React notes

React → A javascript library for building user interfaces

HTML

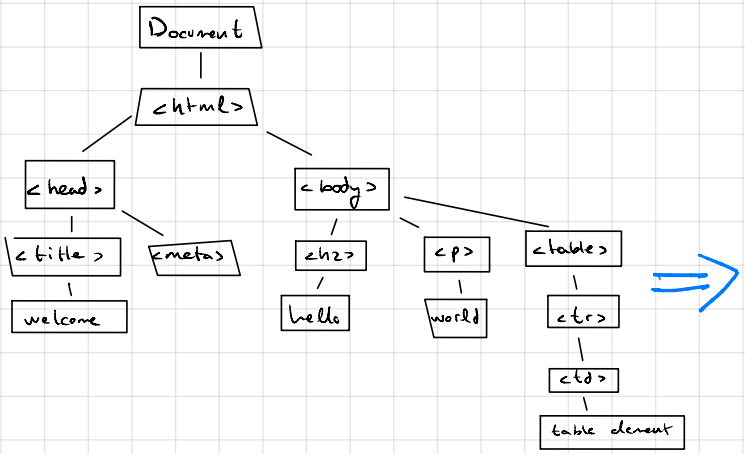
- Declarative for static content
- When element change whole HTML DOM is rendered. Update whole tree

VS

React

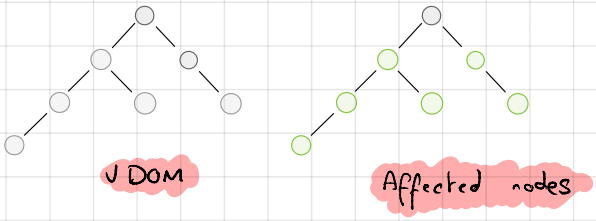
- Declarative for dynamic data
- When some element change virtual DOM render HTML tree from JS (in memory)

RDOM



VDOM

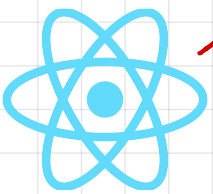
VDOM is a programing concept where VDOM is kept in memory synced with RDOM by ReactDOM library. This process is called reconciliation.



- DOM manipulation is very expensive
- There is too much memory wastage
- it updates slow
- it can directly update HTML
- Creates a new DOM if the element updates
- it allows us to directly target any specific node (HTML element)
- it represents the ui of your app

≠

- DOM manipulation is very easy
- No memory wastage
- it updates fast
- it can't directly update HTML
- Update the JSX if the element update
- it can produce ~ 200k VDOM nodes/sec
- it's a virtual representation



Components
- Live functions
- Input: props, state ⟩ Output: UI
- Reusable and composable
- <Component />
- Can manage a private state

Reactive updates
- React will react
- Take updates to the browser

Virtual views in memory
- Generate HTML using JS
- No HTML template lang
- Tree reconciliation

React components

Uppercase

```
function Hello () {
  1 // return <div> Hello </div>
  2 return React.createElement (
        'div',
        null,
        'Hello'
    );
ReactDOM.render (
  1 // <Hello />
  2 document.getElementById ('element')
);
```

React hooks

Hooks are functions that let you "hook into" React state and lifecycle features from function components. They let you use React without classes

- Hooks
  - useState
    - State variable
    - Function that modify
  - useEffect
    - Function
      - body: Use an effect that made changes
      - return function: Use effect after component unmount
  - React API Hooks (View official documentation)
  - Own + hook

custom state variable

function that change state

```
function logRandom () {
    console.log (Math.random());
}
function Button () {
    const [counter, setCounter] = useState (0);
    return <button onClick = {logRandom}> counter </button>
}
ReactDOM.render (
    <Button />
    document.getElementById ('element'),
);
```

Hooks are a new addition in React 16.8. They let you use state and other React features without writing a class

Can declare multiple states

Equivalent Class example

```
class Example extend React.Component {

    constructor (props) {
        super(props);
        this.state = {
            count : 0
        };
    }

    render () {

        return (
            <button onClick={() => this.setstate ({ count : this.state.count +1 })}>
                Click me
            </button>

        );
    }
};
```

Reading State

```
<p> You clicked { this.state.count} times </p>

<p> You clicked {count} times </p>
```

Class type (1)

Function type (2)

Updating State

```
<button onClick={() => this.setState ({ count: this.state.count +1 })}>
    Click me
</button>

<button onClick={() => setCount (count + 1)}>
    Click me
</button>
```

1

2

Custom Hooks

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

function useFriendStatus (friendId) {
    const [isOnline, setIsOnline] = useState (null);
    useEffect ( () => {
        function handleStatusChange (status) {
            setIsOnline (status.isOnline);
        }
        ChatAPI.subscribeToFriendStatus ( friendId, handleStatusChange);
        return () => {
            ChatAPI. unsubscribeToFriendStatus ( friendId, handleStatusChange);
        };
    });
    return isOnline;
}
```

- Use set prefix convention
- Do 2 components using the same hooks share state? No
- How does a custom hook get isolated state? Each call to a hook gets isolated state. Because we call 'useFriendStatus' directly.

```
function FriendListItem (props) {
    const isOnline = useFriendStatus (props.friend.id);
    return (
        <li style={{ color: isOnline ? 'green' : 'black' }}>
            {props.friend.name}
        </li>
    );
}
```

```
function FriendStatus (props) {
    const isOnline = useFriendStatus (props.friend.id);
    if (isOnline === null) {
        return 'Loading...';
    }
    return isOnline ? 'Online' : 'Offline';
}
```

Create React App

- If you are learning react or creating a new single-page app → Create React App
- If you are building a server-rendered website with Node.js → Next.js
- If you are building a static content-oriented website → Gatsby
- If you are building a component library or integrating with an existing codebase by more flexible toolchains.

  ↳ Neutrino, Nx, Parcel, Razzle.

Creating a Toolchain from Scratch

- Package manager → yarn, npm
- Bundler → webpack, Parcel
- Compiler → Babel

JSX

- JSX produces React "elements"
- React doesn't require using JSX, but most people find it helpful as a visual aid when working with UI inside JS.
- It allows React to show more useful error and warning messages.
- After compilation JSX expressions become regular javascript
- You can use JSX inside of if and for loops, assign to variables, accept it as arguments and return it from function.

Embedding expression

You can put any valid JS expression.

```
const name = 'Nombre';
const element = <h1>Hello {name}</h1>
```

Specifying attributes with JSX

You may use quotes to specify string literals as attributes

```
const element = <a href="url">link</a>
```

You may also use curly braces to embed JS expression in an attribute

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

Specifying children with JSX

- If a tag is empty you may close it inmediately with /> like XML

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

- JSX may contain children:

```
const element = (
    <div>
        <h1>Hello!</h1>
        <h2>Erik</h2>
    </div>
);
```

JSX prevents Injection attacks

By default, React DOM escapes any values embedded in JSX before rendering them. Thus it ensures that you can never inject anything that's not explicitly written in your app. Everything is converted to a string before being rendered. This prevents XSS

JSX represents objects

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

```
const element = (
    <h1 className="greeting">
        Hello Erik
    </h1>
);
```

=

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