalid`	Form field validation fails
`onSelect`	Text is selected in input/textarea

- ✅ Focus Events

Event	Description
`onFocus`	Element receives focus
`onBlur`	Element loses focus

- ✅ Clipboard Events

Event	Description
`onCopy`	Copy operation triggered
`onCut`	Cut operation triggered
`onPaste`	Paste operation triggered

- ✅ Composition Events

Event	Description
`onCompositionStart`	Composition starts (IME)
`onCompositionUpdate`	During composition
`onCompositionEnd`	Composition ends

- ✅ Touch Events (Mobile)

Event	Description
`onTouchStart`	Finger touches the screen
`onTouchMove`	Finger moves on screen

Event	Description
`onTouchEnd`	Finger lifted from screen
`onTouchCancel`	Touch event interrupted

- ✅ Pointer Events

Event	Description
`onPointerDown`	Pointer is pressed down
`onPointerMove`	Pointer is moved
`onPointerUp`	Pointer is released
`onPointerCancel`	Pointer is canceled
`onPointerEnter`	Pointer enters element
`onPointerLeave`	Pointer leaves element
`onPointerOver`	Pointer is over element or child
`onPointerOut`	Pointer leaves element or child

- ✅ UI Events

Event	Description
`onScroll`	Element is scrolled

- ✅ Wheel Events

Event	Description
`onWheel`	Mouse wheel or trackpad used

- ✅ Media Events

Event	Description
`onAbort`	Media load aborted
`onCanPlay`	Media can start playing
`onCanPlayThrough`	Media can play through
`onDurationChange`	Duration metadata loaded
`onEmptied`	Media becomes empty
`onEncrypted`	Encrypted media encountered
`onEnded`	Playback reaches end
`onLoadedData`	Media data loaded

Event	Description
`onLoadedMetadata`	Metadata (duration, etc.) loaded
`onLoadStart`	Media loading started
`onPause`	Media is paused
`onPlay`	Media is starting to play
`onPlaying`	Media is playing
`onProgress`	Media is downloading
`onRateChange`	Playback rate changed
`onSeeked`	Seek operation completed
`onSeeking`	Seeking in progress
`onStalled`	Fetching media is stalled
`onSuspend`	Media fetch suspended
`onTimeUpdate`	Time indicated by the `currentTime`
`onVolumeChange`	Volume changed
`onWaiting`	Playback is waiting for more data

- ✅ Image Events

Event	Description
`onLoad`	Image or iframe is loaded
`onError`	Error occurred while loading

- ✅ Animation Events

Event	Description
`onAnimationStart`	CSS animation starts
`onAnimationEnd`	CSS animation ends
`onAnimationIteration`	CSS animation repeats

- ✅ Transition Events

Event	Description
`onTransitionEnd`	CSS transition completes

- ✅ Drag Events

Event	Description

Event	Description
`onDrag`	Element is being dragged
`onDragStart`	Dragging starts
`onDragEnd`	Dragging ends
`onDragEnter`	Draggable enters a target
`onDragLeave`	Draggable leaves a target
`onDragOver`	Draggable is over a target
`onDrop`	Dropped on a target

---

setState

In React, setState is a method used to update the state of a component. It triggers a re-render with the new state.

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

  increment = () => {
    this.setState({ count: this.state.count + 1 });
  };

  render() {
    return <button onClick={this.increment}>Count: {this.state.count}
</button>;
  }
}
```

- Asynchronous: setState doesn't update the state immediately.
- Batched Updates: React may combine multiple setState calls for performance.
- Function Form (when new state depends on previous state):

```
this.setState((prevState) => ({ count: prevState.count + 1 }));
```

Passing Arguments to Event handlers in ReactJS

Passing Arguments to Event Handlers

- **Arrow Function**
  <button onClick={(e) => this.handleClick(id, e)}>Delete</button>

- **Bind Method**
  <button onClick={this.handleClick.bind(this, id)}>Delete</button>

Note:-

- In both cases, the *e* argument representing the React event will be passed as a second argument after the ID.
- With an arrow function, we have to pass it explicitly, but with bind any further arguments are automatically forwarded.

> inplace of the extra function we can pass it as arroow function inside the jsx/tsx itself

there's also another way

```
<button onClick={this.handleClick.bind(this, id)}>Delete</button>
```

day6

Life Cycle of Components in React

In React, components go through a lifecycle of events from creation to destruction. Understanding these lifecycle methods is crucial for managing side effects, optimizing performance, and ensuring that your components behave as expected. they are divided into three main phases:

1. **Mounting**: When an instance of a component is being created and inserted into the DOM.
2. **Updating**: When a component is being re-rendered as a result of changes to either its props or state.
3. **Unmounting**: When a component is being removed from the DOM.
4. **Error Handling**: When an error occurs during rendering, in a lifecycle method, or in the constructor of any child component.

mounting:-

- Mounting is the process of creating an element and inserting it in a DOM tree

Following methgods are called in the following order when an instance of a component is being created and inserted into the DOM

- **constructor**

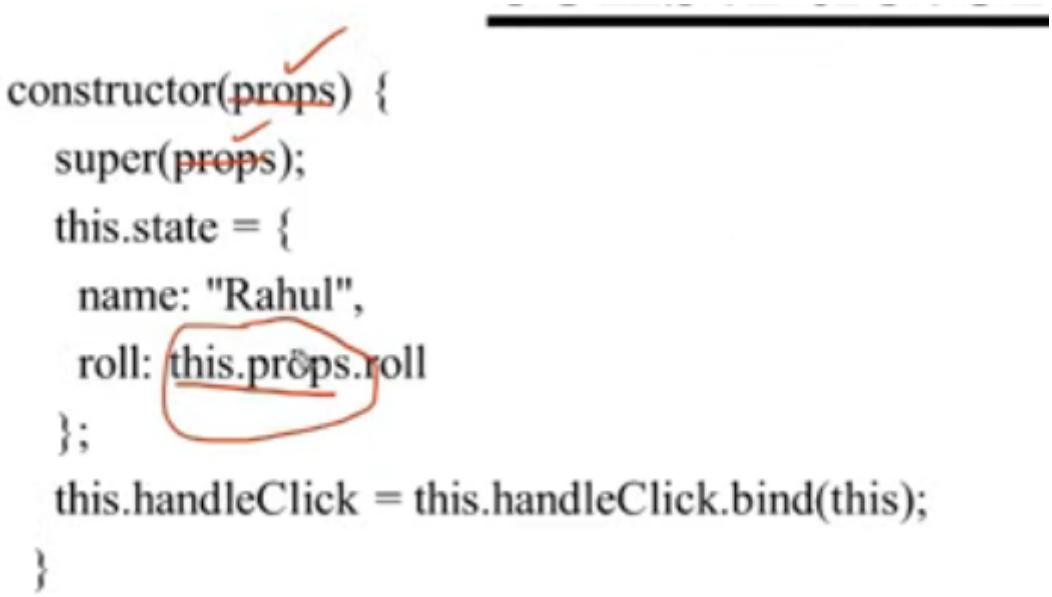
- static getDerivedStateFromProps
- **render**
- **componentDidMount**

Constructor

The constructor is called before a React component is called before it is mounted. When implementing the constructor for a React.Component subclass , you should call super(props) before any other statement. Otherwise, this.props will be undefined in the constructor, which can lead to bugs.

React Constructors are used only for 2 purpose

- Initializing local state by assiginig an object to this.state
- binding event handler methods to an instance.



getDerivedStateFromProps

getDerivedStateFromProps is invoked right before calling the render method, both on the initial mount and on subsequent updates. It should return an object to update state, or null to update nothing. Yhis method exists for rare use cases where the state depends on changes in props over time. It is a static method, so it does not have access to this.

```
static getDerivedStateFromProps(props, state) {
  // Return an object to update state, or null to update nothing.
  return null;
}
```

Render

The render() method is the only required method in a class component. It examines this.props and this.state. It returns one of the following types:

- React elements - These are created via JSX(Not required). For example,
  and are React elements that instruct React to render a DOM node, or another user-defined component, respectively.
- Arrays and fragments It is used to return multiple elements from render.
- Portals It is used to render children into a different DOM subtree.
- String and numbers - These are rendered as text nodes in the DOM.
- Booleans or null It renders nothing. (Mostly exists to support return test && <Child pattern, where test is boolean.)

> Note The render() function should be pure, meaning that it does not modify component state, it returns the same result each time it's invoked, and it does not directly interact with the browser.

componentDidMount

componentDidMount is invoked immediately after a component is mounted. This method is executed once, only on the client side, and is a good place to initiate network requests, set up subscriptions, or perform any setup that requires DOM nodes.

```
componentDidMount() {
  // Perform setup that requires DOM nodes or network requests.
}
```

Updating:-

Updating is the process of changing state or props of an element in a DOM tree.

An update can be caused by changes to either the component's props or state. The following methods are called in the following order when a component is being re-rendered as a result of changes to either its props or state:

- static getDerivedStateFromProps
- shouldComponentUpdate
- **render**
- getSnapshotBeforeUpdate
- **componentDidUpdate**

getDerivedStateFromProps

This method is invoked right before calling the render method, both on the initial mount and on subsequent updates. It should return an object to update state, or null to update nothing. This method exists for rare use cases where the state depends on changes in props over time. It is a static method, so it does not have access to `this`.

```
static getDerivedStateFromProps(props, state) {
  // Return an object to update state, or null to update nothing.
```

```
  return null;
}
```

Let's say we have 2 components, `Parent` and `Child`, where `Child` receives props from `Parent`. If `Parent` updates its state, `Child` will re-render. If you want to update the state of `Child` based on the new props it receives, you can use `getDerivedStateFromProps`.

```
class Parent extends React.Component {
    constructor(props) {
        super(props);
        this.state = { value: 0 };
    }
    increment = () => {
        this.setState({ value: this.state.value + 1 });
    };
    render() {
        return (
            <div>
                <Child value={this.state.value} />
                <button onClick={this.increment}>Increment</button>
            </div>
        );
}
```

```
class Child extends React.Component {
    constructor(props) {
        super(props);
        this.state = { derivedValue: 0 };
    }
    static getDerivedStateFromProps(Props, State) {
        // Update derivedValue based on the new props
        if (Props.value !== State.derivedValue) {
            return { derivedValue: Props.value };
        }
        return null; // No state update needed
    }
    render() {
        return <div>Derived Value: {this.state.derivedValue}</div>;
    }
}
```

shouldComponentUpdate

shouldComponentUpdate is invoked before rendering when new props or state are received. It allows you to control whether a component should re-render or not. If it returns false, the component will not re-render. This method is useful for optimizing performance by preventing unnecessary renders.

```
shouldComponentUpdate(nextProps, nextState) {
  // Return true to allow re-render, false to prevent it.
  return true; // or false based on your logic
}
```

For example, if you have a component that receives props frequently but doesn't need to update its UI, you can use shouldComponentUpdate to prevent unnecessary re-renders.

```
class MyComponent extends React.Component {
    shouldComponentUpdate(nextProps, nextState) {
        // Prevent re-render if props haven't changed
        return nextProps.value !== this.props.value;
    }
    render() {
        return <div>{this.props.value}</div>;
    }
}
```

getSnapshotBeforeUpdate

This method is invoked right before the most recently rendered output is committed to the DOM. It allows you to capture some information (snapshot) from the DOM before it changes. The value returned by this method is passed as a third parameter to componentDidUpdate.

```
getSnapshotBeforeUpdate(prevProps, prevState) {
  // Capture some information from the DOM before it changes.
  return null; // or some value to be used in componentDidUpdate
}
```

For example, if you want to capture the scroll position of a list before it updates, you can use getSnapshotBeforeUpdate:

```
class ListComponent extends React.Component {
    getSnapshotBeforeUpdate(prevProps, prevState) {
        // Capture the scroll position before the update
        const list = this.listRef.current;
        return list.scrollTop; // Return the scroll position
    }
    componentDidUpdate(prevProps, prevState, snapshot) {
        // Use the snapshot to restore the scroll position after the update
        const list = this.listRef.current;
        if (snapshot !== null) {
            list.scrollTop = snapshot; // Restore the scroll position
        }
    }
    render() {
```

```
        return (
            <div ref={this.listRef}>
                {/* Render list items here */}
            </div>
        );
    }
}
```

componentDidUpdate

componentDidUpdate is invoked immediately after updating occurs. This method is not called for the initial render. It is a good place to perform side effects, such as network requests or DOM manipulations, based on the updated props or state. It receives three parameters: prevProps, prevState, and snapshot (if getSnapshotBeforeUpdate is used). It will not get called if shouldComponentUpdate returns false.

```
componentDidUpdate(prevProps, prevState, snapshot) {
  // Perform side effects based on the updated props or state.
  // prevProps and prevState are the previous values before the update.
  // snapshot is the value returned by getSnapshotBeforeUpdate, if used.
}
```

For example, if you want to fetch new data based on updated props, you can use componentDidUpdate:

```
class DataFetcher extends React.Component {
    componentDidUpdate(prevProps) {
        // Fetch new data if the props have changed
        if (prevProps.id !== this.props.id) {
            this.fetchData(this.props.id);
        }
    }
    fetchData(id) {
        // Fetch data based on the provided id
        fetch(`/api/data/${id}`)
            .then(response => response.json())
            .then(data => {
                this.setState({ data });
            });
    }
    render() {
        return (
            <div>
                {/* Render fetched data here */}
            </div>
        );
    }
}
```

Life Cycle Diagram

Unmounting:-

Unmounting is the process of removing a component from the DOM. The following method is called when a component is being removed from the DOM:

- **componentWillUnmount**

componentWillUnmount

componentWillUnmount is invoked immediately before a component is unmounted and destroyed. This method is used to perform any necessary cleanup, such as cancelling network requests, removing event listeners, or cleaning up timers.

```
componentWillUnmount() {
  // Perform cleanup before the component is removed from the DOM.
}
```

For example, if you have a component that sets up a timer, you can use componentWillUnmount to clear the timer when the component is about to be removed:

```
class TimerComponent extends React.Component {
    componentDidMount() {
        this.timer = setInterval(() => {
```

```
            this.setState({ time: new Date() });
        }, 1000);
    }
    componentWillUnmount() {
        clearInterval(this.timer); // Clear the timer when the component is
unmounted
    }
    render() {
        return <div>Current Time: {this.state.time.toLocaleTimeString()}
</div>;
    }
}
```

Hooks

Hooks are functions that let you use state and other React features without writing a class. They allow you to manage component lifecycle, state, and side effects in functional components.

when to use hooks:

- When you want to use state in a functional component.

Rules of Hooks:

- Only call hooks at the top level of your React function. Don't call hooks inside loops, conditions, or nested functions.
- Only call hooks from React function components or custom hooks. Don't call hooks from regular JavaScript functions.
- React relies on the order of hooks calls to maintain state consistency. If you change the order of hooks, it can lead to bugs.
- Hooks don't work inside class components. They are designed for functional components only.

UseState

useState is a Hook that lets you add state to your functional components. we call it inside a functional component to declare a state variable and a function to update it. Usestate returns an array with two elements: the current state value and a function to update that state value.

```
import React, { useState } from 'react';
function Counter() {
  // Declare a state variable called count, initialized to 0
  const [count, setCount] = useState(0);
  muhehehe = () => {
    // Update the count state when the button is clicked
    setCount(count + 1);
  };
  return (
    <div>
      <p>You clicked {count} times</p>
```

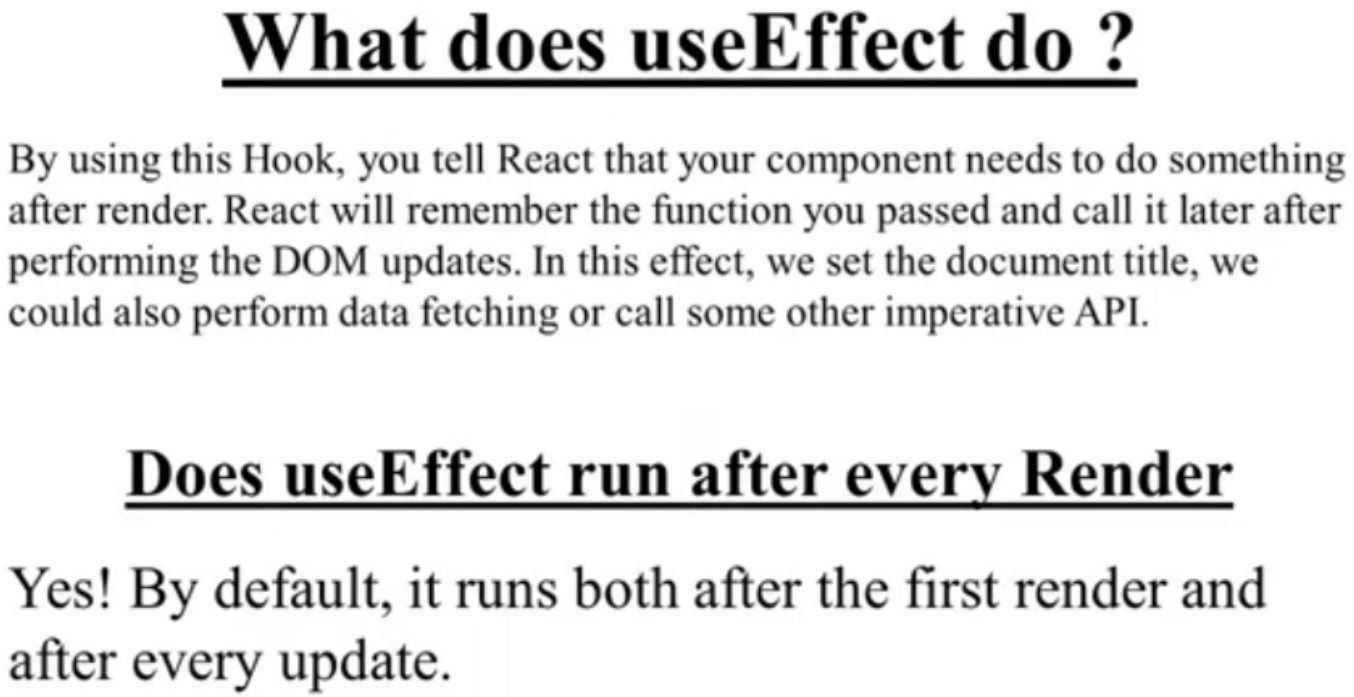
```
      {/* Update the count state when the button is clicked */}
      <button onClick={muhehehe}>
        Click me
      </button>
    </div>
  );
}
```

UseEffect

useEffect is a Hook that lets you perform side effects in your functional components. It is called after the component renders and can be used for tasks like data fetching, subscriptions, or manually changing the DOM. useEffect takes two arguments: a function that contains the side effect logic and an optional dependency array that determines when the effect should run. If the dependency array is empty, the effect runs only once after the initial render. If it contains variables, the effect runs whenever those variables change. Basically it is used to replace the componentDidMount, componentDidUpdate, and componentWillUnmount lifecycle methods in class components.

```
import React, { useState, useEffect } from 'react';
function ExampleComponent() {
  const [count, setCount] = useState(0);
    useEffect(() => {
        // This effect runs after every render
        document.title = `You clicked ${count} times`;

        // Cleanup function (optional)
        return () => {
        console.log('Cleanup before the next effect or unmount');
        };
    }, [count]); // The effect depends on the count variable
    return (
        <div>
            <p>You clicked {count} times</p>
            <button onClick={() => setCount(count + 1)}>
                Click me
            </button>
        </div>
    );
}
```



It also takes an array of dependencies as the second argument. If any of the dependencies change, the effect will run again. If you pass an empty array, the effect will only run once after the initial render, similar to componentDidMount.

```
useEffect(() => {
  // This effect runs only once after the initial render
  console.log('Component mounted');
}, []); // Empty dependency array
```

Custom Hooks

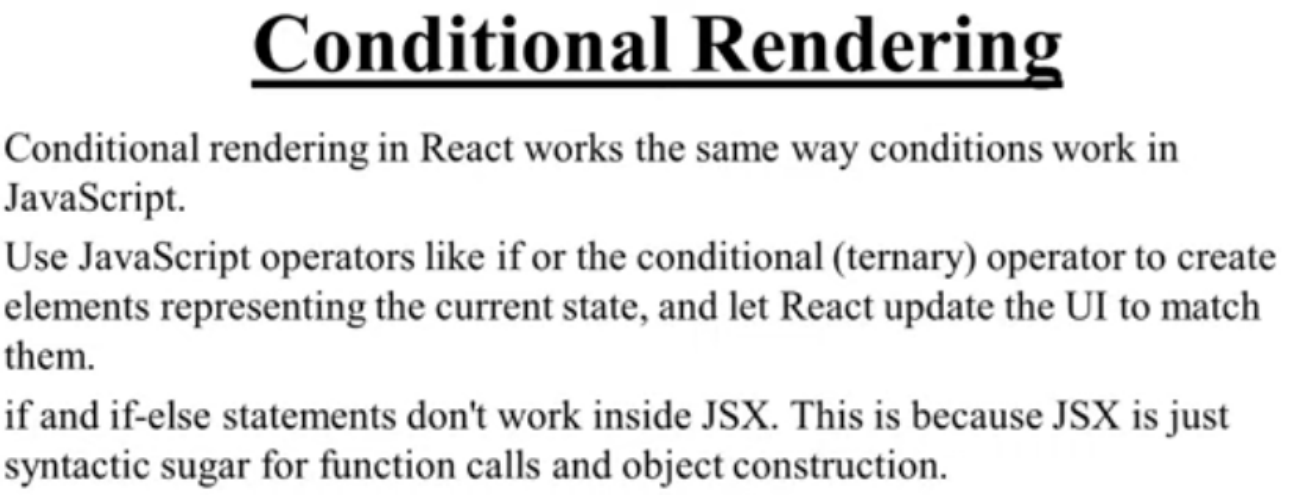
A custom Hook is a JavaScript function, when we want to share logic between components, we can create a custom Hook. Custom Hooks allow you to extract component logic into reusable functions.

> Example of a custom Hook that manages a counter:

```
import { useState } from "react";
function useCustomCounter() {
  const [count, setCount] = useState(0);
  const handleIncrement = () => {
    setCount(count + 1);
  };
  return {
    count,
    handleIncrement
  };
}
export default useCustomCounter;
```

day7

Conditional Rendering in React



Conditional Rendering

Conditional rendering in React works the same way conditions work in JavaScript.

Use JavaScript operators like if or the conditional (ternary) operator to create elements representing the current state, and let React update the UI to match them.

if and if-else statements don't work inside JSX. This is because JSX is just syntactic sugar for function calls and object construction.

Inline if with Logical && Operator

You may embed any expressions in JSX by wrapping them in curly braces. This includes the JavaScript logical && operator.

Operand 1 && Operand 2		Result
True	True	True
True	False	False
False	True	False
False	False	False
True	Expression	Expression
False	Expression	False

Ex:- purchase && <Payment />
If *purchase* evaluates to *true*, the <Payment /> component will be return

Ex:- purchase && <Payment />
If *purchase* evaluates to *false*, the <Payment /> component will be ignored

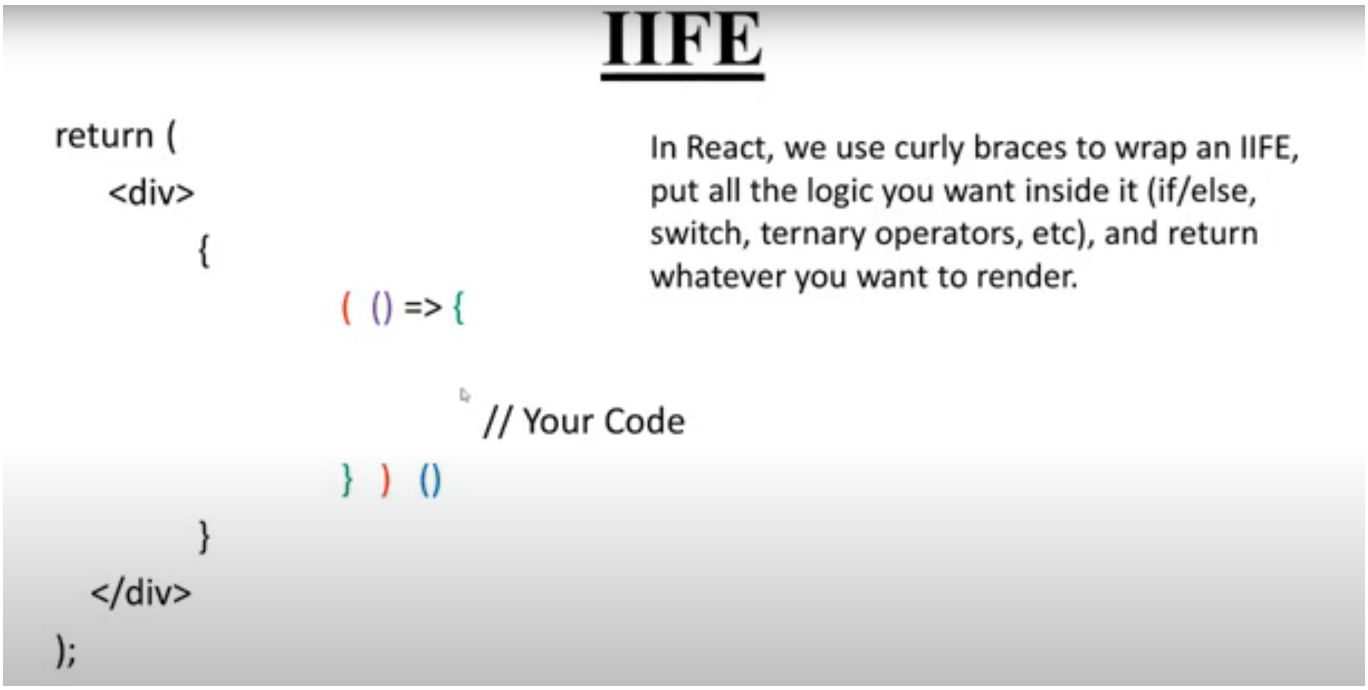
true && expresion1 && expression2 = expression2

Inline if-else with Conditional Operator

Syntax: -

Condition ? Expression_1 : Expression_2

If the condition is true it will return expression_1 else it will return expression_2.



IIFE (Immediately Invoked Function Expression)

```
const MyComponent = ({ user }) => {
  return (
    <div>
      {
        (() => {
          if (user.isAdmin) {
            return <p>Welcome, Admin!</p>;
          } else {
            return <p>Welcome, User!</p>;
          }
        })()
      }
    </div>
  );
};
export default MyComponent;
```

Lists in React

Iteration using map ( ) Method

The map( ) method creates a new array with the results of calling a provided function on every element in the calling array.

map calls a provided callback function once for each element in an array, in order, and returns a new array from the results.

Syntax:- map(callback(currentValue, index, array), thisArg);

Ex:- map((num, index) => {return num})

```
// Declaration and Initialization of Array
  const arr = [10, 20, 30, 40];

  // Using Array Map Method
  const newArr = arr.map(num => {
    return <li>{num * 2}</li>;
  });
```

```jsx
const MyList = ({ items }) => {
  return (
    <ul>
      {items.map((item, index) => (
        <li key={index}>{item}</li>
      ))}
    </ul>
  );
};
export default MyList;
```

keys in Lists

Keys

- A "key" is a special string attribute you need to include when creating lists of elements.
- Keys help React identify which items have changed, are added, or are removed.
- Keys should be given to the elements inside the array to give the elements a stable identity.
- The best way to pick a key is to use a string that uniquely identifies a list item among its siblings.
- Most often you would use IDs from your data as keys.
- Keys used within arrays should be unique among their siblings. However they don't need to be globally unique. We can use the same keys when we produce two different arrays.
- Keys serve as a hint to React but they don't get passed to your components.
- If you need the same value in your component, pass it explicitly as a prop with a different name.

Inline Styles in React

Inline Stylesheet

style is most often used in React applications to add dynamically-computed styles at render time.

The *style* attribute accepts a JavaScript object with camelCased properties rather than a CSS string. This is consistent with the DOM style JavaScript property, is more efficient, and prevents XSS security holes.

CSS classes are generally better for performance than inline styles.

styles are not autoprefixed. Vendor prefixes other than ms should begin with a capital letter e.g. WebkitTransition has an uppercase "W"

Ex:-

```
const btnStyle = {
 color: 'blue',
 backgroundColor: 'orange',
};
<button style={btnStyle}>Button</button>;
```

```jsx
const MyComponent = () => {
  const divStyle = {
    color: 'blue',
    backgroundColor: 'lightgray',
    padding: '10px',
    borderRadius: '5px',
  };

  return <div style={divStyle}>Hello, Inline Styles!</div>;
```

```
};
export default MyComponent;
```

To apply both class

```
import React, { Component } from "react";

export default class App extends Component {
  render() {
    const txtc = {
      color: "blue"
    };
    const txts = {
      fontSize: "80px"
    };
    return <h1 style={{ ...txtc, ...txts }}>Hello App</h1>;
  }
}
```

h1(props?: React.DetailedHTMLProps< HTMLHeadingElement>, ...children: React.ReactNode[]): 1/2

External CSS in React

External Stylesheet

App.css

```
.txt {
  color: blue;
}
```

App.js

```
import './App.css';                    // This tells Webpack that App.js uses these styles.
<h1 className="txt">Hello App</h1>
```

Note:-

- Use className not class e.g. className="txt"
- Pass a string as the className prop.
- It is common for CSS classes to depend on the component props or state.

```
import './styles.css';
const MyComponent = () => {
  return <div className="my-class">Hello, External CSS!</div>;
};
export default MyComponent;
```

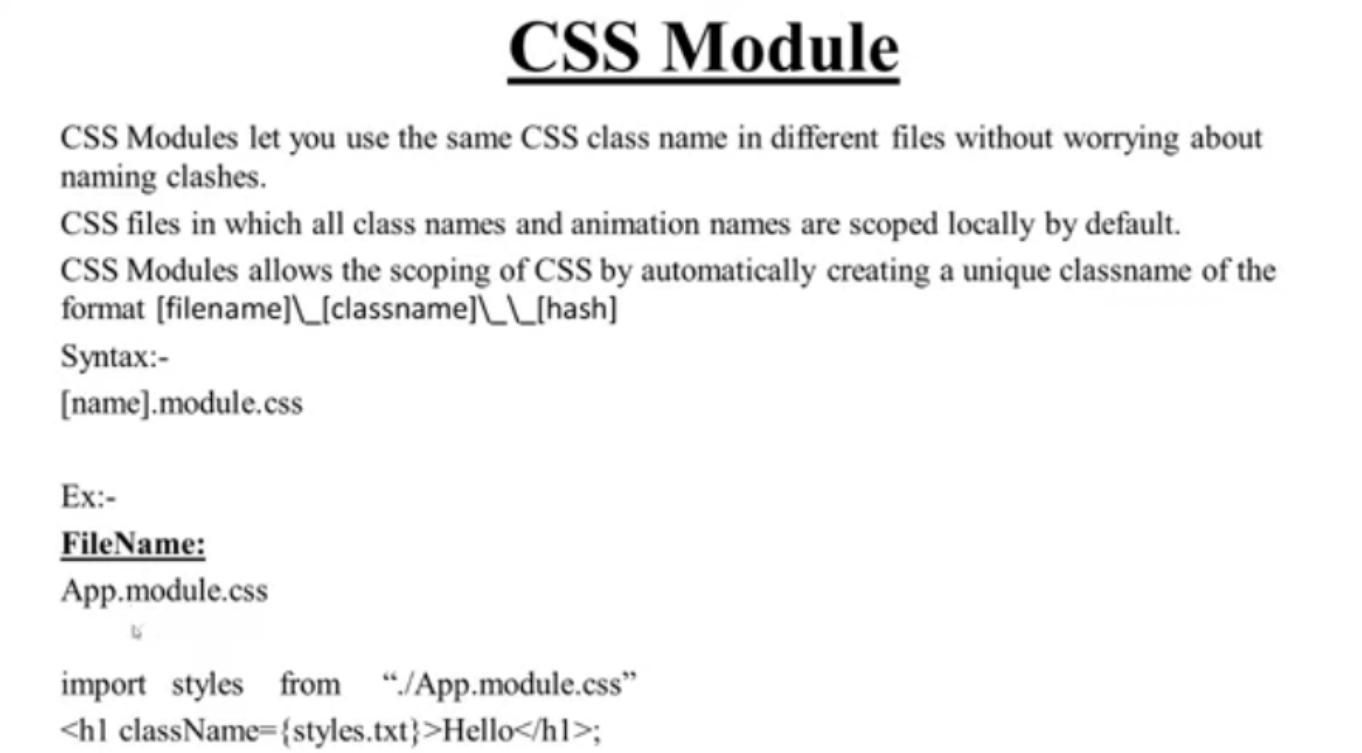
```css
.my-class {
  color: green;
  background-color: lightyellow;
  padding: 10px;
  border-radius: 5px;
}
```

> External CSS is global and can affect all components that use the same class names. To avoid conflicts, consider using CSS Modules or styled-components for scoped styles.

day8

CSS Module

This is a simple CSS module that can be used to style your web applications. It includes basic styles for layout, typography, and buttons. It let's us define styles in a modular way, avoiding conflicts with other styles in the application.



CSS Module

CSS Modules let you use the same CSS class name in different files without worrying about naming clashes.

CSS files in which all class names and animation names are scoped locally by default.

CSS Modules allows the scoping of CSS by automatically creating a unique classname of the format [filename]_[classname]__[hash]

Syntax:-

[name].module.css

Ex:-

FileName:

App.module.css

import styles from "./App.module.css"

<h1 className={styles.txt}>Hello</h1>;

```css
/* app.module.css */
.container {
  display: flex;
  flex-direction: column;
  align-items: center;
  padding: 20px;
}
.title {
  font-size: 2rem;
```

```
  color: #333;
}
.button {
  padding: 10px 20px;
  background-color: #007bff;
  color: white;
  border: none;
  border-radius: 5px;
  cursor: pointer;
}
```

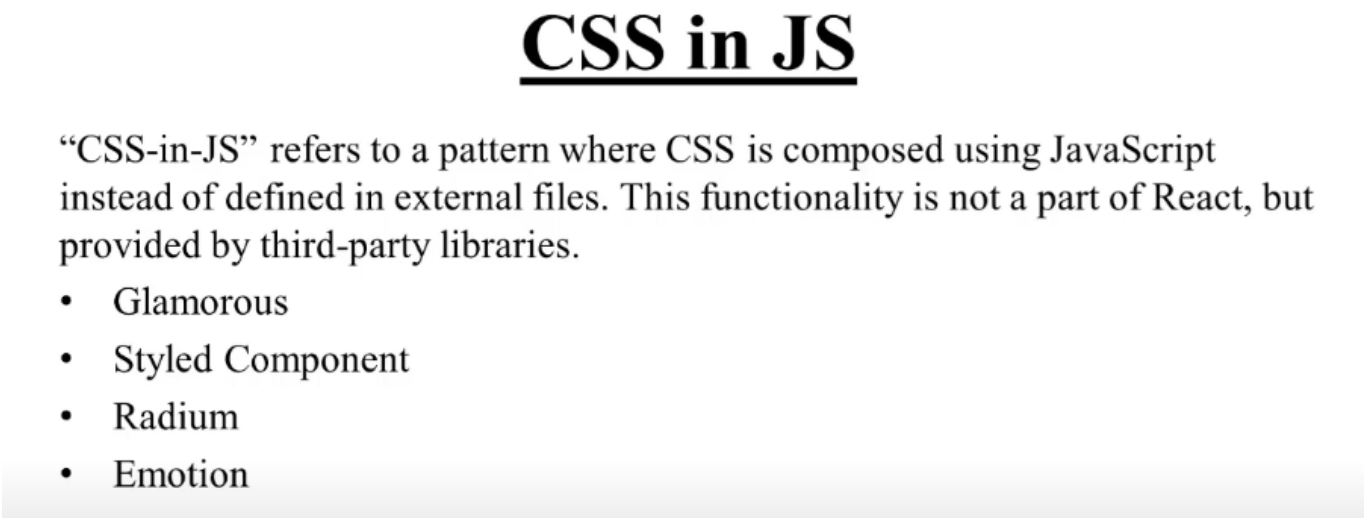
```
import React from 'react';
import styles from './app.module.css';

const App = () => {
  return (
    <div className={styles.container}>
      <h1 className={styles.title}>Welcome to My App</h1>
      <button className={styles.button}>Click Me</button>
    </div>
  );
};

export default App;
```

CSS in JS

This is a simple CSS-in-JS example using styled-components. It allows you to write CSS directly within your JavaScript files, making it easier to manage styles that are scoped to components.



Images and assets in React

Inside public Folder

If you put a file into the public folder, it will not be processed by Webpack. Instead it will be copied into the build folder untouched.

To reference assets in the public folder, you need to use a special variable called PUBLIC_URL. Only files inside the public folder will be accessible by %PUBLIC_URL% prefix.

Normally we recommend importing stylesheets, images, and fonts from JavaScript.

<link rel="shortcut icon" href="%PUBLIC_URL%/favicon.ico">

- None of the files in public folder get post-processed or minified.
- Missing files will not be called at compilation time, and will cause 404 errors for your users.
- Result filenames won't include content hashes so you'll need to add query arguments or rename them every time they change.

Inside public Folder

When use Public Folder

- You need a file with a specific name in the build output, such as manifest.webmanifest.
- You have thousands of images and need to dynamically reference their paths.
- You want to include a small script like pace.js outside of the bundled code.
- Some library may be incompatible with Webpack and you have no other option but to include it as a <script> tags

Inside public Folder

How to use

Public Folder -> index.html

App.js

Public Folder

For running in HTML:-

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>CSS Module Example</title>
    <link rel="stylesheet" href="app.module.css">
</head>
<body>
    <div id="root"></div>
    <img src="%PUBLIC_URL%/image.png" alt="Image description">
    <script src="app.js"></script>
</body>
</html>
```

For running in React:-

```
import React from 'react';
export default function App() {
  return (
    <div>
      <h1>CSS Module Example</h1>
      <img src={process.env.PUBLIC_URL + '/image.png')} alt="Image
description" />
    </div>
  );
}
```

src Folder

Inside src Folder

With Webpack, using static assets like images and fonts works similarly to CSS.

You can import a file right in a JavaScript module. This tells Webpack to include that file in the bundle. Unlike CSS imports, importing a file gives you a string value. This value is the final path you can reference in your code, e.g. as the src attribute of an image or the href of a link to a PDF.

- Scripts and stylesheets get minified and bundled together to avoid extra network requests.

Inside src Folder

How to Use

App.js

```
import pic from './pic.jpg';
<img src={pic} alt="mypic" />
```

This ensures that when the project is built, Webpack will correctly move the images into the build folder, and provide us with correct paths.

Form

Forms

HTML form elements work a little bit differently from other DOM elements in React, because form elements naturally keep some internal state.

In HTML, form elements such as <input>, <textarea>, and <select> typically maintain their own state and update it based on user input. In React, mutable (changeable) state is typically kept in the state property of components, and only updated with setState().

- Controlled Component
- Uncontrolled Component

Controlled Component

Form has the default HTML form behavior of browsing to a new page when the user submits the form. If you want this behavior in React, it just works. But in most cases, it's convenient to have a JavaScript function that handles the submission of the form and has access to the data that the user entered into the form. The standard way to achieve this is with a technique called "controlled components".

In a controlled component, form data is handled by a React component.

When Use Controlled Component-

You need to write an event handler for every way your data can change and pipe all of the input state through a React component.

Uncontrolled Component

In a controlled component, form data is handled by a React component. The alternative is uncontrolled components, where form data is handled by the DOM itself.

To write an uncontrolled component, instead of writing an event handler for every state update, you can use a ***ref*** to get form values from the DOM.

When Use Uncontrolled Component-

You do not need to write an event handler for every way your data can change and pipe all of the input state through a React component.

Converting a preexisting codebase to React, or integrating a React application with a non-React library.

day9

Controlled Compositions in React

So in React, we often use controlled components to manage form inputs. This means that the component's state is controlled by React, and the input value is set via props.

In case of a controlled input, the value of the input is set by the state of the component, and any changes to the input are handled by an event handler that updates the state.

Suppose we have a html input element with a value set by the component's state:

```
<input type="text" value="Hell no" />
```

and a react input component :-

```
import React from 'react';

export default function ControlledInput() {
 return (
    <input type="text" value="hell no" />
  );
}
```

We will see that the input value is set to "hell no" when the component renders. However, if we try to change the input value by typing in it, nothing will happen because the input is controlled by React and does not have an `onChange` handler to update the state. but The html input element will not throw an error.

Now the solution is either to add an `onChange` handler to the input element or `defaultValue`

For the onChange handler, we can do something like this:

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

export default function ControlledInput() {
 const [inputValue, setInputValue] = useState('');

 const handleChange = (e) => {
   setInputValue(e.target.value.toUpperCase());
 };
 return (
   <input
     type="text"
     value={inputValue}
     onChange={handleChange}
   />
 );
}
```

Managing multiple inputs

When dealing with multiple inputs, we can use a single state object to manage all input values.

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

export default function ControlledInput() {
 const [formData, setFormData] = useState({
   firstName: '',
   lastName: '',
 });

 const handleChange = (e) => {
   const { name, value } = e.target;
```

```
    setFormData((prevData) => ({
      ...prevData,
      [name]: value.toUpperCase(),
    }));
  };

  return (
    <div>
      <input
        type="text"
        name="firstName"
        value={formData.firstName}
        onChange={handleChange}
      />
      <input
        type="text"
        name="lastName"
        value={formData.lastName}
        onChange={handleChange}
      />
    </div>
  );
}
```

Form submission

When submitting a form, we can handle the submission event and prevent the default behavior. We can then access the input values from the state.

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

export default function ControlledInput() {
  const [formData, setFormData] = useState({
    firstName: '',
    lastName: '',
  });

  const handleChange = (e) => {
    const { name, value } = e.target;
    setFormData((prevData) => ({
      ...prevData,
      [name]: value.toUpperCase(),
    }));
  };

  const handleSubmit = (e) => {
    e.preventDefault();
    console.log('Form submitted:', formData);
  };
```

```
  return (
    <form onSubmit={handleSubmit}>
      <input
        type="text"
        name="firstName"
        value={formData.firstName}
        onChange={handleChange}
      />
      <input
        type="text"
        name="lastName"
        value={formData.lastName}
        onChange={handleChange}
      />
      <button type="submit">Submit</button>
    </form>
  );
}
```

Uncontrolled components

Uncontrolled components are those state is managed by the DOM, rather than relying on React to control it. This means that the component does not store its state in a React state variable, but instead relies on the DOM to keep track of the input values. To use uncontrolled components, we can use a `ref` to access the input value directly from the DOM.

Ref

refs provide a way to access DOM nodes or React elements created in the render method. They can be used to directly interact with the DOM, bypassing the React state management.

When to use refs:

- Managing focus, text selection, or media playback.
- Triggering imperative animations.
- Integrating with third-party DOM libraries.

refs are created using `React.createRef()`[for class components] or the `useRef` [for functional components] hook in functional components. They can be attached to React elements via the `ref` attribute. Refs are commonly assigned to an instance prop

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

export default function ControlledInput(){
    const inputRef = useRef(null);
    const handleSubmit = (e) => {
        e.preventDefault();
        console.log('Input value:', inputRef.current.value);
    };
```

```
    return (
        <form onSubmit={handleSubmit}>
            <input type="text" ref={inputRef} />
            <button type="submit">Submit</button>
        </form>
    );
}
```

```
import React from 'react';

class ControlledInput extends React.Component {
    constructor(props) {
        super(props);
        this.inputRef = React.createRef();
    }

    handleSubmit = (e) => {
        e.preventDefault();

        console.log('Input value:', this.inputRef.current.value);
    };

    render() {
        return (
            <form onSubmit={this.handleSubmit}>
                <input type="text" ref={this.inputRef} />
                <button type="submit">Submit</button>
            </form>
        );
    }
}
```

Accessing Refs

To access the value of an uncontrolled input, we can use the `current` property of the ref. This property points to the DOM element associated with the ref.

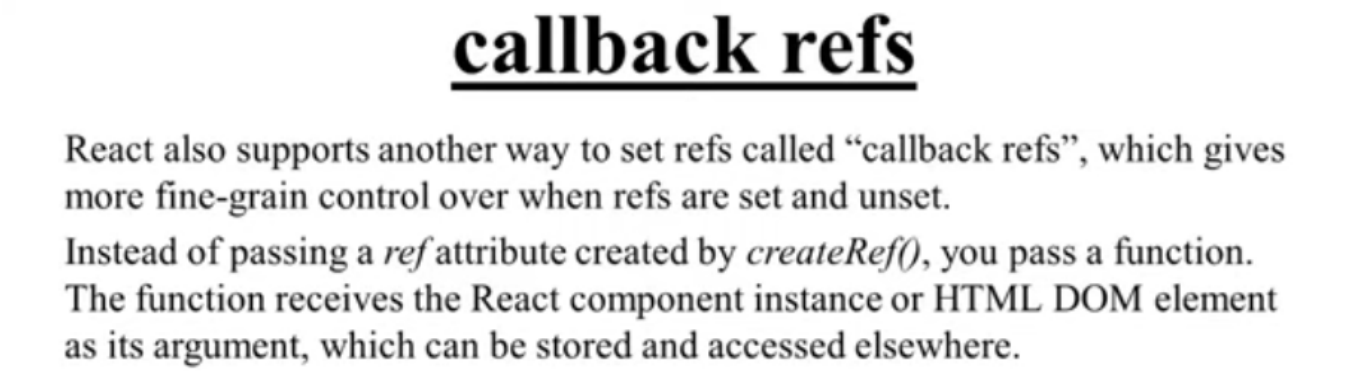
```
import React, { useRef } from 'react';

export default function ControlledInput(){
    const inputRef = useRef(null);
    const handleSubmit = (e) => {
        e.preventDefault();
        inputRef.current.focus(); // Focus the input
        console.log('Input value:', inputRef.current.value);
    };
    return (
        <form onSubmit={handleSubmit}>
            <input type="text" ref={inputRef} />
```

```
            <button type="submit">Submit</button>
        </form>
    );
}
```

callback refs

Callback refs are a way to create refs using a function instead of the `createRef` or `useRef` methods. They allow you to set the ref dynamically and can be useful for more complex scenarios where you need to perform additional logic when the ref is set or unset.



callback refs

React also supports another way to set refs called "callback refs", which gives more fine-grain control over when refs are set and unset.

Instead of passing a *ref* attribute created by *createRef()*, you pass a function. The function receives the React component instance or HTML DOM element as its argument, which can be stored and accessed elsewhere.

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

export default function ControlledInput() {
  const [inputValue, setInputValue] = useState('');
  const inputRef = (node) => {
    if (node) {
      node.focus(); // Focus the input when it is mounted
    }
  };

  const handleChange = (e) => {
    setInputValue(e.target.value);
  };

  return (
    <div>
      <input
        type="text"
        value={inputValue}
        onChange={handleChange}
        ref={inputRef} // Using callback ref
      />
    </div>
  );
}
```