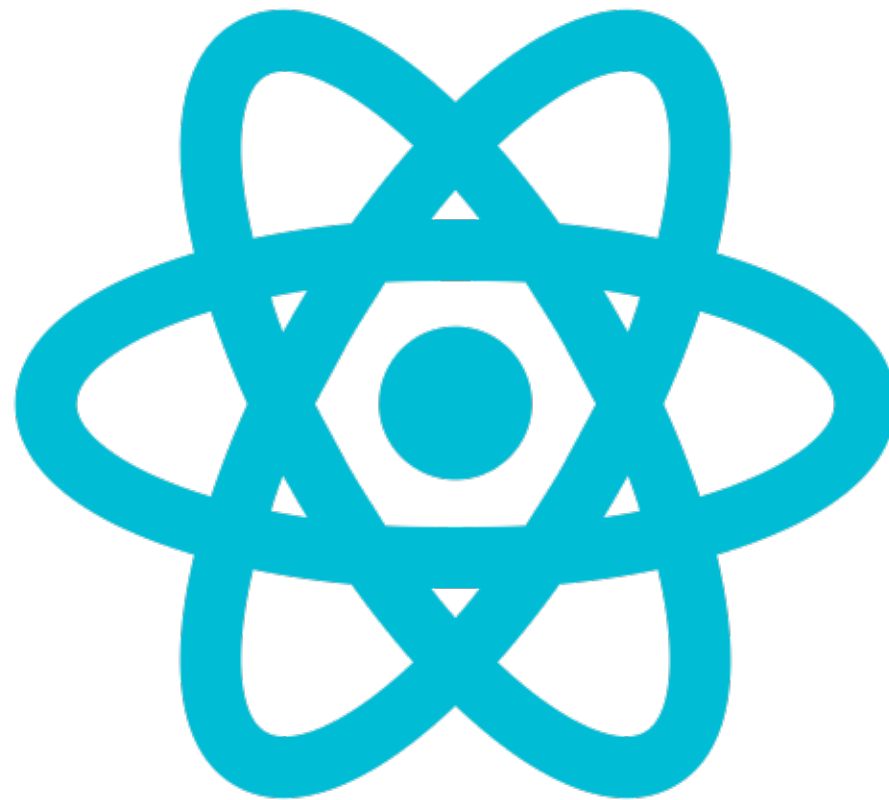


# Introduction to React



# React libraries

- This link after Javascript revision  
[https://developer.mozilla.org/en-US/docs/Web/JavaScript/A\\_re-introduction\\_to\\_JavaScript](https://developer.mozilla.org/en-US/docs/Web/JavaScript/A_re-introduction_to_JavaScript)
- React: <https://reactjs.org/docs/react-api.html>
- ReactDOM: <https://reactjs.org/docs/react-dom.html>

# Create React App

- [Create React App](#) is a comfortable environment for **learning React**, and is the best way to start building **a new single-page application** in React.
- It sets up your development environment so that you can use the latest JavaScript features, provides a nice developer experience, and optimizes your app for production. You'll need to have [Node >= 10.16](#) [and npm >= 5.6](#) on your machine. To create a project, run:

```
npx create-react-app my-app  
cd my-app  
npm start
```

# JavaScript build toolchain

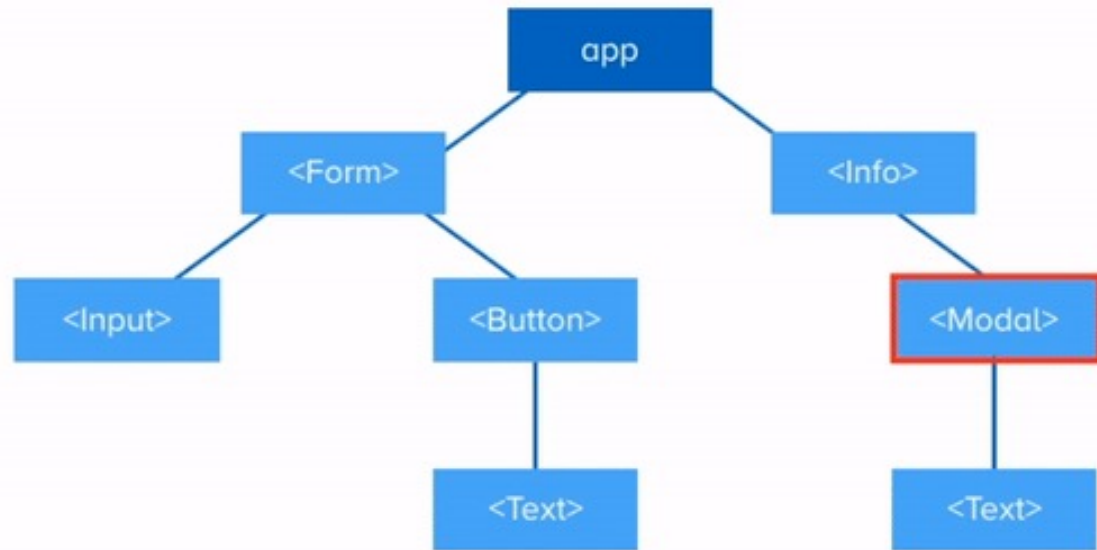
- A **package manager**, such as Yarn or npm. It lets you take advantage of a vast ecosystem of third-party packages, and easily install or update them.
- A **bundler**, such as webpack or Parcel. It lets you write modular code and bundle it together into small packages to optimize load time.
- A **compiler** (transpiler) such as Babel. It lets you write modern JavaScript code that still works in older browsers.

How does It work

# What is the Virtual DOM?

- The virtual DOM (VDOM) is a programming concept where an ideal, or “virtual”, representation of a UI is kept in memory and synced with the “real” DOM by a library such as ReactDOM. This process is called [reconciliation](#).
- When you use React, at a single point in time you can think of the render() function as creating a tree of React elements. On the next state or props update, that render() function will return a different tree of React elements. React then needs to figure out how to efficiently update the UI to match the most recent tree.

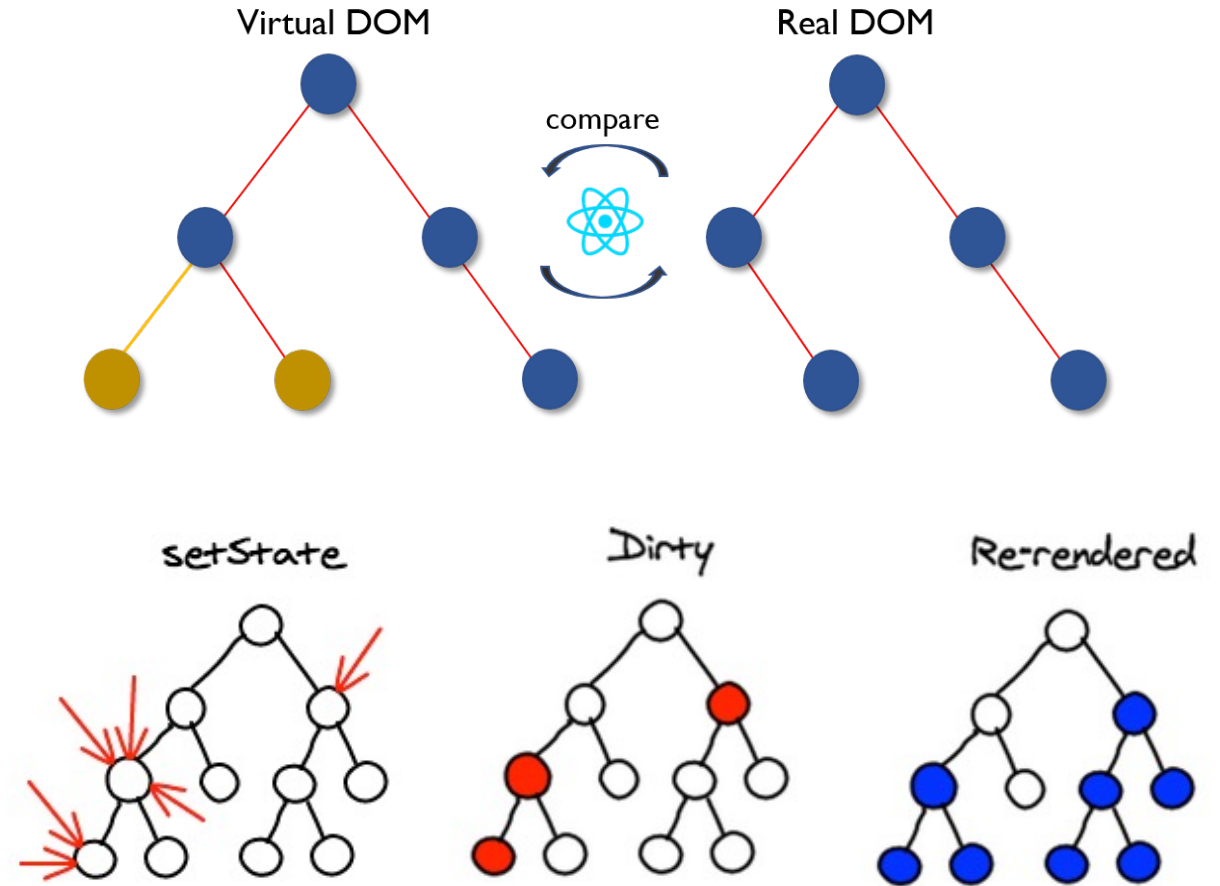
# Virtual DOM Update



- - DOM node
- - React component

# Virtual DOM Update

- **React** follows the observable pattern and listens for state changes. When the state of a component changes, **React updates** the **virtual DOM** tree. Once the **virtual DOM** has been **updated**, **React** then compares the current version of the **virtual DOM** with the previous version of the **virtual DOM**. This process is called "diffing".





Main concepts

# Hello World

- The smallest React example looks like this:

```
ReactDOM.render(  
  <h1>Hello, world!</h1>,  
  document.getElementById('root')  
)
```

It displays a heading saying “Hello, world!” on the page.

# Introducing JSX

# JSX

```
const element = <h1>Hello, world!</h1>;
```

- This funny tag syntax is neither a string nor HTML.
- It is called JSX, and it is a syntax extension to JavaScript. It is recommend using it with React to describe what the UI should look like. JSX may remind you of a template language, but it comes with the full power of JavaScript.

# Embedding Expressions in JSX

- In the example below, we declare a variable called name and then use it inside JSX by wrapping it in curly braces:

```
const name = 'Josh Perez';  
const element = <h1>Hello, {name}</h1>;  
  
ReactDOM.render(  
  element,  
  document.getElementById('root')  
);
```

# JSX is an Expression Too

- After compilation, JSX expressions become regular JavaScript function calls and evaluate to JavaScript objects.
- This means that you can use JSX inside of if statements and for loops, assign it to variables, accept it as arguments, and return it from functions:

```
function getGreeting(user) {  
  if (user) {  
    return <h1>Hello, {formatName(user)}!</h1>;  
  }  
  return <h1>Hello, Stranger.</h1>;  
}
```

# Specifying Attributes with JSX

- You may use quotes to specify string literals as attributes:

```
const element = <div tabIndex="0"></div>;
```

- You may also use curly braces to embed a JavaScript expression in an attribute:

```
const element = <img src={user.avatarUrl}></img>;
```

- Don't put quotes around curly braces when embedding a JavaScript expression in an attribute. You should either use quotes (for string values) or curly braces (for expressions), but not both in the same attribute.

# Warning

- Since JSX is closer to JavaScript than to HTML, React DOM uses camelCase property naming convention instead of HTML attribute names.
- For example, class becomes `className` in JSX, and `tabindex` becomes `tabIndex`.



# Specifying Children with JSX

- If a tag is empty, you may close it immediately with `/>`, like XML:

```
const element = <img src={user.avatarUrl} />;
```

JSX tags may contain children:

```
const element = (  
  <div>  
    <h1>Hello!</h1>  
    <h2>Good to see you here.</h2>  
  </div>  
);
```

# JSX Represents Objects

- Babel compiles JSX down to `React.createElement()` calls.

These two examples are identical:

```
const element = (  
  <h1 className="greeting">  
    Hello, world!  
  </h1>  
);
```

```
const element = React.createElement(  
  'h1',  
  {className: 'greeting'},  
  'Hello, world!'  
);
```

Rendering Elements

# Element to render

- An element describes what you want to see on the screen:

```
const element = <h1>Hello, world!</h1>;
```

- Unlike browser DOM elements, React elements are plain objects, and are cheap to create. React DOM takes care of updating the DOM to match the React elements.
- *Elements are not components!*

# Rendering an element

- Let's say there is a `<div>` somewhere in your HTML file:

```
<div id="root"></div>
```

- We call this a “root” DOM node because everything inside it will be managed by React DOM.
- Applications built with just React usually have a single root DOM node. If you are integrating React into an existing app, you may have as many isolated root DOM nodes as you like.
- To render a React element into a root DOM node, pass both to [ReactDOM.render\(\)](#):

```
const element = <h1>Hello, world</h1>;  
ReactDOM.render(element, document.getElementById('root'));
```

# Updating the Rendered Element

- React elements are [immutable](#). Once you create an element, you can't change its children or attributes. An element is like a single frame in a movie: it represents the UI at a certain point in time.
- With our knowledge so far, the only way to update the UI is to create a new element, and pass it to [ReactDOM.render\(\)](#).
- Consider this ticking clock example:

```
function tick() {  
  const element = (  
    <div>  
      <h1>Hello, world!</h1>  
      <h2>It is {new Date().toLocaleTimeString()}</h2>  
    </div>  
  );  
  ReactDOM.render(element, document.getElementById('root'));  
}  
  
setInterval(tick, 1000);
```