JavaScript - Lesson 2
Enhanced Applications

Intervenant

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- MTI 2014

- Lead Front-End Engineer
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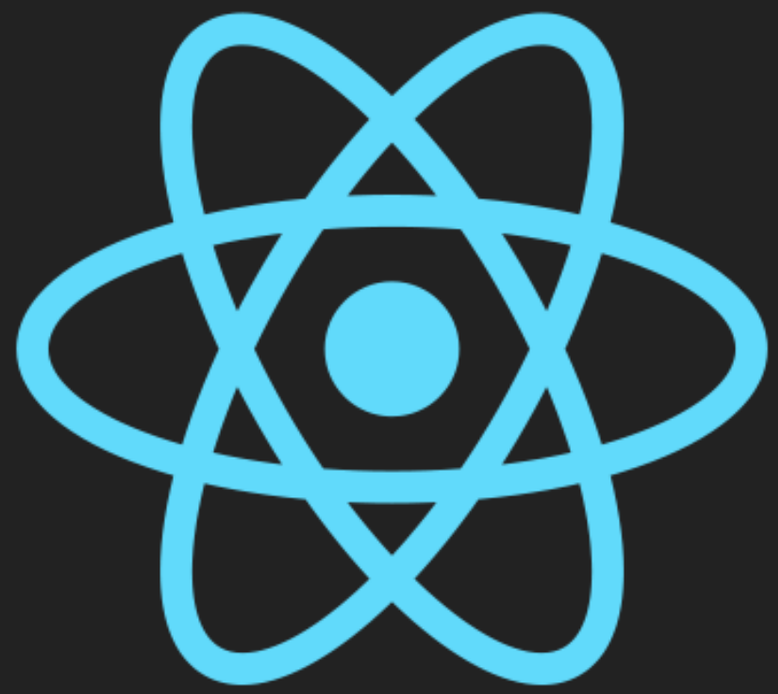
- I make digital ads for a living,

- I'm pretty sure there is a
  special place in hell for this.



React

What is it ?

A framework ?
nope

A library ?
yep, but not only…

(Even though the website says:
“React is a JavaScript library for building user interfaces”)

An ecosystem ?

Yes

React key-points

- **Declarative:** describe your interface.
- **Component-based:** create your blocks, compose them, enhance them.
- **Learn once, write anywhere:** React does not only target the DOM (see ReactNative, ReactVR…)

JSX

```
const helloDiv = <div>Hello Epita !</div>;
```

Do not run away, it’s **only** syntax sugar

JSX

```jsx
const helloDiv = (
  <div className="hello">
    Hello Epita !
  </div>
);

// <=>

const helloDiv = React.createElement(
  'div',
  {className: 'hello'},
  'Hello Epita !'
);
```

- JSX is React's way to bring you its declarative part
- Translates straight to Javascript objects

React DOM

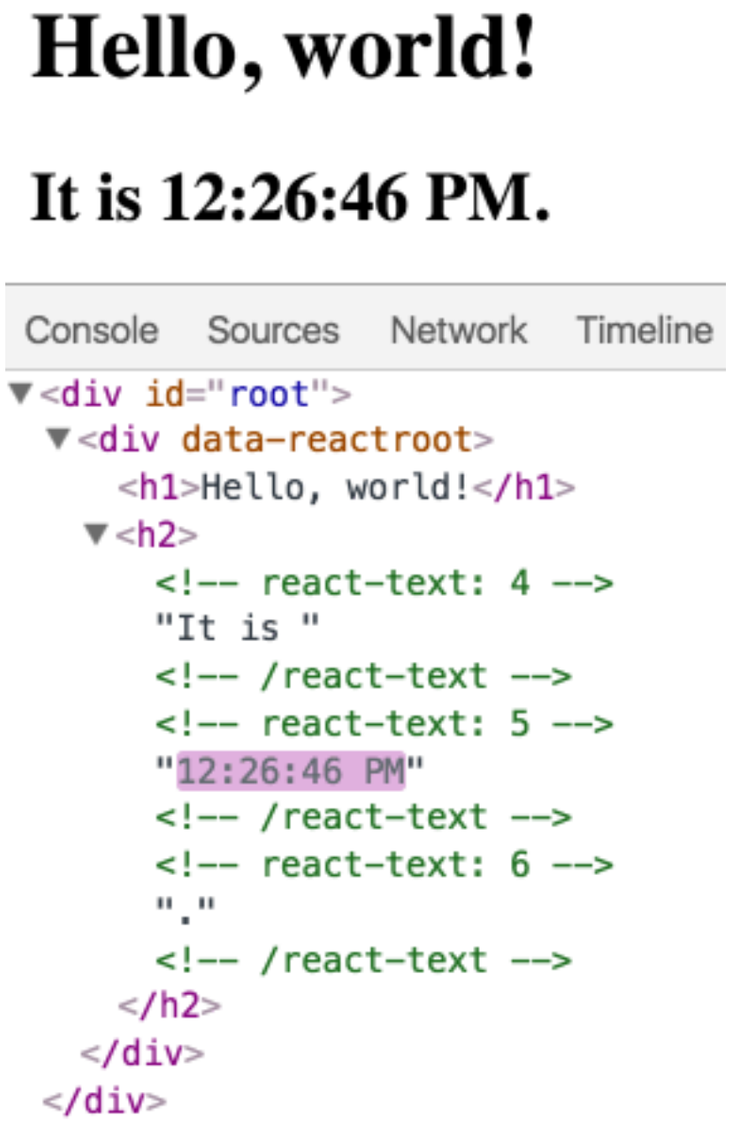
- Allows you to render your React tree to the DOM
- NPM package name: **react-dom**

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

ReactDOM.render(
  element,
  document.getElementById('root')
);
```

React DOM: loop([compute, diff, patch])

- Anytime an update is made, a new tree is built.
- ReactDOM compares the previous elements with the new ones
- ReactDOM only updates what has changed.



Components

```
const MyComponent = () => <h1>Hello, world</h1>;
```

The “atom” element in React is the component,
the most basic of which is a simple function returning an element.

Components: functional

```
const MyComponent = (props) => (
  <h1>Hello, {props.name}</h1>
)
```

A component made of a function taking a single **props** argument and returning a React element is called a **functional component**

Components: class

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

The same component can be written using the ES6 **class** keyword, it is therefore called a **class component**

Components: render

```
ReactDOM.render(
  <MyComponent name="quentin" />,
  window.document.body.getElementById('root')
)
```

This component can be rendered by using it's name as a JSX tag.

Convention: components **always** start with a capital letter.

Components: props

```
const MyComponent = (props) => (
  <h1>Hello, {props.name}</h1>
)
```

```
ReactDOM.render(
  <MyComponent name="quentin" />,
  window.document.body.getElementById('root')
)
```

- **name** is a passed as a **prop** to **MyComponent**
- As components are **pure** functions, **props** are **read-only.**

Components: state

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

    this.state = {
      greeting: "Hello",
    };
  }

  render() {
    return <h1>{this.state.greeting}, {this.props.name}</h1>
  }
)
```

Components can have a local state

Components: setState

- State updates are made using **setState**
- !!! **setState** is asynchronous !!!
- setState can take a callback as a second argument. It will called when the state and the tree have been updated.

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

  handleClick(event) {
    this.setState({ value: this.state.value + 1 });
  }

  render() {
    return (
      <div onClick={e => this.handleClick(e)}>
        {this.state.value}
      </div>
  }
)
```

Components: refs

- **refs** give you a reference to the component right after it is mounted.

- when referencing your node, the ref is called with the node as an argument.

- when changing reference, the ref is called with null before it's run again with the new reference.

- you should avoid using it as much as possible.

Components lifecycle

- Components provide hooks to their lifecycle
- These hooks allow you to “react” to changes

Components lifecycle: mounting & unmounting

- **componentWillMount**: invoked once right before the initial render

- **componentDidMount**: invoked right after the initial render

- **componentWillUnmount**: invoked right before the component is unmounted from the DOM, use it for cleanup.

Components lifecycle: mounting & unmounting

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

  componentWillMount() { console.log("we are about to count !"); }

  componentDidMount() {
    const update = () => {
      this.setState(
        { value: this.state.value + 1 },
        () => { this.timeout = setTimeout(update, 1000) };
      );
    }

    update();
  }

  componentWillUnmount() {
    clearTimeout(this.timeout); // clean up your mess
  }

  render() { return <div> {this.state.value}</div>; }
)
```

Components lifecycle: updating

- **componentWillReceiveProps**: invoked before rendering after a props update.

- **shouldComponentUpdate**: use it to tackle performance bottlenecks and discard renders that are not useful

- **componentWillUpdate**: your component is going to update any way

- **componentDidUpdate:** honestly, who uses this ?

Components lifecycle: updating

```
class Counter extends React.Component {
  constructor(props) {
    super(props);
    this.state = {
      isMouseOver: false,
      color: 'blue',
    };
  }

  componentWillReceiveProps(nextProps, nextState) {
    if (this.state.isMouseOver && !nextState.isMouseOver) {
      this.setState({ color: 'blue' });
    }

    if (!this.state.isMouseOver && nextState.isMouseOver) {
      this.setState({ color: 'green' });
    }
  }

  render() { return <div style={{ backgroundColor: this.state.color }} />; }
)
```

Lifecycle: sum up

“Render Phase”

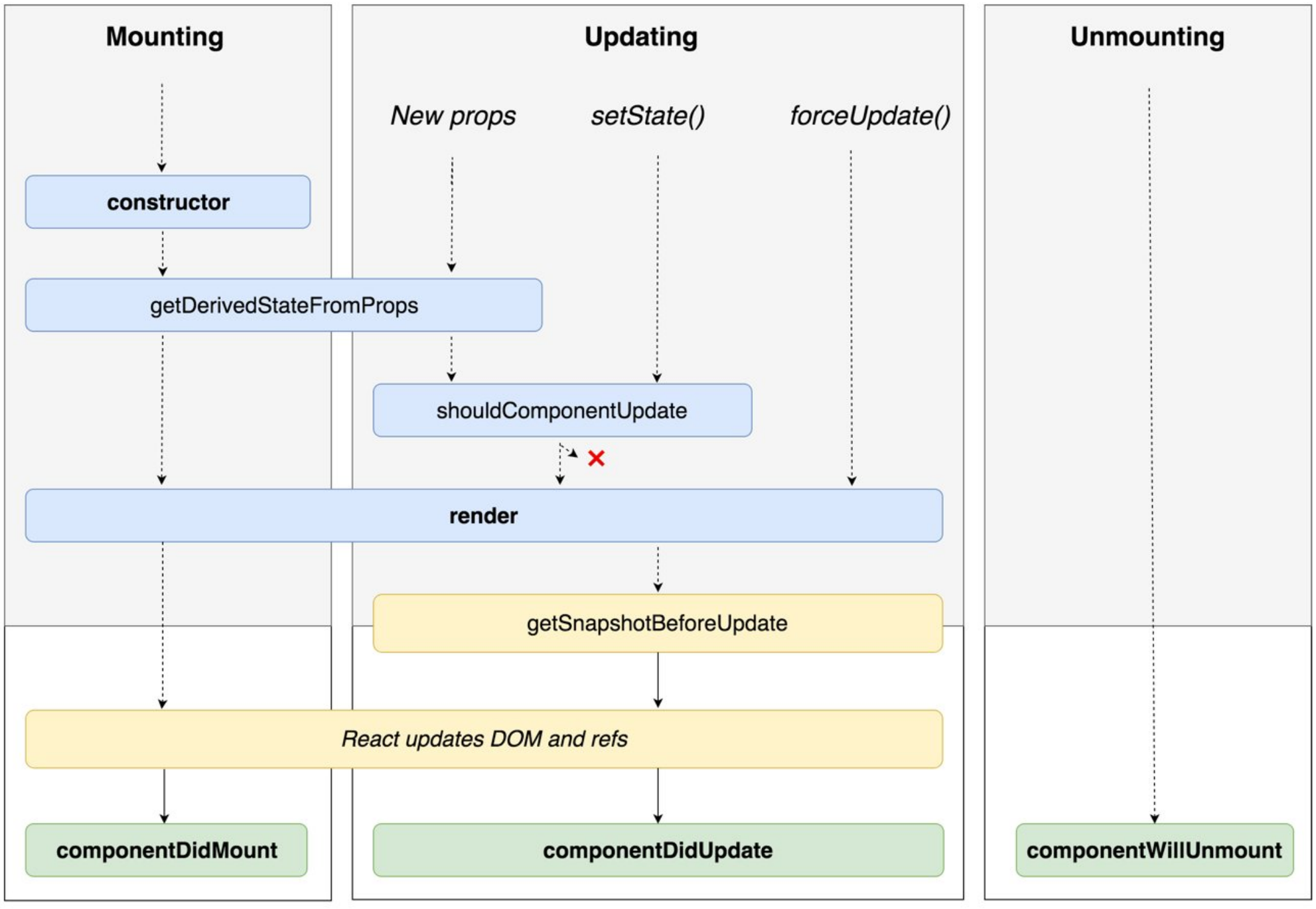
Pure and has no side effects. May be paused, aborted or restarted by React.

“Pre-Commit Phase”

Can read the DOM.

“Commit Phase”

Can work with DOM, run side effects, schedule updates.



Components lifecycle: after React 16.3

- *componentWillReceiveProps*, *componentWillUpdate*, *componentWillMount*, have been prefixed with **UNSAFE_**

- **static getDerivedStateFromProps(props, prevState):** this method is now called before every render, use it to detect changes and update state consequently this method must return a new PartialState.

Debug

- https://github.com/facebook/react-devtools

- Profile with `?react_perf`

More & Credits

React was initiated by Jordan Walke, who's also working on ReasonML

An EPITA alumni is part of React Native core team @vjeux (he's also been a great influence on React and also works on prettier)

A keystone of the ecosystem is Dan Abramov, co-creator of Redux and now core-member of the React team

Checkout @_chenglou's talk on the cost of abstraction
(I think he was an intern at Facebook at the time…)

Checkout Reason-React

Have a question later ?

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“Gouter, on va gouter !”

– Richard Bullit

You can fetch the assets for the workshop here:

https://github.com/qpre/epita-ing1-tp2