INTERVIEW QUESTIONS ON REACTJS

1. What is React?

React is a front-end and open-source JavaScript library which is useful in developing user interfaces specifically for applications with a single page. It is helpful in building complex and reusable user interface(UI) components of mobile and web applications as it follows the component-based approach.

The important features of React are:

- It supports server-side rendering.
- It will make use of the virtual DOM rather than real DOM (Data Object Model) as RealDOM manipulations are expensive.
- It follows unidirectional data binding or data flow.
- It uses reusable or composable UI components for developing the view.

2. What are the advantages of using React?

MVC is generally abbreviated as Model View Controller.

- **Use of Virtual DOM to improve efficiency:** React uses virtual DOM to render the view. As the name suggests, virtual DOM is a virtual representation of the real DOM. Each time the data changes in a react app, a new virtual DOM gets created. Creating a virtual DOM is much faster than rendering the UI inside the browser. Therefore, with the use of virtual DOM, the efficiency of the app improves.
- **Gentle learning curve:** React has a gentle learning curve when compared to frameworks like Angular. Anyone with little knowledge of javascript can start building web applications using React.
- **SEO friendly:** React allows developers to develop engaging user interfaces that can be easily navigated in various search engines. It also allows server-side rendering, which boosts the SEO of an app.
- **Reusable components:** React uses component-based architecture for developing applications. Components are independent and reusable bits of code. These components can be shared across various applications having similar functionality. The re-use of components increases the pace of development.
- **Huge ecosystem of libraries to choose from:** React provides you with the freedom to choose the tools, libraries, and architecture for developing an application based on your requirement.

3. What are the limitations of React?

The few limitations of React are as given below:

- React is not a full-blown framework as it is only a library.
- The components of React are numerous and will take time to fully grasp the benefits of all.
- It might be difficult for beginner programmers to understand React.
- Coding might become complex as it will make use of inline templating and JSX.

4. What is useState() in React?

The useState() is a built-in React Hook that allows you for having state variables in functional components. It should be used when the DOM has something that is dynamically manipulating/controlling.

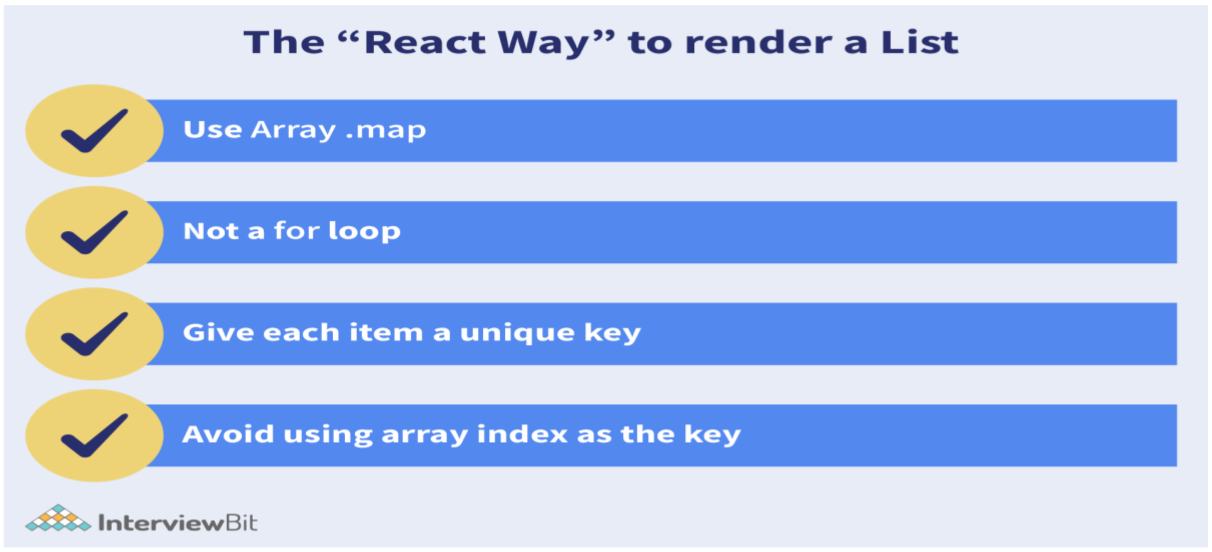
In the below-given example code, The useState(0) will return a tuple where the count is the first parameter that represents the counter's current state and the second parameter setCounter method will allow us to update the state of the counter.

```
...
const [count, setCounter] = useState(0);
const [otherStuffs, setOtherStuffs] = useState(...);
...
const setCount = () => {
  setCounter(count + 1);
  setOtherStuffs(...);
  ...
};
```

We can make use of setCounter() method for updating the state of count anywhere. In this example, we are using setCounter() inside the setCount function where various other things can also be done. The idea with the usage of hooks is that we will be able to keep our code more functional and avoid class-based components if they are not required.

5. What are keys in React?

A key is a special string attribute that needs to be included when using lists of elements.


The "React Way" to render a List
Use Array .map
Not a for loop
Give each item a unique key
Avoid using array index as the key
InterviewBit

Example of a list using key -

```
const ids = [1,2,3,4,5];
const listElements = ids.map((id)=>{
return(
<li key={id.toString()}>
  {id}
</li>
)
})
```

Importance of keys -

- Keys help react identify which elements were added, changed or removed.
- Keys should be given to array elements for providing a unique identity for each element.
- Without keys, React does not understand the order or uniqueness of each element.
- With keys, React has an idea of which particular element was deleted, edited, and added.
- Keys are generally used for displaying a list of data coming from an API.

***Note- Keys used within arrays should be unique among siblings. They need not be globally unique.

6. What is JSX?

JSX stands for JavaScript XML. It allows us to write HTML inside JavaScript and place them in the DOM without using functions like appendChild( ) or createElement( ).

As stated in the official docs of React, JSX provides syntactic sugar for React.createElement( ) function.

Note- We can create react applications without using JSX as well.

Let’s understand **how JSX works**:

Without using JSX, we would have to create an element by the following process:

```
const text = React.createElement('p', {}, 'This is a text');

const container = React.createElement('div','{}',text );

ReactDOM.render(container,rootElement);
```

Using JSX, the above code can be simplified:

```
const container = (

<div>

  <p>This is a text</p>

</div>

);

ReactDOM.render(container,rootElement);
```

As one can see in the code above, we are directly using HTML inside JavaScript.

7. What are the differences between functional and class components?

Before the introduction of Hooks in React, functional components were called stateless components and were behind class components on a feature basis. After the introduction of Hooks, functional components are equivalent to class components.

Although functional components are the new trend, the react team insists on keeping class components in React. Therefore, it is important to know how these components differ.

On the following basis let’s compare functional and class components:

- **Declaration**

Functional components are nothing but JavaScript functions and therefore can be declared using an arrow function or the function keyword:

```
  function card(props){

   return(
    <div className="main-container">
      <h2>Title of the card</h2>
    </div>
  )
 }
 const card = (props) =>{
  return(
    <div className="main-container">
      <h2>Title of the card</h2>
    </div>
  )
 }
```

Class components, on the other hand, are declared using the ES6 class:

```
class Card extends React.Component{
 constructor(props){
    super(props);
  }
   render(){
     return(
       <div className="main-container">
         <h2>Title of the card</h2>
       </div>
     )
   }
  }
```

- **Handling props**

  Let's render the following component with props and analyse how functional and class components handle props:

```
<Student Info name="Vivek" rollNumber="23" />
```

In functional components, the handling of props is pretty straightforward. Any prop provided as an argument to a functional component can be directly used inside HTML elements:

```
function StudentInfo(props){
  return(
    <div className="main">
      <h2>{props.name}</h2>
      <h4>{props.rollNumber}</h4>
    </div>
  )
}
```

In the case of class components, props are handled in a different way:

```
class StudentInfo extends React.Component{
  constructor(props){
    super(props);
   }
   render(){
     return(
       <div className="main">
         <h2>{this.props.name}</h2>
         <h4>{this.props.rollNumber}</h4>
       </div>
     )
   }
  }
```

As we can see in the code above, **this** keyword is used in the case of class components.

- **Handling state**

  Functional components use React hooks to handle state. It uses the useState hook to set the state of a variable inside the component:

```
function ClassRoom(props){
  let [studentsCount,setStudentsCount] = useState(0);
  const addStudent = () => {
    setStudentsCount(++studentsCount);
  }
  return(
    <div>
      <p>Number of students in class room: {studentsCount}</p>
      <button onClick={addStudent}>Add Student</button>
    </div>
  )
  }
```

Since useState hook returns an array of two items, the first item contains the current state, and the second item is a function used to update the state.

In the code above, using array destructuring we have set the variable name to studentsCount with a current value of "0" and setStudentsCount is the function that is used to update the state.

For reading the state, we can see from the code above, the variable name can be directly used to read the current state of the variable.

We cannot use React Hooks inside class components, therefore state handling is done very differently in a class component:

Let's take the same above example and convert it into a class component:

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

            this.addStudent = this.addStudent.bind(this);
         }

            addStudent(){
            this.setState((prevState)=>{
               return {studentsCount: prevState.studentsCount++}
            });
```

```
      }


        render(){
         return(
           <div>
             <p>Number of students in class room: {this.state.studentsCount}</p>
             <button onClick={this.addStudent}>Add Student</button>
           </div>
         )
       }
      }
```

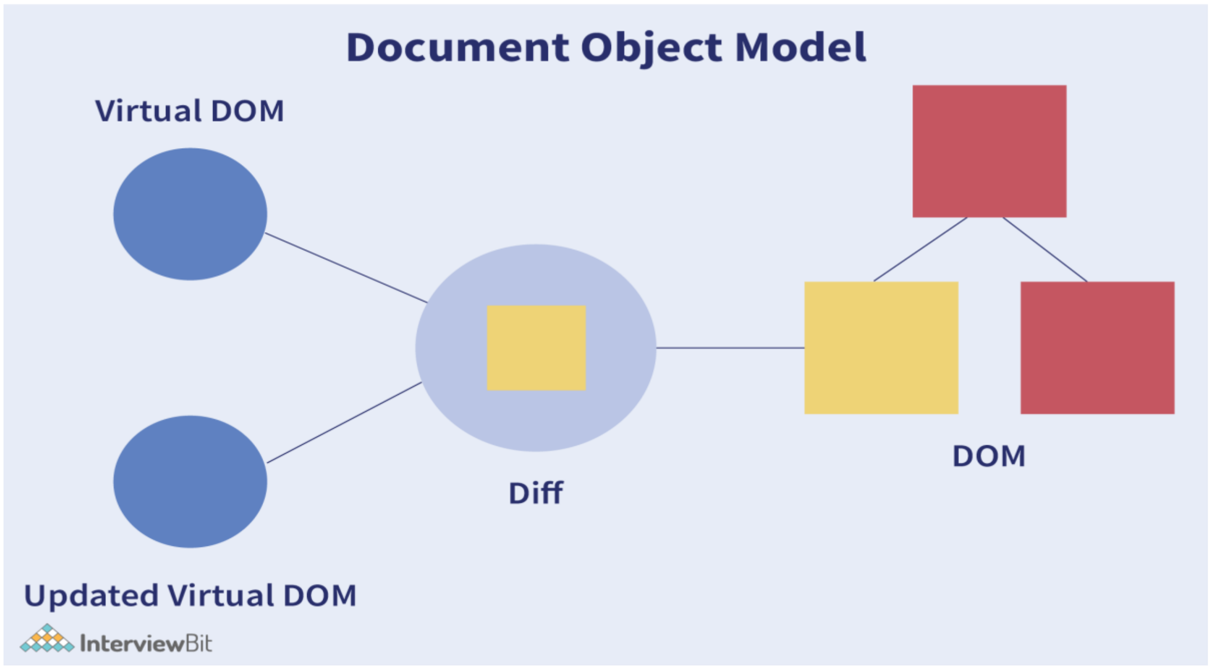
In the code above, we see we are using **this.state** to add the variable studentsCount and setting the value to “0”.

For reading the state, we are using **this.state.studentsCount**.

For updating the state, we need to first bind the addStudent function to **this**. Only then, we will be able to use the **setState** function which is used to update the state.

8. What is the virtual DOM? How does react use the virtual DOM to render the UI?

As stated by the react team, virtual DOM is a concept where a virtual representation of the real DOM is kept inside the memory and is synced with the real DOM by a library such as ReactDOM.



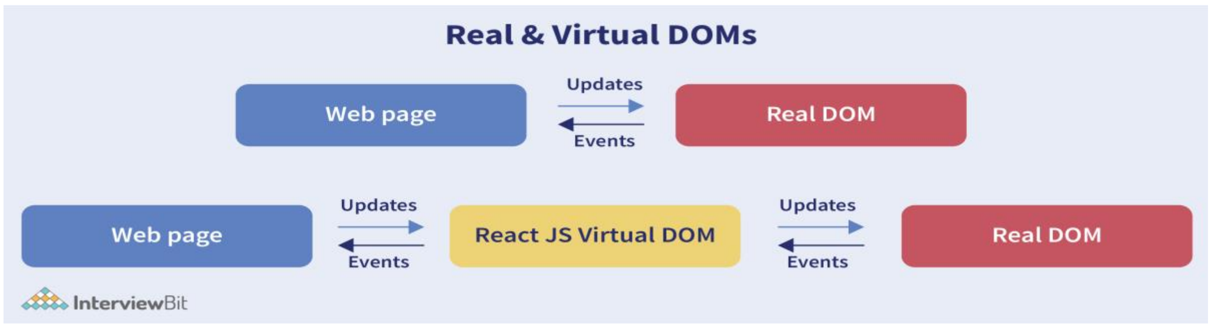
Why was virtual DOM introduced?

DOM manipulation is an integral part of any web application, but DOM manipulation is quite slow when compared to other operations in JavaScript. The efficiency of the application gets affected when several DOM manipulations are being done. Most JavaScript frameworks update the entire DOM even when a small part of the DOM changes.

For example, consider a list that is being rendered inside the DOM. If one of the items in the list changes, the entire list gets rendered again instead of just rendering the item that was changed/updated. This is called inefficient updating.

To address the problem of inefficient updating, the react team introduced the concept of virtual DOM.

How does it work?



For every DOM object, there is a corresponding virtual DOM object(copy), which has the same properties. The main difference between the real DOM object and the virtual DOM object is that any changes in the virtual DOM object will not reflect on the screen directly. Consider a virtual DOM object as a blueprint of the real DOM object. Whenever a JSX element gets rendered, every virtual DOM object gets updated.

**Note- One may think updating every virtual DOM object might be inefficient, but that’s not the case. Updating the virtual DOM is much faster than updating the real DOM since we are just updating the blueprint of the real DOM.

React uses two virtual DOMs to render the user interface. One of them is used to store the current state of the objects and the other to store the previous state of the objects. Whenever the virtual DOM gets updated, react compares the two virtual DOMs and gets to know about which virtual DOM objects were updated. After knowing which objects were updated, react renders only those objects inside the real DOM instead of rendering the complete real DOM. This way, with the use of virtual DOM, react solves the problem of inefficient updating.

9. What are the differences between controlled and uncontrolled components?

Controlled and uncontrolled components are just different approaches to handling input from elements in react.

Feature	Uncontrolled	Controlled	Name attrs
One-time value retrieval (e.g. on submit)	✔	✔	✔
Validating on submit	✔	✔	✔
Field-level Validation	✕	✔	✔
Conditionally disabling submit button	✕	✔	✔
Enforcing input format	✕	✔	✔
several inputs for one piece of data	✕	✔	✔
dynamic inputs	✕	✔	🤔

- **Controlled component:** In a controlled component, the value of the input element is controlled by React. We store the state of the input element inside the code, and by using event-based callbacks, any changes made to the input element will be reflected in the code as well.

  When a user enters data inside the input element of a controlled component, onChange function gets triggered and inside the code, we check whether the value entered is valid or invalid. If the value is valid, we change the state and re-render the input element with the new value.

  Example of a controlled component:

```
function FormValidation(props) {
let [inputValue, setInputValue] = useState("");
let updateInput = e => {
  setInputValue(e.target.value);
};
return (
  <div>
    <form>
      <input type="text" value={inputValue} onChange={updateInput} />
    </form>
  </div>
);
}
```

As one can see in the code above, the value of the input element is determined by the state of the **inputValue** variable. Any changes made to the input element is handled by the **updateInput** function.

- **Uncontrolled component:** In an uncontrolled component, the value of the input element is handled by the DOM itself. Input elements inside uncontrolled components work just like normal HTML input form elements.

  The state of the input element is handled by the DOM. Whenever the value of the input element is changed, event-based callbacks are not called. Basically, react does not perform any action when there are changes made to the input element.

  Whenever use enters data inside the input field, the updated data is shown directly. To access the value of the input element, we can use **ref**.

  Example of an uncontrolled component:

```
function FormValidation(props) {
let inputValue = React.createRef();
let handleSubmit = e => {
  alert(`Input value: ${inputValue.current.value}`);
  e.preventDefault();
};
return (
  <div>
    <form onSubmit={handleSubmit}>
      <input type="text" ref={inputValue} />
      <button type="submit">Submit</button>
    </form>
  </div>
);
}
```

  As one can see in the code above, we are **not** using **onChange** function to govern the changes made to the input element. Instead, we are using **ref** to access the value of the input element.

10. What are props in React?

The props in React are the inputs to a component of React. They can be single-valued or objects having a set of values that will be passed to components of React during creation by using a naming convention that almost looks similar to HTML-tag attributes. We can say that props are the data passed from a parent component into a child component.

The main purpose of props is to provide different component functionalities such as:

- Passing custom data to the React component.
- Using through this.props.reactProp inside render() method of the component.
- Triggering state changes.

For example, consider we are creating an element with reactProp property as given below: <Element reactProp = "1" />
This reactProp name will be considered as a property attached to the native props object of React which already exists on each component created with the help of React library: props.reactProp;.

11. Explain React state and props.

Props	State
Immutable	Owned by its component
Has better performance	Locally scoped
Can be passed to child components	Writeable/Mutable
	has setState() method to modify properties
	Changes to state can be asynchronous
	can only be passed as props

- **React State**
  Every component in react has a built-in state object, which contains all the property values that belong to that component.
  In other words, the state object controls the behaviour of a component. Any change in the property values of the state object leads to the re-rendering of the component.

Note- State object is not available in functional components but, we can use React Hooks to add state to a functional component.

How to declare a state object?

Example:

```
class Car extends React.Component{
constructor(props){
  super(props);
  this.state = {
    brand: "BMW",
    color: "black"
  }
}
}
```

How to use and update the state object?

```
class Car extends React.Component {
constructor(props) {
  super(props);
  this.state = {
    brand: "BMW",
    color: "Black"
  };
}
changeColor() {
  this.setState(prevState => {
    return { color: "Red" };
  });
}
render() {
  return (
    <div>
      <button onClick={() => this.changeColor()}>Change Color</button>
      <p>{this.state.color}</p>
    </div>
  );
}
}
```

As one can see in the code above, we can use the state by calling **this.state.propertyName** and we can change the state object property using **setState** method.

- **React Props**

  Every React component accepts a single object argument called props (which stands for "properties"). These props can be passed to a component using HTML attributes and the component accepts these props as an argument.

  Using props, we can pass data from one component to another.

  Passing props to a component:

  While rendering a component, we can pass the props as an HTML attribute:

```
<Car brand="Mercedes"/>
```

  The component receives the props:

  In Class component:

```
class Car extends React.Component {
constructor(props) {
  super(props);
  this.state = {
    brand: this.props.brand,
    color: "Black"
  };
}
}
```

  In Functional component:

```
function Car(props) {
let [brand, setBrand] = useState(props.brand);
}
```

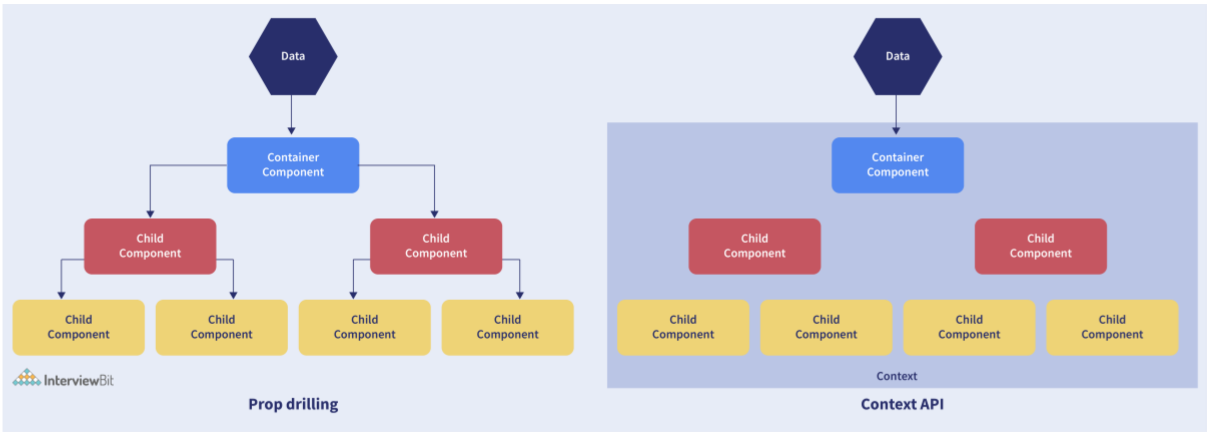
  Note- Props are read-only. They cannot be manipulated or changed inside a component.

12. Explain about types of side effects in React component.

There are two types of side effects in React component. They are:

- **Effects without Cleanup:** This side effect will be used in useEffect which does not restrict the browser from screen update. It also improves the responsiveness of an application. A few common examples are network requests, Logging, manual DOM mutations, etc.
- **Effects with Cleanup:** Some of the Hook effects will require the cleanup after updating of DOM is done. For example, if you want to set up an external data source subscription, it requires cleaning up the memory else there might be a problem of memory leak. It is a known fact that React will carry out the cleanup of memory when the unmounting of components happens. But the effects will run for each render() method rather than for any specific method. Thus we can say that, before execution of the effects succeeding time the React will also cleanup effects from the preceding render.

13. What is prop drilling in React?



Sometimes while developing React applications, there is a need to pass data from a component that is higher in the hierarchy to a component that is deeply nested. To pass data between such components, we pass props from a source component and keep passing the prop to the next component in the hierarchy till we reach the deeply nested component.

The **disadvantage** of using prop drilling is that the components that should otherwise be not aware of the data have access to the data.

14. What are error boundaries?

Introduced in version 16 of React, Error boundaries provide a way for us to catch errors that occur in the render phase.

- **What is an error boundary?**

Any component which uses one of the following lifecycle methods is considered an error boundary.
In what places can an error boundary detect an error?

1. Render phase
2. Inside a lifecycle method
3. Inside the constructor

Without using error boundaries:

```
class CounterComponent extends React.Component{
constructor(props){
  super(props);
  this.state = {
    counterValue: 0
  }
  this.incrementCounter = this.incrementCounter.bind(this);
}
incrementCounter(){
  this.setState(prevState => counterValue = prevState+1);
}
render(){
  if(this.state.counter === 2){
    throw new Error('Crashed');
  }
  return(
    <div>
      <button onClick={this.incrementCounter}>Increment Value</button>
      <p>Value of counter: {this.state.counterValue}</p>
    </div>
  )
}
}
```

In the code above, when the counterValue equals 2, we throw an error inside the render method.

When we are not using the error boundary, instead of seeing an error, we see a blank page. Since any error inside the render method leads to unmounting of the component. To display an error that occurs inside the render method, we use error boundaries.

With error boundaries: As mentioned above, error boundary is a component using one or both of the following methods: **static getDerivedStateFromError and componentDidCatch.**

Let’s create an error boundary to handle errors in the render phase:

```
class ErrorBoundary extends React.Component {
constructor(props) {
  super(props);
  this.state = { hasError: false };
}
static getDerivedStateFromError(error) {
  return { hasError: true };
}
 componentDidCatch(error, errorInfo) {
  logErrorToMyService(error, errorInfo);
}
render() {
  if (this.state.hasError) {
    return <h4>Something went wrong</h4>
  }
  return this.props.children;
}}
```

In the code above, **getDerivedStateFromError** function renders the fallback UI interface when the render method has an error.

componentDidCatch logs the error information to an error tracking service.

Now with the error boundary, we can render the CounterComponent in the following way:

```
<ErrorBoundary>
 <CounterComponent/>
</ErrorBoundary>
```

15. What is React Hooks?

React Hooks are the built-in functions that permit developers for using the state and lifecycle methods within React components. These are newly added features made available in React 16.8 version. Each lifecycle of a component is having 3 phases which include mount, unmount, and update. Along with that, components have properties and states. Hooks will allow using these methods by developers for improving the reuse of code with higher flexibility navigating the component tree.

Using Hook, all features of React can be used without writing class components. ***For example***, before React version 16.8, it required a class component for managing the state of a component. But now using the useState hook, we can keep the state in a functional component.

16. Explain React Hooks.

What are Hooks? Hooks are functions that let us "hook into" React state and lifecycle features from a **functional component.**

React Hooks **cannot** be used in class components. They let us write components without class.

Why were Hooks introduced in React?

React hooks were introduced in the 16.8 version of React. Previously, functional components were called stateless components. Only class components were used for state management and lifecycle methods. The need to change a functional component to a class component, whenever state management or lifecycle methods were to be used, led to the development of Hooks.

Example of a hook: **useState hook:**

In functional components, the useState hook lets us define a state for a component:

```
function Person(props) {

// We are declaring a state variable called name.

// setName is a function to update/change the value of name

let [name, setName] = useState('');

}
```

The state variable "name" can be directly used inside the HTML.

17. What are the rules that must be followed while using React Hooks?

There are 2 rules which must be followed while you code with Hooks:

- React Hooks must be called only at the top level. It is not allowed to call them inside the nested functions, loops, or conditions.
- It is allowed to call the Hooks only from the React Function Components.

18. What is the use of useEffect React Hooks?

The useEffect React Hook is used for performing the side effects in functional components. With the help of useEffect, you will inform React that your component requires something to be done after rendering the component or after a state change. The function you have passed(can be referred to as "effect") will be remembered by React and call afterwards the performance of DOM updates is over. Using this, we can perform various calculations such as data fetching, setting up document title, manipulating DOM directly, etc, that don't target the output value. The useEffect hook will run by default after the first render and also after each update of the component. React will guarantee that the DOM will be updated by the time when the effect has run by it.

The useEffect React Hook will accept 2 arguments: useEffect(callback[, dependencies]);

Where the first argument callback represents the function having the logic of side-effect and it will be immediately executed after changes were being pushed to DOM. The second argument dependencies represent an optional array of dependencies. The useEffect() will execute the callback only if there is a change in dependencies in between renderings.

Example:

```
import { useEffect } from 'react';

function WelcomeGreetings({ name }) {

 const msg = `Hi, ${name}!`;     // Calculates output

 useEffect(() => {

   document.title = `Welcome to you ${name}`;    // Side-effect!

 }, [name]);

 return <div>{msg}</div>;         // Calculates output

}
```

The above code will update the document title which is considered to be a side-effect as it will not calculate the component output directly. That is why updating of document title has been placed in a callback and provided to useEffect().

Consider you don't want to execute document title update each time on rendering of WelcomeGreetings component and you want it to be executed only when the name prop changes then you need to supply name as a dependency to useEffect(callback, [name]).

19. Why do React Hooks make use of refs?

Earlier, refs were only limited to class components but now it can also be accessible in function components through the useRef Hook in React.

The refs are used for:

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

20. What are Custom Hooks?

A Custom Hook is a function in Javascript whose name begins with ‘use’ and which calls other hooks. It is a part of React v16.8 hook update and permits you for reusing the stateful logic without any need for component hierarchy restructuring.

In almost all of the cases, custom hooks are considered to be sufficient for replacing render props and HoCs (Higher-Order components) and reducing the amount of nesting required. Custom Hooks will allow you for avoiding multiple layers of abstraction or wrapper hell that might come along with Render Props and HoCs.

The **disadvantage** of Custom Hooks is it cannot be used inside of the classes.

21. Explain Strict Mode in React.

StrictMode is a tool added in **version 16.3** of React to highlight potential problems in an application. It performs additional checks on the application.

```
function App() {
 return (
   <React.StrictMode>
     <div classname="App">
       <Header/>
       <div>
         Page Content
       </div>
       <Footer/>
     </div>
   </React.StrictMode>
 );
}
```

To enable StrictMode, <React.StrictMode> tags need to be added inside the application:

```
import React from "react";
import ReactDOM from "react-dom";
import App from "./App";
const rootElement = document.getElementById("root");
ReactDOM.render(
<React.StrictMode>
  <App />
</React.StrictMode>,
rootElement
);
```

StrictMode currently helps with the following issues:

- **Identifying components with unsafe lifecycle methods:**
  - Certain lifecycle methods are unsafe to use in asynchronous react applications. With the use of third-party libraries, it becomes difficult to ensure that certain lifecycle methods are not used.
  - StrictMode helps in providing us with a warning if any of the class components use an unsafe lifecycle method.
- **Warning about the usage of legacy string API:**
  - If one is using an older version of React, **callback ref** is the recommended way to manage **refs** instead of using the **string refs**. StrictMode gives a warning if we are using **string refs** to manage refs.
- **Warning about the usage of findDOMNode:**
  - Previously, findDOMNode( ) method was used to search the tree of a DOM node. This method is deprecated in React. Hence, the StrictMode gives us a warning about the usage of this method.
- **Warning about the usage of legacy context API (because the API is error-prone).**

22. How to prevent re-renders in React?

- **Reason for re-renders in React:**
  - Re-rendering of a component and its child components occur when props or the state of the component has been changed.
  - Re-rendering components that are not updated, affects the performance of an application.
- **How to prevent re-rendering:**

Consider the following components:

```
class Parent extends React.Component {
```

```
state = { messageDisplayed: false };
componentDidMount() {
  this.setState({ messageDisplayed: true });
}
render() {
  console.log("Parent is getting rendered");
  return (
    <div className="App">
      <Message />
    </div>
  );
}
}
class Message extends React.Component {
constructor(props) {
  super(props);
  this.state = { message: "Hello, this is vivek" };
}
render() {
  console.log("Message is getting rendered");
  return (
    <div>
      <p>{this.state.message}</p>
    </div>
  );
}
}
```

- The **Parent** component is the parent component and the **Message** is the child component. Any change in the parent component will lead to re-rendering of the child component as well. To prevent the re-rendering of child components, we use the shouldComponentUpdate( ) method:

**Note- Use shouldComponentUpdate( ) method only when you are sure that it's a static component.

```
class Message extends React.Component {
constructor(props) {
  super(props);
  this.state = { message: "Hello, this is vivek" };
}
shouldComponentUpdate() {
  console.log("Does not get rendered");
  return false;
}
render() {
  console.log("Message is getting rendered");
  return (
    <div>
      <p>{this.state.message}</p>
    </div>
  );
}
}
```

As one can see in the code above, we have returned **false** from the shouldComponentUpdate( ) method, which prevents the child component from re-rendering.

23. What are the different ways to style a React component?

There are many different ways through which one can style a React component. Some of the ways are :

- **Inline Styling:** We can directly style an element using inline style attributes. Make sure the value of style is a JavaScript object:

```
class RandomComponent extends React.Component {
 render() {
   return (
     <div>
```

```
      <h3 style={{ color: "Yellow" }}>This is a heading</h3>
      <p style={{ fontSize: "32px" }}>This is a paragraph</p>
    </div>
  );
 }
}
```

- **Using JavaScript object:** We can create a separate JavaScript object and set the desired style properties. This object can be used as the value of the inline style attribute.

```
class RandomComponent extends React.Component {
 paragraphStyles = {
  color: "Red",
  fontSize: "32px"
 };

 headingStyles = {
  color: "blue",
  fontSize: "48px"
 };

 render() {
  return (
    <div>
      <h3 style={this.headingStyles}>This is a heading</h3>
      <p style={this.paragraphStyles}>This is a paragraph</p>
    </div>
  );
 }
}
```

- **CSS Stylesheet:** We can create a separate CSS file and write all the styles for the component inside that file. This file needs to be imported inside the component file.

```
import './RandomComponent.css';


class RandomComponent extends React.Component {
 render() {
   return (
     <div>
       <h3 className="heading">This is a heading</h3>
       <p className="paragraph">This is a paragraph</p>
     </div>
   );
 }
}
```

- **CSS Modules:** We can create a separate CSS module and import this module inside our component. Create a file with ".module.css"' extension, styles.module.css:

```
.paragraph{
 color:"red";
 border:1px solid black;
}
```

We can import this file inside the component and use it:

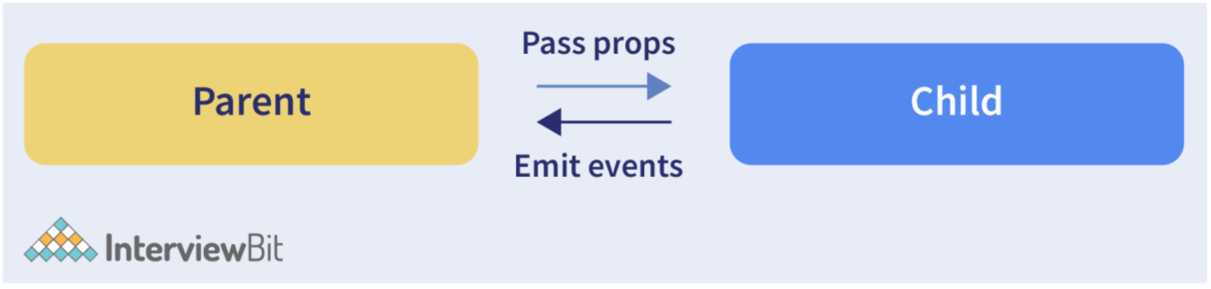
```
import styles from  './styles.module.css';


class RandomComponent extends React.Component {
 render() {
   return (
     <div>
       <h3 className="heading">This is a heading</h3>
       <p className={styles.paragraph} >This is a paragraph</p>
     </div>
   );
 }
}
```

24. Name a few techniques to optimize React app performance.

There are many ways through which one can optimize the performance of a React app, let's have a look at some of them:

- **Using useMemo( ) -**
  - It is a React hook that is used for caching CPU-Expensive functions.
  - Sometimes in a React app, a CPU-Expensive function gets called repeatedly due to re-renders of a component, which can lead to slow rendering. useMemo( ) hook can be used to cache such functions. By using useMemo( ), the CPU-Expensive function gets called only when it is needed.
- **Using React.PureComponent -**
  - It is a base component class that checks the state and props of a component to know whether the component should be updated.
  - Instead of using the simple React.Component, we can use React.PureComponent to reduce the re-renders of a component unnecessarily.
- **Maintaining State Colocation -**
  - This is a process of moving the state as close to where you need it as possible.
  - Sometimes in React app, we have a lot of unnecessary states inside the parent component which makes the code less readable and harder to maintain. Not to forget, having many states inside a single component leads to unnecessary re-renders for the component.
  - It is better to shift states which are less valuable to the parent component, to a separate component.
- **Lazy Loading -**
  - It is a technique used to reduce the load time of a React app. Lazy loading helps reduce the risk of web app performances to a minimum.

25. How to pass data between react components?



Parent Component to Child Component (using props)

With the help of props, we can send data from a parent to a child component.

How do we do this?

Consider the following Parent Component:

```
import ChildComponent from "./Child";
   function ParentComponent(props) {
    let [counter, setCounter] = useState(0);


    let increment = () => setCounter(++counter);


    return (
      <div>
        <button onClick={increment}>Increment Counter</button>
        <ChildComponent counterValue={counter} />
      </div>
    );
   }
```

As one can see in the code above, we are rendering the child component inside the parent component, by providing a prop called counterValue. The value of the counter is being passed from the parent to the child component.

We can use the data passed by the parent component in the following way:

```
function ChildComponent(props) {
return (
  <div>
    <p>Value of counter: {props.counterValue}</p>
  </div>
);
}
```

We use the **props.counterValue** to display the data passed on by the parent component.

Child Component to Parent Component (using callbacks)

This one is a bit tricky. We follow the steps below:

- Create a callback in the parent component which takes in the data needed as a parameter.
- Pass this callback as a prop to the child component.
- Send data from the child component using the callback.

We are considering the same example above but in this case, we are going to pass the updated counterValue from child to parent.

Step1 and Step2: Create a callback in the parent component, pass this callback as a prop.

```
function ParentComponent(props) {
let [counter, setCounter] = useState(0);
let callback = valueFromChild => setCounter(valueFromChild);
return (
  <div>
    <p>Value of counter: {counter}</p>
    <ChildComponent callbackFunc={callback} counterValue={counter} />
  </div>
);
}
```

As one can see in the code above, we created a function called callback which takes in the data received from the child component as a parameter.

Next, we passed the function callback as a prop to the child component.

Step3: Pass data from the child to the parent component.

```
function ChildComponent(props) {
let childCounterValue = props.counterValue;
return (
  <div>
    <button onClick={() => props.callbackFunc(++childCounterValue)}>
      Increment Counter
    </button>
  </div>
);
}
```

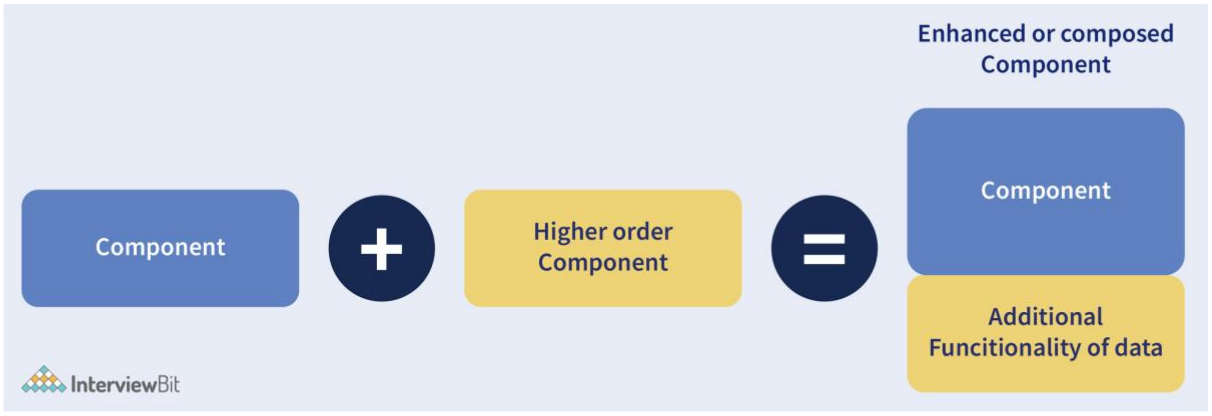
In the code above, we have used the props.counterValue and set it to a variable called childCounterValue.

Next, on button click, we pass the incremented childCounterValue to the **props.callbackFunc**.

This way, we can pass data from the child to the parent component.

26. What are Higher Order Components?

Simply put, Higher-Order Component(HOC) is a function that takes in a component and returns a new component.


Enhanced or composed Component
Component
Higher order Component
Component
Additional Funcitionality of data
InterviewBit

When do we need a Higher Order Component?

While developing React applications, we might develop components that are quite similar to each other with minute differences. In most cases, developing similar components might not be an issue but, while developing larger applications we need to keep our code **DRY**, therefore, we want an **abstraction** that allows us to define this logic in a single place and share it across components. HOC allows us to create that abstraction.

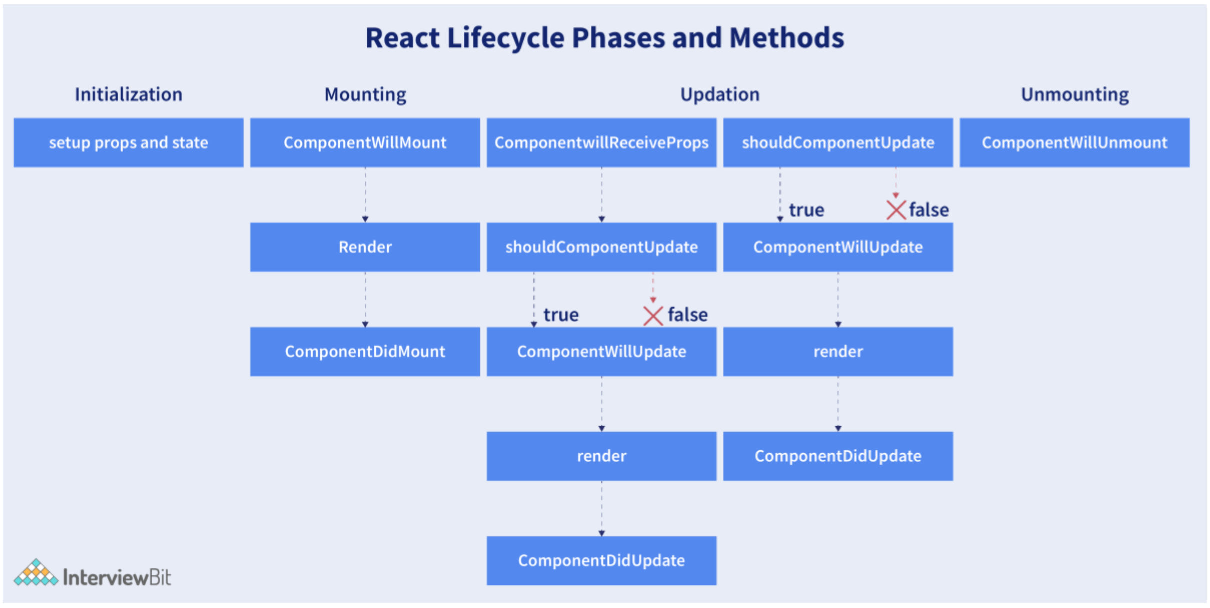
27. What are the different phases of the component lifecycle?

There are four different phases in the lifecycle of React component. They are:

- **Initialization:** During this phase, React component will prepare by setting up the default props and initial state for the upcoming tough journey.
- **Mounting:** Mounting refers to putting the elements into the browser DOM. Since React uses VirtualDOM, the entire browser DOM which has been currently rendered would not be refreshed. This phase includes the lifecycle methods componentWillMount and componentDidMount.
- **Updating:** In this phase, a component will be updated when there is a change in the state or props of a component. This phase will have lifecycle methods

like componentWillUpdate, shouldComponentUpdate, render, and componentDidUpdate.

- **Unmounting:** In this last phase of the component lifecycle, the component will be removed from the DOM or will be unmounted from the browser DOM. This phase will have the lifecycle method named componentWillUnmount.



28. What are the lifecycle methods of React?

React lifecycle hooks will have the methods that will be automatically called at different phases in the component lifecycle and thus it provides good control over what happens at the invoked point. It provides the power to effectively control and manipulate what goes on throughout the component lifecycle.

For example, if you are developing the YouTube application, then the application will make use of a network for buffering the videos and it consumes the power of the battery (assume only these two). After playing the video if the user switches to any other application, then you should make sure that the resources like network and battery are being used most efficiently. You can stop or pause the video buffering which in turn stops the battery and network usage when the user switches to another application after video play.

So we can say that the developer will be able to produce a quality application with the help of lifecycle methods and it also helps developers to make sure to plan what and how to do it at different points of birth, growth, or death of user interfaces.

The various lifecycle methods are:

- constructor(): This method will be called when the component is initiated before anything has been done. It helps to set up the initial state and initial values.
- getDerivedStateFromProps(): This method will be called just before element(s) rendering in the DOM. It helps to set up the state object depending on the initial props. The getDerivedStateFromProps() method will have a state as an argument and it

returns an object that made changes to the state. This will be the first method to be called on an updating of a component.

- render(): This method will output or re-render the HTML to the DOM with new changes. The render() method is an essential method and will be called always while the remaining methods are optional and will be called only if they are defined.
- componentDidMount(): This method will be called after the rendering of the component. Using this method, you can run statements that need the component to be already kept in the DOM.
- shouldComponentUpdate(): The Boolean value will be returned by this method which will specify whether React should proceed further with the rendering or not. The default value for this method will be True.
- getSnapshotBeforeUpdate(): This method will provide access for the props as well as for the state before the update. It is possible to check the previously present value before the update, even after the update.
- componentDidUpdate(): This method will be called after the component has been updated in the DOM.
- componentWillUnmount(): This method will be called when the component removal from the DOM is about to happen.

29. Does React Hook work with static typing?

Static typing refers to the process of code check during the time of compilation for ensuring all variables will be statically typed. React Hooks are functions that are designed to make sure about all attributes must be statically typed. For enforcing stricter static typing within our code, we can make use of the React API with custom Hooks.

30. Explain about types of Hooks in React.

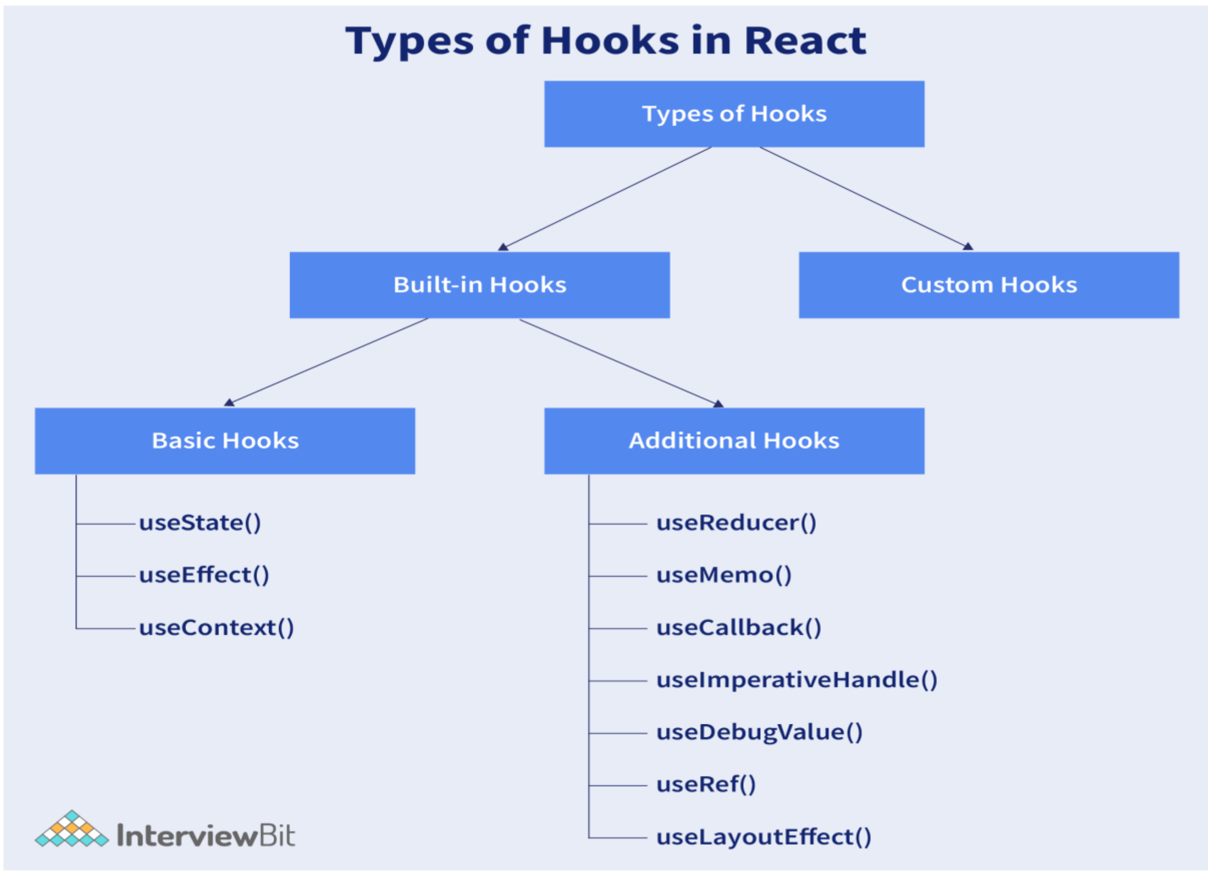
There are two types of Hooks in React. They are:

1. Built-in Hooks: The built-in Hooks are divided into 2 parts as given below:

- **Basic Hooks:**
  - useState(): This functional component is used to set and retrieve the state.
  - useEffect(): It enables for performing the side effects in the functional components.
  - useContext(): It is used for creating common data that is to be accessed by the components hierarchy without having to pass the props down to each level.
- **Additional Hooks:**
  - useReducer() : It is used when there is a complex state logic that is having several sub-values or when the upcoming state is dependent on the previous state. It will also enable you to optimization of component performance that will trigger deeper updates as it is permitted to pass the dispatch down instead of callbacks.

- useMemo() : This will be used for recomputing the memoized value when there is a change in one of the dependencies. This optimization will help for avoiding expensive calculations on each render.
- useCallback() : This is useful while passing callbacks into the optimized child components and depends on the equality of reference for the prevention of unneeded renders.
- useImperativeHandle(): It will enable modifying the instance that will be passed with the ref object.
- useDebugValue(): It is used for displaying a label for custom hooks in React DevTools.
- useRef() : It will permit creating a reference to the DOM element directly within the functional component.
- useLayoutEffect(): It is used for the reading layout from the DOM and re-rendering synchronously.

2. Custom Hooks: A custom Hook is basically a function of JavaScript. The Custom Hook working is similar to a regular function. The "use" at the beginning of the Custom Hook Name is required for React to understand that this is a custom Hook and also it will describe that this specific function follows the rules of Hooks. Moreover, developing custom Hooks will enable you for extracting component logic from within reusable functions.



31. Differentiate React Hooks vs Classes.

React Hooks	Classes
It is used in functional components of React.	It is used in class-based components of React.
It will not require a declaration of any kind of constructor.	It is necessary to declare the constructor inside the class component.
It does not require the use of this keyword in state declaration or modification.	Keyword this will be used in state declaration (this.state) and in modification (this.setState()).
It is easier to use because of the useState functionality.	No specific function is available for helping us to access the state and its corresponding setState variable.
React Hooks can be helpful in implementing Redux and context API.	Because of the long setup of state declarations, class states are generally not preferred.

32. How does the performance of using Hooks will differ in comparison with the classes?

- React Hooks will avoid a lot of overheads such as the instance creation, binding of events, etc., that are present with classes.
- Hooks in React will result in smaller component trees since they will be avoiding the nesting that exists in HOCs (Higher Order Components) and will render props which result in less amount of work to be done by React.

33. Do Hooks cover all the functionalities provided by the classes?

Our goal is for Hooks to cover all the functionalities for classes at its earliest. There are no Hook equivalents for the following methods that are not introduced in Hooks yet:

- getSnapshotBeforeUpdate()
- getDerivedStateFromError()
- componentDidCatch()

Since it is an early time for Hooks, few third-party libraries may not be compatible with Hooks at present, but they will be added soon.

34. What is React Router?

React Router refers to the standard library used for routing in React. It permits us for building a single-page web application in React with navigation without even refreshing the page when the user navigates. It also allows to change the browser URL and will keep the user interface in sync with the URL. React Router will make use of the component structure for calling the components, using which appropriate information can be shown. Since React is a component-based framework, it's not necessary to include and use this package. Any other compatible routing library would also work with React.

The major components of React Router are given below:

- **BrowserRouter:** It is a router implementation that will make use of the HTML5 history API (pushState, popstate, and event replaceState) for keeping your UI to be in sync with the URL. It is the parent component useful in storing all other components.
- **Routes:** It is a newer component that has been introduced in the React v6 and an upgrade of the component.
- **Route:** It is considered to be a conditionally shown component and some UI will be rendered by this whenever there is a match between its path and the current URL.
- **Link:** It is useful in creating links to various routes and implementing navigation all over the application. It works similarly to the anchor tag in HTML.

35. Can React Hook replaces Redux?

The React Hook cannot be considered as a replacement for Redux (It is an open-source, JavaScript library useful in managing the application state) when it comes to the management of the global application state tree in large complex applications, even though the React will provide a useReducer hook that manages state transitions similar to Redux. Redux is very useful at a lower level of component hierarchy to handle the pieces of a state which are dependent on each other, instead of a declaration of multiple useState hooks.

In commercial web applications which is larger, the complexity will be high, so using only React Hook may not be sufficient. Few developers will try to tackle the challenge with the help of React Hooks and others will combine React Hooks with the Redux.

36. Explain conditional rendering in React.

Conditional rendering refers to the dynamic output of user interface markups based on a condition state. It works in the same way as JavaScript conditions. Using conditional rendering, it is possible to toggle specific application functions, API data rendering, hide or show elements, decide permission levels, authentication handling, and so on.

There are different approaches for implementing conditional rendering in React. Some of them are:

- Using if-else conditional logic which is suitable for smaller as well as for medium-sized applications
- Using ternary operators, which takes away some amount of complication from if-else statements
- Using element variables, which will enable us to write cleaner code.

37. Explain how to create a simple React Hooks example program.

I will assume that you are having some coding knowledge about JavaScript and have installed Node on your system for creating a below given React Hook program. An installation of Node comes along with the command-line tools: npm and npx, where npm is useful to install the packages into a project and npx is useful in running commands of Node from the command line. The npx looks in the current project folder for checking whether a command has been installed there. When the command is not available on your computer, the npx will look in the npmjs.com repository, then the latest version of the command script will be loaded and will run without locally installing it. This feature is useful in creating a skeleton React application within a few key presses.

Open the Terminal inside the folder of your choice, and run the following command:

```
npx create-react-app react-items-with-hooks
```

Here, the create-react-app is an app initializer created by Facebook, to help with the easy and quick creation of React application, providing options to customize it while creating the application? The above command will create a new folder named react-items-with-hooks and it will be initialized with a basic React application. Now, you will be able to open the project in your favourite IDE. You can see an src folder inside the project along with the main application component App.js. This file is having a single function App() which will return an element and it will make use of an extended JavaScript syntax(JSX) for defining the component.

JSX will permit you for writing HTML-style template syntax directly into the JavaScript file. This mixture of JavaScript and HTML will be converted by React toolchain into pure JavaScript that will render the HTML element.

It is possible to define your own React components by writing a function that will return a JSX element. You can try this by creating a new file src/SearchItem.jsand put the following code into it.

```
import React from 'react';

export function SearchItem() {

 return (

   <div>

     <div className="search-input">

       <input type="text" placeholder="SearchItem"/>
```

```
    </div>
    <h1 className="h1">Search Results</h1>
    <div className="items">
      <table>
        <thead>
          <tr>
            <th className="itemname-col">Item Name</th>
            <th className="price-col">Price</th>
            <th className="quantity-col">Quantity</th>
          </tr>
        </thead>
        <tbody></tbody>
      </table>
    </div>
  </div>
 );
}
```

This is all about how you can create a component. It will only display the empty table and doesn't do anything. But you will be able to use the Search component in the application. Open the file src/App.js and add the import statement given below to the top of the file.

```
import { SearchItem } from './SearchItem';
```

Now, from the logo.svg, import will be removed and then contents of returned value in the function App() will be replaced with the following code:

```
<div className="App">
 <header>
   Items with Hooks
 </header>
 <SearchItem/>
</div>
```

You can notice that the element <SearchItem/> has been used just similar to an HTML element. The JSX syntax will enable for including the components in this approach directly within the JavaScript code. Your application can be tested by running the below-given command in your terminal.

```
npm start
```

This command will compile your application and open your default browser into http://localhost:4000. This command can be kept on running when code development is in progress to make sure that the application is up-to-date, and also this browser page will be reloaded each time you modify and save the code.

This application will work finely, but it doesn't look nice as it doesn't react to any input from the user. You can make it more interactive by adding a state with React Hooks, adding authentication, etc.

38. How to create a switching component for displaying different pages?

A switching component refers to a component that will render one of the multiple components. We should use an object for mapping prop values to components.

A below-given example will show you how to display different pages based on page prop using switching component:

```
import HomePage from './HomePage'
import AboutPage from './AboutPage'
import FacilitiesPage from './FacilitiesPage'
import ContactPage from './ContactPage'
import HelpPage from './HelpPage'
const PAGES = {
 home: HomePage,
 about: AboutPage,
 facilitiess: FacilitiesPage,
 contact: ContactPage
 help: HelpPage
}
const Page = (props) => {
 const Handler = PAGES[props.page] || HelpPage
 return <Handler {...props} />
}
// The PAGES object keys can be used in the prop types for catching errors during dev-time.
```

```
Page.propTypes = {
 page: PropTypes.oneOf(Object.keys(PAGES)).isRequired
}
```

39. How to re-render the view when the browser is resized?

It is possible to listen to the resize event in **componentDidMount()** and then update the width and height dimensions. It requires the removal of the event listener in the **componentWillUnmount()** method.

Using the below-given code, we can render the view when the browser is resized.

```
class WindowSizeDimensions extends React.Component {
 constructor(props){
   super(props);
   this.updateDimension = this.updateDimension.bind(this);
 }

 componentWillMount() {
   this.updateDimension()
 }
 componentDidMount() {
   window.addEventListener('resize', this.updateDimension)
 }
 componentWillUnmount() {
   window.removeEventListener('resize', this.updateDimension)
 }
 updateDimension() {
   this.setState({width: window.innerWidth, height: window.innerHeight})
 }
 render() {
   return <span>{this.state.width} x {this.state.height}</span>
 }
}
```

40. How to pass data between sibling components using React router?

Passing data between sibling components of React is possible using React Router with the help of history.push and match.params.

In the code given below, we have a Parent component AppDemo.js and have two Child Components HomePage and AboutPage. Everything is kept inside a Router by using React-router Route. It is also having a route for /about/{params} where we will pass the data.

```
import React, { Component } from ‘react’;
class AppDemo extends Component {
render() {
  return (
    <Router>
      <div className="AppDemo">
      <ul>
        <li>
          <NavLink to="/"  activeStyle={{ color:'blue' }}>Home</NavLink>
        </li>
        <li>
          <NavLink to="/about"  activeStyle={{ color:'blue' }}>About
 </NavLink>
        </li>
 </ul>
             <Route path="/about/:aboutId" component={AboutPage} />
             <Route path="/about" component={AboutPage} />
             <Route path="/" component={HomePage} />
      </div>
    </Router>
  );
}
}
export default AppDemo;
```

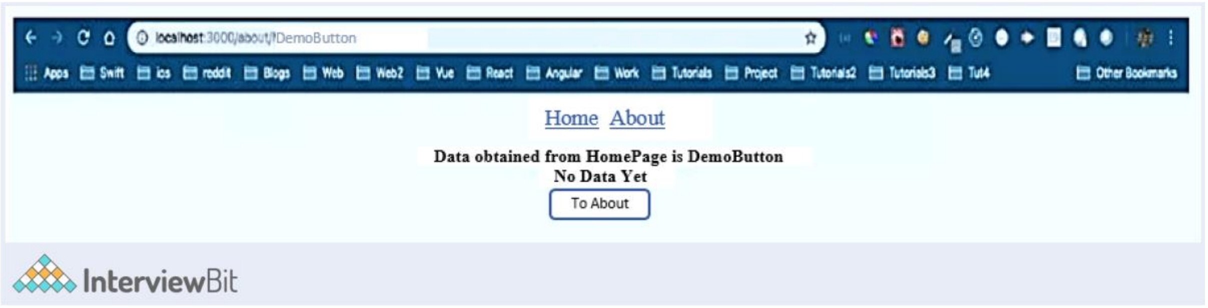
The HomePage is a functional component with a button. On button click, we are using props.history.push('/about/' + data) to programmatically navigate into /about/data.

```
export default function HomePage(props) {
 const handleClick = (data) => {
  props.history.push('/about/' + data);
 }
return (
  <div>
    <button onClick={() => handleClick('DemoButton')}>To About</button>
  </div>
)
}
```

Also, the functional component AboutPage will obtain the data passed by props.match.params.aboutId.

```
export default function AboutPage(props) {
if(!props.match.params.aboutId) {
    return <div>No Data Yet</div>
}
return (
  <div>
    {`Data obtained from HomePage is ${props.match.params.aboutId}`}
  </div>
)
}
```

After button click in the HomePage the page will look like below:


localhost:3000/about/DemoButton

Home About

Data obtained from HomePage is DemoButton
No Data Yet

41. How to perform automatic redirect after login?

The react-router package will provide the component <Redirect> in React Router. Rendering of a <Redirect> component will navigate to a newer location. In the history stack, the current location will be overridden by the new location just like the server-side redirects.

```
import React, { Component } from 'react'
import { Redirect } from 'react-router'
export default class LoginDemoComponent extends Component {
 render() {
   if (this.state.isLoggedIn === true) {
     return <Redirect to="/your/redirect/page" />
   } else {
     return <div>{'Please complete login'}</div>
   }
 }
}
```

1. Differentiate between Real DOM and Virtual DOM.

Real DOM vs Virtual DOM

Real DOM	**Virtual DOM**
1. It updates slow.	1. It updates faster.
2. Can directly update HTML.	2. Can’t directly update HTML.
3. Creates a new DOM if element updates.	3. Updates the JSX if element updates.
4. DOM manipulation is very expensive.	4. DOM manipulation is very easy.
5. Too much of memory wastage.	5. No memory wastage.

2. What is React?

- React is a front-end JavaScript library developed by Facebook in 2011.
- It follows the component based approach which helps in building reusable UI components.
- It is used for developing complex and interactive web and mobile UI.
- Even though it was open-sourced only in 2015, it has one of the largest communities supporting it.

3. What are the features of React?

Major features of React are listed below:

i. It uses the **virtual DOM** instead of the real DOM.
ii. It uses **server-side rendering**.
iii. It follows **uni-directional data flow** or data binding.

4. List some of the major advantages of React.

Some of the major advantages of React are:

i. It increases the application's performance
ii. It can be conveniently used on the client as well as server side
iii. Because of JSX, code's readability increases
iv. React is easy to integrate with other frameworks like Meteor, Angular, etc
v. Using React, writing UI test cases become extremely easy

5. What are the limitations of React?

Limitations of React are listed below:

i. React is just a library, not a full-blown framework
ii. Its library is very large and takes time to understand
iii. It can be little difficult for the novice programmers to understand
iv. Coding gets complex as it uses inline templating and JSX

6. What is JSX?

JSX is a shorthand for JavaScript XML. This is a type of file used by React which utilizes the expressiveness of JavaScript along with HTML like template syntax. This makes the HTML file really easy to understand. This file makes applications robust and boosts its performance. Below is an example of JSX:

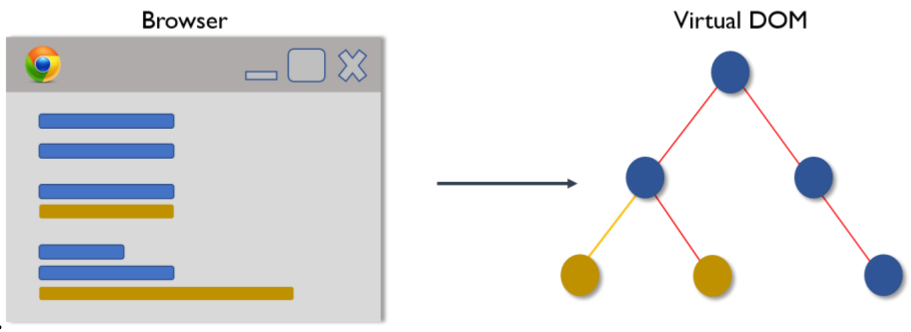
```
render(){
    return(

<div>

<h1> Hello World from Edureka!!</h1>

        </div>

   );
}
```

7. What do you understand by Virtual DOM? Explain its works.

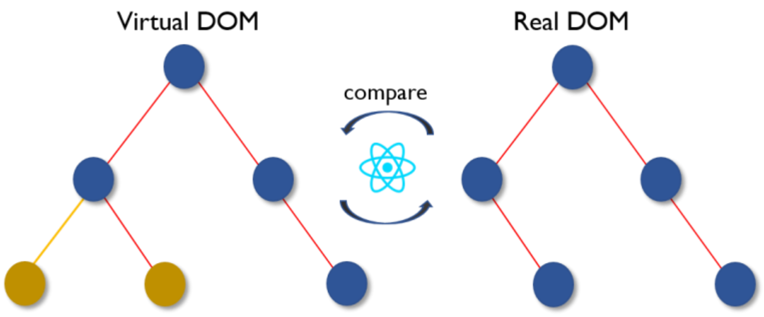
A virtual DOM is a lightweight JavaScript object which originally is just a copy of the real DOM. It is a node tree that lists the elements, their attributes and content as Objects and their properties. React's render function creates a node tree out of the React components. It then updates this tree in response to the mutations in the data model which is caused by various actions done by the user or by the system. Check out this Web developer course online to learn more about react.

This Virtual DOM works in three simple steps.

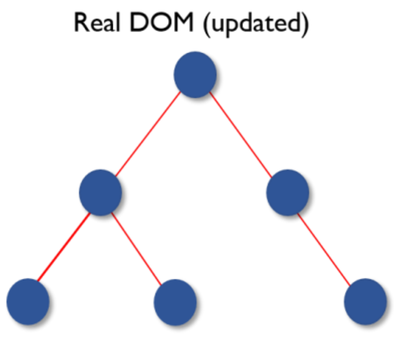
1. Whenever any underlying data changes, the entire UI is re-rendered in Virtual DOM representation.



2. Then the difference between the previous DOM representation and the new one is calculated.



3. Once the calculations are done, the real DOM will be updated with only the things that have actually changed.



8. Why can't browsers read JSX?

Browsers can only read JavaScript objects but JSX in not a regular JavaScript object. Thus to enable a browser to read JSX, first, we need to transform JSX file into a JavaScript object using JSX transformers like Babel and then pass it to the browser.

9. How different is React's ES6 syntax when compared to ES5?

Syntax has changed from ES5 to ES6 in the following aspects:

i. require vs import

```
// ES5
var React = require('react');

// ES6
import React from 'react';
```

ii. export vs exports

```
// ES5
module.exports = Component;

// ES6
export default Component;
```

iii. component and function

```
// ES5
var MyComponent = React.createClass({
    render: function() {
        return

<h3>Hello Edureka!</h3>
;
    }
});

// ES6
class MyComponent extends React.Component {
    render() {
        return

<h3>Hello Edureka!</h3>
;
    }
}
```

iv. props

```
// ES5
var App = React.createClass({
    propTypes: { name: React.PropTypes.string },
    render: function() {
        return

<h3>Hello, {this.props.name}!</h3>
;
    }
});

// ES6
class App extends React.Component {
    render() {
        return

<h3>Hello, {this.props.name}!</h3>
;
    }
}
```

v. state

```
// ES5
var App = React.createClass({
    getInitialState: function() {
        return { name: 'world' };
    },
    render: function() {
        return

<h3>Hello, {this.state.name}!</h3>
;
    }
});

// ES6
class App extends React.Component {
    constructor() {
        super();
        this.state = { name: 'world' };
    }
    render() {
        return

<h3>Hello, {this.state.name}!</h3>
;
  }
}
```

10. How is React different from Angular?

React vs Angular		
TOPIC	**REACT**	**ANGULAR**
1. ARCHITECTURE	Only the View of MVC	Complete MVC
2. RENDERING	Server-side rendering	Client-side rendering
3. DOM	Uses virtual DOM	Uses real DOM
4. DATA BINDING	One-way data binding	Two-way data binding
5. DEBUGGING	Compile time debugging	Runtime debugging
6. AUTHOR	Facebook	Google

11. "In React, everything is a component." Explain.

Components are the building blocks of a React application's UI. These components split up the entire UI into small independent and reusable pieces. Then it renders each of these components independent of each other without affecting the rest of the UI.

12. What is the purpose of render() in React.

Each React component must have a **render()** mandatorily. It returns a single React element which is the representation of the native DOM component. If more than one HTML element needs to be rendered, then they must be grouped together inside one enclosing tag such as **<form>, <group>,<div>** etc. This function must be kept pure i.e., it must return the same result each time it is invoked.

13. How can you embed two or more components into one?

We can embed components into one in the following way:

```
class MyComponent extends React.Component{
   render(){
      return(

<div>

<h1>Hello</h1>

            <Header/>
         </div>

      );
   }
}
class Header extends React.Component{
   render(){
      return

<h1>Header Component</h1>

   };
}
ReactDOM.render(
   <MyComponent/>, document.getElementById('content')
);
```

14. What is Props?

Props is the shorthand for Properties in React. They are read-only components which must be kept pure i.e. immutable. They are always passed down from the parent to the child components throughout the application. A child component can never send a prop back to the parent component. This help in maintaining the unidirectional data flow and are generally used to render the dynamically generated data.

15. What is a state in React and how is it used?

States are the heart of React components. States are the source of data and must be kept as simple as possible. Basically, states are the objects which determine components rendering and behavior. They are mutable unlike the props and create dynamic and interactive components. They are accessed via **this.state().**

16. Differentiate between states and props.

States vs Props		
Conditions	**State**	**Props**
1. Receive initial value from parent component	Yes	Yes
2. Parent component can change value	No	Yes
3. Set default values inside component	Yes	Yes
4. Changes inside component	Yes	No
5. Set initial value for child components	Yes	Yes
6. Changes inside child components	No	Yes

18. What is arrow function in React? How is it used?

Arrow functions are more of brief syntax for writing the function expression. They are also called *'fat arrow*' (=>) the functions. These functions allow to bind the context of the components properly since in ES6 auto binding is not available by default. Arrow functions are mostly useful while working with the higher order functions.

```
//General way
render() {
    return(
        <MyInput onChange={this.handleChange.bind(this) } />
    );
}
//With Arrow Function
render() {
    return(
        <MyInput onChange={ (e) => this.handleOnChange(e) } />
    );
}
```

19. Differentiate between stateful and stateless components.

Stateful vs Stateless

Stateful Component	**Stateless Component**
1. Stores info about component's state change in memory	1. Calculates the internal state of the components
2. Have authority to change state	2. Do not have the authority to change state
3. Contains the knowledge of past, current and possible future changes in state	3. Contains no knowledge of past, current and possible future state changes
4. Stateless components notify them about the requirement of the state change, then they send down the props to them.	4. They receive the props from the Stateful components and treat them as callback functions.

20. What are the different phases of React component's lifecycle?

There are three different phases of React component's lifecycle:

i. *Initial Rendering Phase:* This is the phase when the component is about to start its life journey and make its way to the DOM.

ii. *Updating Phase:* Once the component gets added to the DOM, it can potentially update and re-render only when a prop or state change occurs. That happens only in this phase.

iii. *Unmounting Phase:* This is the final phase of a component's life cycle in which the component is destroyed and removed from the DOM.

21. Explain the lifecycle methods of React components in detail.

Some of the most important lifecycle methods are:

i. ***componentWillMount()*** – Executed just before rendering takes place both on the client as well as server-side.

ii. ***componentDidMount()*** – Executed on the client side only after the first render.

iii. ***componentWillReceiveProps()*** – Invoked as soon as the props are received from the parent class and before another render is called.

iv. ***shouldComponentUpdate()*** – Returns true or false value based on certain conditions. If you want your component to update, return **true** else return **false**. By default, it returns false.

v. ***componentWillUpdate()*** – Called just before rendering takes place in the DOM.

vi. ***componentDidUpdate()*** – Called immediately after rendering takes place.

vii. ***componentWillUnmount()*** – Called after the component is unmounted from the DOM. It is used to clear up the memory spaces.

22. What is an event in React?

In React, events are the triggered reactions to specific actions like mouse hover, mouse click, key press, etc. Handling these events are similar to handling events in DOM elements. But there are some syntactical differences like:

i. Events are named using camel case instead of just using the lowercase.

ii. Events are passed as functions instead of strings.

The event argument contains a set of properties, which are specific to an event. Each event type contains its own properties and behavior which can be accessed via its event handler only.

24. What are synthetic events in React?

Synthetic events are the objects which act as a cross-browser wrapper around the browser's native event. They combine the behavior of different browsers into one API. This is done to make sure that the events show consistent properties across different browsers.

25. What do you understand by refs in React?

Refs is the short hand for References in React. It is an attribute which helps to store a reference to a particular React element or component, which will be returned by the components render configuration function. It is used to return references to a particular element or component returned by render(). They come in handy when we need DOM measurements or to add methods to the components.

26. List some of the cases when you should use Refs.

Following are the cases when refs should be used:

- When you need to manage focus, select text or media playback
- To trigger imperative animations
- Integrate with third-party DOM libraries

27. How do you modularize code in React?

We can modularize code by using the export and import properties. They help in writing the components separately in different files.

28. How are forms created in React?

React forms are similar to HTML forms. But in React, the state is contained in the state property of the component and is only updated via setState(). Thus the elements can't directly update their state and their submission is handled by a JavaScript function. This function has full access to the data that is entered by the user into a form.

```
handleSubmit(event) {
    alert('A name was submitted: ' + this.state.value);
    event.preventDefault();
}

render() {
    return (

<form onSubmit={this.handleSubmit}>
          <label>
              Name:
              <input type="text" value={this.state.value} onChange={this.handleSubmit} />
          </label>
          <input type="submit" value="Submit" />
       </form>

    );
}
```

29. What do you know about controlled and uncontrolled components?

Controlled vs Uncontrolled Components

Controlled Components	**Uncontrolled Components**
1. They do not maintain their own state	1. They maintain their own state
2. Data is controlled by the parent component	2. Data is controlled by the DOM
3. They take in the current values through props and then notify the changes via callbacks	3. Refs are used to get their current values

In case you are facing any challenges with these React interview questions, please comment on your problems in the section below.

30. What are Higher Order Components(HOC)?

Higher Order Component is an advanced way of reusing the component logic. Basically, it’s a pattern that is derived from React’s compositional nature. HOC are custom components which wrap another component within it. They can accept any dynamically provided child component but they won’t modify or copy any behavior from their input components. You can say that HOC are ‘pure’ components.

31. What can you do with HOC?

HOC can be used for many tasks like:

- Code reuse, logic and bootstrap abstraction
- Render High jacking
- State abstraction and manipulation
- Props manipulation

32. What are Pure Components?

Pure components are the simplest and fastest components which can be written. They can replace any component which only has a **render().** These components enhance the simplicity of the code and performance of the application.

33. What is the significance of keys in React?

Keys are used for identifying unique Virtual DOM Elements with their corresponding data driving the UI. They help React to optimize the rendering by recycling all the existing elements in the DOM. These keys must be a unique number or string, using which React just reorders the elements instead of re-rendering them. This leads to increase in application’s performance.

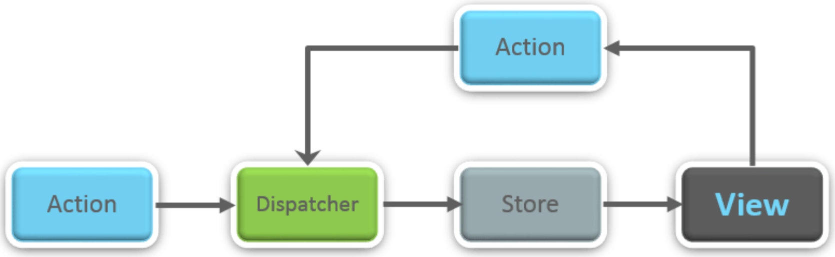
34. What were the major problems with MVC framework?

Following are some of the major problems with MVC framework:

- DOM manipulation was very expensive
- Applications were slow and inefficient
- There was huge memory wastage
- Because of circular dependencies, a complicated model was created around models and views

35. Explain Flux.

Flux is an architectural pattern which enforces the uni-directional data flow. It controls derived data and enables communication between multiple components using a central Store which has authority for all data. Any update in data throughout the application must occur here only. Flux provides stability to the application and reduces run-time errors.



36. What is Redux?

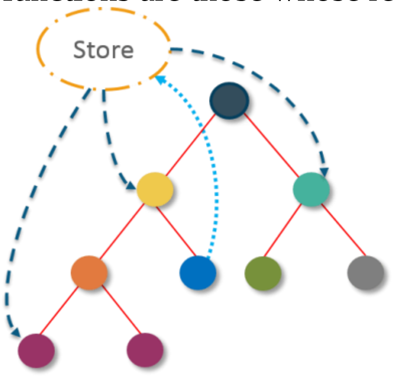
Redux is one of the most trending libraries for front-end development in today's marketplace. It is a predictable state container for JavaScript applications and is used for the entire applications state management. Applications developed with Redux are easy to test and can run in different environments showing consistent behavior.

37. What are the three principles that Redux follows?

i. ***Single source of truth:*** The state of the entire application is stored in an object/ state tree within a single store. The single state tree makes it easier to keep track of changes over time and debug or inspect the application.

ii. ***State is read-only:*** The only way to change the state is to trigger an action. An action is a plain JS object describing the change. Just like state is the minimal representation of data, the action is the minimal representation of the change to that data.

iii. ***Changes are made with pure functions:*** In order to specify how the state tree is transformed by actions, you need pure functions. Pure functions are those whose return value depends solely on the values of their arguments.



38. What do you understand by "Single source of truth"?

Redux uses 'Store' for storing the application's entire state at one place. So all the component's state are stored in the Store and they receive updates from the Store itself. The single state tree makes it easier to keep track of changes over time and debug or inspect the application.

39. List down the components of Redux.

Redux is composed of the following components:

i. **Action** – It's an object that describes what happened.

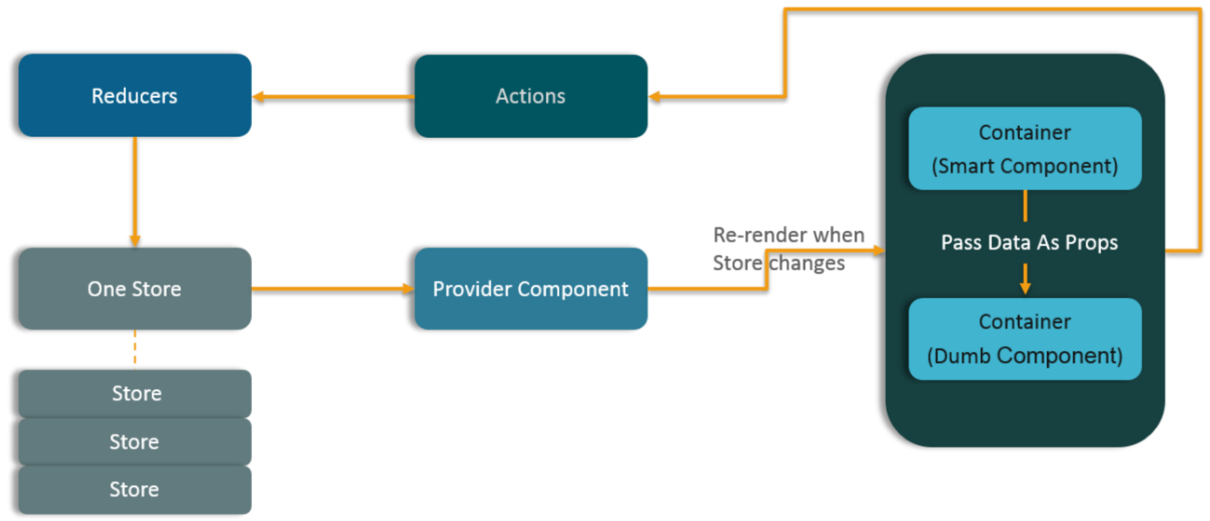
ii. **Reducer** – It is a place to determine how the state will change.

iii. **Store** – State/ Object tree of the entire application is saved in the Store.

iv. **View** – Simply displays the data provided by the Store.

In case you are facing any challenges with these React interview questions, please comment on your problems in the section below.

40. Show how the data flows through Redux?



41. How are Actions defined in Redux?

Actions in React must have a type property that indicates the type of ACTION being performed. They must be defined as a String constant and you can add more properties to it as well. In Redux, actions are created using the functions called Action Creators. Below is an example of Action and Action Creator:

```
function addTodo(text) {
      return {
               type: ADD_TODO,
                text
   }
}
```

42. Explain the role of Reducer.

Reducers are pure functions which specify how the application's state changes in response to an ACTION. Reducers work by taking in the previous state and action, and then it returns a new state. It determines what sort of update needs to be done based on the type of the action, and then returns new values. It returns the previous state as it is, if no work needs to be done.

43. What is the significance of Store in Redux?

A store is a JavaScript object which can hold the application's state and provide a few helper methods to access the state, dispatch actions and register listeners. The entire state/ object tree of an application is saved in a single store. As a result of this, Redux is very simple and predictable. We can pass middleware to the store to handle the processing of data as well as to keep a log of various actions that change the state of stores. All the actions return a new state via reducers.

44. How is Redux different from Flux?

Flux vs Redux

Flux	**Redux**
1. The Store contains state and change logic	1. Store and change logic are separate
2. There are multiple stores	2. There is only one store
3. All the stores are disconnected and flat	3. Single store with hierarchical reducers
4. Has singleton dispatcher	4. No concept of dispatcher
5. React components subscribe to the store	5. Container components utilize connect
6. State is mutable	6. State is immutable

In case you are facing any challenges with these React interview questions, please comment on your problems in the section below.

45. What are the advantages of Redux?

Advantages of Redux are listed below:

- **Predictability of outcome –** Since there is always one source of truth, i.e. the store, there is no confusion about how to sync the current state with actions and other parts of the application.
- **Maintainability –** The code becomes easier to maintain with a predictable outcome and strict structure.
- **Server-side rendering –** You just need to pass the store created on the server, to the client side. This is very useful for initial render and provides a better user experience as it optimizes the application performance.

- **Developer tools –** From actions to state changes, developers can track everything going on in the application in real time.
- **Community and ecosystem –** Redux has a huge community behind it which makes it even more captivating to use. A large community of talented individuals contribute to the betterment of the library and develop various applications with it.
- **Ease of testing –** Redux's code is mostly functions which are small, pure and isolated. This makes the code testable and independent.
- **Organization –** Redux is precise about how code should be organized, this makes the code more consistent and easier when a team works with it.

46. What is React Router?

React Router is a powerful routing library built on top of React, which helps in adding new screens and flows to the application. This keeps the URL in sync with data that's being displayed on the web page. It maintains a standardized structure and behavior and is used for developing single page web applications. React Router has a simple API.

47. Why is switch keyword used in React Router v4?

Although a **<div>** is used to encapsulate multiple routes inside the Router. The 'switch' keyword is used when you want to display only a single route to be rendered amongst the several defined routes. The **<switch>** tag when in use matches the typed URL with the defined routes in sequential order. When the first match is found, it renders the specified route. Thereby bypassing the remaining routes.

48. Why do we need a Router in React?

A Router is used to define multiple routes and when a user types a specific URL, if this URL matches the path of any 'route' defined inside the router, then the user is redirected to that particular route. So basically, we need to add a Router library to our app that allows creating multiple routes with each leading to us a unique view.

```
<switch>
    <route exact path=&rsquo;/&rsquo;&nbsp;component={Home}/>
    <route path=&rsquo;/posts/:id&rsquo; component={Newpost}/>
    <route path=&rsquo;/posts&rsquo;&nbsp;&nbsp; component={Post}/>
</switch>
```

49. List down the advantages of React Router.

Few advantages are:

i. Just like how React is based on components, in React Router v4, the API is *'All About Components'*. A Router can be visualized as a single root component (**<BrowserRouter>**) in which we enclose the specific child routes (**<route>**).

ii. No need to manually set History value: In React Router v4, all we need to do is wrap our routes within the **<BrowserRouter>** component.

iii. The packages are split: Three packages one each for Web, Native and Core. This supports the compact size of our application. It is easy to switch over based on a similar coding style.

50. How is React Router different from conventional routing?

Conventional Routing vs React Routing

Topic	Conventional Routing	React Routing
PAGES INVOLVED	Each view corresponds to a new file	Only single HTML page is involved
URL CHANGES	A HTTP request is sent to a server and corresponding HTML page is received	Only the History attribute is changed
FEEL	User actually navigates across different pages for each view	User is duped thinking he is navigating across different pages

3) What are the most crucial advantages of using React?

Following is a list of the most crucial advantages of using React:

React is easy to learn and use

React comes with good availability of documentation, tutorials, and training resources. It is easy for any developer to switch from JavaScript background to React and easily understand and start creating web apps using React. Anyone with little knowledge of JavaScript can start building web applications using React.

React follows the MVC architecture.

React is the V (view part) in the MVC (Model-View-Controller) architecture model and is referred to as "one of the JavaScript frameworks." It is not fully featured but has many advantages of the open-source JavaScript User Interface (UI) library, which helps execute the task in a better manner.

React uses Virtual DOM to improve efficiency.

React uses virtual DOM to render the view. The virtual DOM is a virtual representation of the real DOM. Each time the data changes in a react app, a new virtual DOM gets created. Creating a virtual DOM is much faster than rendering the UI inside the browser. Therefore, with the use of virtual DOM, the efficiency of the app improves. That's why React provides great efficiency.

Creating dynamic web applications is easy.

In React, creating a dynamic web application is much easier. It requires less coding and gives more functionality. It uses JSX (JavaScript Extension), which is a particular syntax letting HTML quotes and HTML tag syntax to render particular subcomponents.

React is SEO-friendly.

React facilitates a developer to develop an engaging user interface that can be easily navigated in various search engines. It also allows server-side rendering, which is also helpful to boost the SEO of your app.

React allows reusable components.

React web applications are made up of multiple components where each component has its logic and controls. These components provide a small, reusable piece of HTML code as an output that can be reused wherever you need them. The code reusability helps developers to make their apps easier to develop and maintain. It also makes the nesting of the components easy and allows developers to build complex applications of simple building blocks. The reuse of components also increases the pace of development.

Support of handy tools

React provides a lot of handy tools that can make the task of the developers understandable and easier. Use these tools in Chrome and Firefox dev extension, allowing us to inspect the React component hierarchies in the virtual DOM. It also allows us to select the particular components and examine and edit their current props and state.

React has a rich set of libraries.

React has a huge ecosystem of libraries and provides you the freedom to choose the tools, libraries, and architecture for developing the best application based on your requirement.

Scope for testing the codes

React web applications are easy to test. These applications provide a scope where the developer can test and debug their codes with the help of native tools.

4) What are the biggest limitations of React?

Following is the list of the biggest limitations of React:

- React is just a library. It is not a complete framework.
- It has a huge library which takes time to understand.
- It may be difficult for the new programmers to understand and code.
- React uses inline templating and JSX, which may be difficult and act as a barrier. It also makes the coding complex.

6) Why can't browsers read JSX?

Browsers cannot read JSX directly because they can only understand JavaScript objects, and JSX is not a regular JavaScript object. Thus, we need to transform the JSX file into a JavaScript object using transpilers like Babel and then pass it to the browser.

7) Why we use JSX?

- It is faster than regular JavaScript because it performs optimization while translating the code to JavaScript.
- Instead of separating technologies by putting markup and logic in separate files, React uses components that contain both.
- t is type-safe, and most of the errors can be found at compilation time.
- It makes easier to create templates.

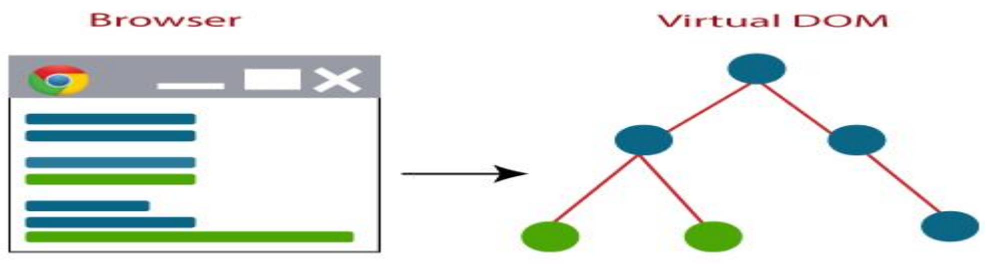
8) What do you understand by Virtual DOM?

A Virtual DOM is a lightweight JavaScript object which is an in-memory representation of real DOM. It is an intermediary step between the render function being called and the displaying of elements on the screen. It is similar to a node tree which lists the elements, their attributes, and content as objects and their properties. The render function creates a node tree of the React components and then updates this node tree in response to the mutations in the data model caused by various actions done by the user or by the system.

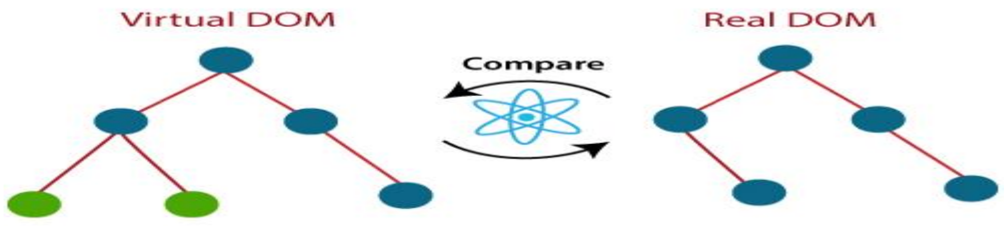
9) Explain the working of Virtual DOM.

Virtual DOM works in three steps:

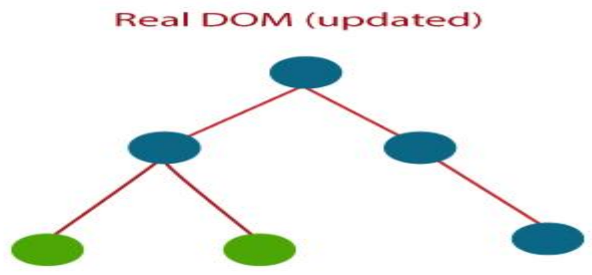
1. Whenever any data changes in the React App, the entire UI is re-rendered in Virtual DOM representation.



2. Now, the difference between the previous DOM representation and the new DOM is calculated.



3. Once the calculations are completed, the real DOM updated with only those things which are changed.



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10) How is React different from Angular?

The React is different from Angular in the following ways.

	Angular	React
Author	Google	Facebook Community
Developer	Misko Hevery	Jordan Walke
Initial Release	October 2010	March 2013
Language	JavaScript, HTML	JSX
Type	Open Source MVC Framework	Open Source JS Framework
Rendering	Client-Side	Server-Side
Data-Binding	Bi-directional	Uni-directional
DOM	Regular DOM	Virtual DOM

Testing	Unit and Integration Testing	Unit Testing
App Architecture	MVC	Flux
Performance	Slow	Fast, due to virtual DOM.

12) What is the difference between ReactJS and React Native?

The main differences between ReactJS and React Native are given below.

SN	ReactJS	React Native
1.	Initial release in 2013.	Initial release in 2015.
2.	It is used for developing web applications.	It is used for developing mobile applications.
3.	It can be executed on all platforms.	It is not platform independent. It takes more effort t platforms.
4.	It uses a JavaScript library and CSS for animations.	It comes with built-in animation libraries.
5.	It uses React-router for navigating web pages.	It has built-in Navigator library for navigating mobile applications.
6.	It uses HTML tags.	It does not use HTML tags.
7.	In this, the Virtual DOM renders the browser code.	In this, Native uses its API to render code for mobile applications.

13) What is the difference between Real DOM and Virtual DOM?

The following table specifies the key differences between the Real DOM and Virtual DOM:

The real DOM creates a new DOM if the element updates.

Real DOM	Virtual DOM
The real DOM updates slower.	The virtual DOM updates faster.
The real DOM can directly update HTML.	The virtual DOM cannot directly update HTML.
The virtual DOM updates the JSX if the element updates.	
In real DOM, DOM manipulation is very expensive.	In virtual DOM, DOM manipulation is very easy.
There is a lot of memory wastage in The real DOM.	There is no memory wastage in the virtual DOM.

15) Explain the purpose of render() in React.

It is mandatory for each React component to have a render() function. Render function is used to return the HTML which you want to display in a component. If you need to rendered more than one HTML element, you need to grouped together inside single enclosing tag (parent tag) such as <div>, <form>, <group> etc. This function returns the same result each time it is invoked.

Example: If you need to display a heading, you can do this as below.

```
import React from 'react'

class App extends React.Component {
  render (){
     return (
        <h1>Hello World</h1>
     )
  }
}
export default App
```

Points to Note:

- Each render() function contains a return statement.
- The return statement can have only one parent HTML tag.

16) How can you embed two or more components into one?

You can embed two or more components into the following way:

```
import React from 'react'

class App extends React.Component {
  render (){
    return (
      <h1>Hello World</h1>
    )
  }
}

class Example extends React.Component {
  render (){
    return (
      <h1>Hello JavaTpoint</h1>
    )
  }
}
export default App
```

17) What is Props?

Props stand for "Properties" in React. They are read-only inputs to components. Props are an object which stores the value of attributes of a tag and work similar to the HTML attributes. It gives a way to pass data from the parent to the child components throughout the application.

It is similar to function arguments and passed to the component in the same way as arguments passed in a function.

Props are immutable so we cannot modify the props from inside the component. Inside the components, we can add attributes called props. These attributes are available in the component as this.props and can be used to render dynamic data in our render method.

18) What is a State in React?

The State is an updatable structure which holds the data and information about the component. It may be changed over the lifetime of the component in response to user action or system event. It is the heart of the react component which determines the behavior of the component and how it will render. It must be kept as simple as possible.

Let's create a "User" component with "message state."

```
import React from 'react'

class User extends React.Component {
  constructor(props) {
    super(props)

    this.state = {
      message: 'Welcome to JavaTpoint'
    }
  }

  render() {
    return (
      <div>
        <h1>{this.state.message}</h1>
      </div>
    )
  }
}
export default User
```

19) Differentiate between States and Props.

The major differences between States and Props are given below.

SN	Props	State
1.	Props are read-only.	State changes can be asynchronous.
2.	Props are immutable.	State is mutable.
3.	Props allow you to pass data from one component to other components as an argument.	State holds information about the components.
4.	Props can be accessed by the child component.	State cannot be accessed by child components.
5.	Props are used to communicate between components.	States can be used for rendering dynamic changes with the component.
6.	The stateless component can have Props.	The stateless components cannot have State.
7.	Props make components reusable.	The State cannot make components reusable.
8.	Props are external and controlled by whatever renders the component.	The State is internal and controlled by the component itself.

20) How can you update the State of a component?

We can update the State of a component using this.setState() method. This method does not always replace the State immediately. Instead, it only adds changes to the original State. It is a primary method which is used to update the user interface(UI) in response to event handlers and server responses.

Example

```
import React, { Component } from 'react';
import PropTypes from 'prop-types';

class App extends React.Component {
   constructor() {
      super();
      this.state = {
          msg: "Welcome to JavaTpoint"
      };
      this.updateSetState = this.updateSetState.bind(this);
   }
   updateSetState() {
       this.setState({
          msg:"Its a best ReactJS tutorial"
       });
   }
   render() {
      return (
         <div>
             <h1>{this.state.msg}</h1>
             <button onClick = {this.updateSetState}>SET STATE</button>
         </div>
      );
   }
}
```

```
export default App;
```

21) Differentiate between stateless and stateful components.

The difference between stateless and stateful components are:

SN	Stateless Component	Stateful Component
1.	The stateless components do not hold or manage state.	The stateful components can hold or manage state.
2.	It does not contain the knowledge of past, current, and possible future state changes.	It can contain the knowledge of past, current, changes in state.
3.	It is also known as a functional component.	It is also known as a class component.
4.	It is simple and easy to understand.	It is complex as compared to the stateless component.
5.	It does not work with any lifecycle method of React.	It can work with all lifecycle method of React.
6.	The stateless components cannot be reused.	The stateful components can be reused.

22) What is arrow function in React? How is it used?

The Arrow function is the new feature of the ES6 standard. If you need to use arrow functions, it is not necessary to bind any event to 'this.' Here, the scope of 'this' is global and not limited to any calling function. So If you are using Arrow Function, there is no need to bind 'this' inside the constructor. It is also called 'fat arrow '(=>) functions.

```
//General way
render() {
   return(
      <MyInput onChange={this.handleChange.bind(this) } />
   );
}
//With Arrow Function
```

```
render() {
  return(
    <MyInput onChange={ (e) => this.handleOnChange(e) } />
  );
}
```

23) What is an event in React?

An event is an action which triggers as a result of the user action or system generated event like a mouse click, loading of a web page, pressing a key, window resizes, etc. In React, the event handling system is very similar to handling events in DOM elements. The React event handling system is known as Synthetic Event, which is a cross-browser wrapper of the browser's native event.

Handling events with React have some syntactical differences, which are:

- React events are named as camelCase instead of lowercase.
- With JSX, a function is passed as the event handler instead of a string.

26) what is the difference between controlled and uncontrolled components?

The difference between controlled and uncontrolled components are:

SN	Controlled	Uncontrolled
1.	It does not maintain its internal state.	It maintains its internal states.
2.	Here, data is controlled by the parent component.	Here, data is controlled by the DOM itself.
3.	It accepts its current value as a prop.	It uses a ref for their current values.
4.	It allows validation control.	It does not allow validation control.
5.	It has better control over the form elements and data.	It has limited control over the form elements and data.

28) What is the significance of keys in React?

A key is a unique identifier. In React, it is used to identify which items have changed, updated, or deleted from the Lists. It is useful when we dynamically created components or when the users alter the lists. It also helps to determine which components in a collection needs to be re-rendered instead of re-rendering the entire set of components every time. It increases application performance.

30) What are the different phases of React component's lifecycle?

The different phases of React component's lifecycle are:

Initial Phase: It is the birth phase of the React lifecycle when the component starts its journey on a way to the DOM. In this phase, a component contains the default Props and initial State. These default properties are done in the constructor of a component.

Mounting Phase: In this phase, the instance of a component is created and added into the DOM.

Updating Phase: It is the next phase of the React lifecycle. In this phase, we get new Props and change State. This phase can potentially update and re-render only when a prop or state change occurs. The main aim of this phase is to ensure that the component is displaying the latest version of itself. This phase repeats again and again.

Unmounting Phase: It is the final phase of the React lifecycle, where the component instance is destroyed and unmounted(removed) from the DOM.

32) What are Pure Components?

Pure components introduced in React 15.3 version. The React.Component and React.PureComponent differ in the shouldComponentUpdate() React lifecycle method. This method decides the re-rendering of the component by returning a boolean value (true or false). In React.Component, shouldComponentUpdate() method returns true by default. But in React.PureComponent, it compares the changes in state or props to re-render the component. The pure component enhances the simplicity of the code and performance of the application.

33) What are Higher Order Components(HOC)?

In React, Higher Order Component is an advanced technique for reusing component logic. It is a function that takes a component and returns a new component. In other words, it is a function which accepts another function as an argument. According to the official website, it is not the feature(part) in React API, but a pattern that emerges from React's compositional nature.

34) What can you do with HOC?

You can do many tasks with HOC, some of them are given below:

- Code Reusability
- Props manipulation
- State manipulation
- Render highjacking

35) What is the difference between Element and Component?

The main differences between Elements and Components are:

SN	Element	Component
1.	An element is a plain JavaScript object which describes the component state and DOM node, and its desired properties.	A component is the core building block of React application. It is a class or function which accepts an input and returns a React element.
2.	It only holds information about the component type, its properties, and any child elements inside it.	It can contain state and props and has access to the React lifecycle methods.
3.	It is immutable.	It is mutable.
4.	We cannot apply any methods on elements.	We can apply methods on components.

5.	**Example:**
	const element = React.createElement(
	'div',
	{id: 'login-btn'},
	'Login'
	)
		Example:
		function Button ({ onLogin }) {
		return React.createElement(
		'div',
		{id: 'login-btn', onClick: onLogin},
		'Login'
		)
		}

37) Why is it necessary to start component names with a capital letter?

In React, it is necessary to start component names with a capital letter. If we start the component name with lower case, it will throw an error as an unrecognized tag. It is because, in JSX, lower case tag names are considered as HTML tags.

38) What are fragments?

In was introduced in React 16.2 version. In React, Fragments are used for components to return multiple elements. It allows you to group a list of multiple children without adding an extra node to the DOM.

Example

```
render() {
  return (
    <React.Fragment>
```

```
      <ChildA />
      <ChildB />
      <ChildC />
    </React.Fragment>
  )
}
```

There is also a shorthand syntax exists for declaring Fragments, but it's not supported in many tools:

```
render() {
  return (
    <>
      <ChildA />
      <ChildB />
      <ChildC />
    </>
  )
}
```

39) Why are fragments better than container divs?

- Fragments are faster and consume less memory because it did not create an extra DOM node.
- Some CSS styling like CSS Grid and Flexbox have a special parent-child relationship and add <div> tags in the middle, which makes it hard to keep the desired layout.
- The DOM Inspector is less cluttered.

40) How to apply validation on props in React?

Props validation is a tool which helps the developers to avoid future bugs and problems. It makes your code more readable. React components used special property PropTypes that help you to catch bugs by validating data types of values passed through props, although it is not necessary to define components with propTypes.

We can apply validation on props using App.propTypes in React component. When some of the props are passed with an invalid type, you will get the warnings on JavaScript console. After specifying the validation patterns, you need to set the App.defaultProps.

```
class App extends React.Component {
        render() {}
}
Component.propTypes = { /*Definition */};
```

41) What is create-react-app?

Create React App is a tool introduced by Facebook to build React applications. It provides you to create single-page React applications. The create-react-app are preconfigured, which saves you from time-consuming setup and configuration like Webpack or Babel. You need to run a single command to start the React project, which is given below.

```
$ npx create-react-app my-app
```

This command includes everything which we need to build a React app. Some of them are given below:

- It includes React, JSX, ES6, and Flow syntax support.
- It includes Autoprefixed CSS, so you don't need -webkit- or other prefixes.
- It includes a fast, interactive unit test runner with built-in support for coverage reporting.
- It includes a live development server that warns about common mistakes.
- It includes a build script to bundle JS, CSS, and images for production, with hashes and source maps.

42) How can you create a component in React?

There are two possible ways to create a component in React:

Function Components: This is the simplest way to create a component in React. These are the pure JavaScript functions that accept props object as the first parameter and return React elements:

```
function Greeting({ message }) {
  return <h1>{`Hello, ${message}`}</h1>
}
```

Class Components: The class components method facilitates you to use ES6 class to define a component. The above function component can be written as:

```
class Greeting extends React.Component {
  render() {
    return <h1>{`Hello, ${this.props.message}`}</h1>
  }
}
```

43) When do we prefer to use a class component over a function component?

If a component needs state or lifecycle methods, we should use the class component; otherwise, use the function component. However, after React 16.8, with the addition of Hooks, you could use state, lifecycle methods, and other features that were only available in the class component right in your function component.

44) Is it possible for a web browser to read JSX directly?

Web browsers can't read JSX directly. This is because the web browsers are built to read the regular JS objects only, and JSX is not a regular JavaScript object.

If you want a web browser to read a JSX file, you must transform the files into a regular JavaScript object. For this purpose, Babel is used.

45) What do you understand by the state in React?

In react, the state of a component is an object that holds some information that may change over the component's lifetime. It would be best to try to make your state as simple as possible and minimize the number of stateful components.

Let's see how to create a user component with message state:

```
class User extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      message: 'Welcome to React world'
    }
  }
  render() {
    return (
      <div>
        <h1>{this.state.message}</h1>
      </div>
    )
  }
}
```

The state is very similar to props, but it is private and fully controlled by the component. i.e., It is not accessible to any other component till the owner component decides to pass it.

47) What do you understand by props in React?

In React, the props are inputs to components. They are single values or objects containing a set of values passed to components on creation using a naming convention similar to HTML-tag attributes. They are data passed down from a parent component to a child component.

The main purpose of props in React is to provide the following component functionality:

- Pass custom data to your component.
- Trigger state changes.
- Use via this.props.reactProp inside component's render() method.

52) What is the use of Refs?

The Ref in React is used in the following cases:

- It is used to return a reference to the element.
- It is used when we need DOM measurements such as managing focus, text selection, or media playback.
- It is used in triggering imperative animations.
- It is used when integrating with third-party DOM libraries.
- It can also use as in callbacks.

53) What is React Router?

React Router is a standard routing library system built on top of the React. It is used to create Routing in the React application using React Router Package. It helps you to define multiple routes in the app. It provides the synchronous URL on the browser with data that will be displayed on the web page. It maintains the standard structure and behavior of the application and mainly used for developing single page web applications.

54) Why do we need a Router in React?

React Router plays an important role to display multiple views in a single page application. It is used to define multiple routes in the app. When a user types a specific URL into the browser, and if this URL path matches any 'route' inside the router file, the user will be redirected to that particular Route. So, we need to add a Router library to the React app, which allows creating multiple routes with each leading to us a unique view.

```
1. <switch>
2.       <h1>React Router Example</h1>
3.       <Route path="/" component={Home} />
4.       <Route path="/about" component={About} />
5.       <Route path="/contact" component={Contact} />
6. </switch>
```

55) List down the advantages of React Router.

The important advantages of React Router are given below:

- In this, it is not necessary to set the browser history manually.
- Link uses to navigate the internal links in the application. It is similar to the anchor tag.
- It uses Switch feature for rendering.
- The Router needs only a Single Child element.
- In this, every component is specified in <Route>.
- The packages are split into three packages, which are Web, Native, and Core. It supports the compact size of the React application.

56) How is React Router different from Conventional Routing?

The difference between React Routing and Conventional Routing are:

SN	Conventional Routing	React Routing

1.	In Conventional Routing, each view contains a new file.	In React Routing, there is only a single HTML page involved.
2.	The HTTP request is sent to a server to receive the corresponding HTML page.	Only the History attribute <BrowserRouter> is changed.
3.	In this, the user navigates across different pages for each view.	In this, the user is thinking he is navigating across different pages, but its an illusion only.

57) Why you get "Router may have only one child element" warning?

It is because you have not to wrap your Route's in a <Switch> block or <div> block which renders a route exclusively.

Example

```
render((
  <Router>
    <Route {/* ... */} />
    <Route {/* ... */} />
  </Router>
)
```

should be

```
render(
  <Router>
    <Switch>
      <Route {/* ... */} />
      <Route {/* ... */} />
    </Switch>
  </Router>
)
```

58) Why switch keyword used in React Router v4?

The 'switch' keyword is used to display only a single Route to rendered amongst the several defined Routes. The <Switch> component is used to render components only when the path will be matched. Otherwise, it returns to the not found component.

59) How to use styles in React?

We can use style attribute for styling in React applications, which adds dynamically-computed styles at render time. It accepts a JavaScript object in camelCased properties rather than a CSS string. The style attribute is consistent with accessing the properties on DOM nodes in JavaScript.

Example

```
const divStyle = {
  color: 'blue',
  backgroundImage: 'url(' + imgUrl + ')'
};

function HelloWorldComponent() {
  return <div style={divStyle}>Hello World!</div>
}
```

60) How many ways can we style the React Component?

We can style React Component in mainly four ways, which are given below:

- Inline Styling
- CSS Stylesheet
- CSS Module
- Styled Components

61) Explain CSS Module styling in React.

CSS Module is a CSS file where all class names and animation names are scoped locally by default. It is available only for the component which imports it, and without your permission, it cannot be applied to any other Components. You can create CSS Module file with the .module.css extension.

62) What are Styled Components?

Styled-Components is a library for React. It is the successor of CSS Modules. It uses enhance CSS for styling React component systems in your application, which is written with a mixture of JavaScript and CSS. It is scoped to a single component and cannot leak to any other element in the page.

The styled-components provides:

- Automatic critical CSS
- No class name bugs
- Easier deletion of CSS
- Simple dynamic styling
- Painless maintenance

63) What are hooks in React?

Hooks are the new feature introduced in React 16.8 version that facilitates us to use state and other React features without writing a class.

See the following example of useState hook:

```
import { useState } from 'react';
function Example() {
  // Declare a new state variable, which we'll call "count"
  const [count, setCount] = useState(0);
  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click on this button
      </button>
    </div>
  );
}
```

64) What are the rules you should follow for the hooks in React?

We have to follow the following two rules to use hooks in React:

- You should call hooks only at the top level of your React functions and not inside the loops, conditions, or nested functions. This is used to ensure that hooks are called in the same order each time a component renders, and it also preserves the state of hooks between multiple useState and useEffect calls.
- You should call hooks from React functions only. Don't call hooks from regular JavaScript functions.

65) What are forms in React?

In React, forms are used to enable users to interact with web applications. Following is a list of the most common usage of forms in React:

- Forms facilitate users to interact with the application. By using forms, the users can communicate with the application and enter the required information whenever required.
- Forms contain certain elements, such as text fields, buttons, checkboxes, radio buttons, etc., that can make the application more interactive and beautiful.
- Forms are the best possible way to take inputs from the users.
- Forms are used for many different tasks such as user authentication, searching, filtering, indexing, etc.

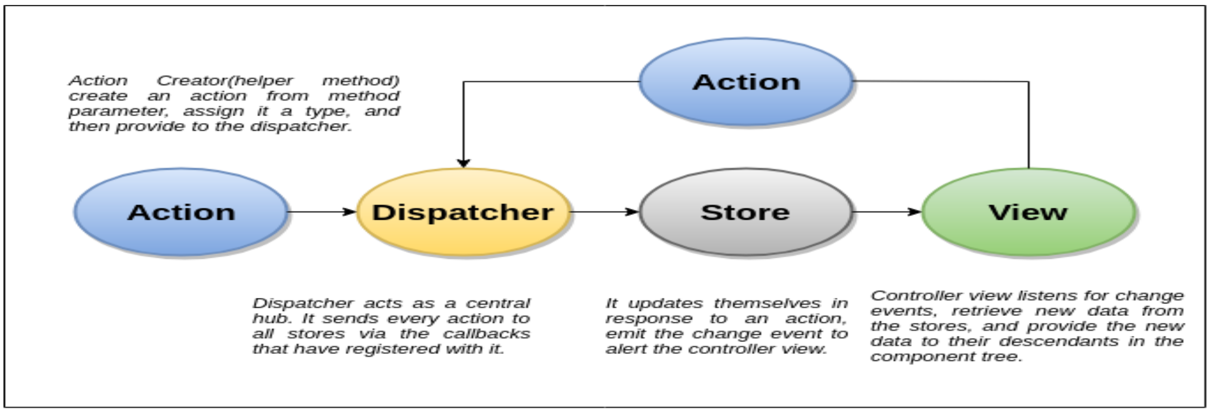
68) What were the major problems with MVC framework?

The major problems with the MVC framework are:

- DOM manipulation was very expensive.
- It makes the application slow and inefficient.
- There was a huge memory wastage.
- It makes the application debugging hard.

69) Explain the Flux concept.

Flux is an application architecture that Facebook uses internally for building the client-side web application with React. It is neither a library nor a framework. It is a kind of architecture that complements React as view and follows the concept of Unidirectional Data Flow model. It is useful when the project has dynamic data, and we need to keep the data updated in an effective manner.


Action Creator(helper method) create an action from method parameter, assign it a type, and then provide to the dispatcher.
Action
Action
Dispatcher
Store
View
Dispatcher acts as a central hub. It sends every action to all stores via the callbacks that have registered with it.
It updates themselves in response to an action, emit the change event to alert the controller view.
Controller view listens for change events, retrieve new data from the stores, and provide the new data to their descendants in the component tree.

71) What are the three principles that Redux follows?

The three principles that redux follows are:

1. **Single source of truth:** The State of your entire application is stored in an object/state tree inside a single Store. The single State tree makes it easier to keep changes over time. It also makes it easier to debug or inspect the application.
2. **The State is read-only:** There is only one way to change the State is to emit an action, an object describing what happened. This principle ensures that neither the views nor the network callbacks can write directly to the State.
3. **Changes are made with pure functions:** To specify how actions transform the state tree, you need to write reducers (pure functions). Pure functions take the previous State and Action as a parameter and return a new State.

72) List down the components of Redux.

The components of Redux are given below.

- **STORE:** A Store is a place where the entire State of your application lists. It is like a brain responsible for all moving parts in Redux.
- **ACTION:** It is an object which describes what happened.
- **REDUCER:** It determines how the State will change.

73) Explain the role of Reducer.

Reducers read the payloads from the actions and then updates the Store via the State accordingly. It is a pure function which returns a new state from the initial State. It returns the previous State as it is if no work needs to be done.

74) What is the significance of Store in Redux?

A Store is an object which holds the application's State and provides methods to access the State, dispatch Actions and register listeners via subscribe(listener). The entire State tree of an application is saved in a single Store which makes the Redux simple and predictable. We can pass middleware to the Store which handles the processing of data as well as keep a log of various actions that change the Store's State. All the Actions return a new state via reducers.

75) How is Redux different from Flux?

The Redux is different from Flux in the following manner.

SN	Redux	Flux
1.	Redux is an open-source JavaScript library used to manage application State.	Flux is neither a library nor a framework. It is a kind of architecture that complements React as view and follows the concept of Unidirectional Data Flow model.
2.	Store's State is immutable.	Store's State is mutable.
3.	In this, Store and change logic are separate.	In this, the Store contains State and change logic.
4.	It has only a single Store.	It can have multiple Store.
5.	Redux does not have Dispatcher concept.	It has single Dispatcher, and all actions pass through that Dispatcher.

76) What are the advantages of Redux?

The main advantages of React Redux are:

- React Redux is the official UI bindings for react Application. It is kept up-to-date with any API changes to ensure that your React components behave as expected.
- It encourages good 'React' architecture.
- It implements many performance optimizations internally, which allows to components re-render only when it actually needs.
- It makes the code maintenance easy.
- Redux's code written as functions which are small, pure, and isolated, which makes the code testable and independent.

77) How to access the Redux store outside a component?

You need to export the Store from the module where it created with createStore() method. Also, you need to assure that it will not pollute the global window space.

1. store = createStore(myReducer)
2. export **default** store

1) What is Reactjs?

React is a JavaScript library that makes building user interfaces easy. It was developed by Facebook.

2) Does React use <u>HTML</u>?

No, It uses JSX, which is similar to HTML.

3) When was React first released?

React was first released on March 2013.

4) Give me two most significant drawbacks of React

- Integrating React with the MVC framework like Rails requires complex configuration.
- React require the users to have knowledge about the integration of user interface into MVC framework.

5) State the difference between Real DOM and Virtual DOM

Real DOM	Virtual DOM
It is updated slowly.	It updates faster.
It allows a direct update from HTML.	It cannot be used to update HTML directly.
It wastes too much memory.	Memory consumption is less

6) What is Flux Concept In React?

Facebook widely uses flux architecture concept for developing client-side web applications. It is *not* a framework or a library. It is simply a new kind of architecture that complements React and the concept of Unidirectional Data Flow.

7) Define the term Redux in React

Redux is a library used for front end development. It is a state container for JavaScript applications which should be used for the applications state management. You can test and run an application developed with Redux in different environments.

8) What is the 'Store' feature in Redux?

Redux has a feature called 'Store' which allows you to save the application's entire State at one place. Therefore all it's component's State are stored in the Store so that you will get regular updates directly from the Store. The single state tree helps you to keep track of changes over time and debug or inspect the application.

9) What is an action in Redux?

It is a function which returns an action object. The action-type and the action data are always stored in the action object. Actions can send data between the Store and the software application. All information retrieved by the Store is produced by the actions.

10) Name the important features of React

Here, are important features of React.

- Allows you to use 3rd party libraries
- Time-Saving
- Faster Development
- Simplicity and Composable
- Fully supported by Facebook.
- Code Stability with One-directional data binding
- React Components

11) Explain the term stateless components

Stateless components are pure functions that render DOM-based solely on the properties provided to them.

12) Explain React Router

React Router is a routing library which allows you to add new screen flows to your application, and it also keeps URL in sync with what's being shown on the page.

13) What are the popular animation package in React ecosystem?

Popular animation package in React ecosystem are

- React Motion
- React Transition Group

14) What is Jest?

Jest is a JavaScript unit testing framework created by Facebook based on Jasmine. It offers automated mock creation and a jsdom environment. It is also used as a testing component.

15) What is dispatcher?

A dispatcher is a central hub of app where you will receive actions and broadcast payload to registered callbacks.

16) What is meant by callback function? What is its purpose?

A callback function should be called when setState has finished, and the component is re-rendered.

As the setState is asynchronous, which is why it takes in a second callback function.

17) Explain the term high order component

A higher-order component also shortly known as HOC is an advanced technique for reusing component logic. It is not a part of the React API, but they are a pattern which emerges from React's compositional nature.

18) Explain the Presentational segment

A presentational part is a segment which allows you to renders HTML. The segment's capacity is presentational in markup.

19) What are Props in react js?

Props mean properties, which is a way of passing data from parent to child. We can say that props are just a communication channel between components. It is always moving from parent to child component.

20) What is the use of a super keyword in React?

The super keyword helps you to access and call functions on an object's parent.

21) Explain yield catchphrase in JavaScript

The yield catchphrase is utilized to delay and resume a generator work, which is known as yield catchphrase.

22) Name two types of React component

Two types of react Components are:

- Function component
- Class component

23) Explain synthetic event in React js

Synthetic event is a kind of object which acts as a cross-browser wrapper around the browser's native event. It also helps us to combine the behaviors of various browser into signal API.

24) What is React State?

It is an object which decides how a specific component renders and how it behaves. The state stores the information which can be changed over the lifetime of a React component.

25) How can you update state in react js?

A state can be updated on the component directly or indirectly.

26) Explain the use of the arrow function in React

The arrow function helps you to predict the behavior of bugs when passed as a callback. Therefore, it prevents bug caused by this all together.

27) What are the lifecycle steps of React?

Important lifecycle steps of React js are:

- Initialization
- State/Property updates
- Destruction are the lifecycle of React

28) State the main difference between Pros and State

The main difference the two is that the State is mutable and Pros are immutable.

29) Explain pure components in React js

Pure components are the fastest components which can replace any component with only a render(). It helps you to enhance the simplicity of the code and performance of the application.

30) What kind of information controls a segment in React?

There are mainly two sorts of information that control a segment: State and Props

- State: State information that will change, we need to utilize State.
- Props: Props are set by the parent and which are settled all through the lifetime of a part.

31) What is 'create-react-app'?

'create-react-app' is a command-line tool which allows you to create one basic react application.

32) Explain the use of 'key' in react list

Keys allow you to provide each list element with a stable identity. The keys should be unique.

33) What are children prop?

Children props are used to pass component to other components as properties. You can access it by using

{props.children}

34) Explain error boundaries?

Error boundaries help you to catch Javascript error anywhere in the child components. They are most used to log the error and show a fallback UI.

35) What is the use of empty tags <> </>?

Empty tags are used in React for declaring fragments.

36) Explain strict mode

StrictMode allows you to run checks and warnings for react components. It runs only on development build. It helps you to highlight the issues without rendering any visible UI.

37) What are reacted portals?

Portal allows you to render children into a DOM node. **CreatePortalmethod** is used for it.

38) What is Context?

React context helps you to pass data using the tree of react components. It helps you to share data globally between various react components.

39) What is the use of Webpack?

Webpack in basically is a module builder. It is mainly runs during the development process.

40) What is Babel in React js?

Babel, is a JavaScript compiler that converts latest JavaScript like ES6, ES7 into plain old ES5 JavaScript that most browsers understand.

41) How can a browser read JSX file?

If you want the browser to read JSX, then that JSX file should be replaced using a JSX transformer like Babel and then send back to the browser.

42) What are the major issues of using MVC architecture in React?

Here are the major challenges you will face while handling MVC architecture:

- DOM handling is quite expensive
- Most of the time applications were slow and inefficient
- Because of circular functions, a complex model has been created around models and ideas

43) What can be done when there is more than one line of expression?

At that time a multi-line JSX expression is the only option left for you.

44) What is the reduction?

The reduction is an application method of handling State.

45) Explain the term synthetic events

It is actually a cross-browser wrapper around the browser’s native event. These events have interface stopPropagation() and preventDefault().

46) When should you use the top-class elements for the function element?

If your element does a stage or lifetime cycle, we should use top-class elements.

47) How can you share an element in the parsing?

Using the State, we can share the data.

48) Explain the term reconciliation

When a component's state or props change then rest will compare the rendered element with previously rendered DOM and will update the actual DOM if it is needed. This process is known as reconciliation.

49) Ho can you re-render a component without using setState() function?

You can use forceUpdate() function for re-rending any component.

50) Can you update props in react?

You can't update props in react js because props are read-only. Moreover, you can not modify props received from parent to child.

51) Explain the term 'Restructuring.'

Restructuring is extraction process of array objects. Once the process is completed, you can separate each object in a separate variable.

52) Can you update the values of props?

It is not possible to update the value of props as it is immutable.

53) Explain the meaning of Mounting and Demounting

- The process of attaching the element to the DCOM is called mounting.
- The process of detaching the element from the DCOM is called the demounting process.

54) What is the use of 'prop-types' library?

'Prop-types' library allows you to perform runtime type checking for props and similar object in a recent application.

55) Explain react hooks

React hooks allows you to use State, and other React features without writing a class.

56) What are Fragments?

You can use fragment keyword to group a list of children components without using any extra nodes to the DOM.

For example :

render() {

return (

);

}

57) What is the main difference between createElement and cloneElment?

- createElement is used by react to create react elements.
- cloneElement is used to clone an element and pass it new props.

58) What are Controlled Components?

Controlled components are component which controls the input elements.

59) Why do you need to use props.children?

This props.children allow you to pass a component as data to other components.

60) List down some of the methods in a react-dom package

Important methods for react-dom packages are:

- render()
- hydrate()
- createPortal()
- unmountComponentAtNode()
- findDOMNode()

61) How can we do server-side rendering in React?

We can use reaction serve to do the server-side rendering.

62) State the difference between getIntialState() and constructor()?

If you want to create one component by extending 'React. Component', the constructor helps you to initialize the State. But, if you want to create by using 'Reat.createClass.' then you should use 'genInitiaState.'

63) What is refs?

Ref are an attribute of the DOM elements. The primary purpose of the refs is to find the DOM elements easily.

64) What is ComponentWillMount()

This function is called after the DOM element removes from DOM, and it will swipe the memory, which helps you to increase the access space.

65) How to dispatch the data in-store?

We can dispatch the data to another component which should be based on the action which stores the parent component.

66) How will be you able to handle more action using redux?

In order to create the same component in more action flow, we are using the same functionality in various modules.

67) How can you spill the reducers?

We can spill the rescues based on the event actions. That action should be split in separate modules.

68) Name any five predefined prototypes used in React

Most important protoype used in React js are:

- number
- string
- array
- object
- element

69) What is the purpose of using bindActionsCreators?

BindActionCreator helps you to bind the event based on the action dispatcher to the HTML element.

70) What is REFS in React

Ref is a reference to the element. It should be avoided in most cases. However, sometimes it is used when you need to access DOM or instance of the component directly.

71) Can JSX element be attached to other JSX components?

Yes, you can use attach JSX element with other JSX components which is very much similar to nesting HTML elements.

72) What is the Current Stable Version of React?

The current stable version of React is version 17.5

73) Name out an important feature of Redux workflow features

Important features of Redux workflow are:

- Reset: Helps you to reset the State of the Store
- Revert: Allows you to roll back to the last committed State
- Sweep: All disable action that you might fire by mistake will be removed
- Commit: Helps you to make the current State the initial State.

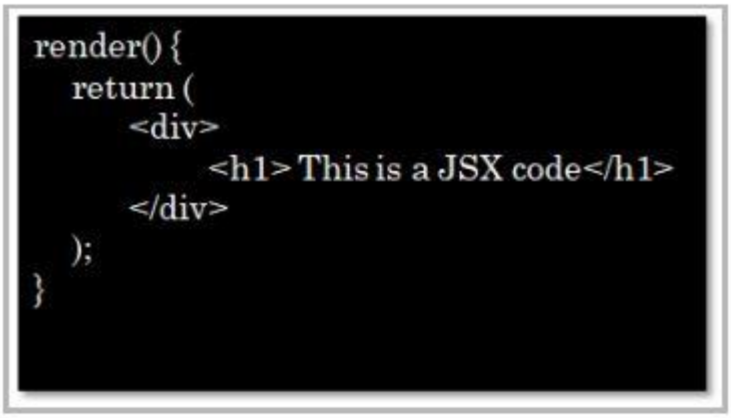
74) State the difference between React JS and React Native

React js is a front end open-source JavaScript library used for building UIs.

Rect Native, is an open-source, mobile framework which allows developers to user React on platforms like Android and iOS.

2. What is JSX?

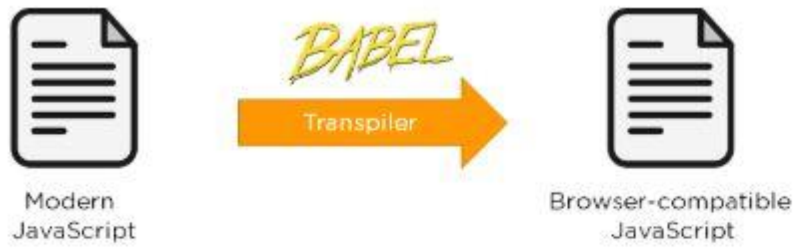
JSX is a syntax extension of JavaScript. It is used with React to describe what the user interface should look like. By using JSX, we can write HTML structures in the same file that contains JavaScript code.



```
render() {
  return (
     <div>
          <h1> This is a JSX code</h1>
     </div>
  );
}
```

3. Can web browsers read JSX directly?

- Web browsers cannot read JSX directly. This is because they are built to only read regular JS objects and JSX is not a regular JavaScript object
- For a web browser to read a JSX file, the file needs to be transformed into a regular JavaScript object. For this, we use Babel



5. Why use React instead of other frameworks, like Angular?

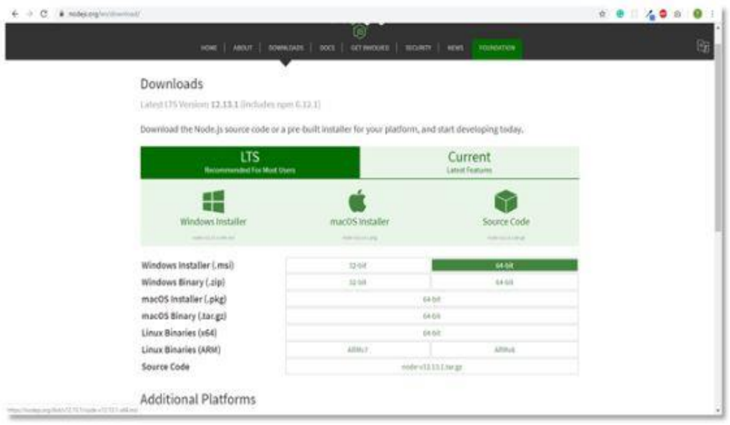
	Easy creation of dynamic applications: React makes it easier to create dynamic web applications because it provides less coding and provides more functionality, whereas, with JavaScript applications, code tends to get complex very quickly.

	Improved performance: React uses virtual DOM, which makes web applications perform faster. Virtual DOM compares its previous state and updates only those components in the real DOM, whose states have changed, rather than updating all the components — like conventional web applications.
	Reusable components: Components are the building blocks of any React application, and a single app usually consists of multiple components. These components have their own logic and controls, and they can be reused through the application, which, in turn, dramatically reduces the development time of an application.
	Unidirectional data flow: React follows a unidirectional data flow. This means that when designing a React app, we often nest child components within parent components. And since the data flows in a single direction, it becomes easier to debug errors and know where the problem occurs in an application at the moment.
	Dedicated tools for easy debugging: Facebook has released a chrome extension that we can use to debug React applications. This makes the process of debugging React to web applications faster and easier.

7. How do you create a React app?

These are the steps for creating a React app:

- Install NodeJS on the computer because we need npm to install the React library. Npm is the node package manager that contains many JavaScript libraries, including React.


Downloads

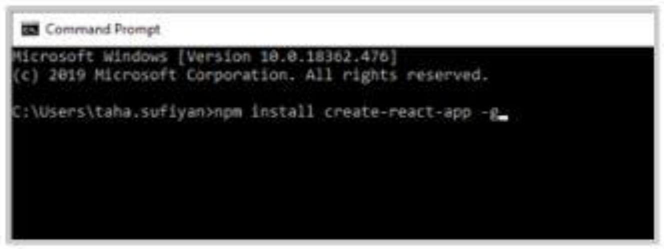
Latest LTS Version: 12.13.1 (includes npm 6.12.1)

Download the Node.js source code or a pre-built installer for your platform, and start developing today.

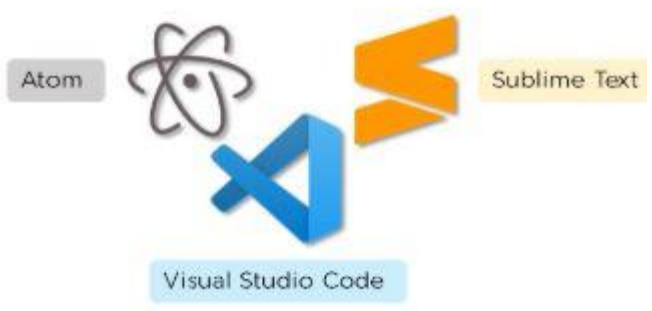
Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit	
macOS Binary (.tar.gz)	64-bit	
Linux Binaries (x64)	64-bit	
Linux Binaries (ARM)	ARMv7	ARMv8
Source Code	node-v12.13.1.tar.gz	

Additional Platforms

- Install the create-react-app package using the command prompt or terminal.


```
Microsoft Windows [Version 10.0.18362.476]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\taha.sufiyan>npm install create-react-app -g
```

- Install a text editor of your choice, like VS Code or Sublime Text.



We have put together a set of Node.js interview questions in case you would like to explore them.

8. What is an event in React?

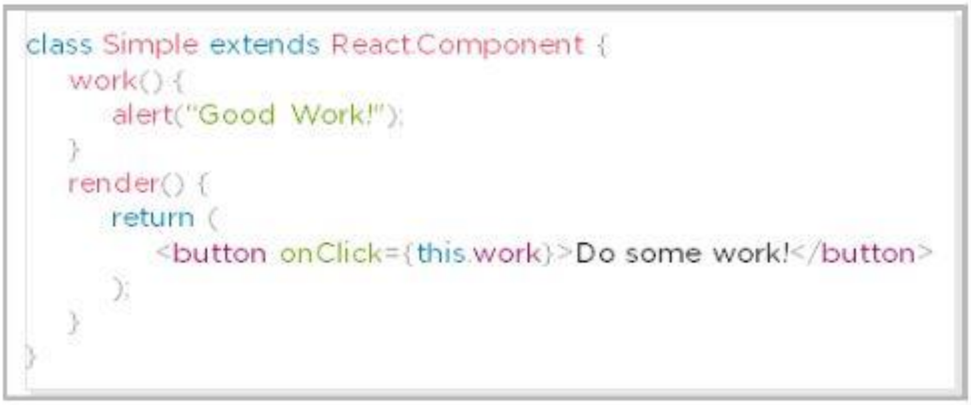
An event is an action that a user or system may trigger, such as pressing a key, a mouse click, etc.

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

```
<Button onPress={lightItUp} />
```

9. How do you create an event in React?

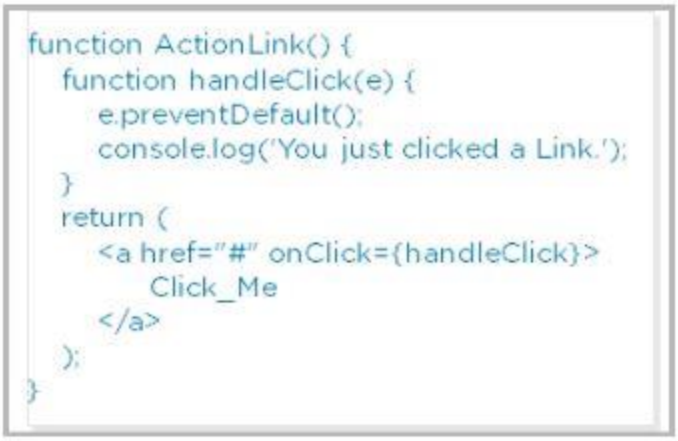
A React event can be created by doing the following:



```
class Simple extends React.Component {
   work() {
      alert("Good Work!");
   }
   render() {
      return (
         <button onClick={this.work}>Do some work!</button>
      );
   }
}
```

10. What are synthetic events in React?

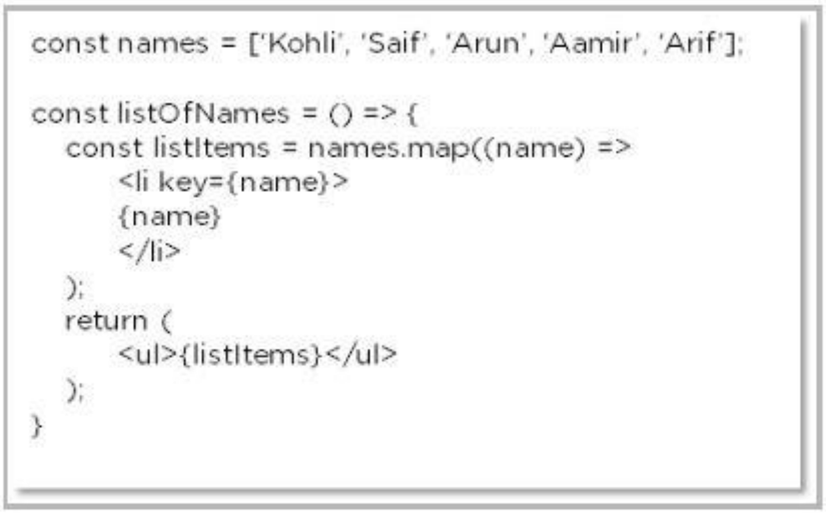
- Synthetic events combine the response of different browser's native events into one API, ensuring that the events are consistent across different browsers.
- The application is consistent regardless of the browser it is running in. Here, preventDefault is a synthetic event.



```
function ActionLink() {
   function handleClick(e) {
      e.preventDefault();
      console.log('You just clicked a Link.');
   }
   return (
      <a href="#" onClick={handleClick}>
         Click_Me
      </a>
   );
}
```

11. Explain how lists work in React

- We create lists in React as we do in regular JavaScript. Lists display data in an ordered format
- The traversal of lists is done using the map() function



```
const names = ['Kohli', 'Saif', 'Arun', 'Aamir', 'Arif'];

const listOfNames = () => {
   const listItems = names.map((name) =>
       <li key={name}>
       {name}
       </li>
   );
   return (
       <ul>{listItems}</ul>
   );
}
```

12. Why is there a need for using keys in Lists?

Keys are very important in lists for the following reasons:

- A key is a unique identifier and it is used to identify which items have changed, been updated or deleted from the lists
- It also helps to determine which components need to be re-rendered instead of re-rendering all the components every time. Therefore, it increases performance, as only the updated components are re-rendered

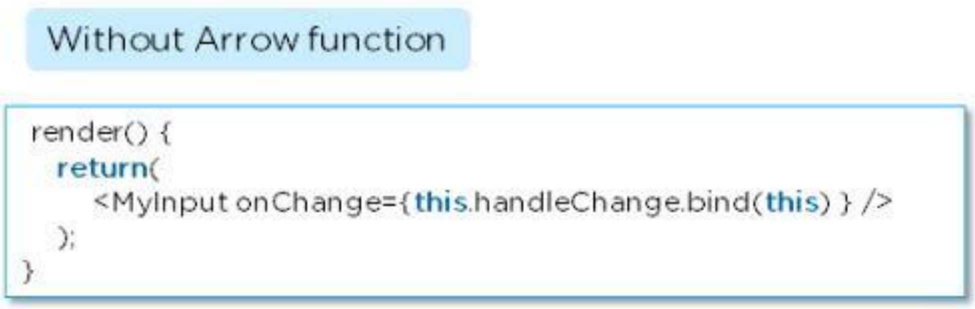
13. What are forms in React?

React employs forms to enable users to interact with web applications.

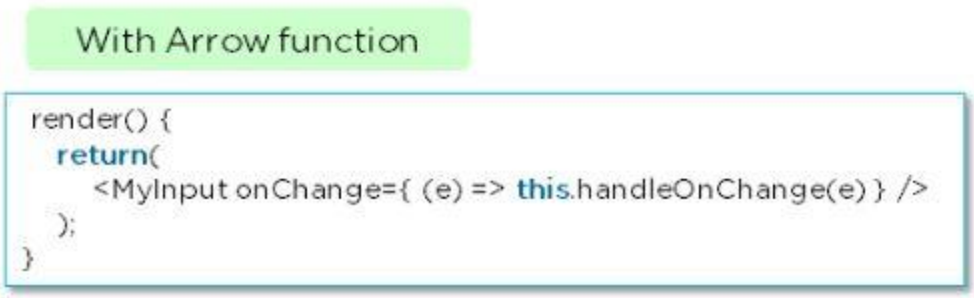
- Using forms, users can interact with the application and enter the required information whenever needed. Form contain certain elements, such as text fields, buttons, checkboxes, radio buttons, etc
- Forms are used for many different tasks such as user authentication, searching, filtering, indexing, etc

16. What is an arrow function and how is it used in React?

- An arrow function is a short way of writing a function to React.
- It is unnecessary to bind 'this' inside the constructor when using an arrow function. This prevents bugs caused by the use of 'this' in React callbacks.



```
render() {
  return(
     <MyInput onChange={this.handleChange.bind(this) } />
  );
}
```



```
render() {
  return(
     <MyInput onChange={ (e) => this.handleOnChange(e) } />
  );
}
```

17. How is React different from React Native?

	React	React Native
Release	2013	2015
Platform	Web	Mobile – Android, iOS
HTML	Yes	No
CSS	Yes	No
Prerequisites	JavaScript, HTML, CSS	React.js

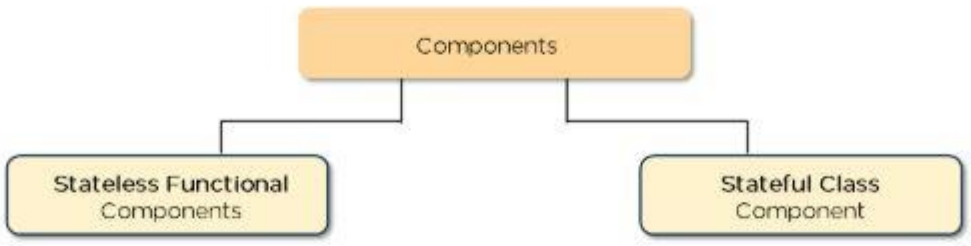
18. How is React different from Angular?

	Angular	React
Author	Google	Facebook
Architecture	Complete MVC	View layer of MVC
DOM	Real DOM	Virtual DOM
Data-Binding	Bi-directional	Uni-directional
Rendering	Client-Side	Server-Side
Performance	Comparatively slow	Faster due to Virtual DOM

19. What are the components in React?

Components are the building blocks of any React application, and a single app usually consists of multiple components. A component is essentially a piece of the user interface. It splits the user interface into independent, reusable parts that can be processed separately.

There are two types of components in React:



- Functional Components: These types of components have no state of their own and only contain render methods, and therefore are also called stateless components. They may derive data from other components as props (properties).

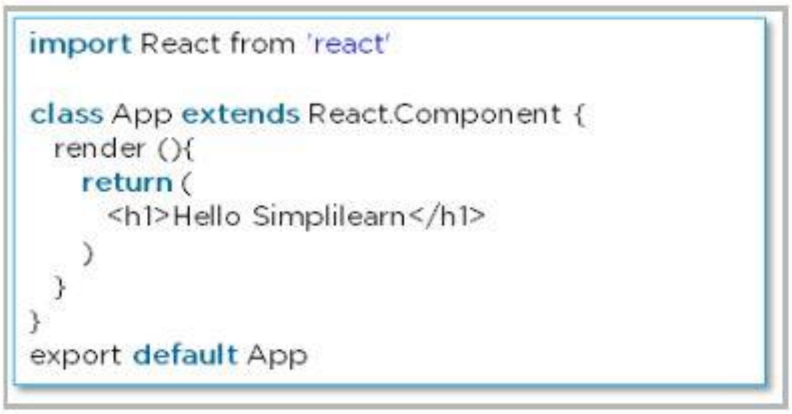
```
function Greeting(props) {
  return <h1>Welcome to {props.name}</h1>;
}
```

- Class Components: These types of components can hold and manage their own state and have a separate render method to return JSX on the screen. They are also called Stateful components as they can have a state.

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

20. What is the use of render() in React?

- It is required for each component to have a render() function. This function returns the HTML, which is to be displayed in the component.
- If you need to render more than one element, all of the elements must be inside one parent tag like <div>, <form>.

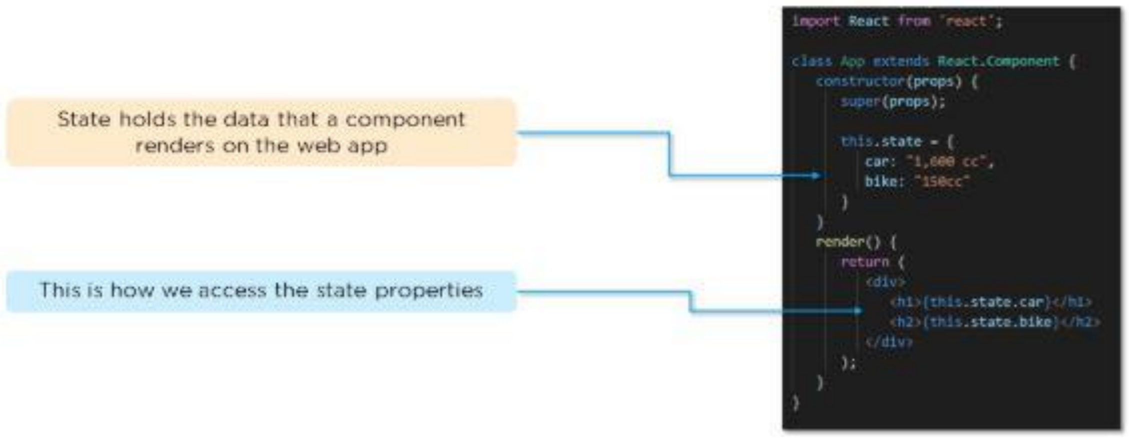


```
import React from 'react'

class App extends React.Component {
  render (){
    return (
      <h1>Hello Simplilearn</h1>
    )
  }
}
export default App
```

21. What is a state in React?

- The state is a built-in React object that is used to contain data or information about the component. The state in a component can change over time, and whenever it changes, the component re-renders.
- The change in state can happen as a response to user action or system-generated events. It determines the behavior of the component and how it will render.

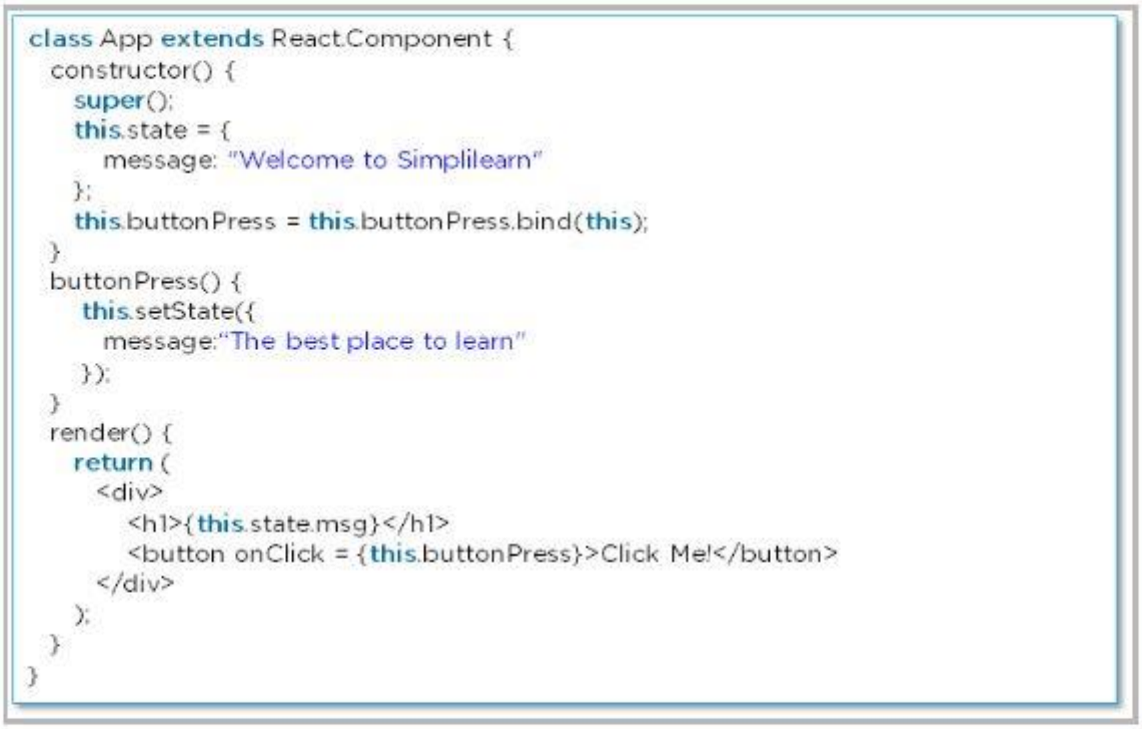
22. How do you implement state in React?


State holds the data that a component renders on the web app
This is how we access the state properties

```
import React from 'react';

class App extends React.Component {
  constructor(props) {
    super(props);

    this.state = {
      car: "1,000 cc",
      bike: "150cc"
    }
  }
  render() {
    return (
      <div>
        <h1>{this.state.car}</h1>
        <h2>{this.state.bike}</h2>
      </div>
    );
  }
}
```

23. How do you update the state of a component?

We can update the state of a component by using the built-in ‘setState()’ method:

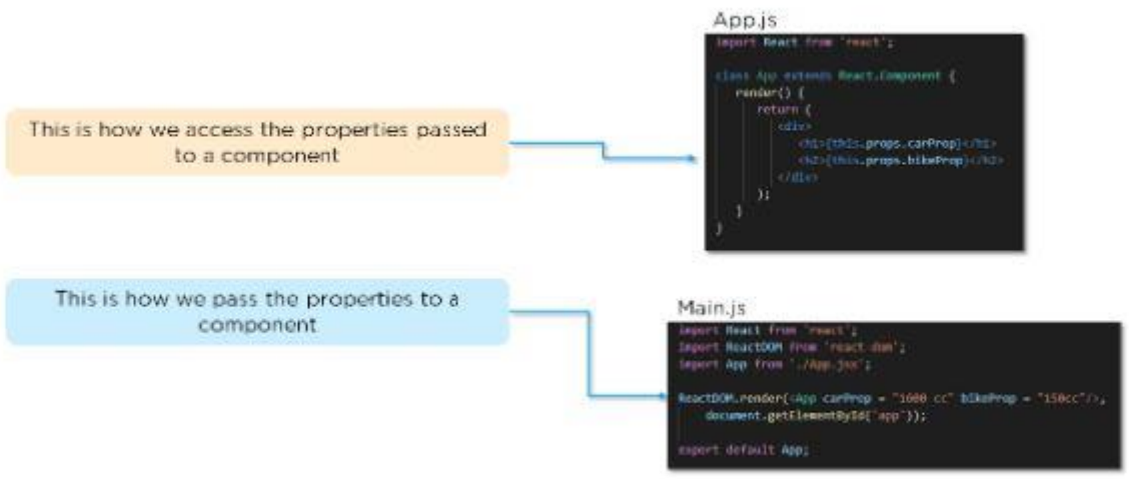


```
class App extends React.Component {
  constructor() {
    super();
    this.state = {
      message: "Welcome to Simplilearn"
    };
    this.buttonPress = this.buttonPress.bind(this);
  }
  buttonPress() {
    this.setState({
      message:"The best place to learn"
    });
  }
  render() {
    return (
      <div>
        <h1>{this.state.msg}</h1>
        <button onClick = {this.buttonPress}>Click Me!</button>
      </div>
    );
  }
}
```

24. What are props in React?

- Props are short for Properties. It is a React built-in object that stores the value of attributes of a tag and works similarly to HTML attributes.
- Props provide a way to pass data from one component to another component. Props are passed to the component in the same way as arguments are passed in a function.

25. How do you pass props between components?


This is how we access the properties passed to a component
This is how we pass the properties to a component
App.js
Main.js

```
import React from 'react';

class App extends React.Component {
   render() {
      return (
         <div>
            <h1>{this.props.carProp}</h1>
            <h2>{this.props.bikeProp}</h2>
         </div>
      );
   }
}
```

```
import React from 'react';
import ReactDOM from 'react-dom';
import App from './App.jsx';

ReactDOM.render(<App carProp = "1000 cc" bikeProp = "150cc"/>,
   document.getElementById('app'));

export default App;
```

26. What are the differences between state and props?

	State	Props
Use	Holds information about the components	Allows to pass data from one component to other components as an argument
Mutability	Is mutable	Are immutable
Read-Only	Can be changed	Are read-only
Child components	Child components cannot access	Child component can access

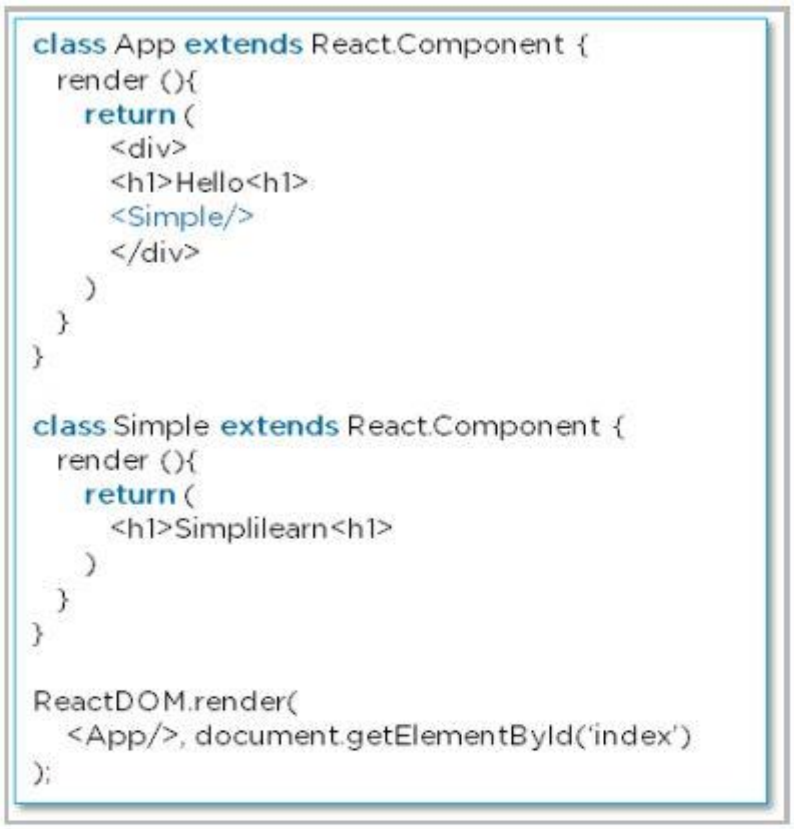
Stateless components	Cannot have state	Can have props

27. What is a higher-order component in React?

A higher-order component acts as a container for other components. This helps to keep components simple and enables re-usability. They are generally used when multiple components have to use a common logic.

28. How can you embed two or more components into one?

We can embed two or more components into one using this method:

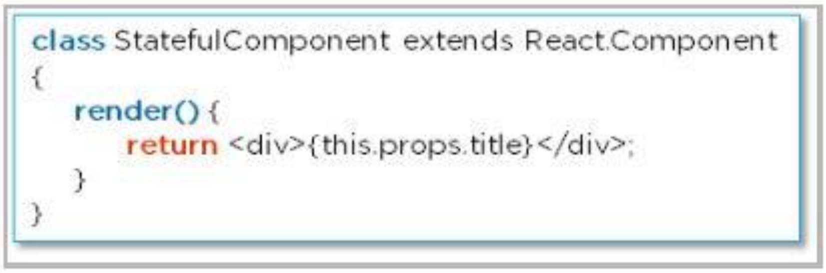


```
class App extends React.Component {
  render (){
    return (
      <div>
      <h1>Hello<h1>
      <Simple/>
      </div>
    )
  }
}

class Simple extends React.Component {
  render (){
    return (
      <h1>Simplilearn<h1>
    )
  }
}

ReactDOM.render(
   <App/>, document.getElementById('index')
);
```

29. What are the differences between class and functional components?

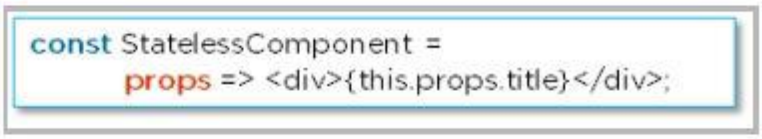
	Class Components	Functional Components
State	Can hold or manage state	Cannot hold or manage state
Simplicity	Complex as compared to the stateless component	Simple and easy to understand
Lifecycle methods	Can work with all lifecycle methods	Does not work with any lifecycle method
Reusability	Can be reused	Cannot be reused

- Class components example:



```
class StatefulComponent extends React.Component
{
    render() {
        return <div>{this.props.title}</div>;
    }
}
```

- Functional components example:



```
const StatelessComponent =
        props => <div>{this.props.title}</div>;
```

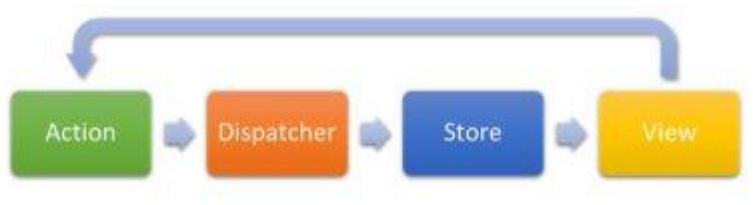
.

31. What is Redux?

Redux is an open-source, JavaScript library used to manage the application state. React uses Redux to build the user interface. It is a predictable state container for JavaScript applications and is used for the entire application’s state management.

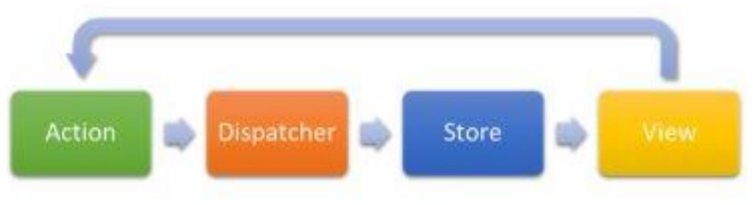
32. What are the components of Redux?

- Store: Holds the state of the application.
- Action: The source information for the store.
- Reducer: Specifies how the application's state changes in response to actions sent to the store.

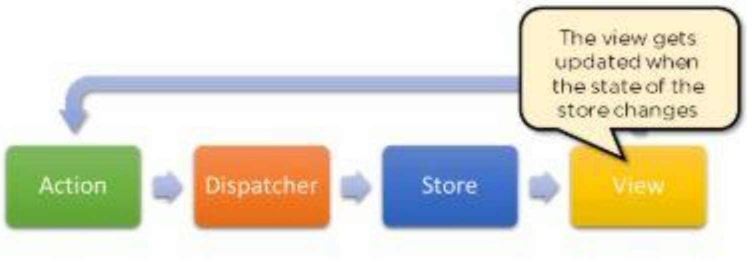


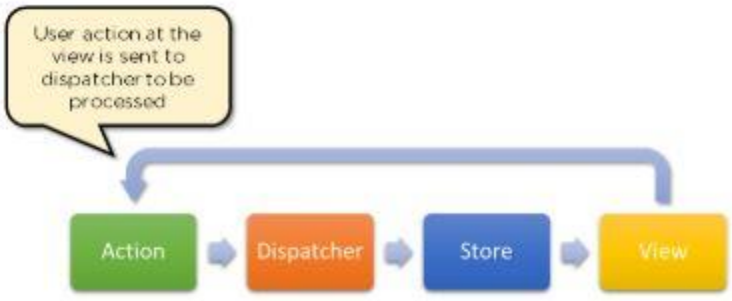
33. What is the Flux?

- Flux is the application architecture that Facebook uses for building web applications. It is a method of handling complex data inside a client-side application and manages how data flows in a React application.

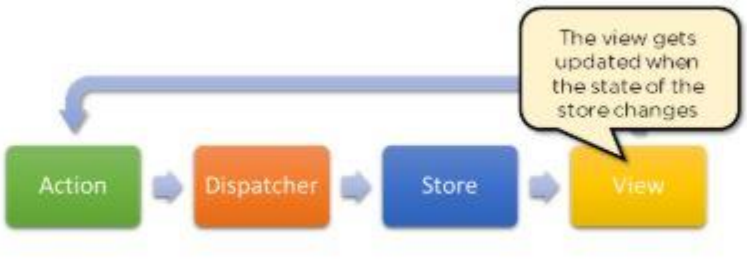


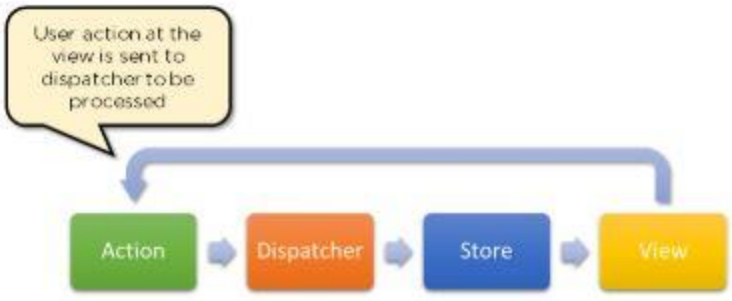
- There is a single source of data (the store) and triggering certain actions is the only way way to update them.The actions call the dispatcher, and then the store is triggered and updated with their own data accordingly.




User action at the view is sent to dispatcher to be processed
Action
Dispatcher
Store
View

- When a dispatch has been triggered, and the store updates, it will emit a change event that the views can rerender accordingly.




User action at the view is sent to dispatcher to be processed
Action
Dispatcher
Store
View

35. What is React Router?

React Router is a routing library built on top of React, which is used to create routes in a React application.

36. Why do we need to React Router?

- It maintains consistent structure and behavior and is used to develop single-page web applications.
- Enables multiple views in a single application by defining multiple routes in the React application.

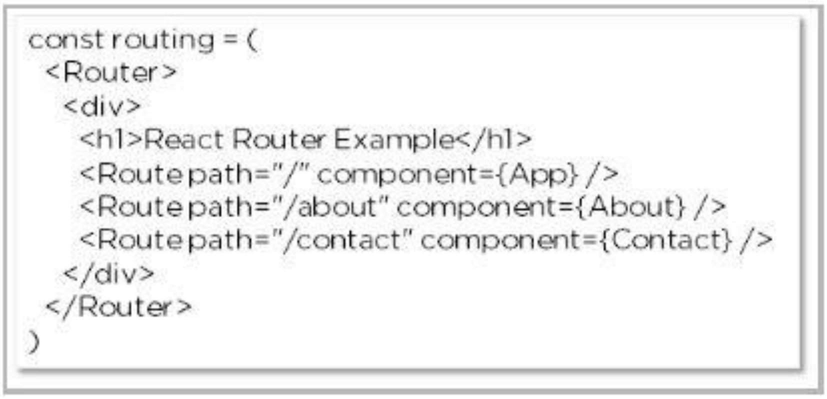
37. How is React routing different from conventional routing?

SN	React Routing	Conventional routing
1.	Single HTML page	Each view is a new HTML file
2.	The user navigates multiple views in the same file	The user navigates multiple files for each view
3.	The page does not refresh since it is a single file	The page refreshes every time user navigates
4.	Improved performance	Slower performance

38. How do you implement React routing?

We can implement routing in our React application using this method:

Considering we have the components App, About, and Contact in our application:

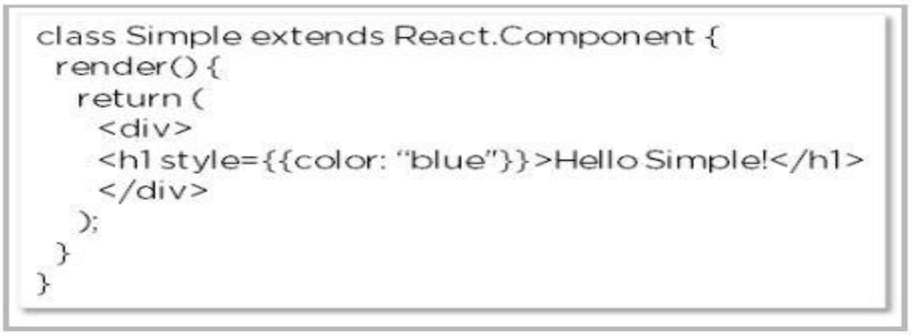


```
const routing = (
 <Router>
  <div>
   <h1>React Router Example</h1>
   <Route path="/" component={App} />
   <Route path="/about" component={About} />
   <Route path="/contact" component={Contact} />
  </div>
 </Router>
)
```

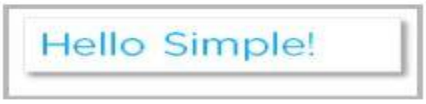
39. How do you style React components?

There are several ways in which we can style React components:

- Inline Styling

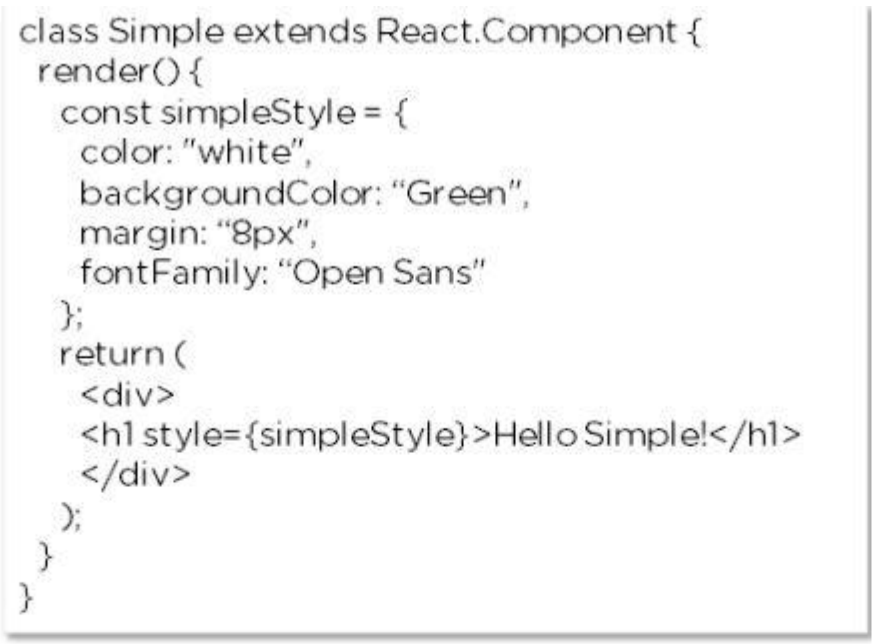


```
class Simple extends React.Component {
 render() {
  return (
   <div>
   <h1 style={{color: "blue"}}>Hello Simple!</h1>
   </div>
  );
 }
}
```

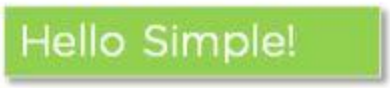


Hello Simple!

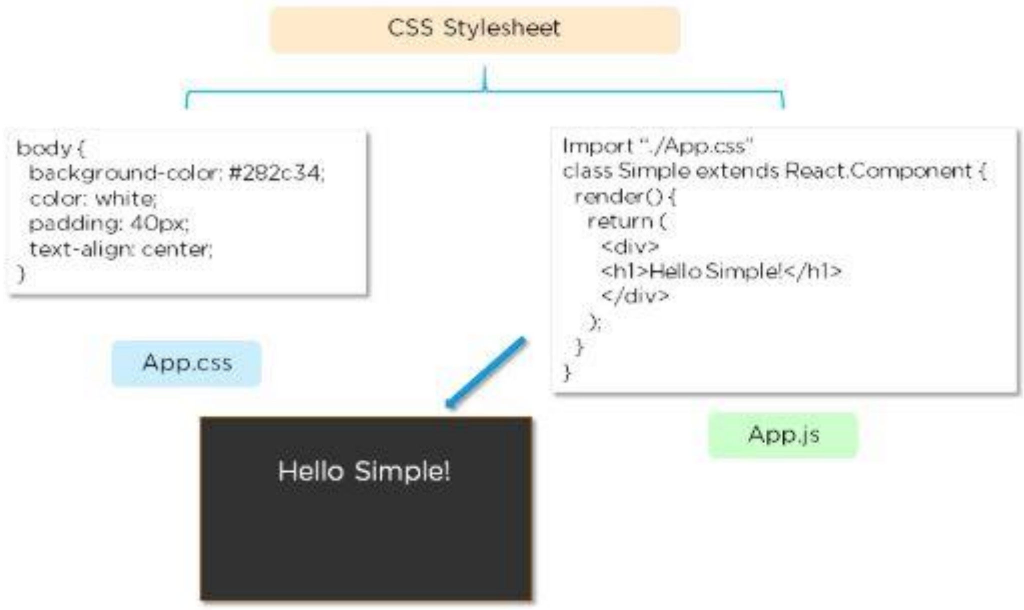
- JavaScript Object



```
class Simple extends React.Component {
  render() {
    const simpleStyle = {
      color: "white",
      backgroundColor: "Green",
      margin: "8px",
      fontFamily: "Open Sans"
    };
    return (
      <div>
      <h1 style={simpleStyle}>Hello Simple!</h1>
      </div>
    );
  }
}
```



- CSS Stylesheet

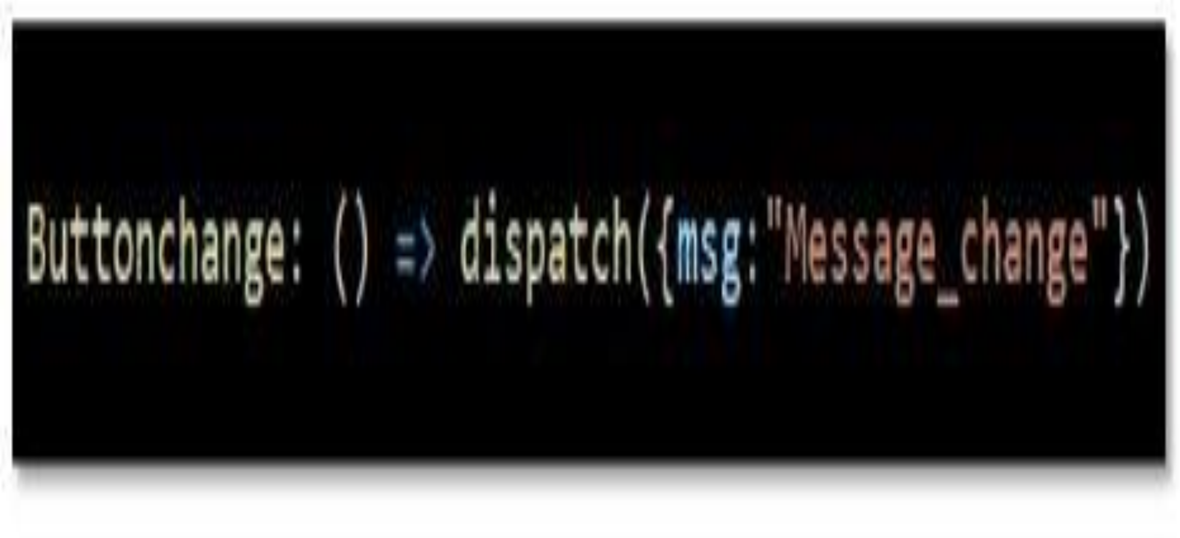


```
body {
  background-color: #282c34;
  color: white;
  padding: 40px;
  text-align: center;
}
```

```
Import "./App.css"
class Simple extends React.Component {
  render() {
    return (
      <div>
      <h1>Hello Simple!</h1>
      </div>
    );
  }
}
```

40. Explain the use of CSS modules in React.

- The CSS module file is created with the .module.css extension
- The CSS inside a module file is available only for the component that imported it, so there are no naming conflicts while styling the components.



```
Buttonchange: () => dispatch({msg:"Message_change"})
```