React 2: Components & Props

IN608: Intermediate Application Development Concepts

Last Session's Content

- React
  - Overview
  - Node.js installation
  - NPM (Node package manager)
- Create React App
- JSX
  - Embedding expressions
  - Attributes
  - Injection attacks
  - Objects

Today’s Content

- File structure
- Components
  - Function
  - Class
- Props

File Structure

File Structure

- React does not have opinions on how you put files into directories
- There are a couple common approaches you may want to consider:
  - Group by features or routes
  - Group by file type - we are going to follow this approach

File Structure - Group By File Type

- Group by file type

```
api/
    APIUtil.js
    APIUtil.test.js
    FeedAPI.js
    FeedAPI.test.js
    ProfileAPI.js
    ProfileAPI.test.js
components/
    Avatar.css
    Avatar.js
    Avatar.test.js
    Feed.css
    Feed.js
    Feed.test.js
    Profile.css
    Profile.js
    Profile.test.js
```

File Structure - Group By Features or Routes

- Group by features or routes

```
common/
    APIUtil.js
    APIUtil.test.js
    Avatar.css
    Avatar.js
    Avatar.test.js
feed/
    Feed.css
    Feed.js
    Feed.test.js
    FeedAPI.js
    FeedAPI.test.js
profile/
    Profile.css
    Profile.js
    Profile.test.js
    ProfileAPI.js
    ProfileAPI.test.js
```

Components

Components

- What are components?
  - User-interface split into independent, reusable chunks of code
  - Each chunk of code is self-contained
  - Accepts an arbitrary arguments called `props` & returns a React element
- A component can be written either as a function or a class
- React treats components starting with lowercase letters as DOM tags, i.e., `<div />`
- `<App />` is an example of a component - starts with a capital letter
- The following examples from React's point of view are equivalent
- Function & class components both have additional features. We will look at this in the next session
- All components are store in `src/components` - you will need to create the `components` directory

Function Component

- Function component example in `Owner.js`

```
import React from 'react'

const Owner = () => <h1>My owner is John Doe</h1>

export default Owner
```

Class Component

- Class component example in `Owner.js`
- Extends `React.Component`
- Avoid creating your own base component class
  - In React components, code reuse is achieved through composition rather than inheritance

```
import React from 'react'

class Owner extends React.Component {
  render() {
    return <h1>My owner is John Doe</h1>
  }
}

export default Owner
```

Components

- In `App.js`

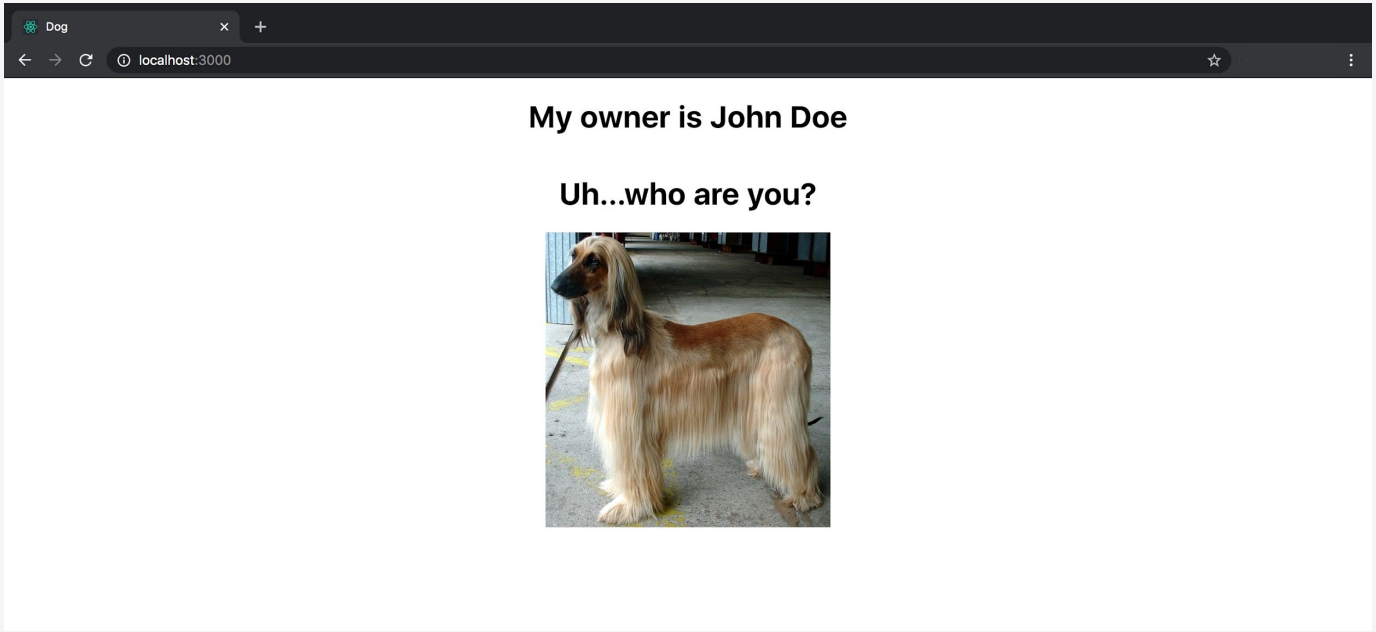
```
import React from 'react'
import Owner from './Owner'
import afghanHoundImg from '../img/afghan-hound.jpg'

const App = () => {
  const dog = {
    name: 'Bingo',
    breed: 'Afghan Hound',
    img: afghanHoundImg,
  }

  const formatDog = (dog) =>
    `Woof woof, my name is ${dog.name} & my breed is an ${dog.breed}`

  const getGreeting = (dog) => {
    if (dog) {
      return <h1>{formatDog(dog)}</h1>
    }
    return <h1>Uh...who are you?</h1>
  }

  return (
    <div className='main-container'>
      <Owner />
      {getGreeting()}
      <img src={dog.img} alt='afghan hound' width='300' />
    </div>
  )
}

export default App
```

Components

- What is happening in `index.js`?
  - `ReactDOM.render()` is called with the `<App />` element
  - Returns a reference to the `App` component
  - `ReactDOM` updates the DOM

```
import React from 'react'
import ReactDOM from 'react-dom'
import './index.css'
import App from './components/App'

ReactDOM.render(
  <React.StrictMode>
    <App />
  </React.StrictMode>,
  document.getElementById('root')
)
```

Components



Props

Props

- When a function or class component is declared, its `props` (properties) must never be modified
- *All React components must act like pure functions with respect to their props*
- What does this mean? Its return value is the same for the same arguments & no side effects
- Function component with `props` example in `Owner.js` - accepts `props` as an argument

```
import React from 'react'

const Owner = (props) => <h1>My owner is {props.name}</h1>

export default Owner
```

Props

- Class component with `props` example in `Owner.js`
- No arguments. Use of the `this` keyword

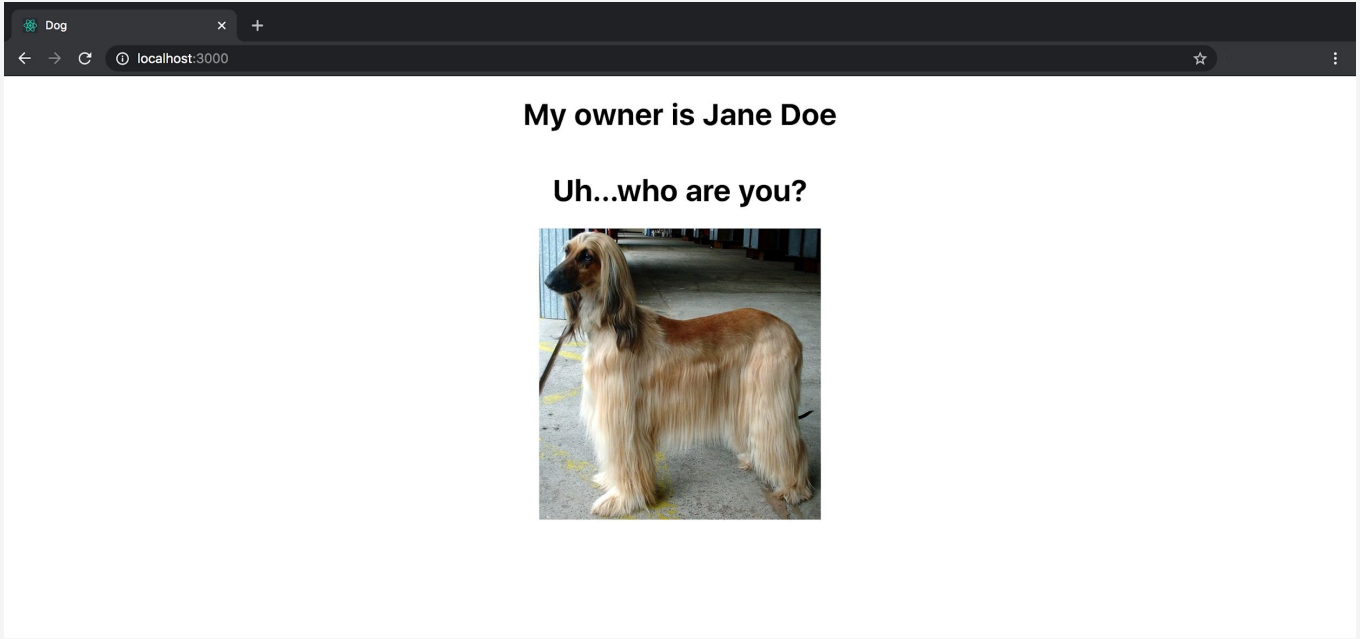
```
import React from 'react'

class Owner extends React.Component {
  render() {
    return <h1>My owner is {this.props.name}</h1>
  }
}

export default Owner
```

Props

- In `App.js`
- Updates the DOM by replacing `props.name` & `this.props.name` with `Jane Doe`

```
import React from 'react'
import Owner from './Owner'
import afghanHoundImg from '../img/afghan-hound.jpg'

const App = () => {
  const dog = {
    name: 'Bingo',
    breed: 'Afghan Hound',
    img: afghanHoundImg,
  }

  const formatDog = (dog) =>
    `Woof woof, my name is ${dog.name} & my breed is an ${dog.breed}`

  const getGreeting = (dog) => {
    if (dog) {
      return <h1>{formatDog(dog)}</h1>
    }
    return <h1>Uh...who are you?</h1>
  }

  return (
    <div className='main-container'>
      <Owner name='Jane Doe' />
      {getGreeting()}
      <img src={dog.img} alt='afghan hound' width='300' />
    </div>
  )
}

export default App
```

Props



Programming Activity

- Checkout to master - `git checkout master`
- Create a new branch called 17-practical - `git checkout -b 17-practical`
- Open the file `17-practical.pdf` and work on the tasks described