Navigation

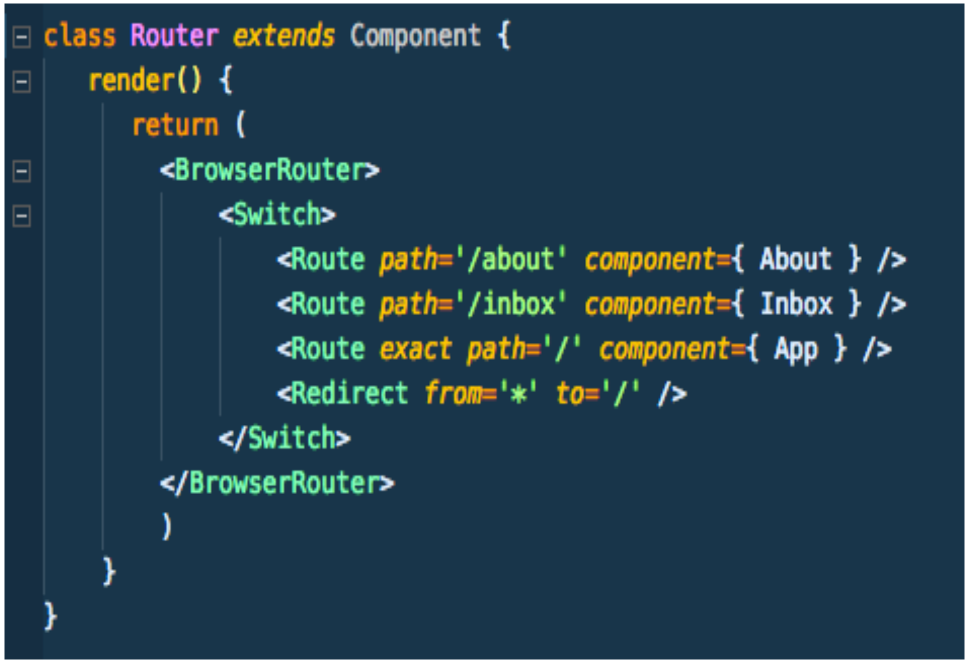
The React Router

Introduction

- **A separate library.**
- **Allows multiple views and flows in an app.**
- **Keeps the URL in sync with what's being displayed.**
- **Supports traditional web principles:**
  1. **Addressability**
  2. **Information sharing.**
  3. **Deep linking.**
  - **1st generation AJAX apps violated these principles**

Basic routing configuration

	URL	Components
1	/	App (Home)
2	/about	About
3	/inbox	Inbox

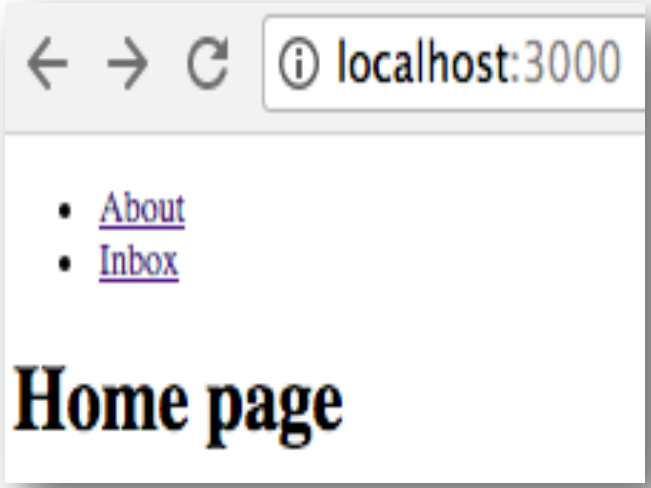


```
class Router extends Component {
  render() {
    return (
      <BrowserRouter>
        <Switch>
          <Route path='/about' component={ About } />
          <Route path='/inbox' component={ Inbox } />
          <Route exact path='/' component={ App } />
          <Redirect from='*' to='/' />
        </Switch>
      </BrowserRouter>
    )
  }
}
```

- **Declarative routing.**
- <Switch> - **Matches browser's URL address to one of the nested** Route **entries – based on** path **prop.**
  - **Matching supports regular expression pattern matching.**
  - **Use** exact **argument for precision.**
  - **Use** <Redirect> - to **avoid 404-type error.**
- ReactDOM.render() **passed an app's Router component**.
- **Ref.** src/sample1/

Hyperlinks

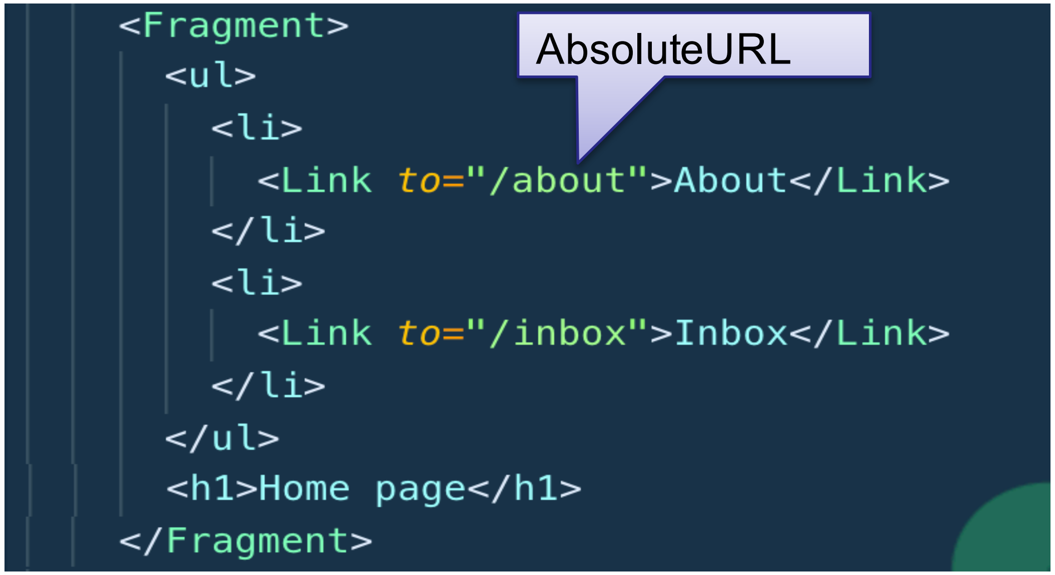
- **Use the** <Link> **component for internal links.**
  - **Use anchor tag for external links -** <a href . . . . . >
- **EX. Ref**. src/sample2/



localhost:3000

- About
- Inbox

Home page



```
<Fragment>
  <ul>
    <li>
      <Link to="/about">About</Link>
    </li>
    <li>
      <Link to="/inbox">Inbox</Link>
    </li>
  </ul>
  <h1>Home page</h1>
</Fragment>
```

- <Link> **gives access to other useful router properties.**
- **Use** <LinlContainer> **when link wraps other 3rd party component, e.g. Bootstrap-React <Buttom />**

Dynamic segments.

- Parameterized URLs**, e.g. /users/22, /users/12/purchases**
  - **How do we declare a parameterized path in the routing configuration?**
  - **How does a custom component access the parameter value?**

- **Ex: Ref** src/sample3/**.**
  - **Suppose the** Inbox **component shows messages for a specific user, based on the browser URL e.g /inbox/123**

    ……

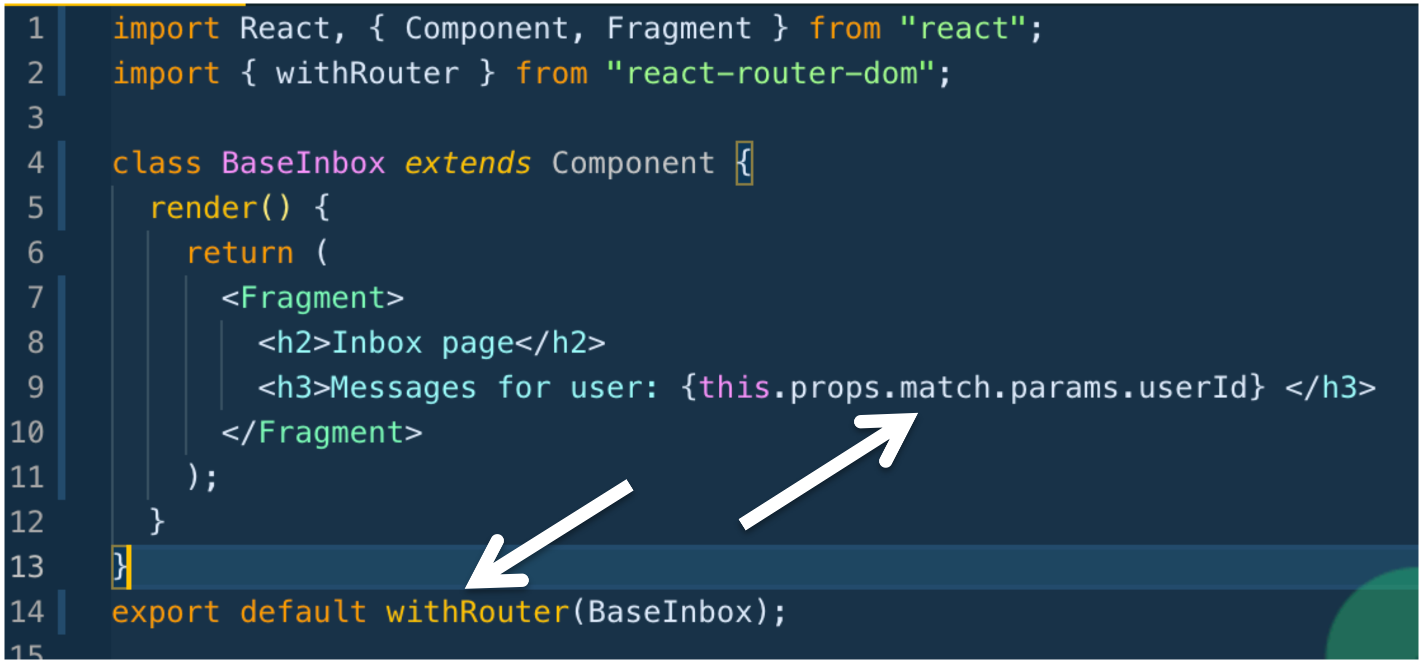
    ```
    <Route path='/inbox/:userId' component={ Inbox } />
    ```

    ……..

    The colon (:) prefixes a parameter in the path.

    Parameter name (e.g. userId) is arbitrary.

Dynamic segments.



```
import React, { Component, Fragment } from "react";
import { withRouter } from "react-router-dom";

class BaseInbox extends Component {
  render() {
    return (
      <Fragment>
        <h2>Inbox page</h2>
        <h3>Messages for user: {this.props.match.params.userId} </h3>
      </Fragment>
    );
  }
}
export default withRouter(BaseInbox);
```

- withRouter() **function:**
  - **Injects routing props into a component:**
    - props.match.params.(parameter-name)
    - props.history
  - **Returns a new, enriched component.**

Nested Routes

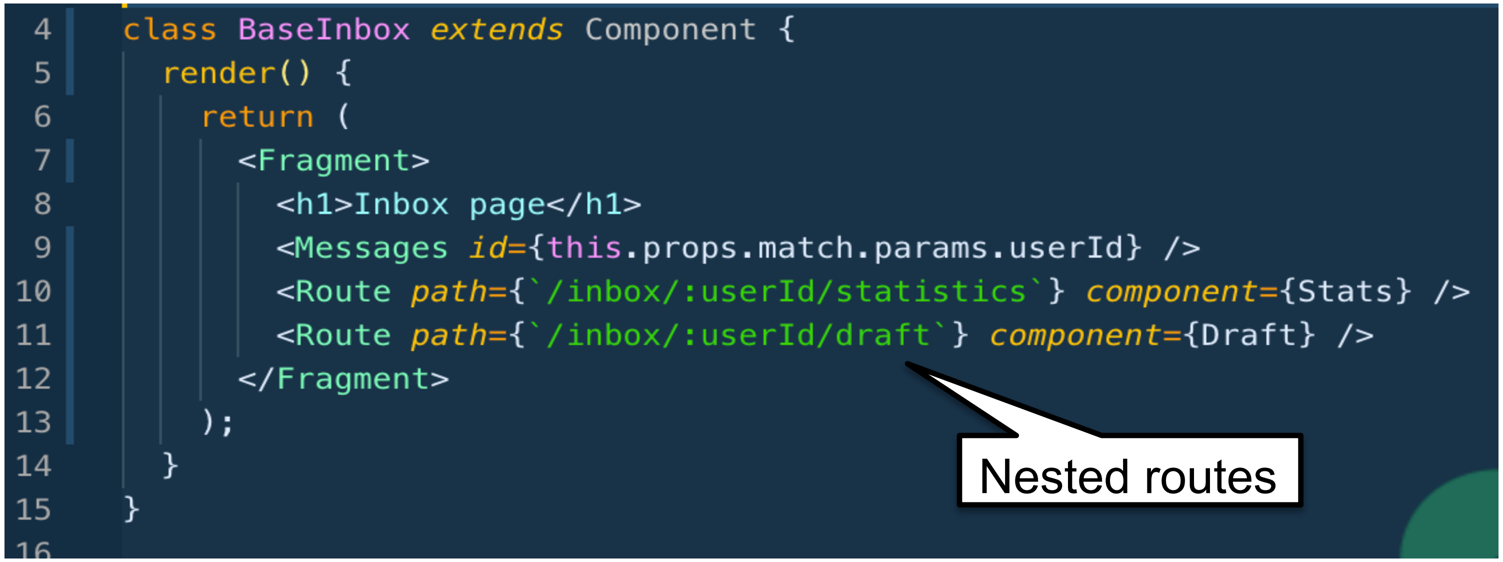
- **EX.: See** src/sample4/**.**

  Objective: Given the route:

  <Route path='/inbox/:userId' component={ Inbox } />,

  when the browser URL is:

  1. /inbox/XXX/statistics **then render Inbox +** Stats **components.**
  2. /inbox/XXX/draft **then render Inbox +** Drafts **components.**



```
class BaseInbox extends Component {
  render() {
    return (
      <Fragment>
        <h1>Inbox page</h1>
        <Messages id={this.props.match.params.userId} />
        <Route path={`/inbox/:userId/statistics`} component={Stats} />
        <Route path={`/inbox/:userId/draft`} component={Draft} />
      </Fragment>
    );
  }
}
```

Aside - The Spread operator (…)

- **Allows an iterable (array/object) to expand in places where 0+ arguments are expected.**

```
let partOfMe = {first: 'Diarmuid', address: '1 Main street'}
let allMe1 = {surname: 'O Connor', partOfMe, employer: 'WIT'}
// { surnaome: 'O Connor’,
        partOfMe : { first: 'Diarmuid', address: '1 Main street'} ,
        employer: 'WIT’ }

let  allMe2 = { surname: 'O Connor', …partOfMe, employer: 'WIT'}
// { surname: 'O Connor’, first: 'Diarmuid',
        address: '1 Main street'} , employer: 'WIT’ }
```

```
let me = { surname: 'O Connor', first: 'Diarmuid',
        address: '1 Main street', employer: 'WIT' }
let updatedMe = { ...me, address: '2 High Street' }
// updatedMe = { surname: 'O Connor', first: 'Diarmuid',
        address: ’2 High street', employer: 'WIT' }
```

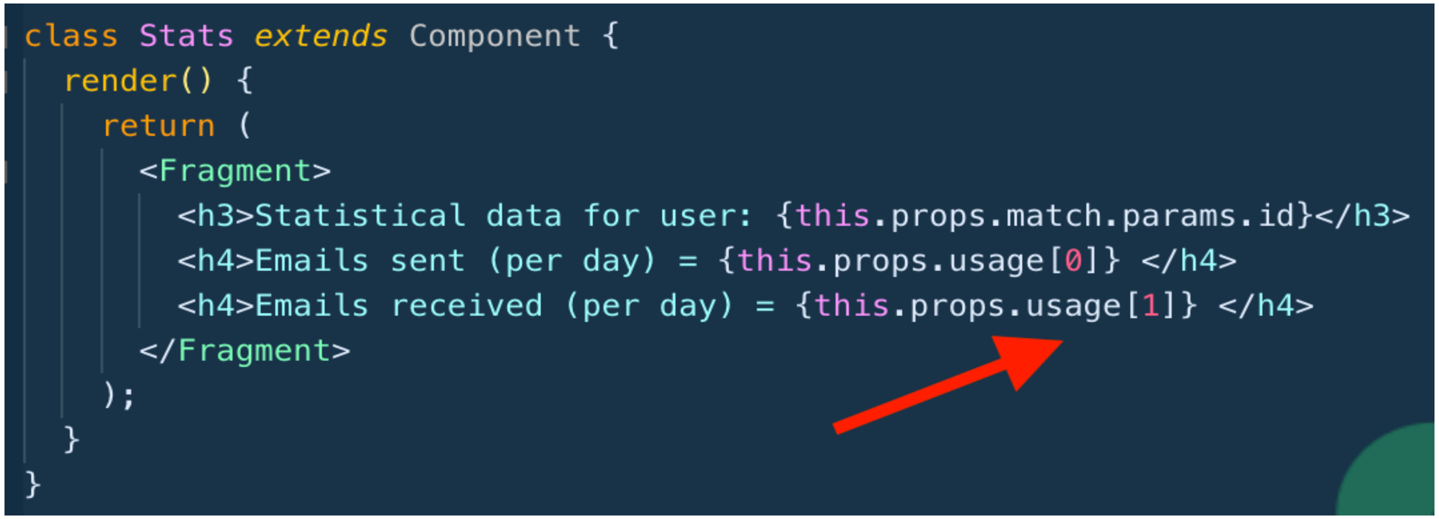
Alternative <Route> API.

- **To-date:** *<Route path={…URL path…} component={ ComponentX} />*
- **Disadv.: We cannot pass custom props to the component.**
- **Alternative:**

  <Route path={…URL path…} remder={…function….}>

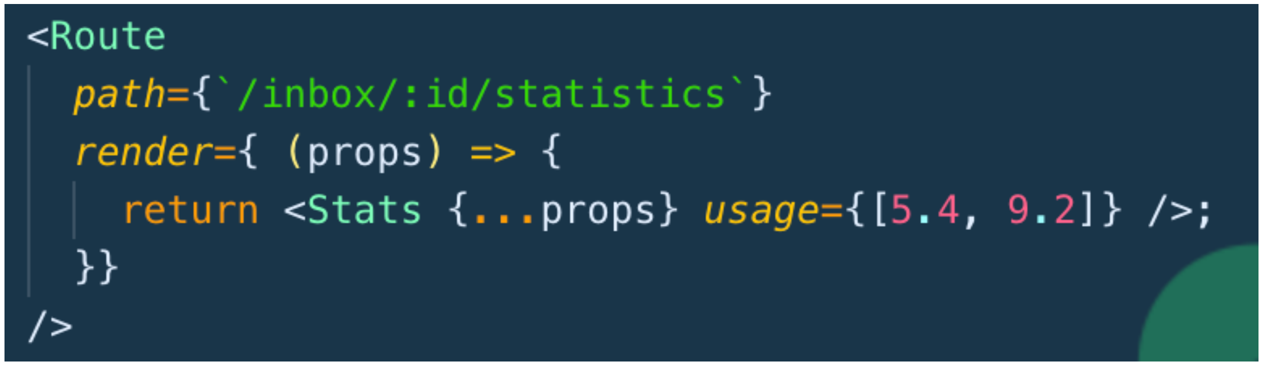
  – **where** *function* **must return a component.**
- **EX.: See** /src/sample5/**.**

  Objective: Pass usage data to the <Stats> **component.**



```
class Stats extends Component {
  render() {
    return (
      <Fragment>
        <h3>Statistical data for user: {this.props.match.params.id}</h3>
        <h4>Emails sent (per day) = {this.props.usage[0]} </h4>
        <h4>Emails received (per day) = {this.props.usage[1]} </h4>
      </Fragment>
    );
  }
}
```

Alternative <Route> API feature.



```
<Route
  path={`/inbox/:id/statistics`}
  render={ (props) => {
    return <Stats {...props} usage={[5.4, 9.2]} />;
  }}
/>
```

render= (props) => {

   . . . Some logic . . .. . .

   return <ComponentX prop1=… prop2=….   **/>**

}

The <Route> **component's own props object is the function parameter, by default.**

Aside - Destructuring

- **Assigning the elements of an array or object to variables using a declarative style rather than an imperative/procedural style..**

```
let obj =
    { alpha:100,
      beta: ‘ICT Skills’,
      gamma: false}
```

Instead of:

```
let alpha = obj.alpha
let beta = obj.beta
let gamma = obj.gamma
```

Use :

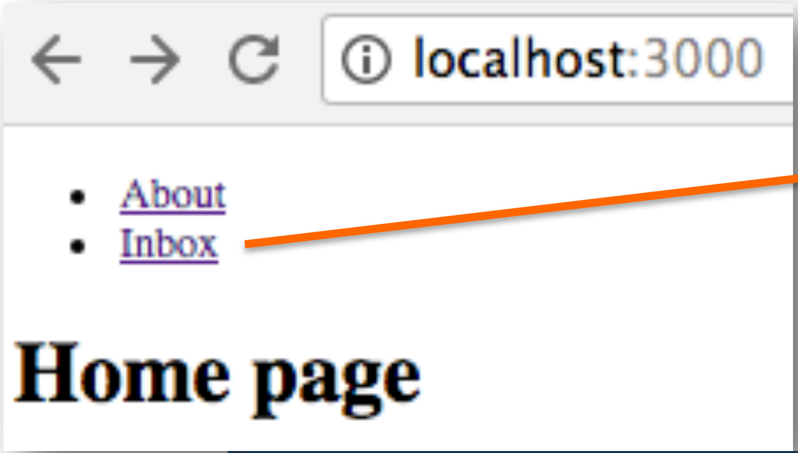
```
let {alpha, beta, gamma} = obj;
```

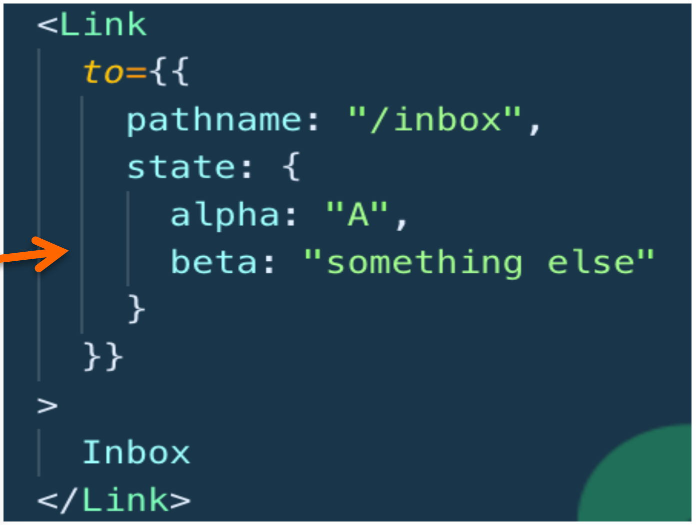
Can also do:

```
let { beta, gamma} = obj
let {alpha : foo,
      gamma : bar} = obj
// foo = 100, bar = false
```

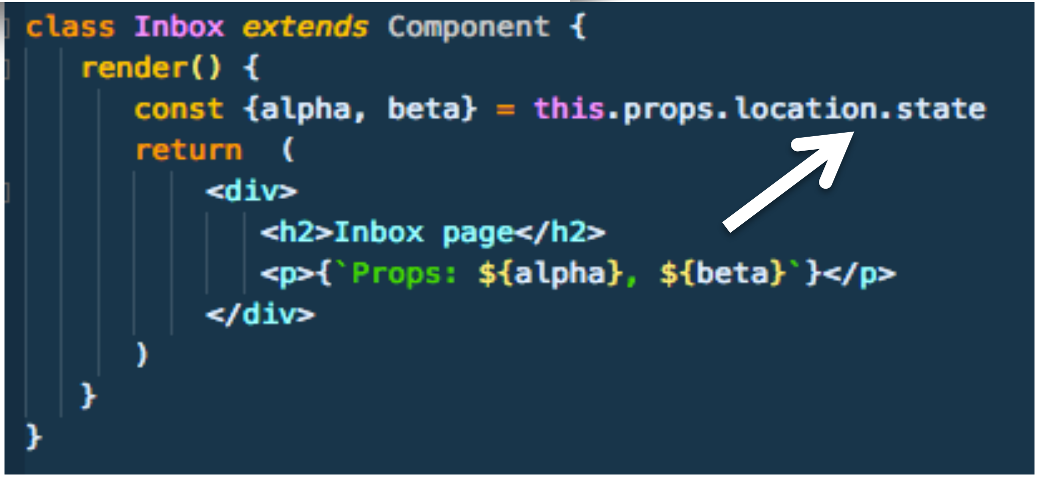
Extended <Link> API

- **Objective: Passing additional props via a <Link>.**
- **EX.: See** /src/sample6/**.**





```
<Link
  to={{
    pathname: "/inbox",
    state: {
      alpha: "A",
      beta: "something else"
    }
  }}
>
  Inbox
</Link>
```

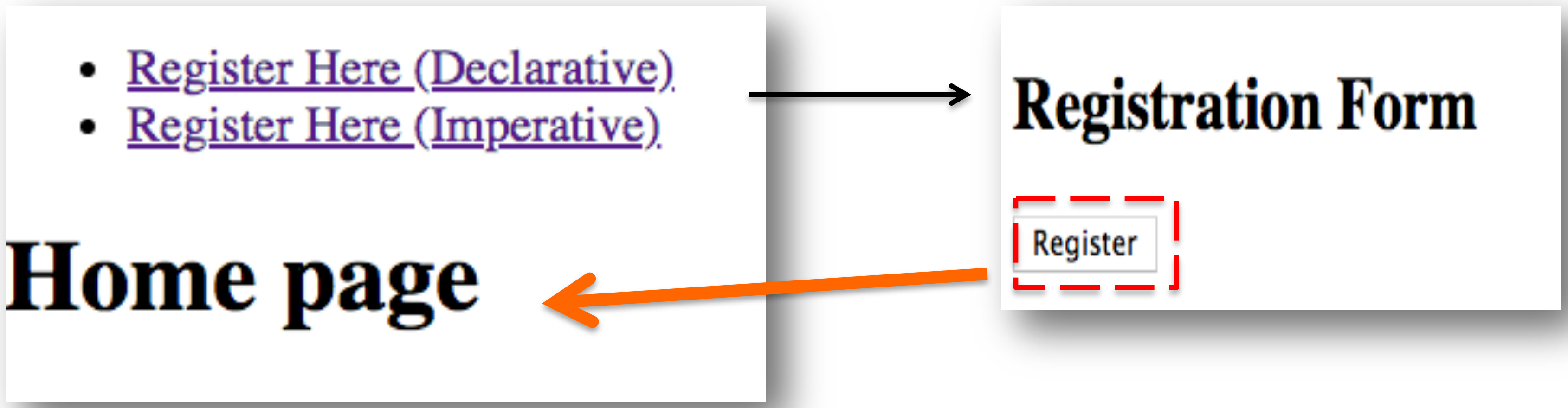


```
class Inbox extends Component {
  render() {
    const {alpha, beta} = this.props.location.state
    return (
      <div>
        <h2>Inbox page</h2>
        <p>{`Props: ${alpha}, ${beta}`}</p>
      </div>
    )
  }
}
```

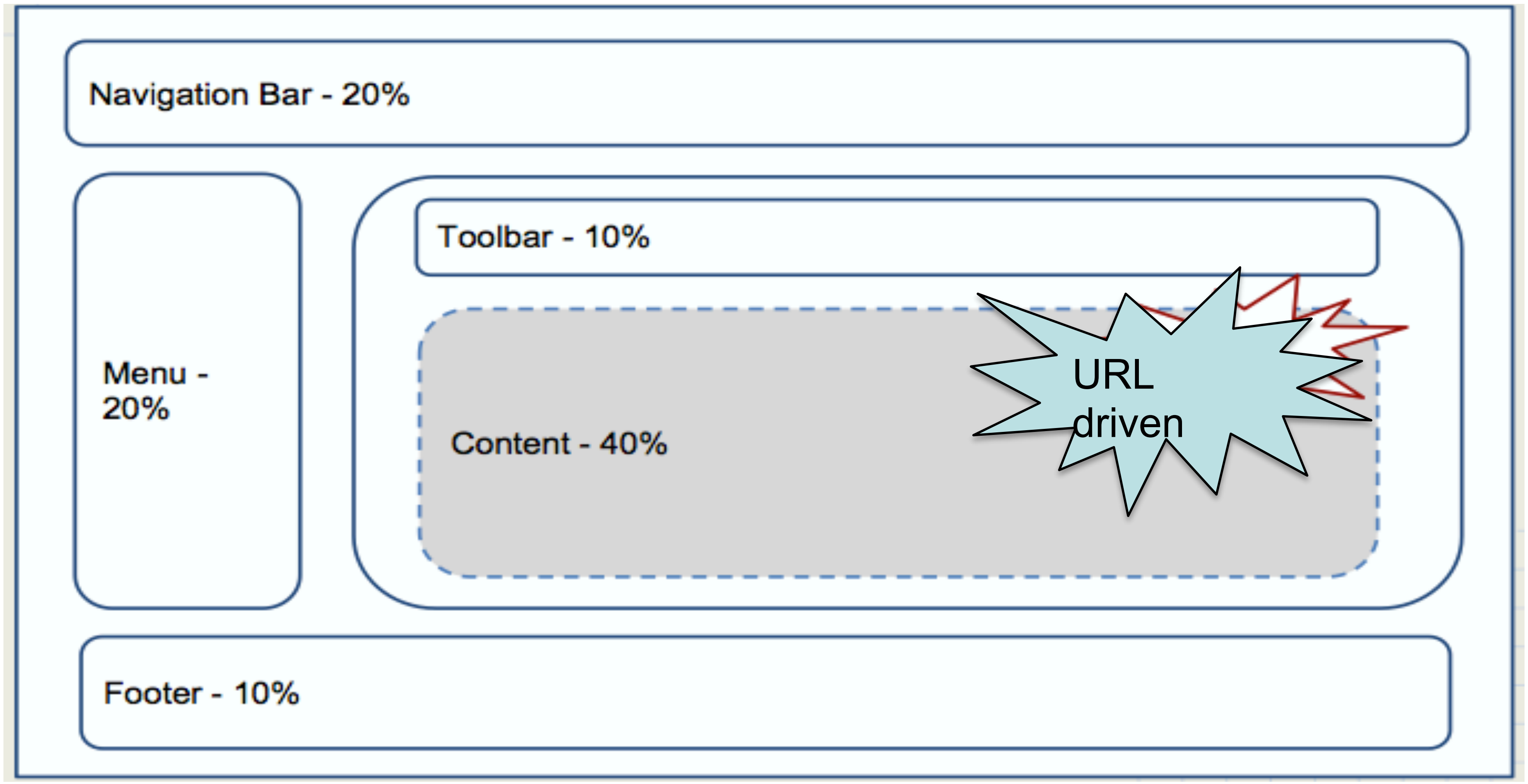
Programmatic Navigation.

- **Performing navigation in JavaScript.**
- **Two options:**
  1. **Declarative – requires state; use** <Redirect />.
  2. **Imperative – requires withRouter() ; use** this,props.history

- **EX.: See** /src/sample7/**.**

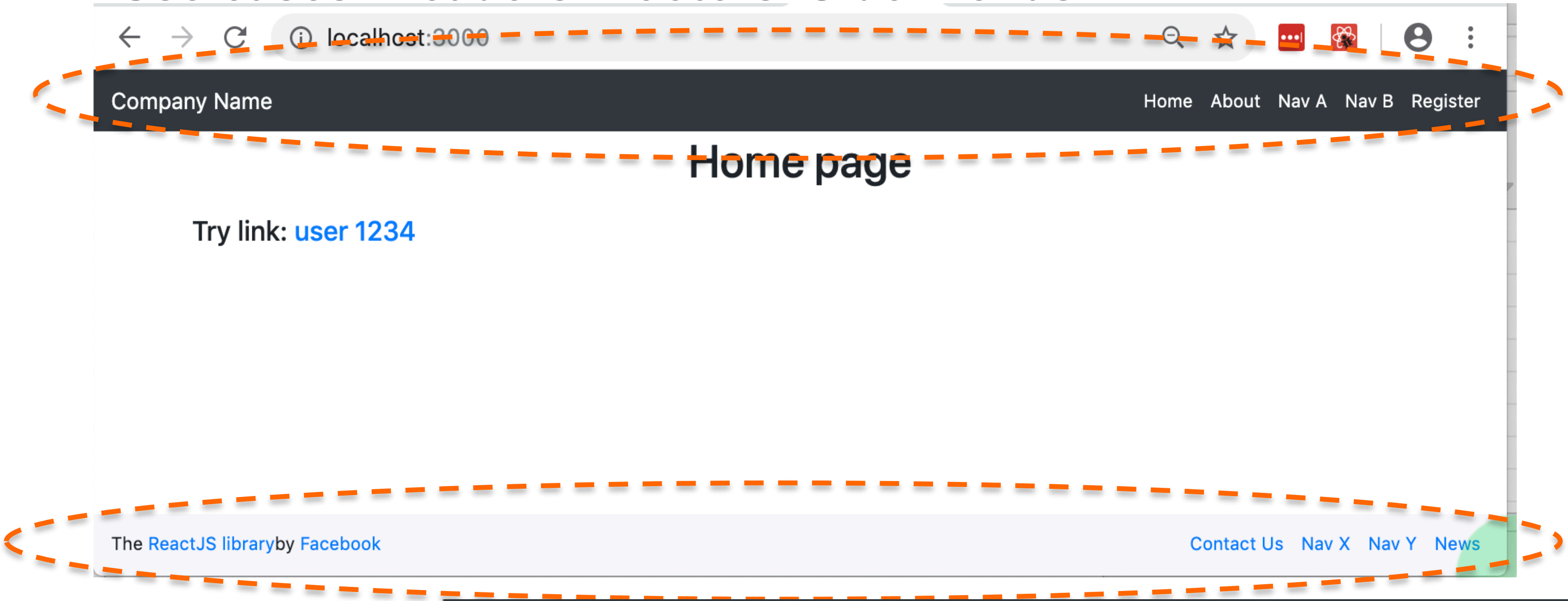


Typical Web app layout



Persistent elements/components

- **Use cases: Headers. Footers. Side menus**



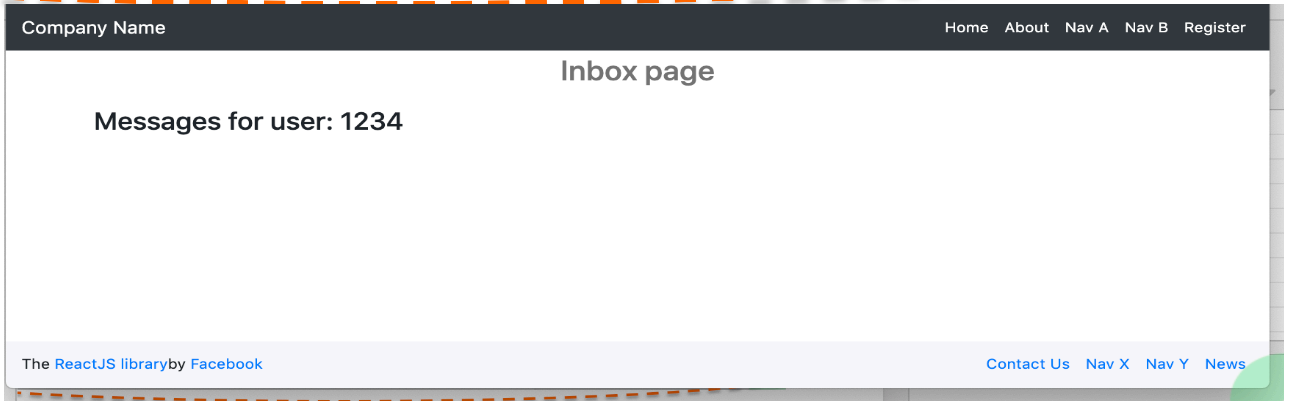
localhost:3000

Company Name | Home | About | Nav A | Nav B | Register

Home page

Try link: user 1234

The ReactJS libraryby Facebook | Contact Us | Nav X | Nav Y | News



Company Name | Home | About | Nav A | Nav B | Register

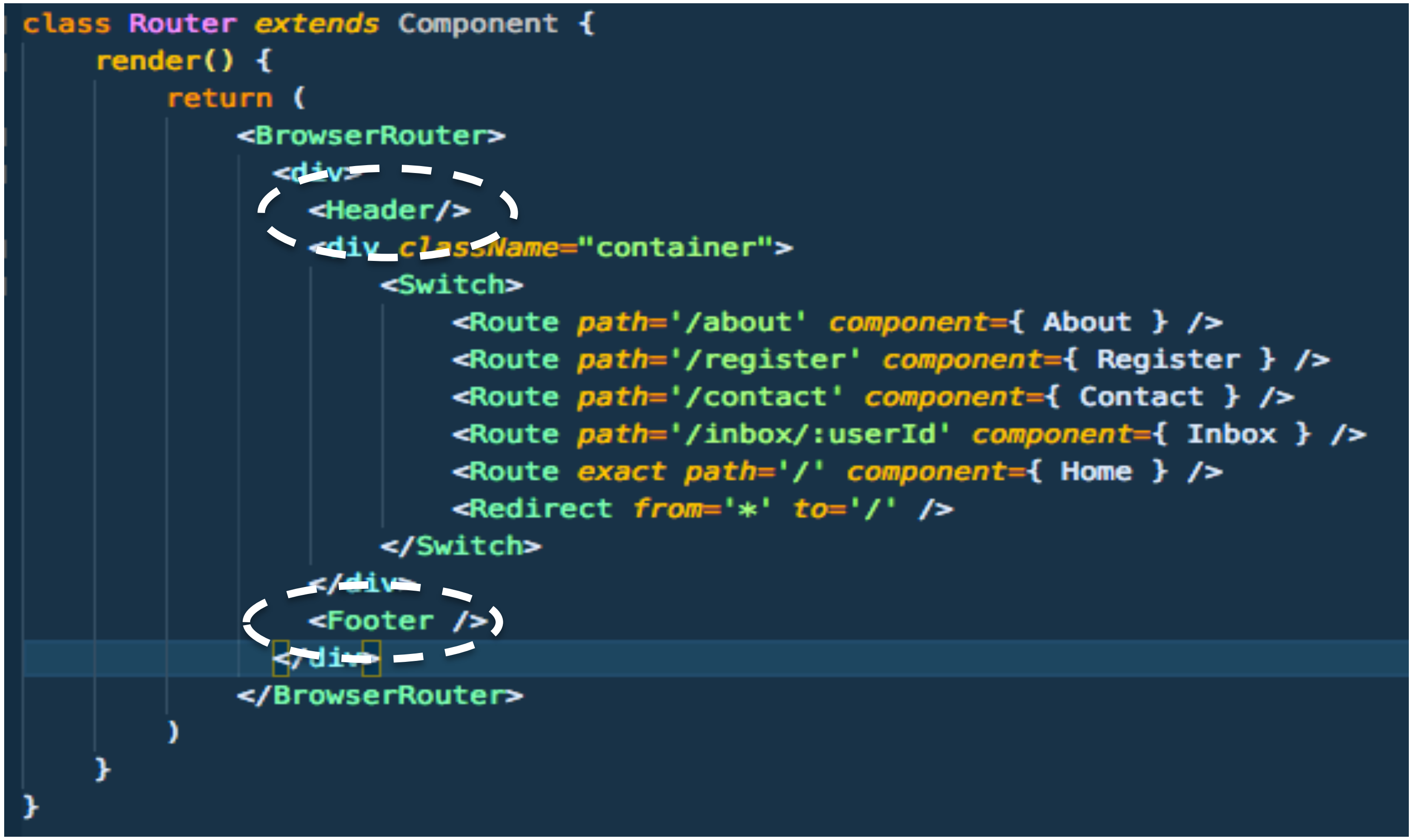
Inbox page

Messages for user: 1234

The ReactJS libraryby Facebook | Contact Us | Nav X | Nav Y | News

Persistent elements/components

- **Ref.** src/sample8



```
class Router extends Component {
    render() {
        return (
            <BrowserRouter>
              <div>
                <Header/>
                <div className="container">
                    <Switch>
                        <Route path='/about' component={ About } />
                        <Route path='/register' component={ Register } />
                        <Route path='/contact' component={ Contact } />
                        <Route path='/inbox/:userId' component={ Inbox } />
                        <Route exact path='/' component={ Home } />
                        <Redirect from='*' to='/' />
                    </Switch>
                </div>
                <Footer />
              </div>
            </BrowserRouter>
        )
    }
}
```

. . . . . . Back to React core . . . . .

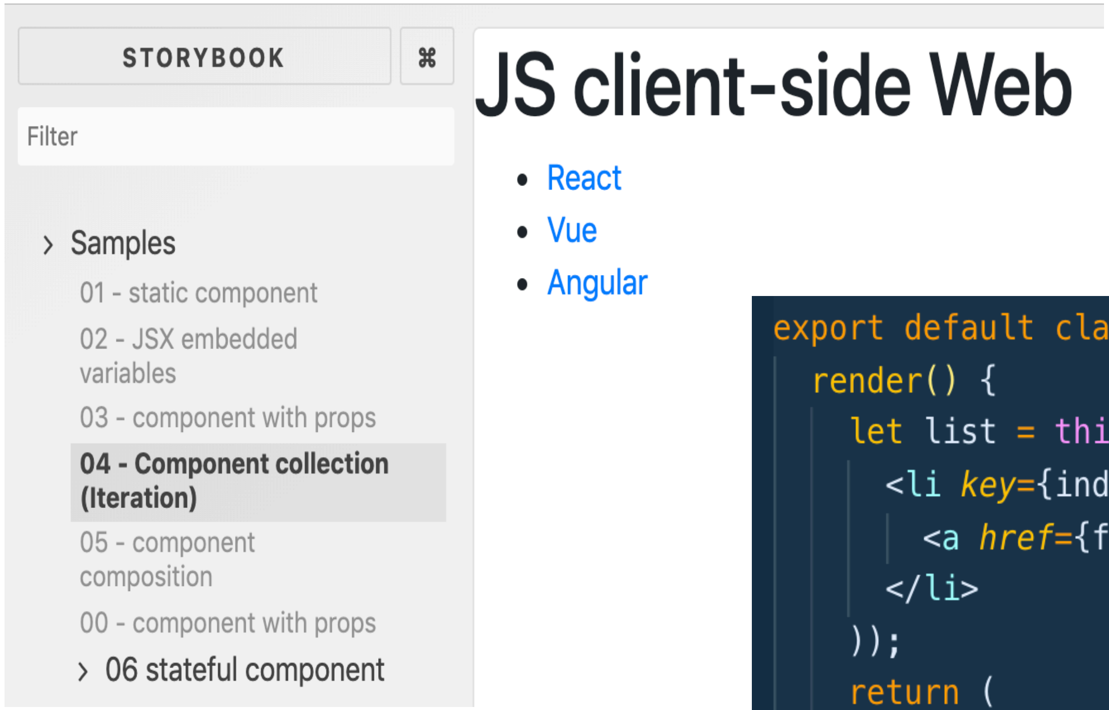
Stateless Functional components

- **Many components only require the** render() **method.**
  - **The lifecycle methods are still inherited, which impacts performance.**

- **Use** stateless functional components **(sfc) where possible.**

```
const ComponentName = (props) => {
     …. body of render method …..
}
```

Sample – Class component


STORYBOOK
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Samples
01 - static component
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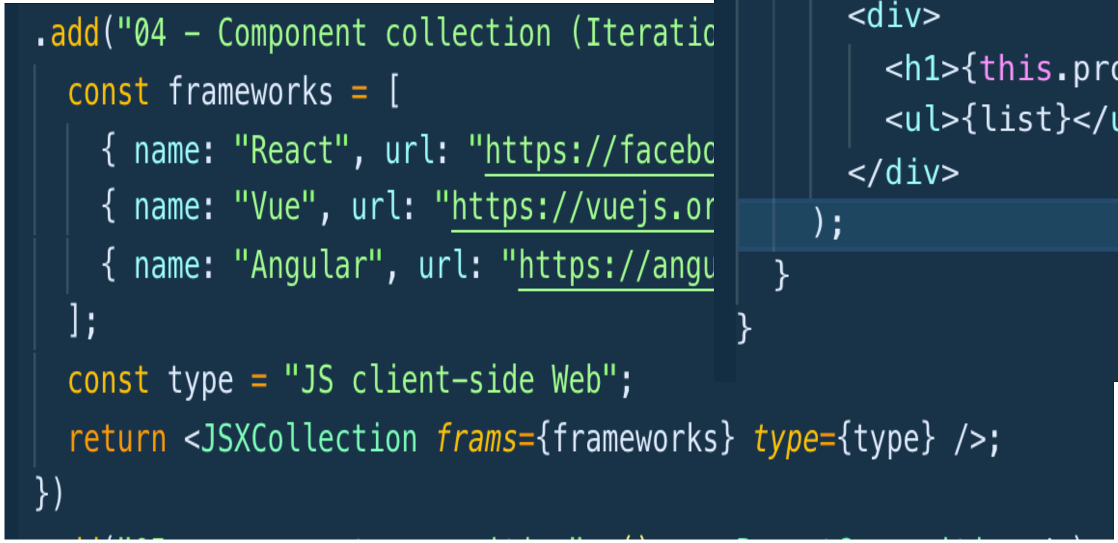
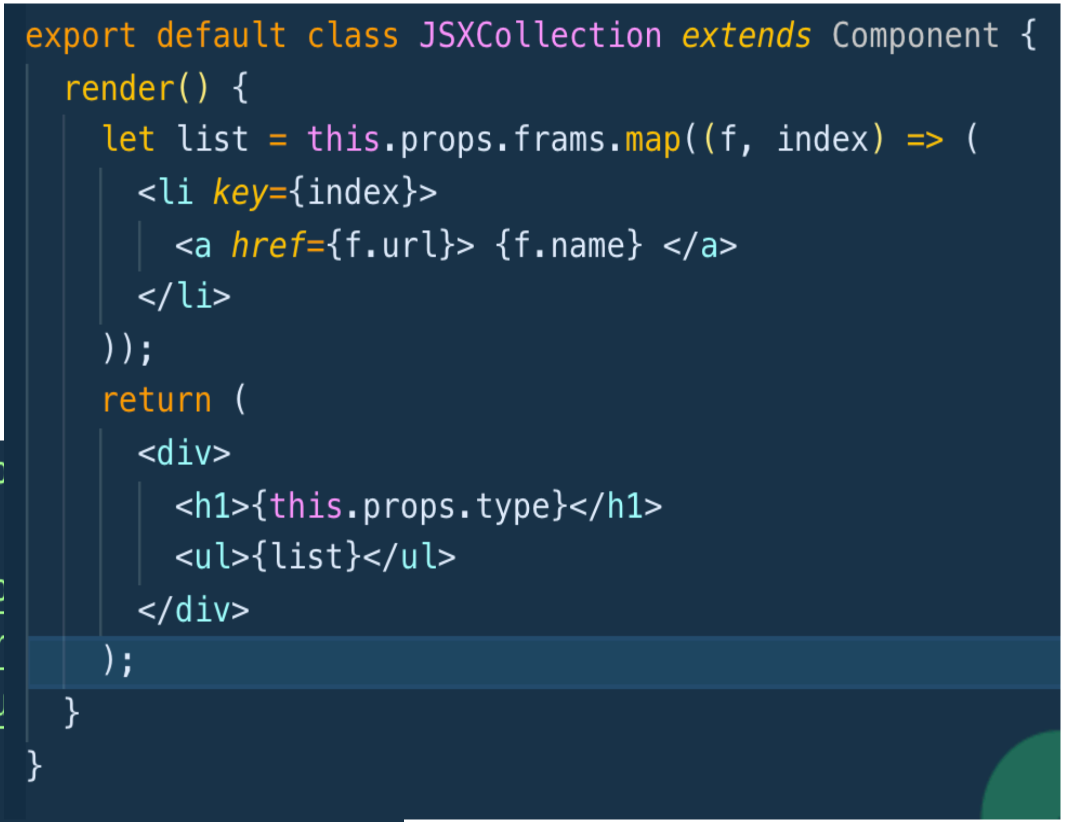
03 - component with props
04 - Component collection (Iteration)
05 - component composition
00 - component with props
06 stateful component

JS client-side Web

- React
- Vue
- Angular

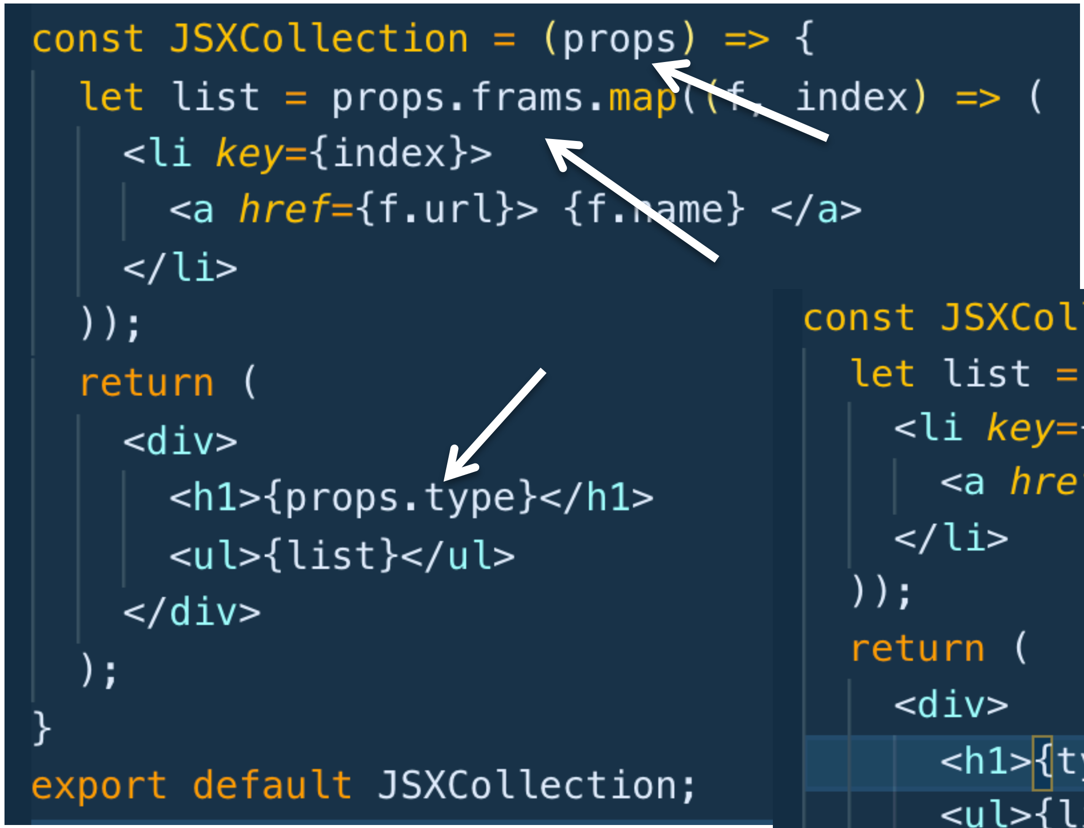


```
.add("04 - Component collection (Iteratic
  const frameworks = [
    { name: "React", url: "https://facebc
    { name: "Vue", url: "https://vuejs.or
    { name: "Angular", url: "https://angu
  ];
  const type = "JS client-side Web";
  return <JSXCollection frams={frameworks} type={type} />;
})
```

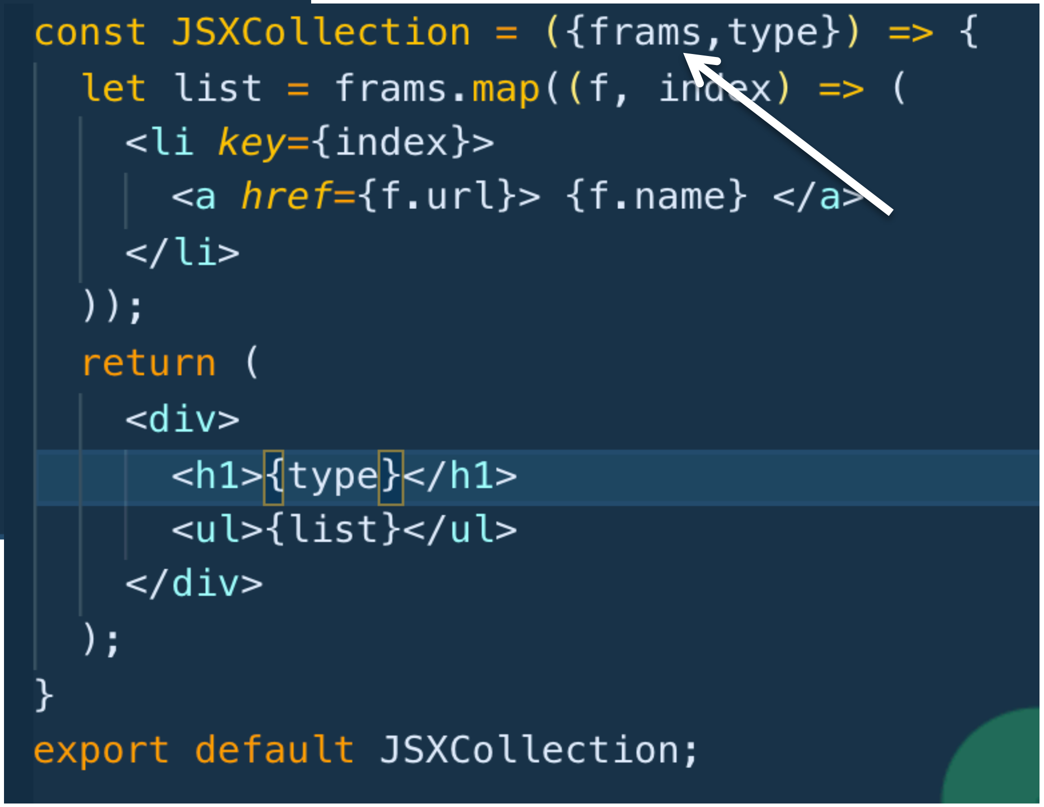


```
export default class JSXCollection extends Component {
  render() {
    let list = this.props.frams.map((f, index) => (
      <li key={index}>
        <a href={f.url}> {f.name} </a>
      </li>
    ));
    return (
      <div>
        <h1>{this.props.type}</h1>
        <ul>{list}</ul>
      </div>
    );
  }
}
```

Sample - Stateless Functional components



```
const JSXCollection = (props) => {
  let list = props.frams.map((f, index) => (
    <li key={index}>
      <a href={f.url}> {f.name} </a>
    </li>
  ));
  return (
    <div>
      <h1>{props.type}</h1>
      <ul>{list}</ul>
    </div>
  );
}
export default JSXCollection;
```



```
const JSXCollection = ({frams,type}) => {
  let list = frams.map((f, index) => (
    <li key={index}>
      <a href={f.url}> {f.name} </a>
    </li>
  ));
  return (
    <div>
      <h1>{type}</h1>
      <ul>{list}</ul>
    </div>
  );
}
export default JSXCollection;
```

Summary

- **React Router (version 4) adheres to React principles:**
  - **Declarative UI**
  - **Component composition**
  - **The event → state change → re-render**

- **Main components - <BrowserRouter>, <Route>, <Link>**

- **The** withRouter() **higher order component.**

- **Additional props: this.props.match.params; this.props.history, this.props.location.**

  --

- **Use stateless functional components where possible.**