# Routing in a React App

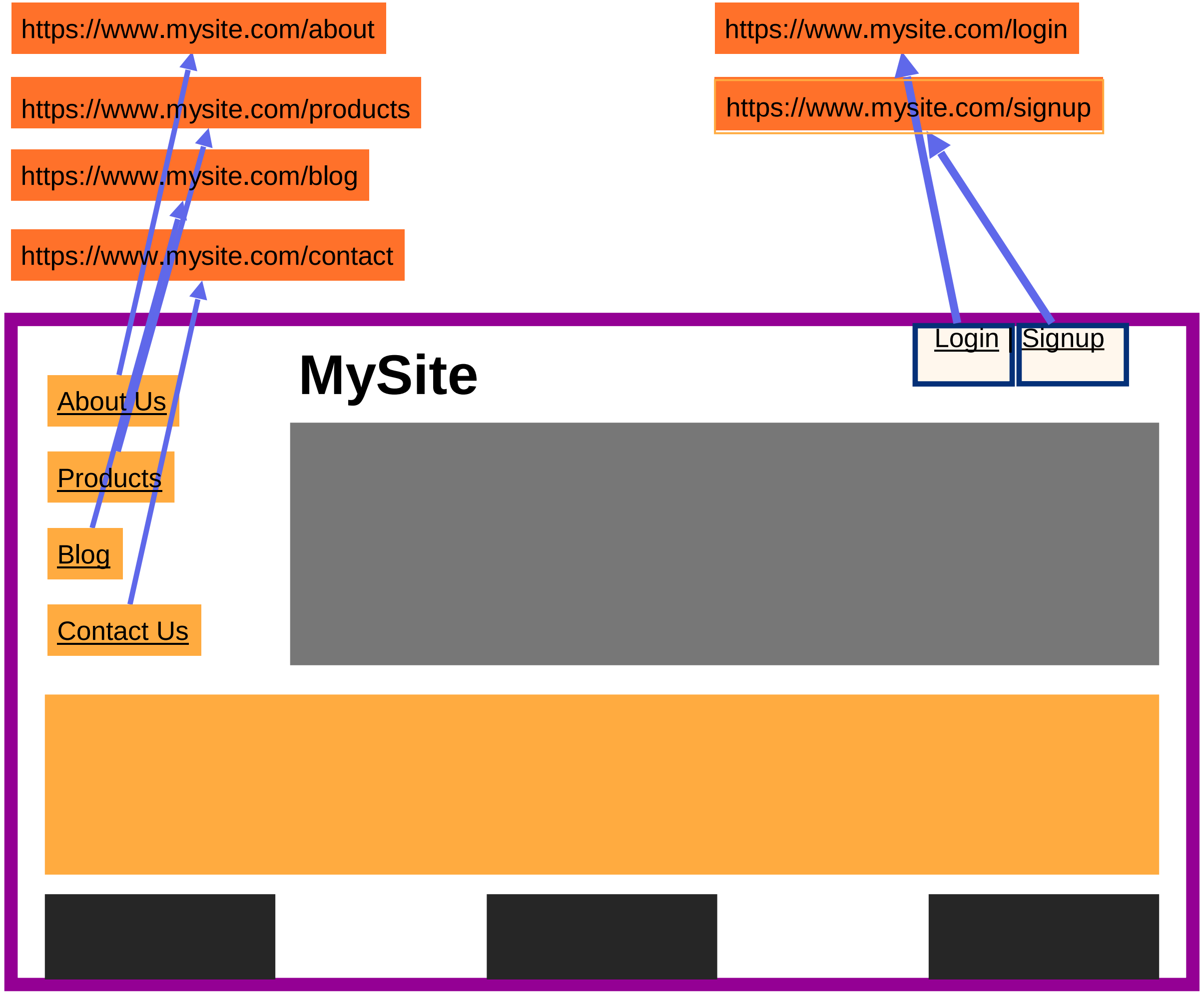
## LEARNING OBJECTIVES

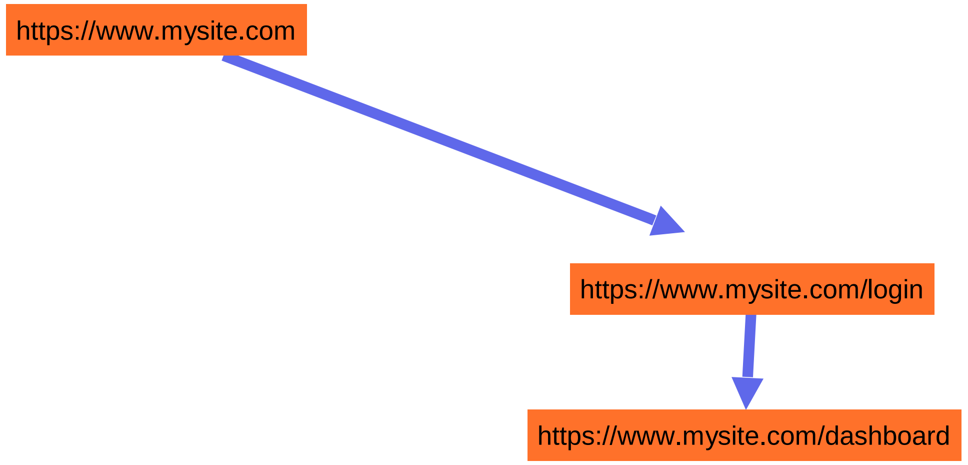
- Understand Routing in a React application
- Understand Dynamic Routing & Setup React Router
- Implement nested routing and use query parameters
- Learn to protect routes from unauthenticated access

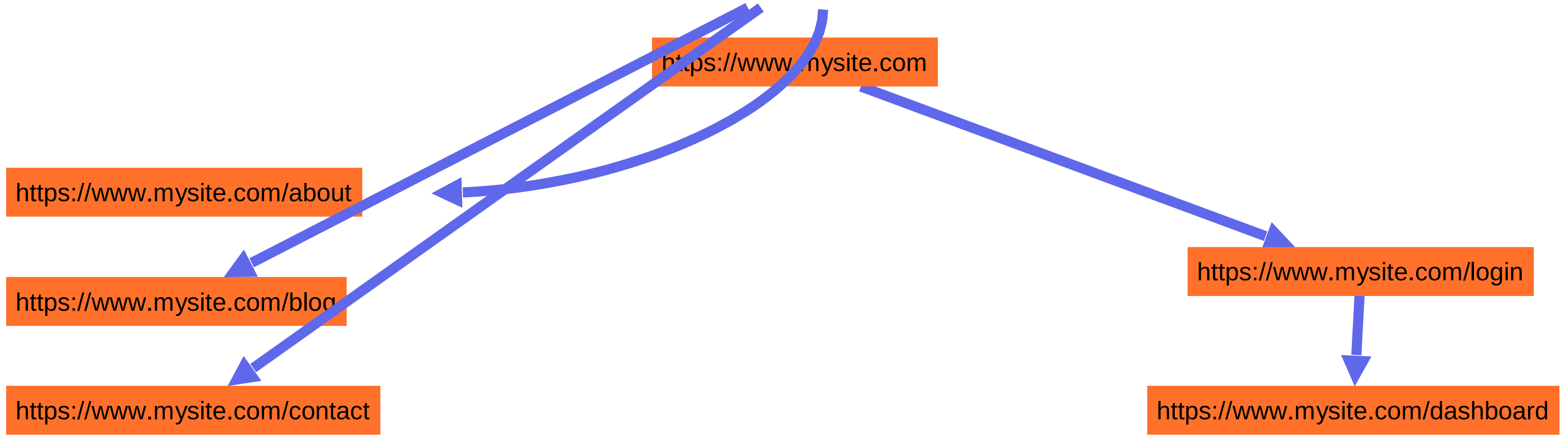
# Routing in a React App

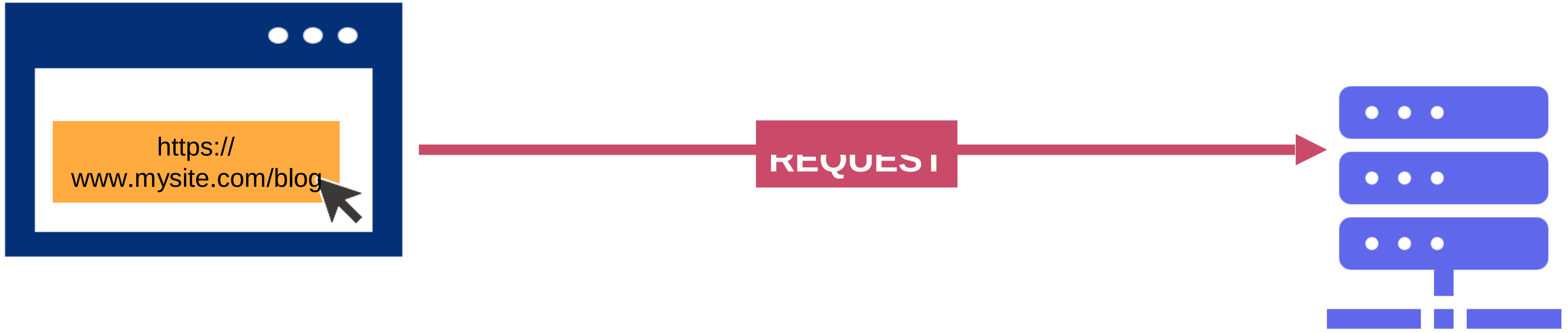
## Routing in a React application

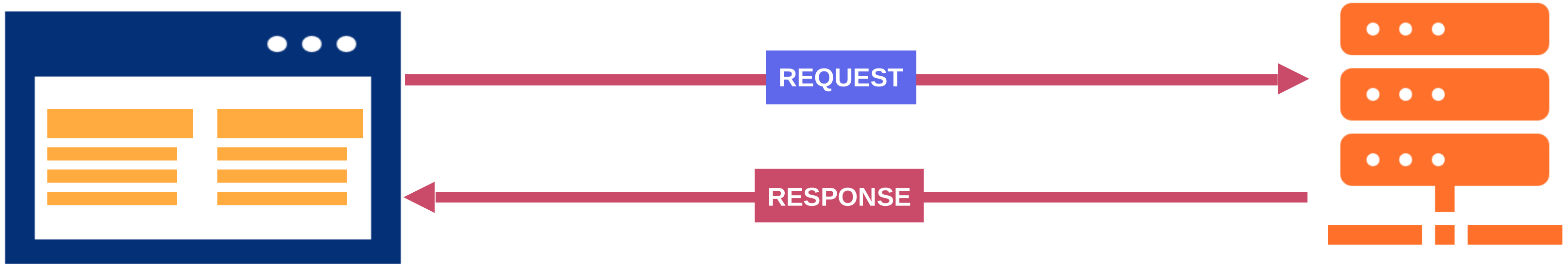
knowledge hut


https://www.mysite.com/about
https://www.mysite.com/products
https://www.mysite.com/blog
https://www.mysite.com/contact
https://www.mysite.com/login
https://www.mysite.com/signup
MySite
Login | Signup
About Us
Products
Blog
Contact Us

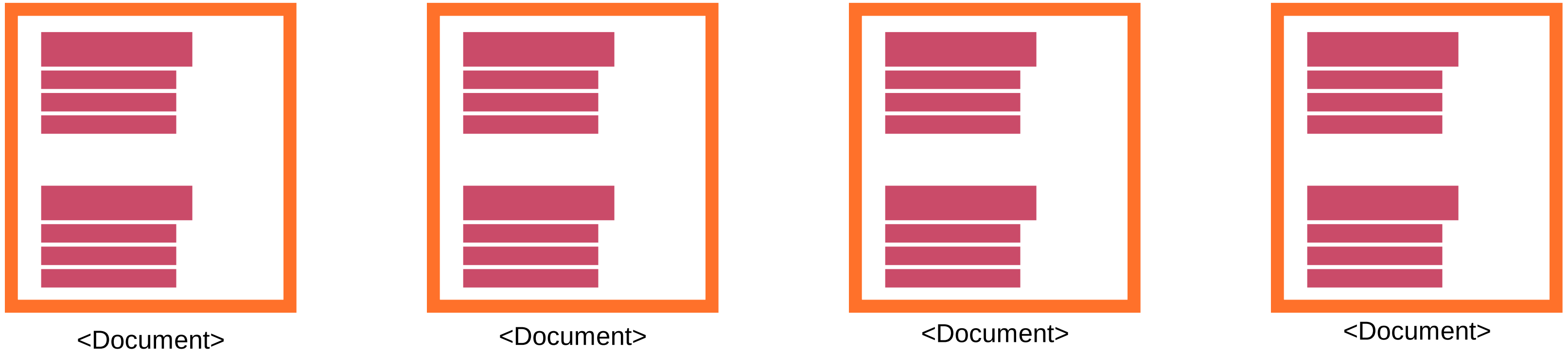

https://www.mysite.com
https://www.mysite.com/login
https://www.mysite.com/dashboard


https://www.mysite.com
https://www.mysite.com/about
https://www.mysite.com/blog
https://www.mysite.com/contact
https://www.mysite.com/login
https://www.mysite.com/dashboard

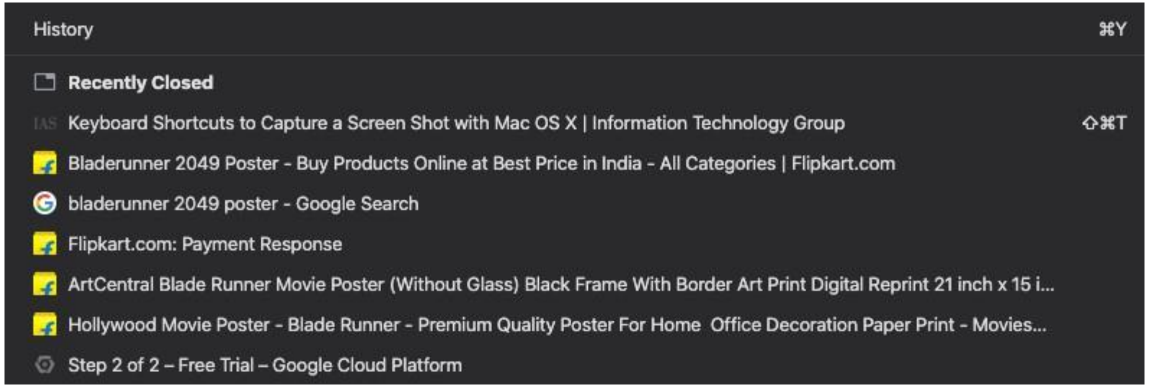

https://
www.mysite.com/blog
REQUEST


REQUEST
RESPONSE

# MULTI-PAGE WEBSITES



## BROWSER'S HISTORY CONTAINS A LIST OF RECENTLY VISITED UNIQUE URLS



History ⌘Y

**Recently Closed**

Keyboard Shortcuts to Capture a Screen Shot with Mac OS X | Information Technology Group ⇧⌘T

Bladerunner 2049 Poster - Buy Products Online at Best Price in India - All Categories | Flipkart.com

bladerunner 2049 poster - Google Search

Flipkart.com: Payment Response

ArtCentral Blade Runner Movie Poster (Without Glass) Black Frame With Border Art Print Digital Reprint 21 inch x 15 i...

Hollywood Movie Poster - Blade Runner - Premium Quality Poster For Home Office Decoration Paper Print - Movies...

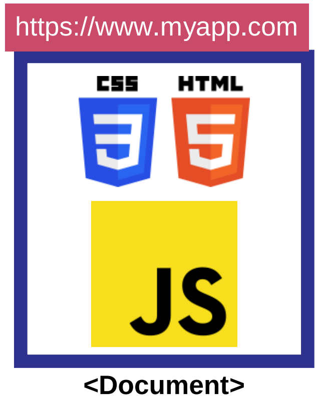
Step 2 of 2 – Free Trial – Google Cloud Platform

- √ Bookmark
- √ Use Navigation features of the browser
- √ Share URL with friends

## WEB APPLICATIONS BUILT USING MODERN JAVASCRIPT LIBRARIES LIKE REACT

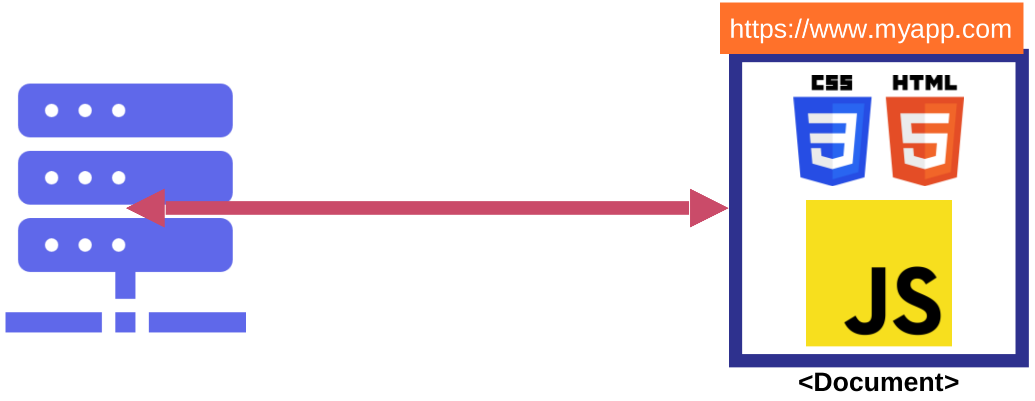
https://www.myapp.com
CSS
HTML
JS
<Document>

## WEB APPLICATIONS BUILT USING MODERN JAVASCRIPT LIBRARIES LIKE REACT



Single Page Apps (SPAs)

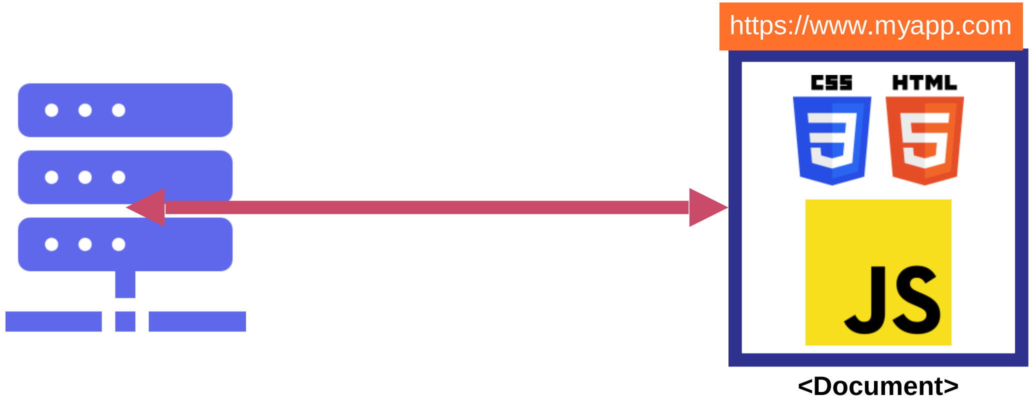
# WEB APPLICATIONS BUILT USING MODERN JAVASCRIPT LIBRARIES LIKE REACT



There's one HTML file with the JavaScript app bundle & stylesheet

Single Page Apps (SPAs)

## WEB APPLICATIONS BUILT USING MODERN JAVASCRIPT LIBRARIES LIKE REACT

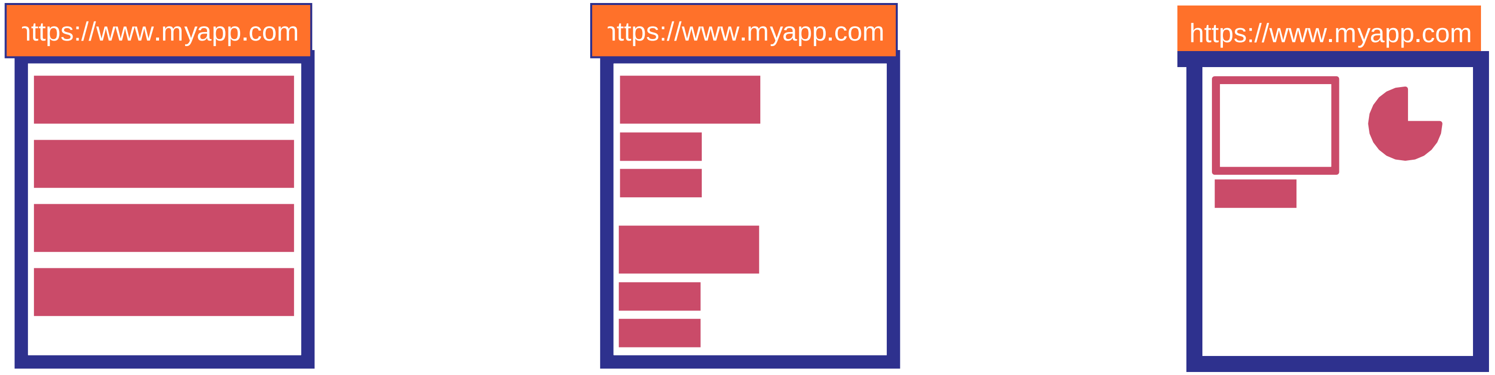


There's one HTML file with the JavaScript app bundle & stylesheet

The application then runs in your browser (client)

Single Page Apps (SPAs)

# WHILE THE UIS IN THE SPA MAY CHANGE, THE URL REMAINS THE SAME!



## CONDITIONALLY SWITCHING UIS (COMPONENTS) IN REACT

```
const ShowLogin = ({show}) => {
  const [ui, setUi] = useState(show);
  return ui ? <Login /> : <Home />
}
```

## CONDITIONALLY SWITCHING UIS (COMPONENTS) IN REACT

```
const ShowLogin = ({show}) => {
  const [ui, setUi] = useState(show);
  return ui ? <Login /> : <Home />
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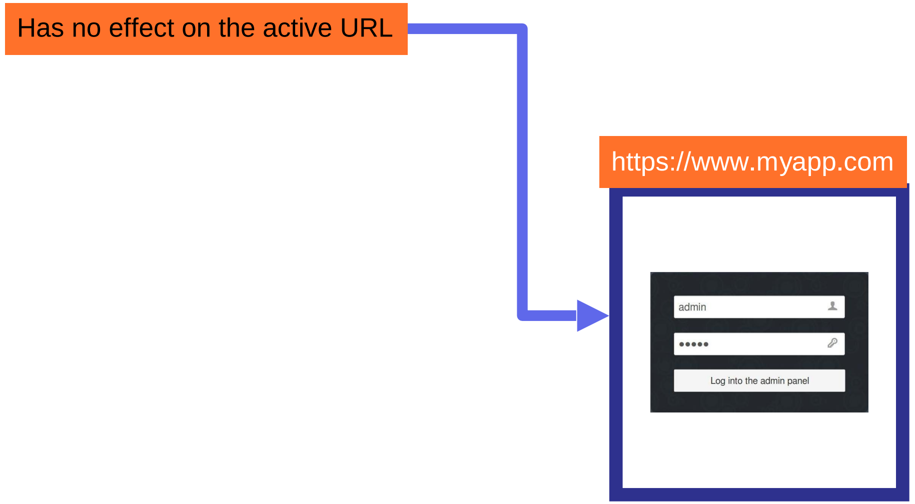
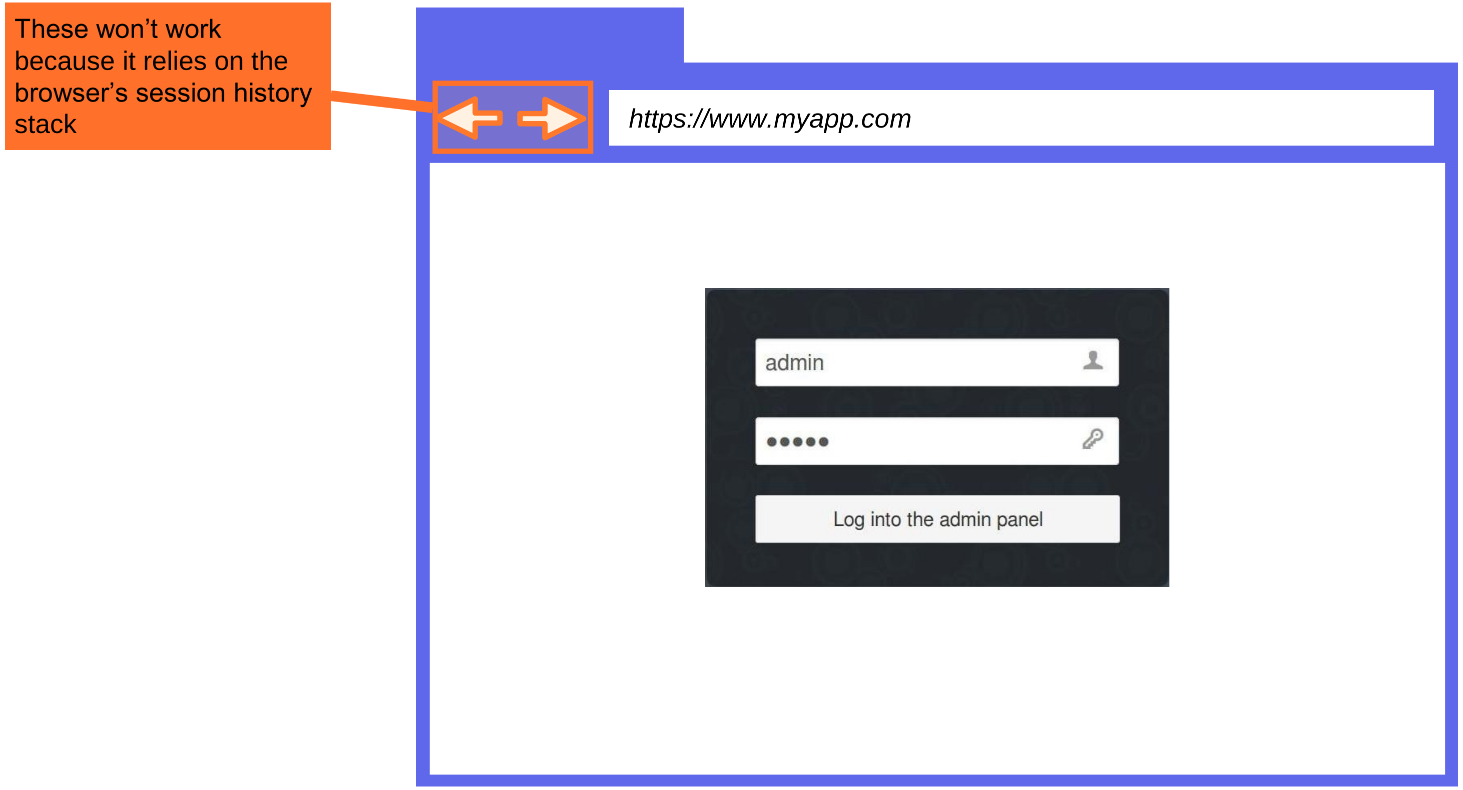



These won’t work because it relies on the browser’s session history stack
https://www.myapp.com
admin
•••••
Log into the admin panel

Internally switching UI components in a Single Page App won’t update the URL and the browser’s session stack

# YOUR BROWSER'S SESSION HISTORY STACK

**Multi-page Site**

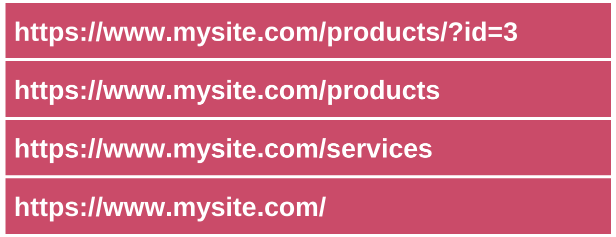
| |
|---|
| 4. https://www.mysite.com/products/?id=3 |
| 3. https://www.mysite.com/products |
| 2. https://www.mysite.com/services |
| 1. https://www.mysite.com/ |

**Single Page App (SPA)**

| |
|---|
| 1. https://www.myapp.com/ |
| |
| |
| |

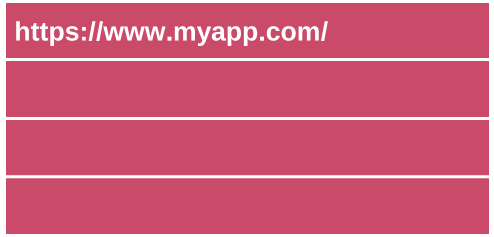
## YOUR BROWSER'S SESSION HISTORY STACK

**Multi-page Site**


https://www.mysite.com/products/?id=3
https://www.mysite.com/products
https://www.mysite.com/services
https://www.mysite.com/

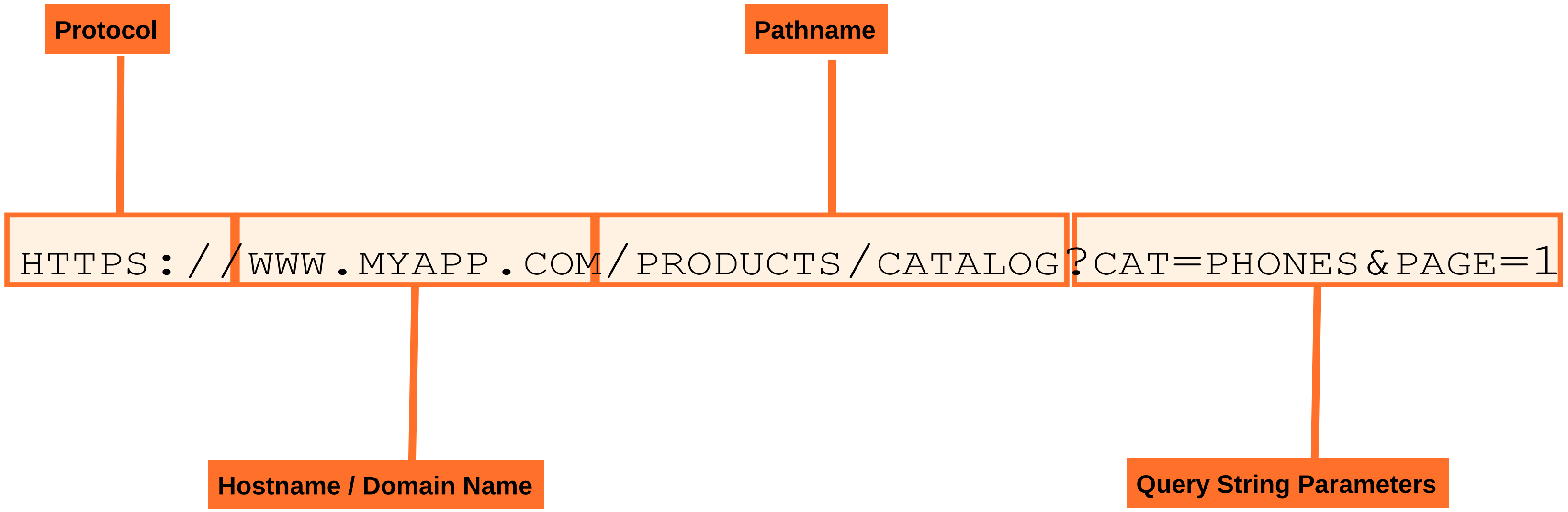
- Bad user experience (Requires roundtrips to the server to fetch each page)
- Browser's navigation features work (Back & Forward buttons)
- You can bookmark & share URLs
- You can revisit a page from history

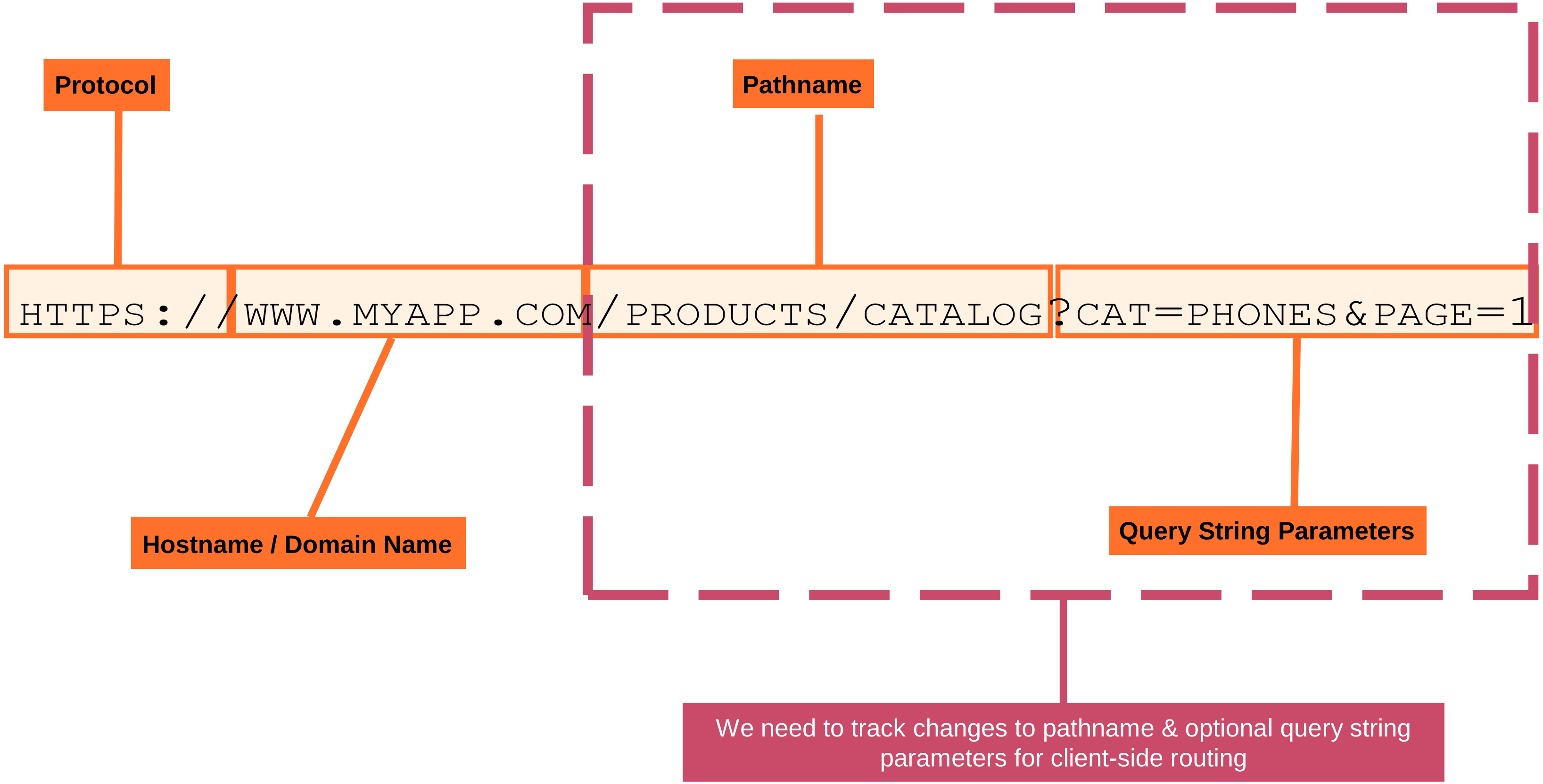
**Single Page App (SPA)**



- Great user experience
- Browser's navigation features don't work (Back & Forward buttons)
- You cannot bookmark or share URLs
- You cannot revisit a particular UI from history

**We need a way to implement client-side routing to synchronize UIs with URLs**


Protocol
Pathname
HTTPS://WWW.MYAPP.COM/PRODUCTS/CATALOG?CAT=PHONES&PAGE=1
Hostname / Domain Name
Query String Parameters



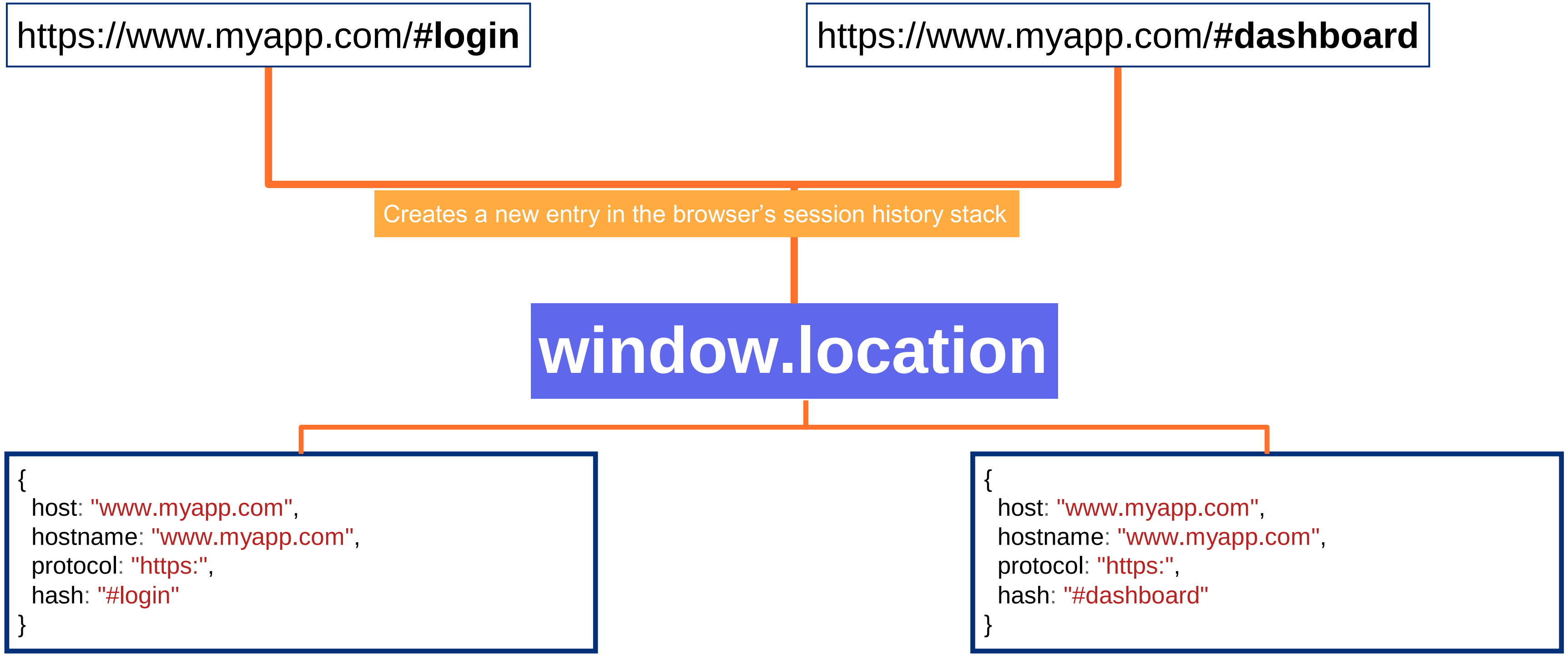
We need to track changes to pathname & optional query string parameters for client-side routing

## HASH BASED URLS

https://www.myapp.com/**#login**

https://www.myapp.com/**#dashboard**

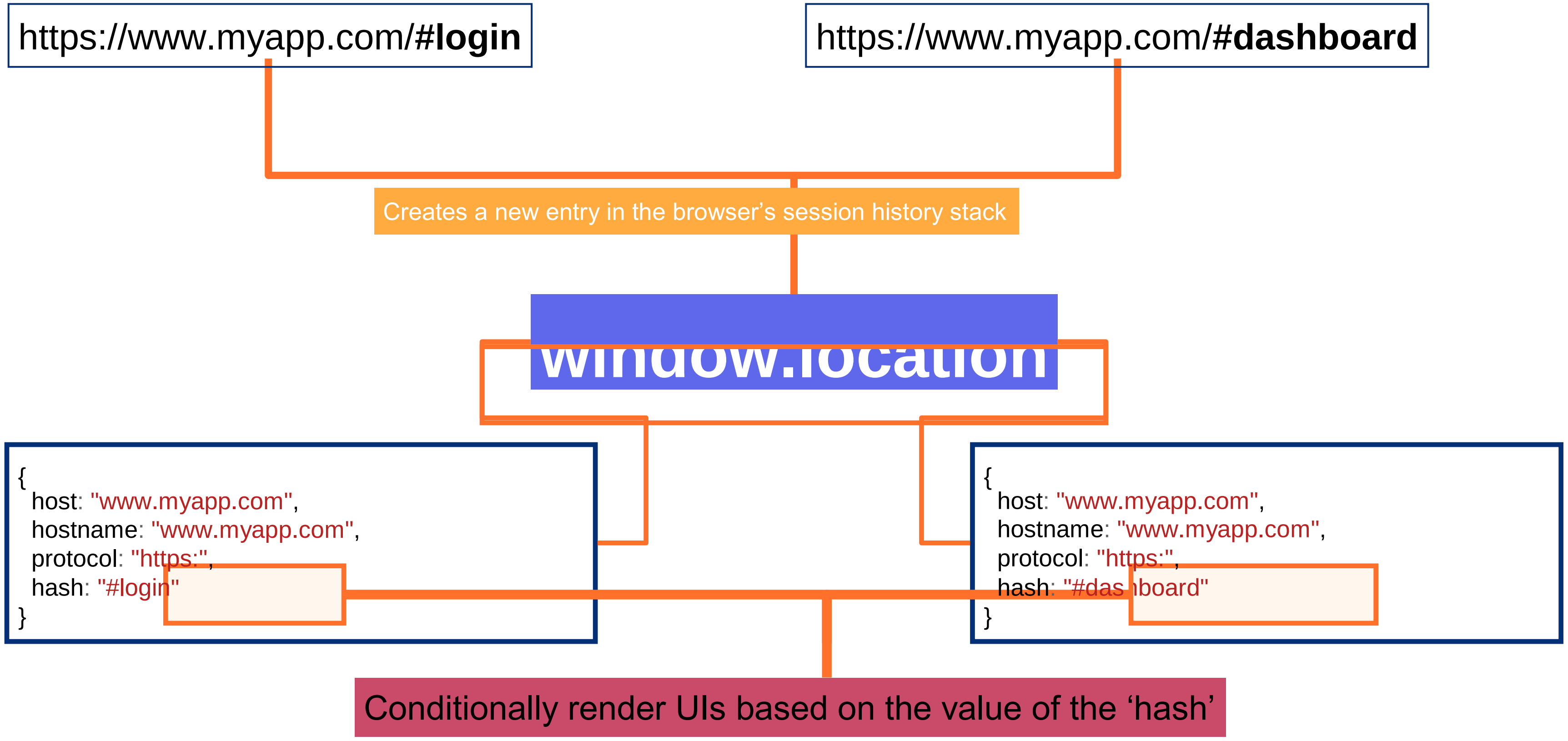
## HASH BASED URLS


https://www.myapp.com/#login
https://www.myapp.com/#dashboard
Creates a new entry in the browser’s session history stack
window.location

```
{
  host: "www.myapp.com",
  hostname: "www.myapp.com",
  protocol: "https:",
  hash: "#login"
}
```

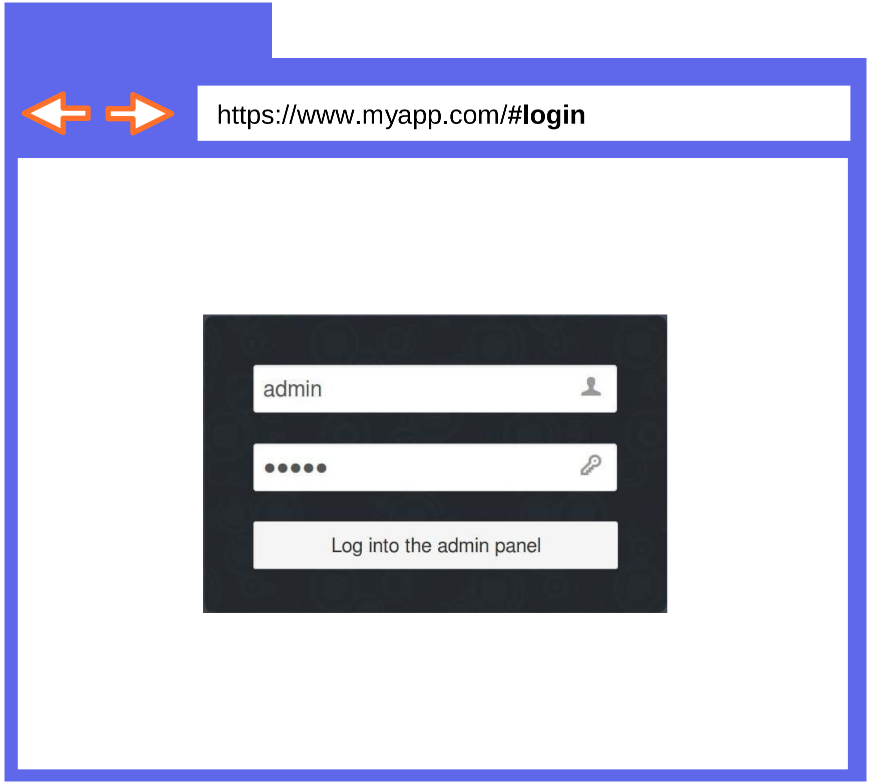
```
{
  host: "www.myapp.com",
  hostname: "www.myapp.com",
  protocol: "https:",
  hash: "#dashboard"
}
```

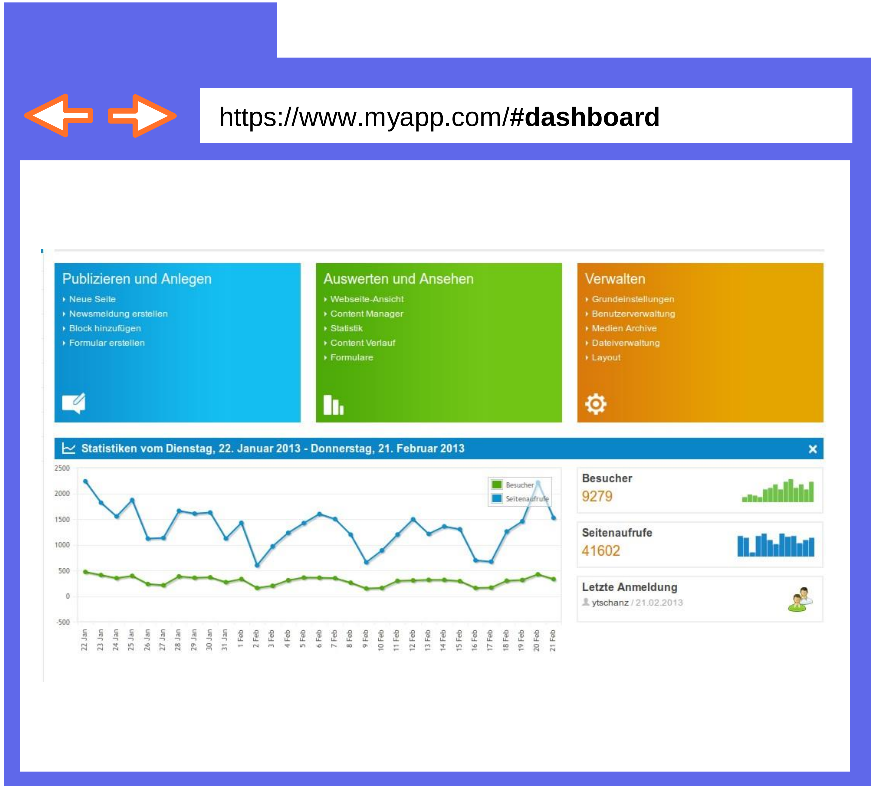
# HASH BASED URLS

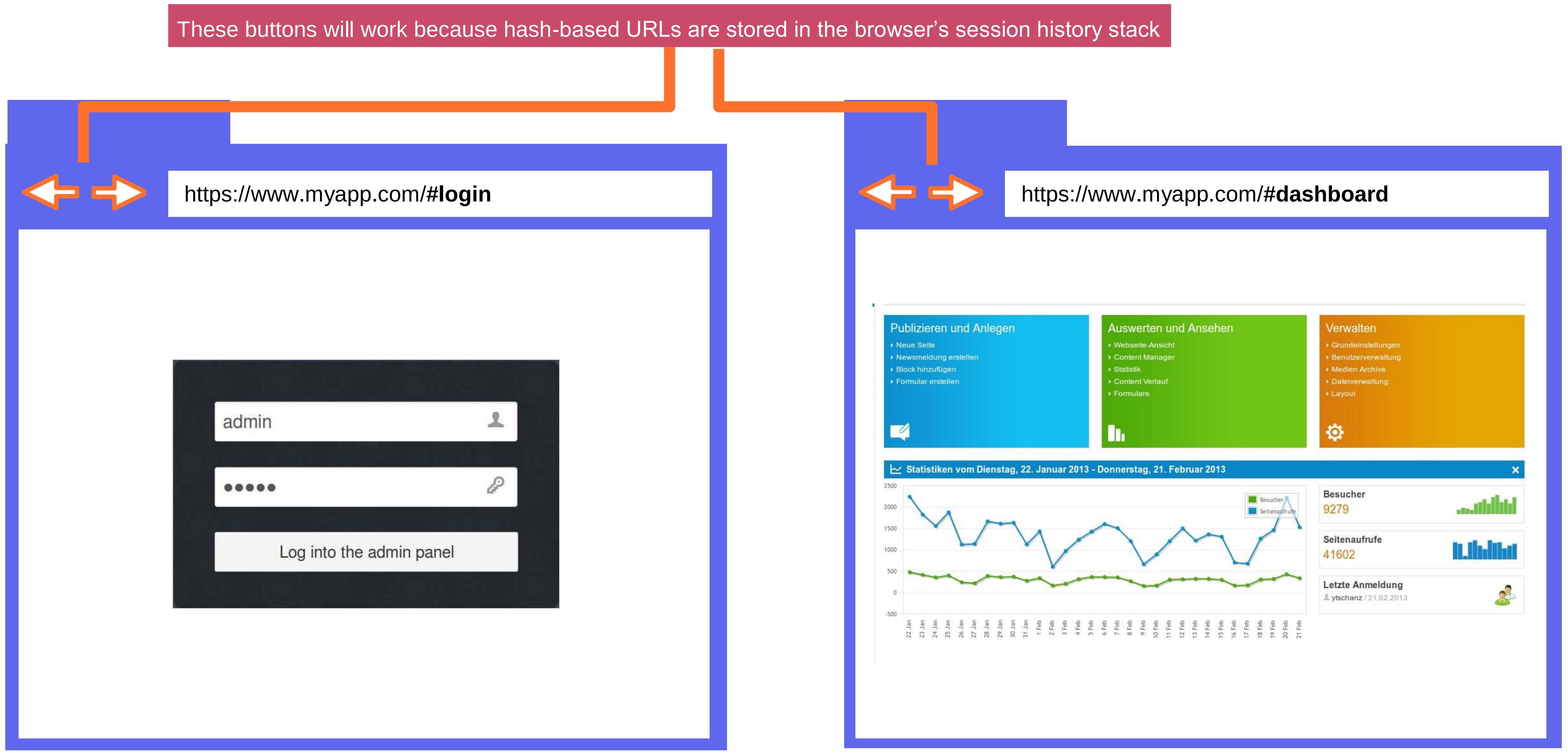

https://www.myapp.com/#login
https://www.myapp.com/#dashboard
Creates a new entry in the browser's session history stack
window.location
Conditionally render UIs based on the value of the 'hash'

```
{
  host: "www.myapp.com",
  hostname: "www.myapp.com",
  protocol: "https:",
  hash: "#login"
}
```

```
{
  host: "www.myapp.com",
  hostname: "www.myapp.com",
  protocol: "https:",
  hash: "#dashboard"
}
```


https://www.myapp.com/#**login**
admin
●●●●●
Log into the admin panel


https://www.myapp.com/#**dashboard**
Publizieren und Anlegen
Neue Seite
Newsmeldung erstellen
Block hinzufügen
Formular erstellen
Auswerten und Ansehen
Webseite-Ansicht
Content Manager
Statistik
Content Verlauf
Formulare
Verwalten
Grundeinstellungen
Benutzerverwaltung
Medien Archive
Dateiverwaltung
Layout
Statistiken vom Dienstag, 22. Januar 2013 - Donnerstag, 21. Februar 2013
Besucher
Seitenaufrufe
Besucher
9279
Seitenaufrufe
41602
Letzte Anmeldung
ytschanz / 21.02.2013



**You can bookmark and share hash URLs and your SPAs will reflect the correct UI for a given URL**

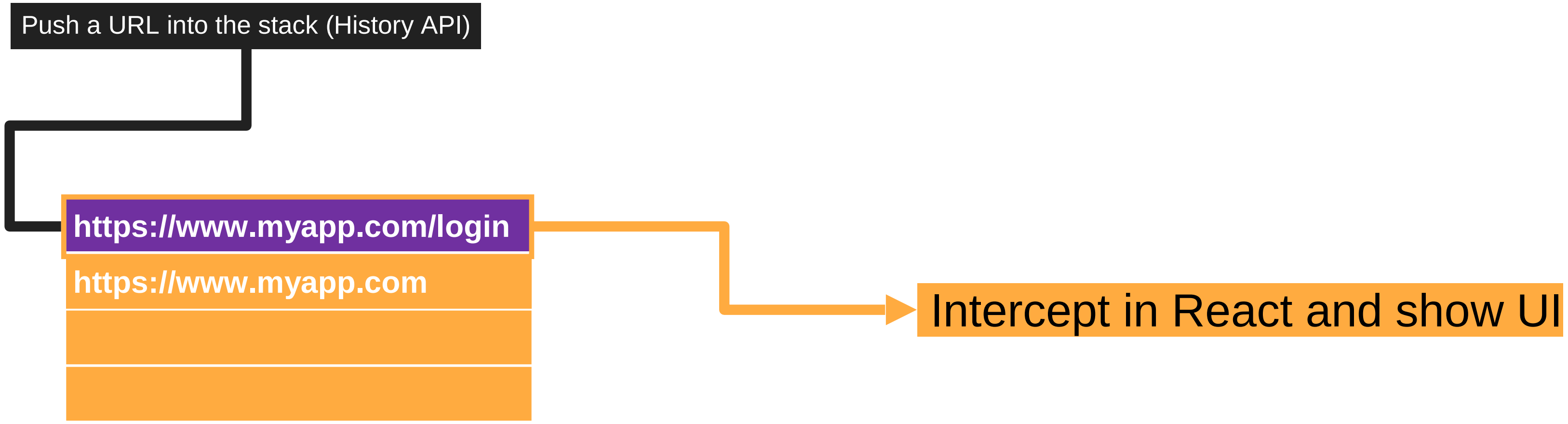
#Hash based URLS allow you to get the best of single page apps with the goodness of native navigation features

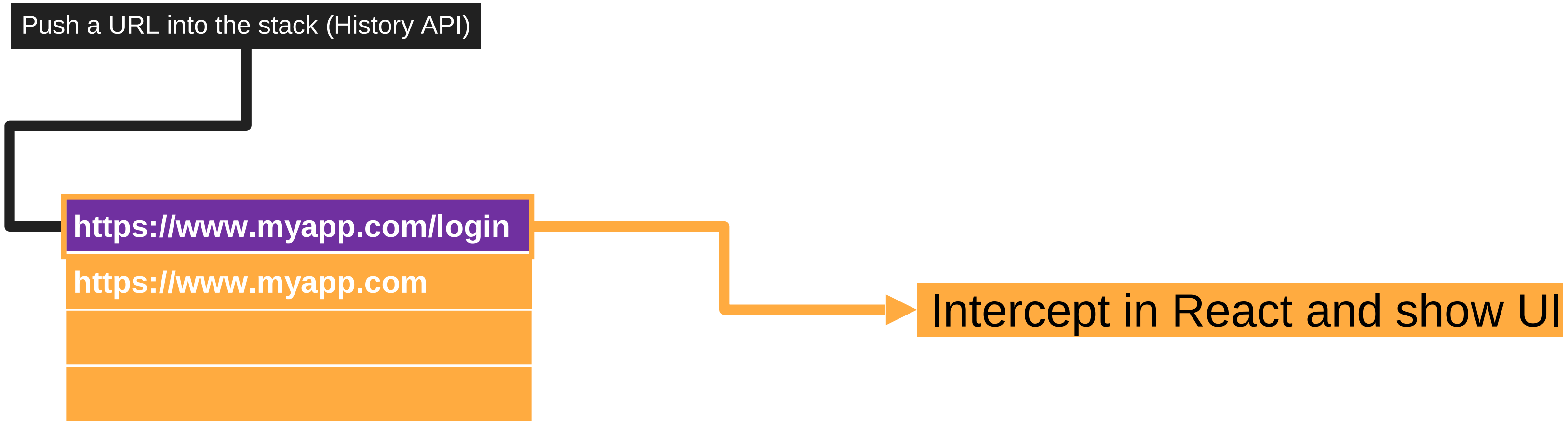
## HTML5’s History API

Works in all browsers except IE <= 9 and Opera Mini

## HTML5’S HISTORY API

- √ Gives you direct access to the browser’s session history stack
- √ You can set unique URLs into the stack programmatically
- √ You can go back and forward and even replace a URL in the stack
- √ All **without** navigating away from the page!


Push a URL into the stack (History API)
https://www.myapp.com/login
https://www.myapp.com
Intercept in React and show UI


Push a URL into the stack (History API)
https://www.myapp.com/login
https://www.myapp.com
Intercept in React and show UI

√ Great user experience
√ Native navigation features
√ You can selectively load parts of the UI

We get to keep our UIs in sync with URLs

React apps can get large, with several UIs and components

React Router

An open source client-side routing library for React

React Router

Michael Jackson

Ryan Florence

React Router

- Internally abstracts & uses the History API for consistent behavior across all browsers
- Whenever the URL changes, re-renders the app.
- Offers a declarative API with components to encapsulate behaviors and features
- Also offers Hooks

## Routing in a React App

### Routing with React Router

## USER EXPERIENCE MATTERS

Client-side routing is key to a great user experience in Single Page Apps (SPAs)

## ROUTING IN REACT APPS

React Router

An open source client-side routing library for React

## ROUTING IN REACT APPS

React Router

**Michael Jackson**

**Ryan Florence**

## ROUTING IN REACT APPS

React Router

=

**Great Developer Experience!**

## ROUTING IN REACT APPS

React Router

**<Dynamic Routing>**

## STATIC ROUTING IN OTHER FRAMEWORKS/LIBRARIES

Static routes defined in an Angular application

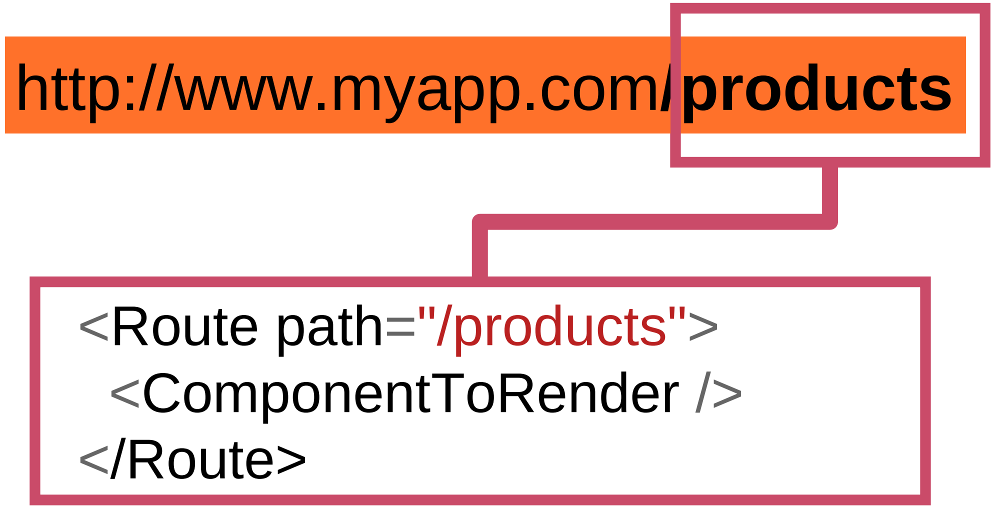
```
const appRoutes: Routes = [
  { path: "about", component: AboutComponent },
  { path: "product/:id", component: ProductComponent },
  { path: "blog", component: BlogComponent },
  { path: "**", component: PageNotFoundComponent }
];
```

## DYNAMIC ROUTING WITH REACT ROUTER USING THE <ROUTE> COMPONENT

```
<Route path="/path-name">
  <ComponentToRender />
</Route>
```

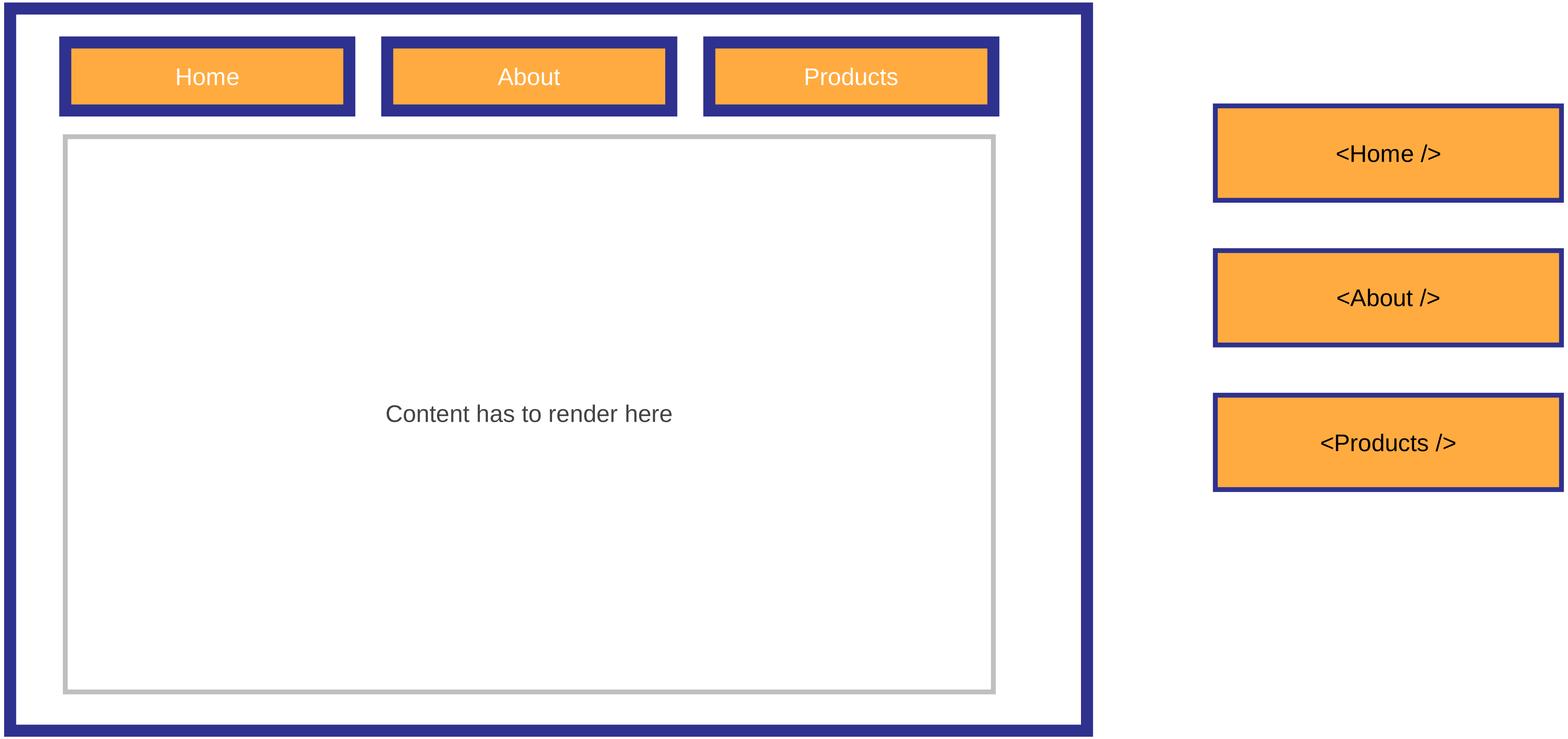
The Route component monitors the browser’s session history stack (History API) and renders the appropriate component when the path matches

# DYNAMIC ROUTING WITH REACT ROUTER

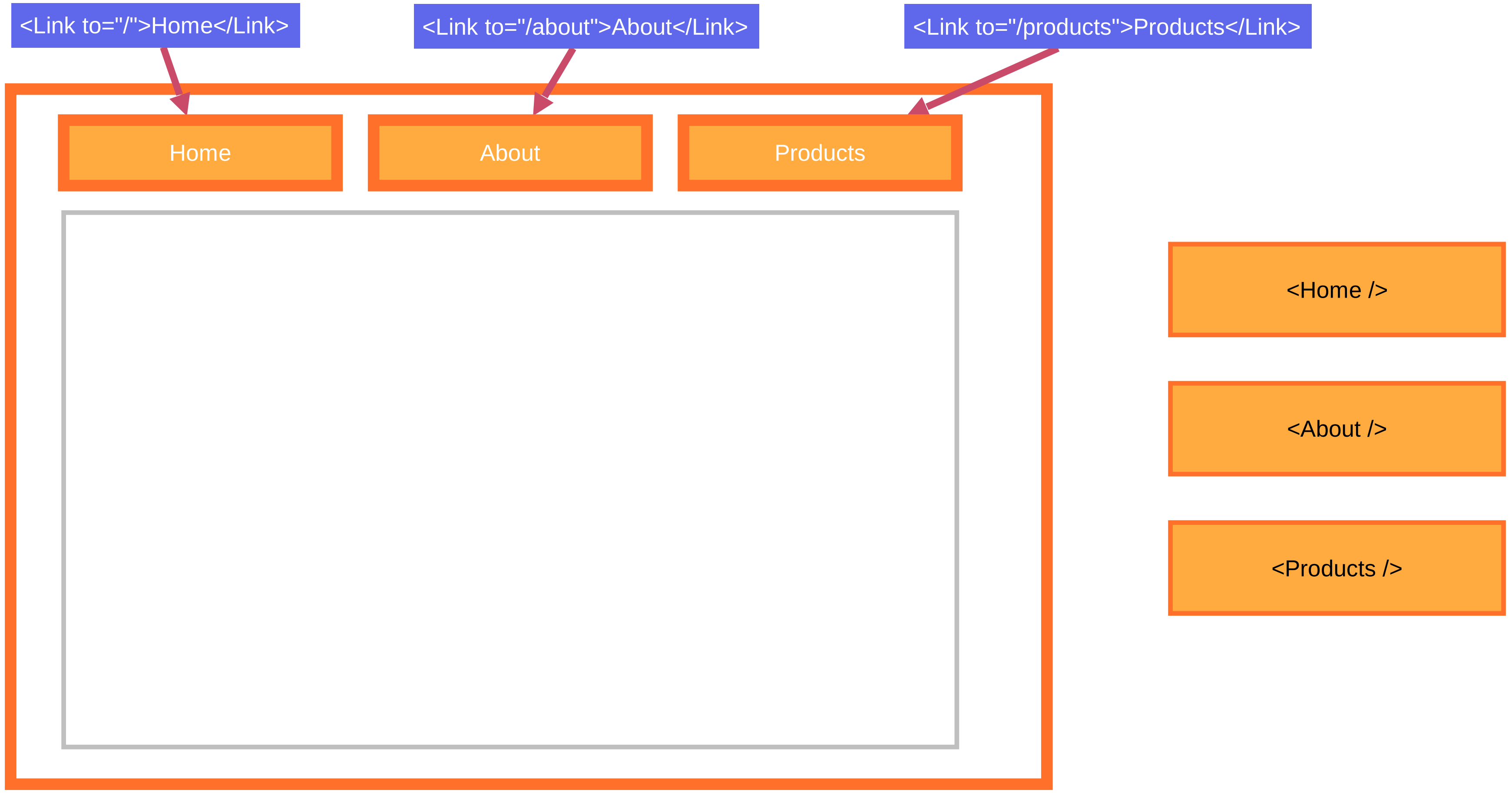


```
<Route path="/products">
  <ComponentToRender />
</Route>
```

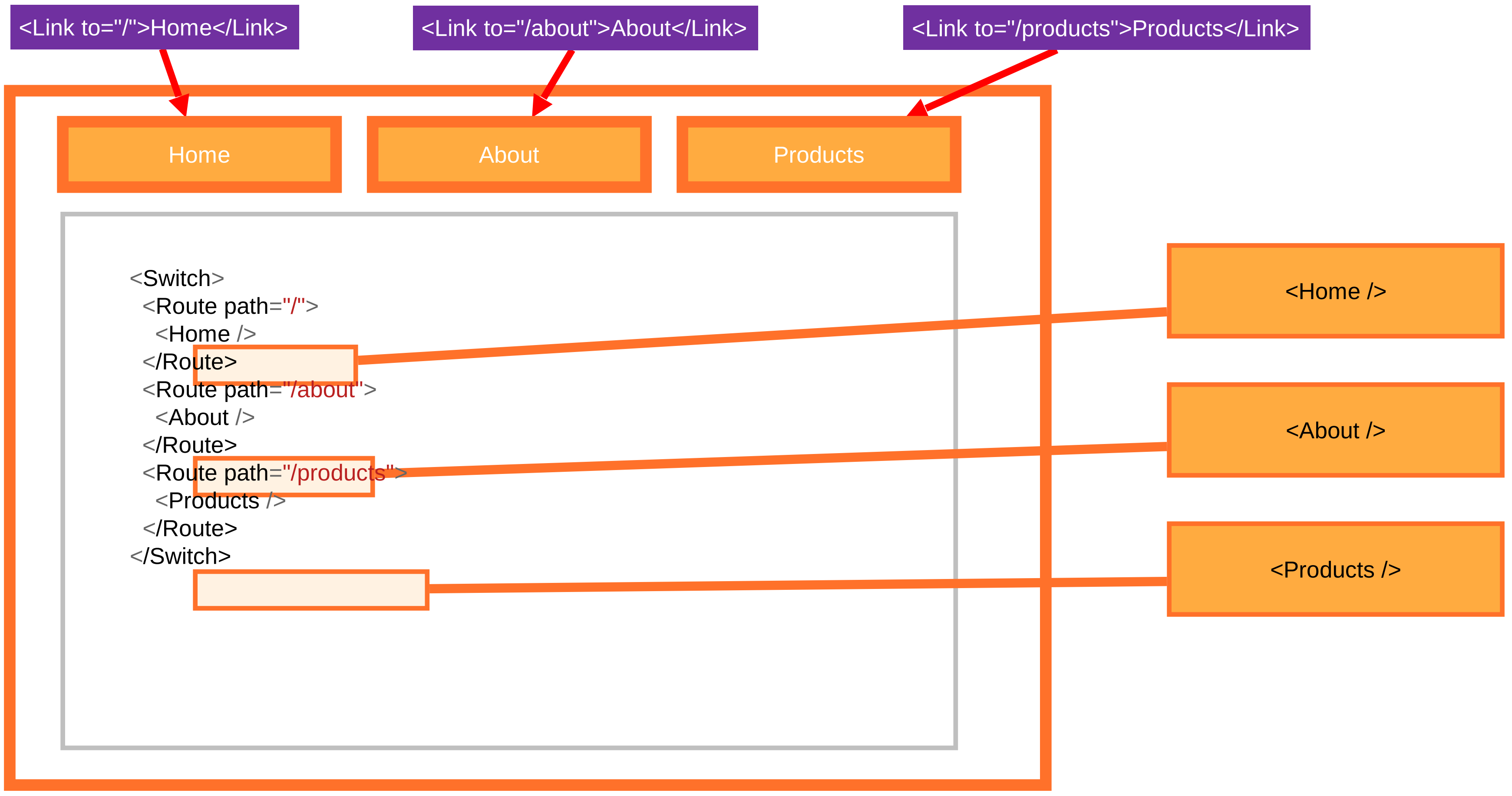
## ROUTING SCENARIO



## The <Link> component

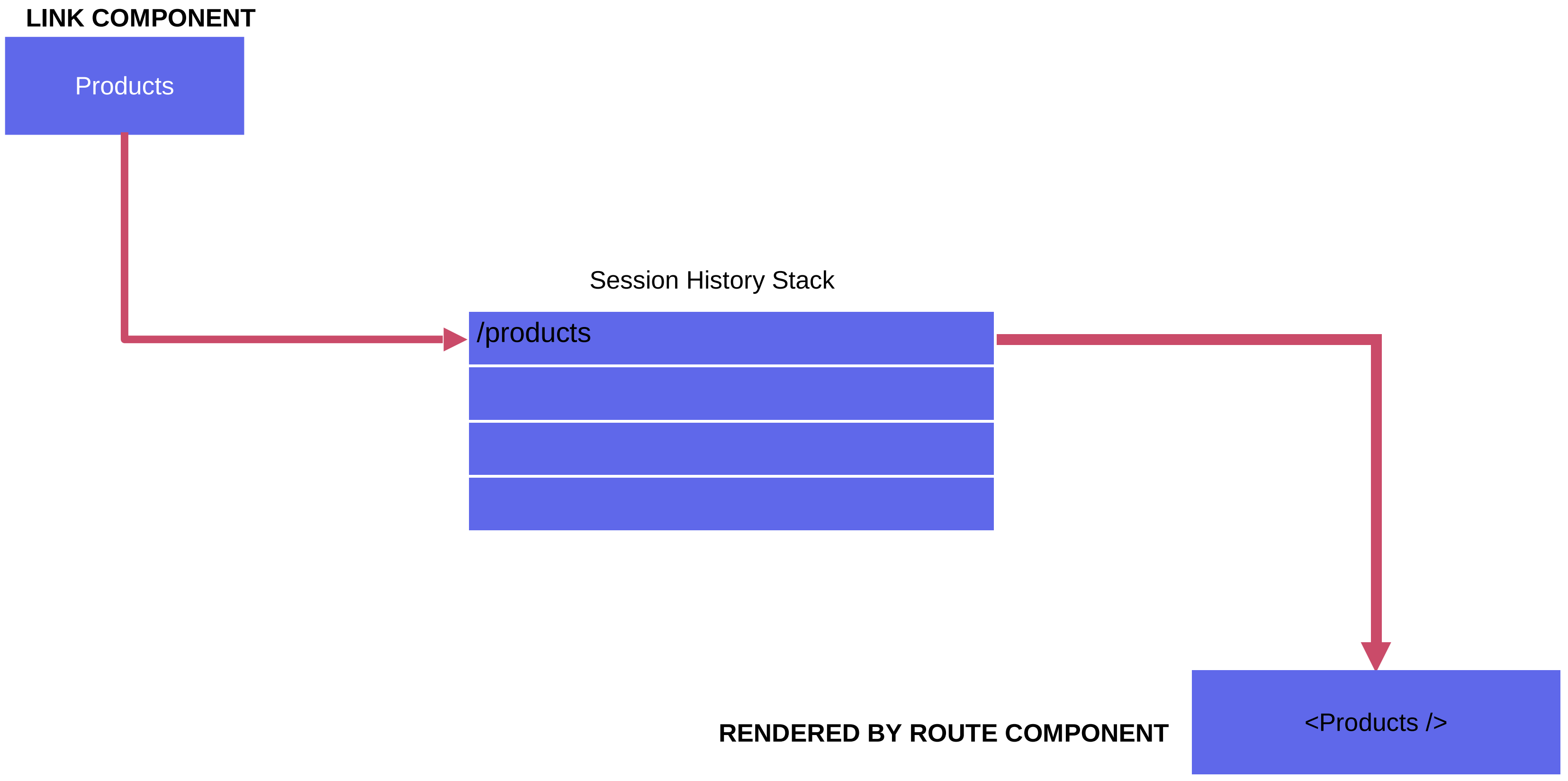


## The <Link>, <Switch> & <Route> components

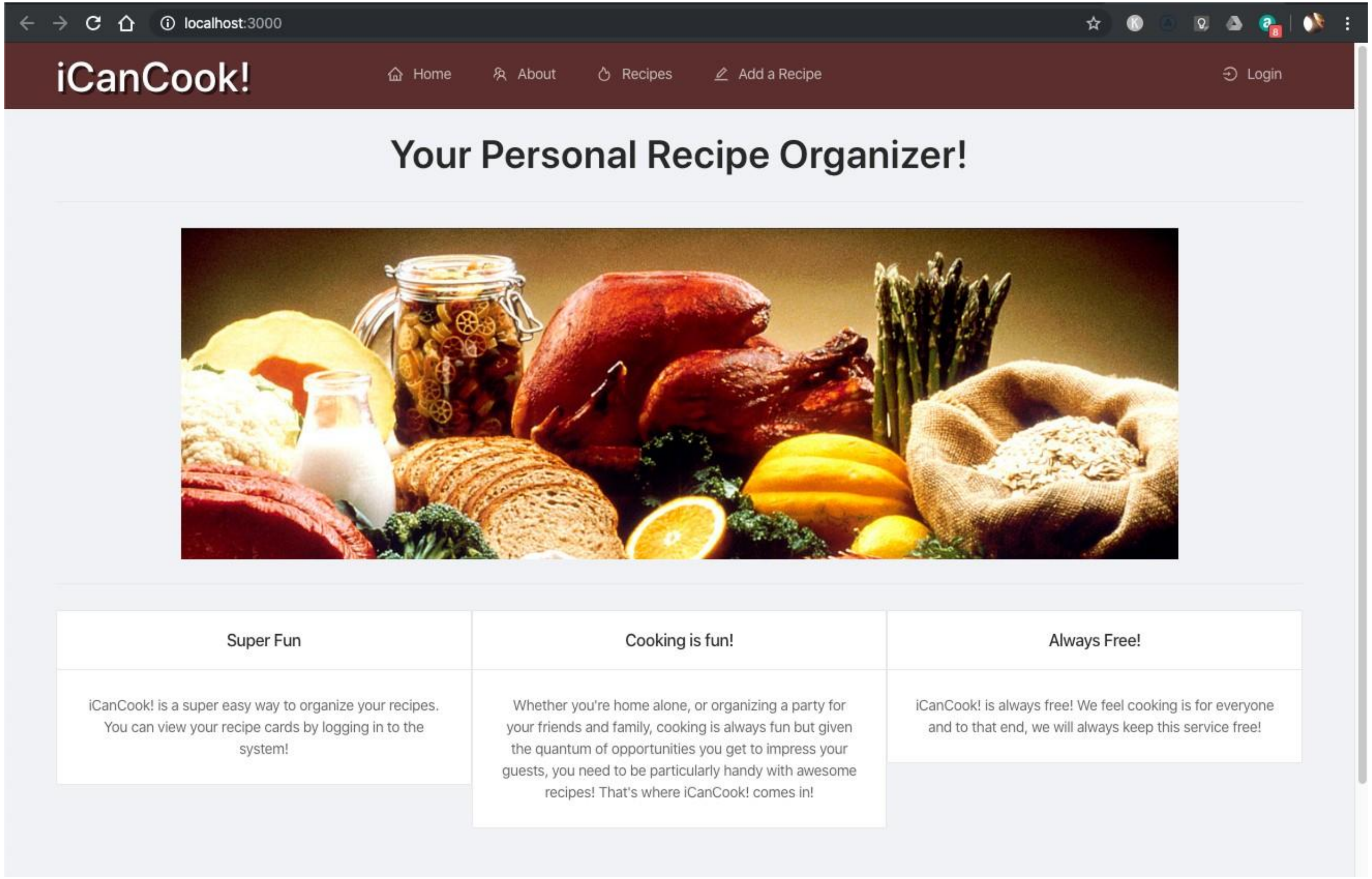


```
<Switch>
  <Route path="/">
    <Home />
  </Route>
  <Route path="/about">
    <About />
  </Route>
  <Route path="/products">
    <Products />
  </Route>
</Switch>
```

## BEHIND THE SCENES



## PROJECT APP | UI BUILT USING THE ANT DESIGN FRAMEWORK (WWW.ANT.DESIGN)



Your Personal Recipe Organizer!

**Super Fun**

iCanCook! is a super easy way to organize your recipes. You can view your recipe cards by logging in to the system!

**Cooking is fun!**

Whether you're home alone, or organizing a party for your friends and family, cooking is always fun but given the quantum of opportunities you get to impress your guests, you need to be particularly handy with awesome recipes! That's where iCanCook! comes in!

**Always Free!**

iCanCook! is always free! We feel cooking is for everyone and to that end, we will always keep this service free!

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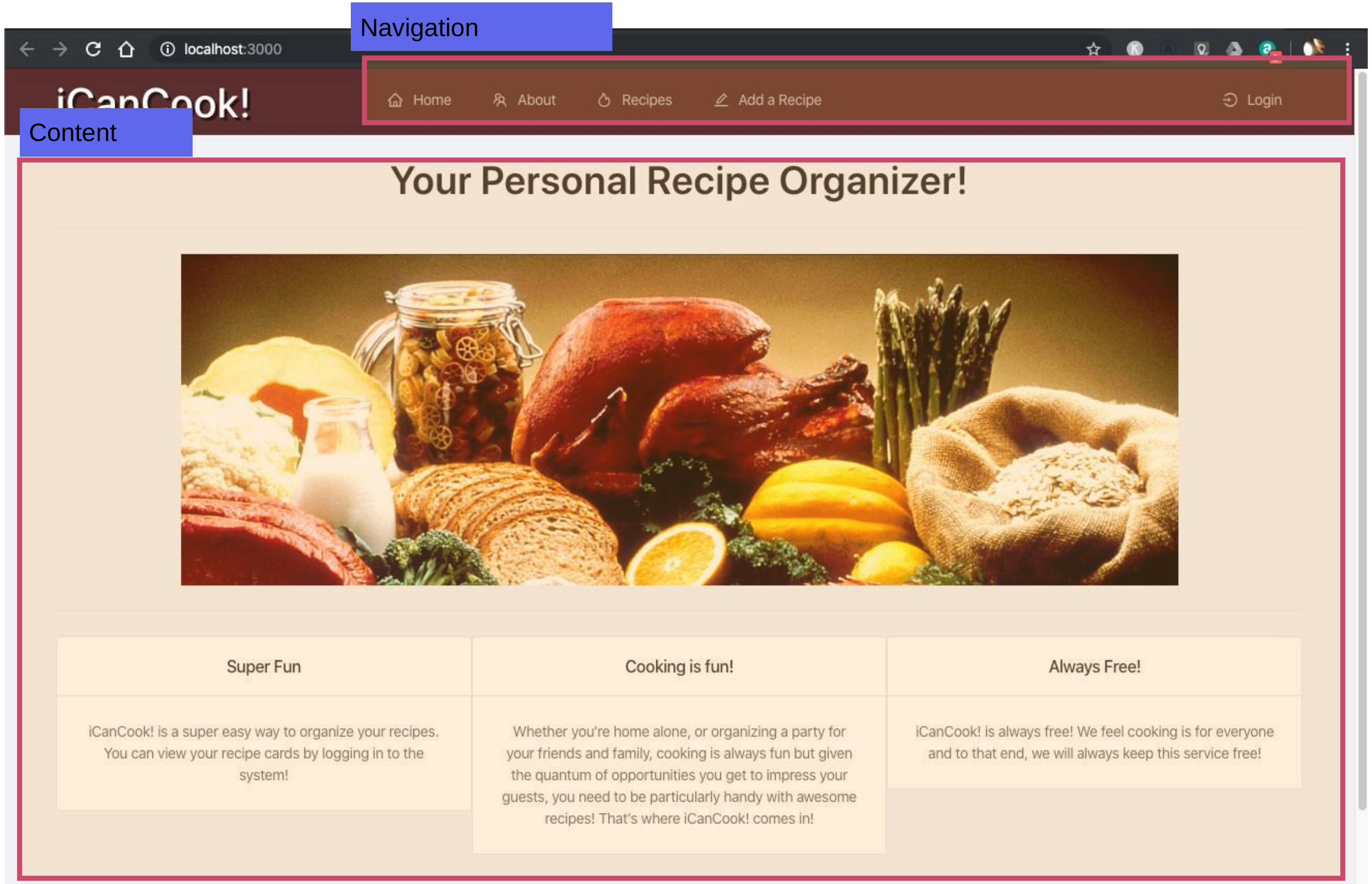

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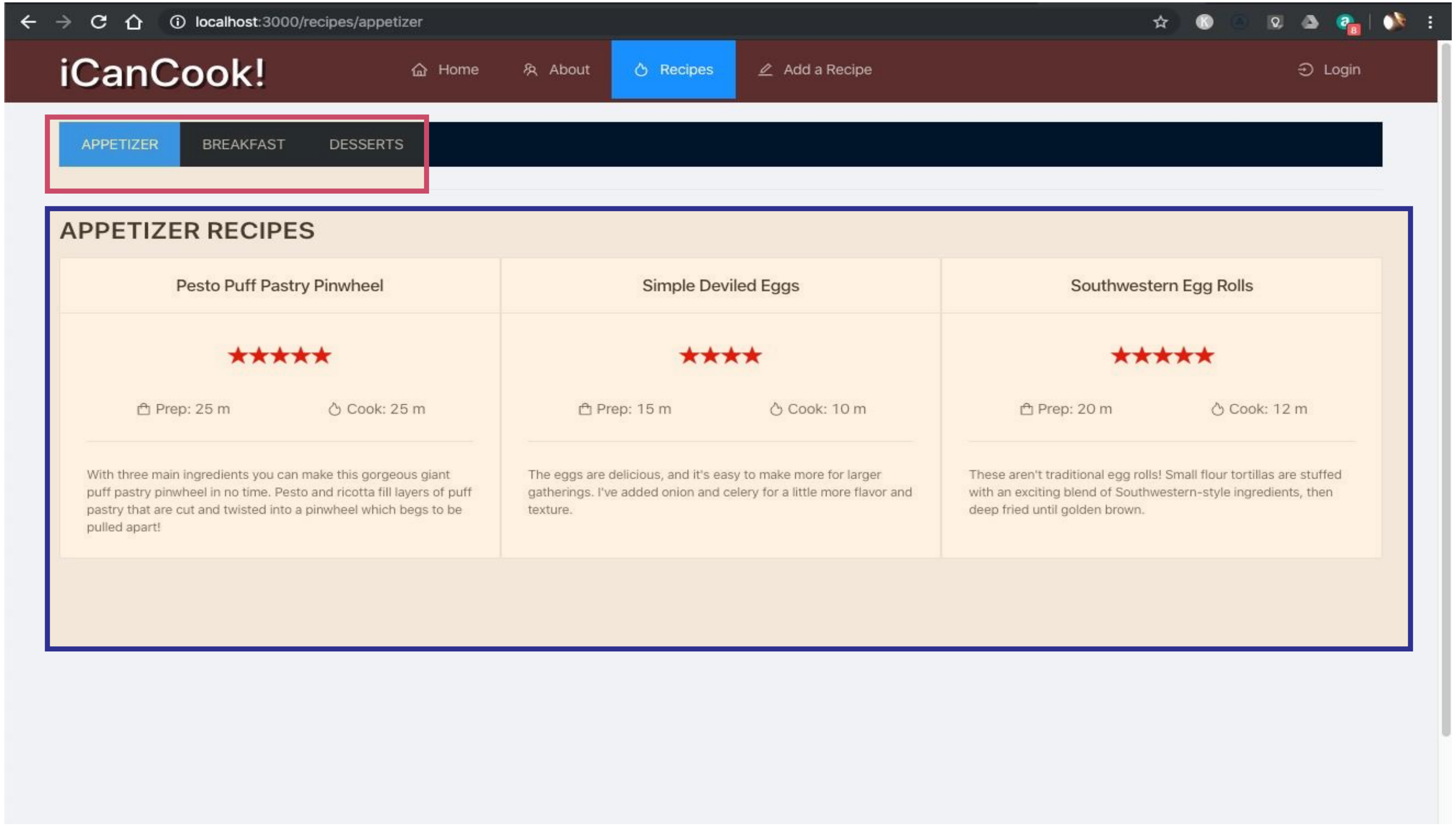
## NESTED NAVIGATION


localhost:3000/recipes/appetizer

APPETIZER RECIPES

Pesto Puff Pastry Pinwheel

★★★★★

Prep: 25 m Cook: 25 m

With three main ingredients you can make this gorgeous giant puff pastry pinwheel in no time. Pesto and ricotta fill layers of puff pastry that are cut and twisted into a pinwheel which begs to be pulled apart!

Simple Deviled Eggs

★★★★

Prep: 15 m Cook: 10 m

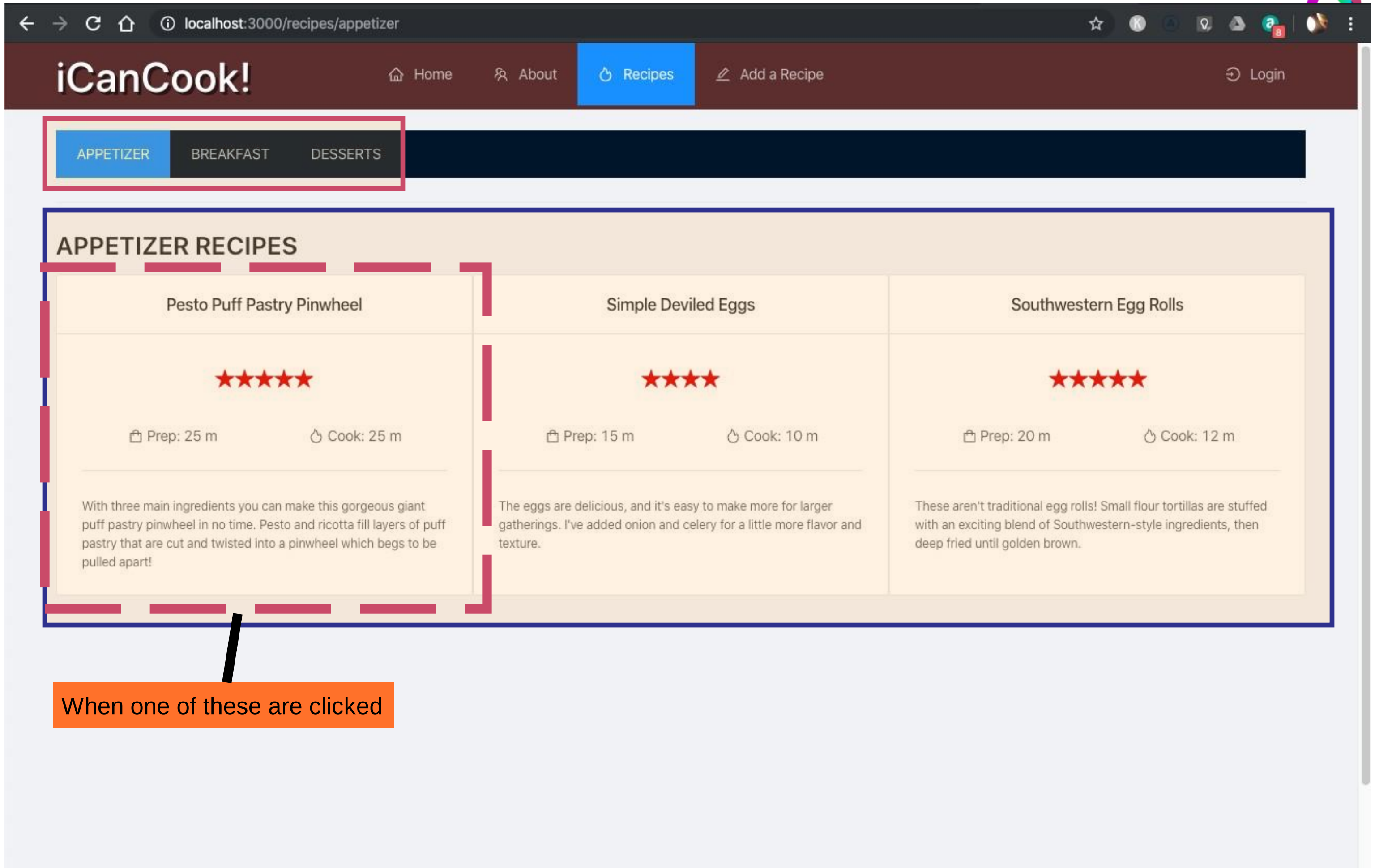
The eggs are delicious, and it's easy to make more for larger gatherings. I've added onion and celery for a little more flavor and texture.

Southwestern Egg Rolls

★★★★★

Prep: 20 m Cook: 12 m

These aren't traditional egg rolls! Small flour tortillas are stuffed with an exciting blend of Southwestern-style ingredients, then deep fried until golden brown.



APPETIZER RECIPES

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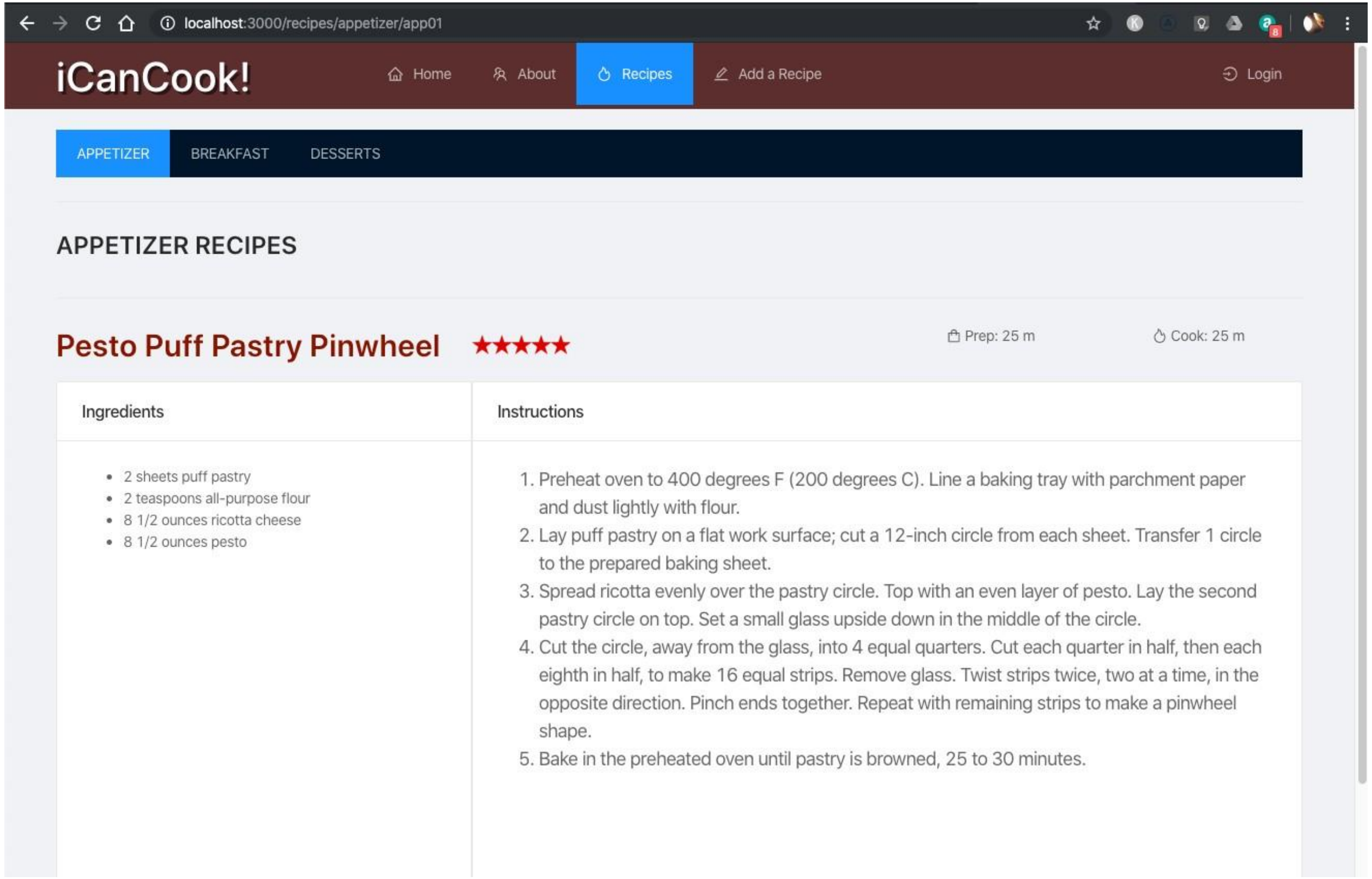
★★★★★

Prep: 20 m Cook: 12 m

These aren't traditional egg rolls! Small flour tortillas are stuffed with an exciting blend of Southwestern-style ingredients, then deep fried until golden brown.

When one of these are clicked

## NESTED NAVIGATION



APPETIZER RECIPES

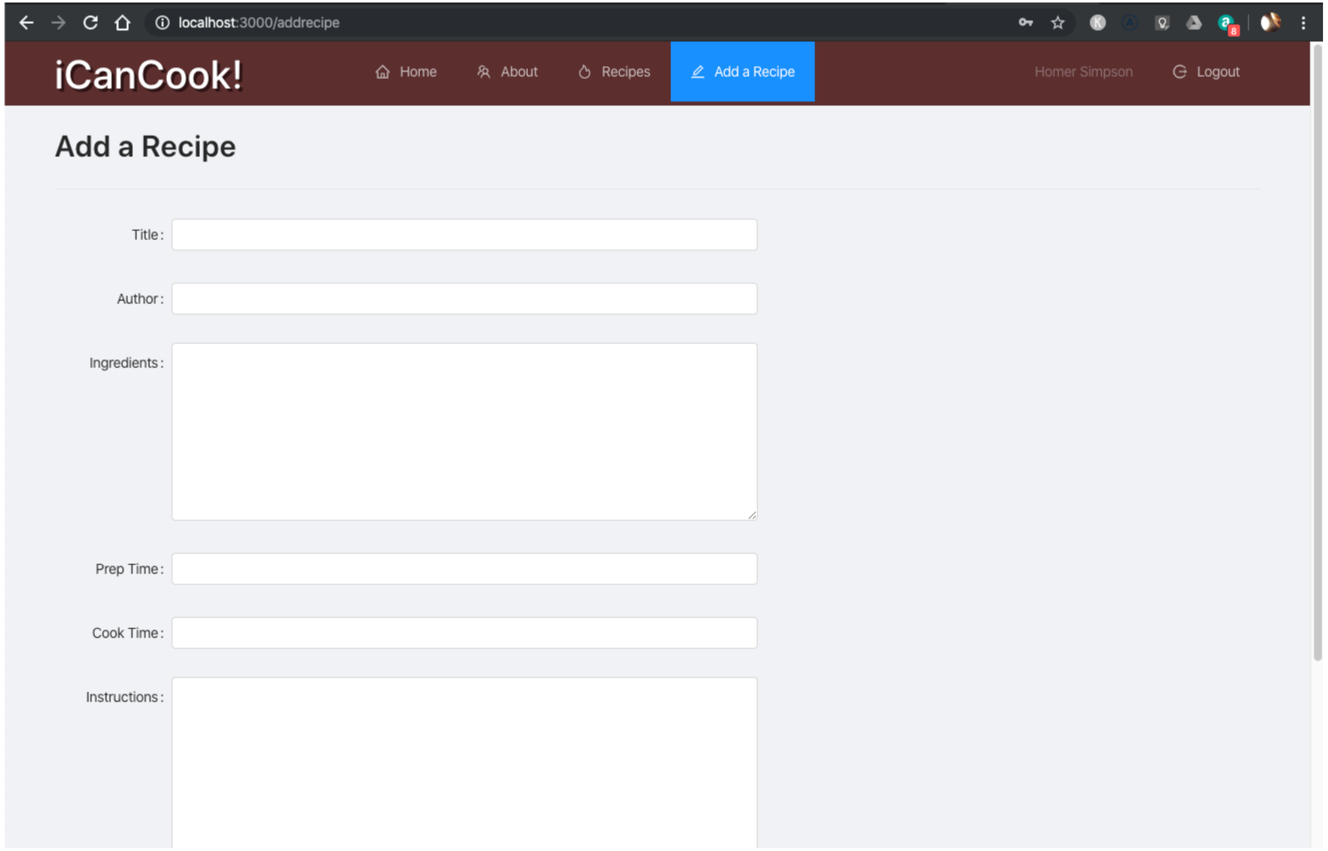
Pesto Puff Pastry Pinwheel ★★★★★

Prep: 25 m

Cook: 25 m

| Ingredients | Instructions |
|---|---|
| • 2 sheets puff pastry<br>• 2 teaspoons all-purpose flour<br>• 8 1/2 ounces ricotta cheese<br>• 8 1/2 ounces pesto | 1. Preheat oven to 400 degrees F (200 degrees C). Line a baking tray with parchment paper and dust lightly with flour.<br>2. Lay puff pastry on a flat work surface; cut a 12-inch circle from each sheet. Transfer 1 circle to the prepared baking sheet.<br>3. Spread ricotta evenly over the pastry circle. Top with an even layer of pesto. Lay the second pastry circle on top. Set a small glass upside down in the middle of the circle.<br>4. Cut the circle, away from the glass, into 4 equal quarters. Cut each quarter in half, then each eighth in half, to make 16 equal strips. Remove glass. Twist strips twice, two at a time, in the opposite direction. Pinch ends together. Repeat with remaining strips to make a pinwheel shape.<br>5. Bake in the preheated oven until pastry is browned, 25 to 30 minutes. |

## PROTECTED ROUTES
## (SHOULD ONLY WORK WHEN THE USER IS LOGGED IN)



Add a Recipe

Title:

Author:

Ingredients:

Prep Time:

Cook Time:

Instructions:

## Download and Setup

# HANDLING ROUTES THAT DON’T MATCH A DEFINED PATH

```
<Switch>
  <Route exact path="/">
    <Home />
  </Route>
  <Route path="/about">
    <About />
  </Route>
  <Route path="/recipes">
    <Recipes />
  </Route>
  <Route path="/addrecipe">
    <AddRecipe />
  </Route>
  <Route path="/login">
    <Login />
  </Route>
  <Route path="*">
    <NoMatch />
  </Route>
</Switch>;
```

Handling routes that cannot be matched (HTTP 404)

## HANDLING ROUTES THAT DON'T MATCH A DEFINED PATH

```
<Switch>
  <Route exact path="/">
    <Home />
  </Route>
  <Route path="/about">
    <About />
  </Route>
  <Route path="/recipes">
    <Recipes />
  </Route>
  <Route path="/addrecipe">
    <AddRecipe />
  </Route>
  <Route path="/login">
    <Login />
  </Route>
  <Route path="*">
    <NoMatch />
  </Route>
</Switch>;
```

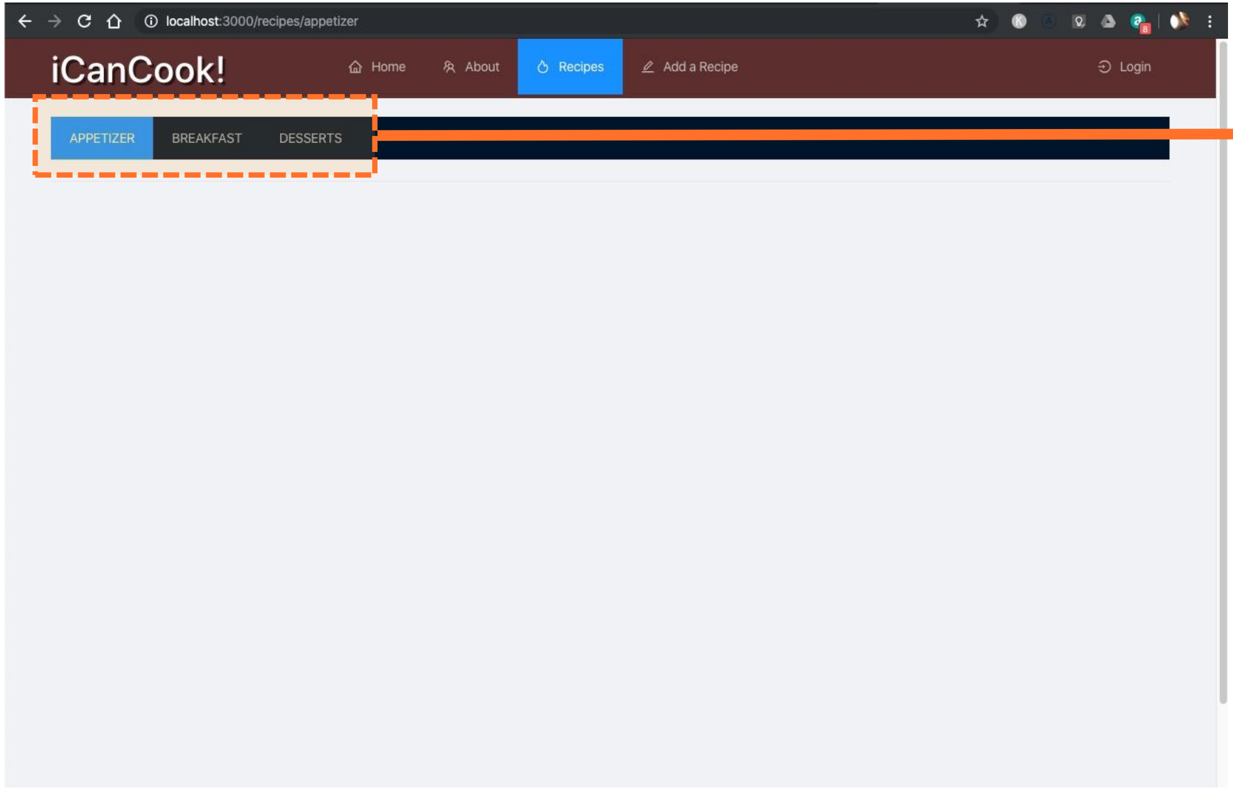
Try adding this capability!

Handling routes that cannot be matched (HTTP 404)

## Routing in a React App

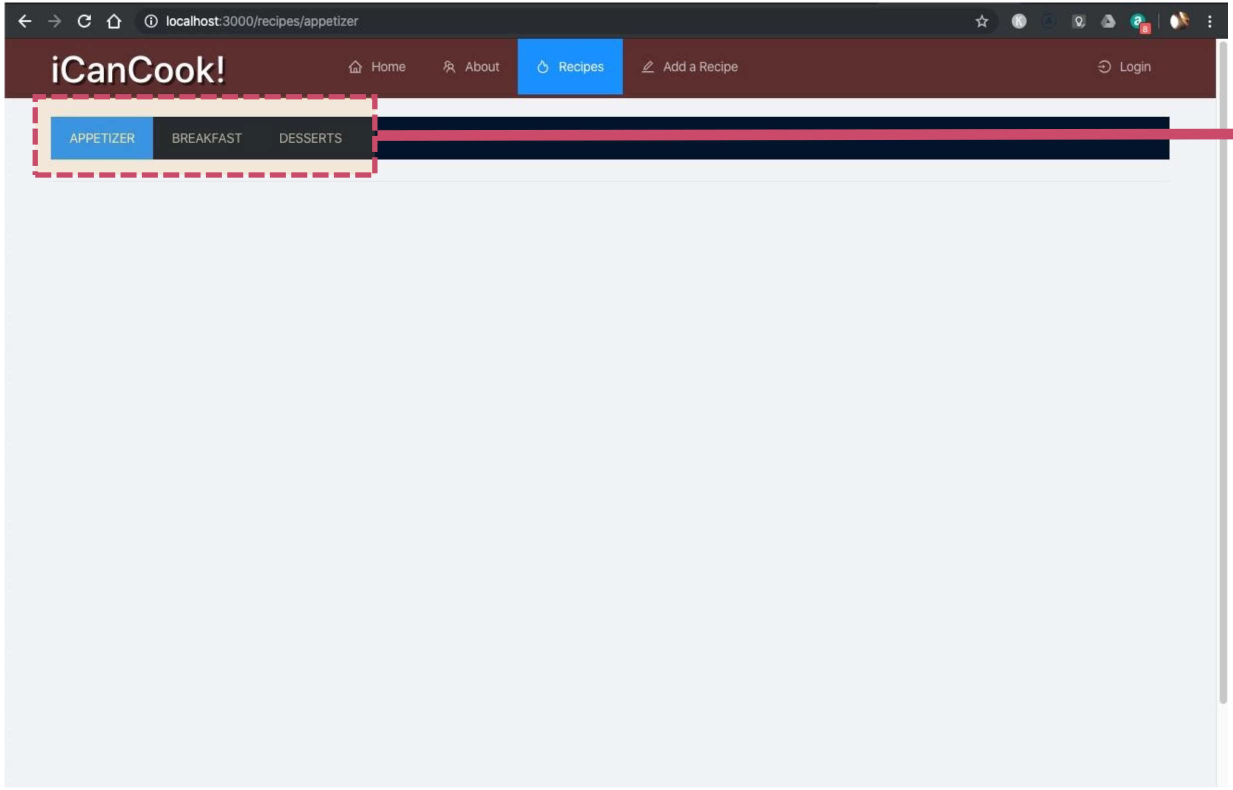
### Nested Routes & Parameters

## NESTED ROUTING ON THE RECIPES



Category buttons

# NESTED ROUTING ON THE RECIPES

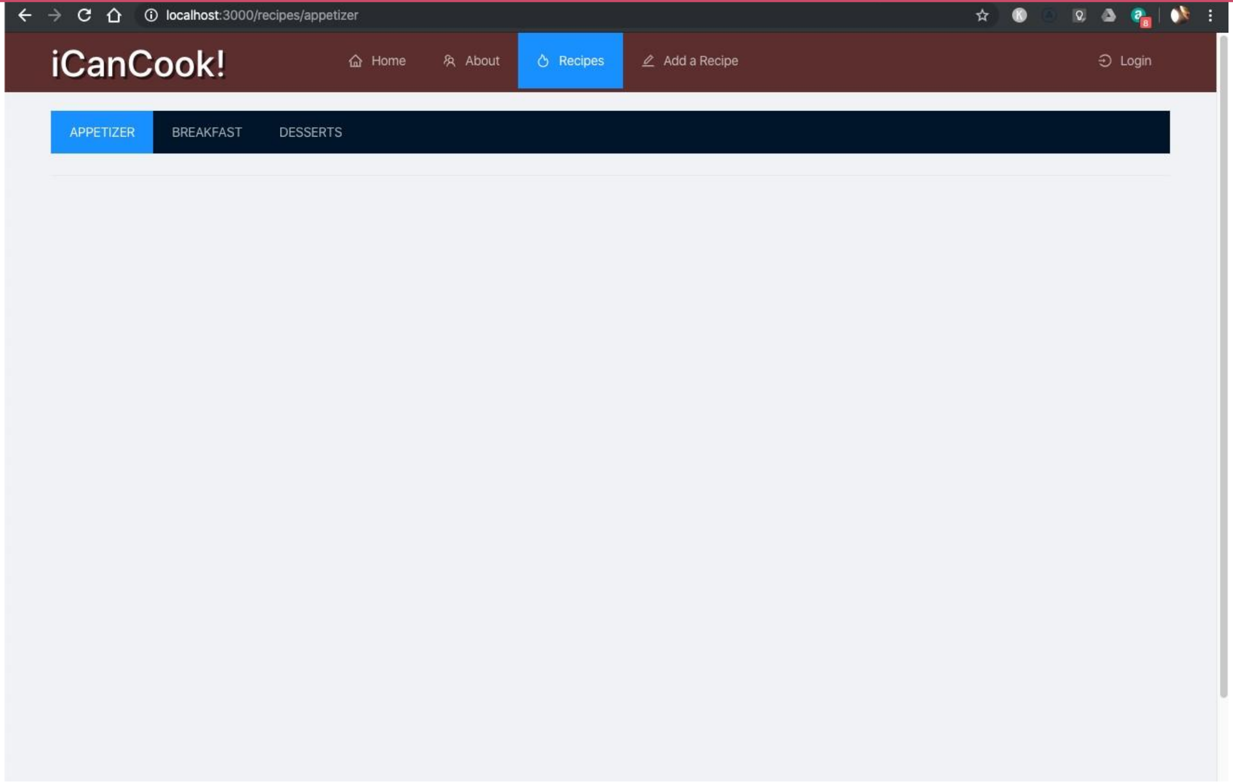


Category buttons

Fetched from a mock API

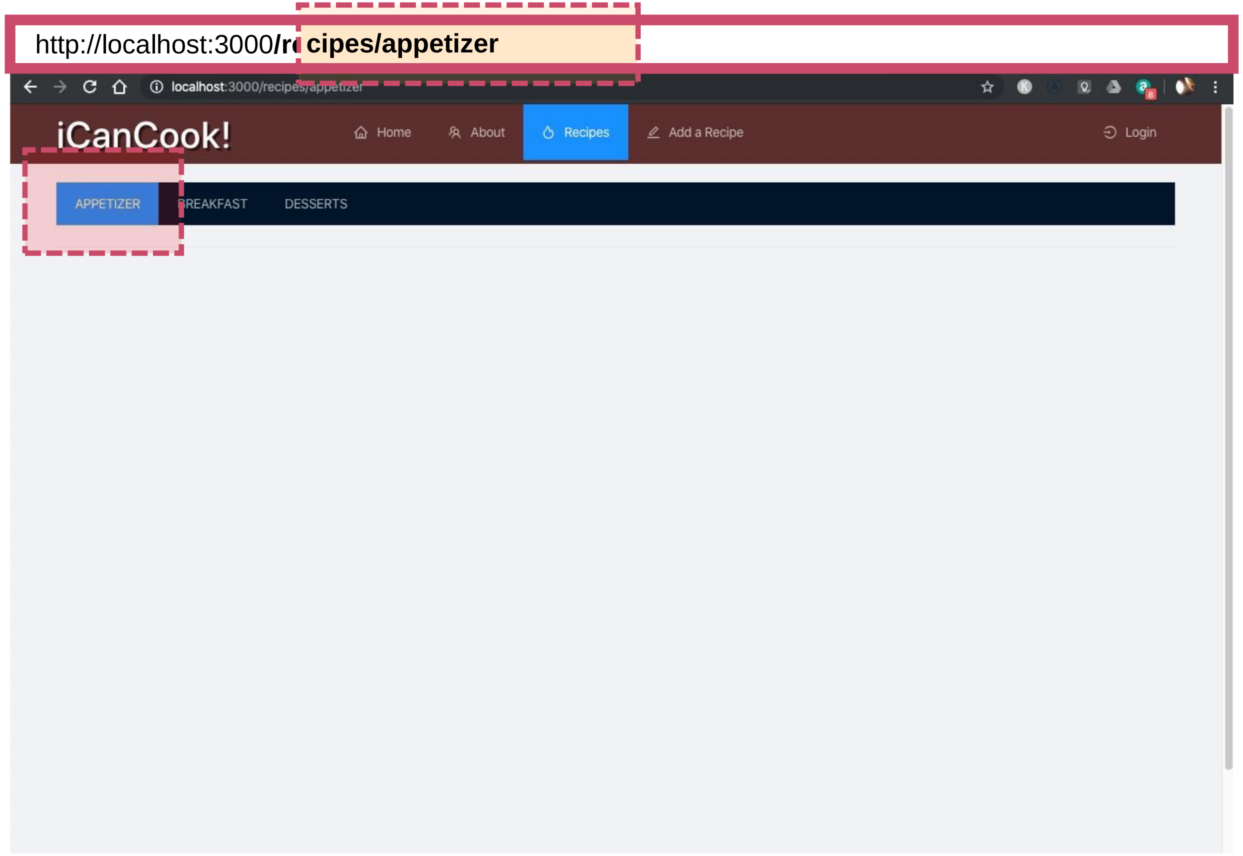
## NESTED ROUTING ON THE RECIPES

http://localhost:3000/recipes



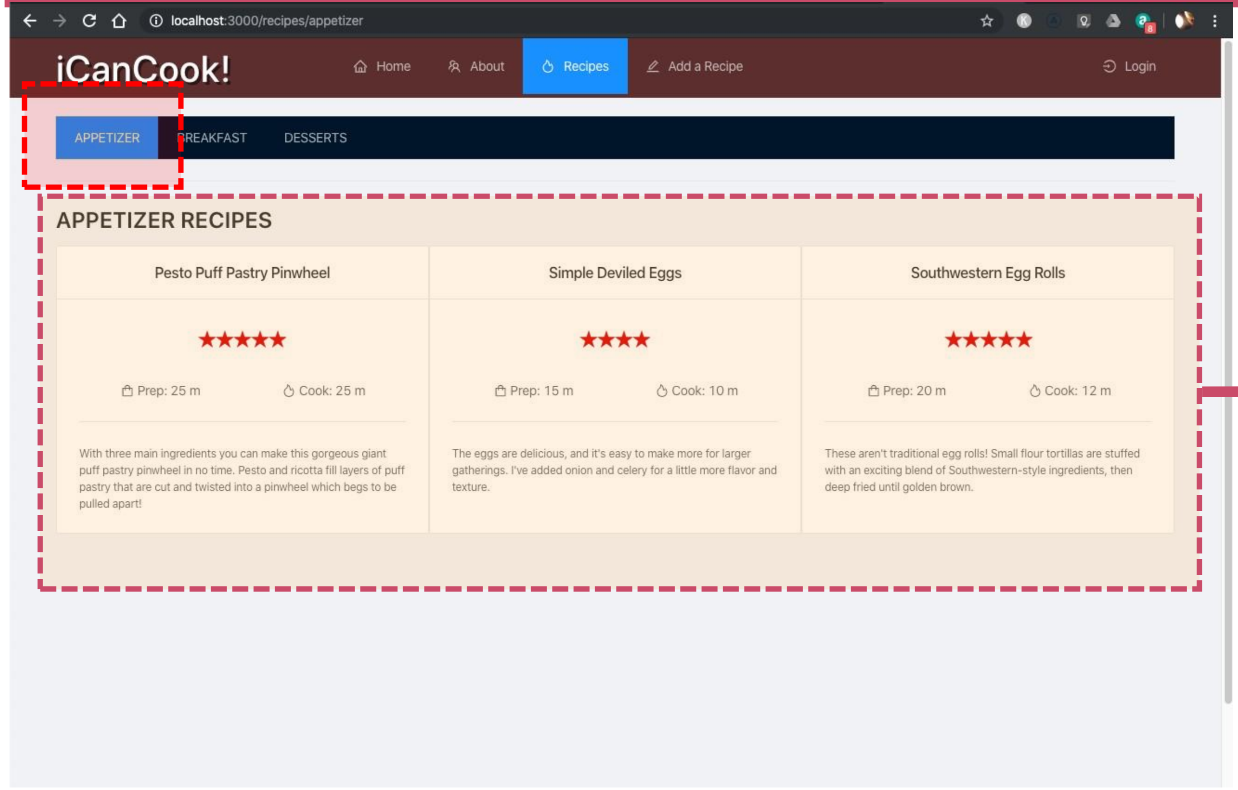
## NESTED ROUTING ON THE RECIPES

http://localhost:3000/re**cipes/appetizer**



## NESTED ROUTING ON THE RECIPES

http://localhost:3000/**recipes/appetizer**



APPETIZER RECIPES

Pesto Puff Pastry Pinwheel

★★★★★

Prep: 25 m Cook: 25 m

With three main ingredients you can make this gorgeous giant puff pastry pinwheel in no time. Pesto and ricotta fill layers of puff pastry that are cut and twisted into a pinwheel which begs to be pulled apart!

Simple Deviled Eggs

★★★★

Prep: 15 m Cook: 10 m

The eggs are delicious, and it's easy to make more for larger gatherings. I've added onion and celery for a little more flavor and texture.

Southwestern Egg Rolls

★★★★★

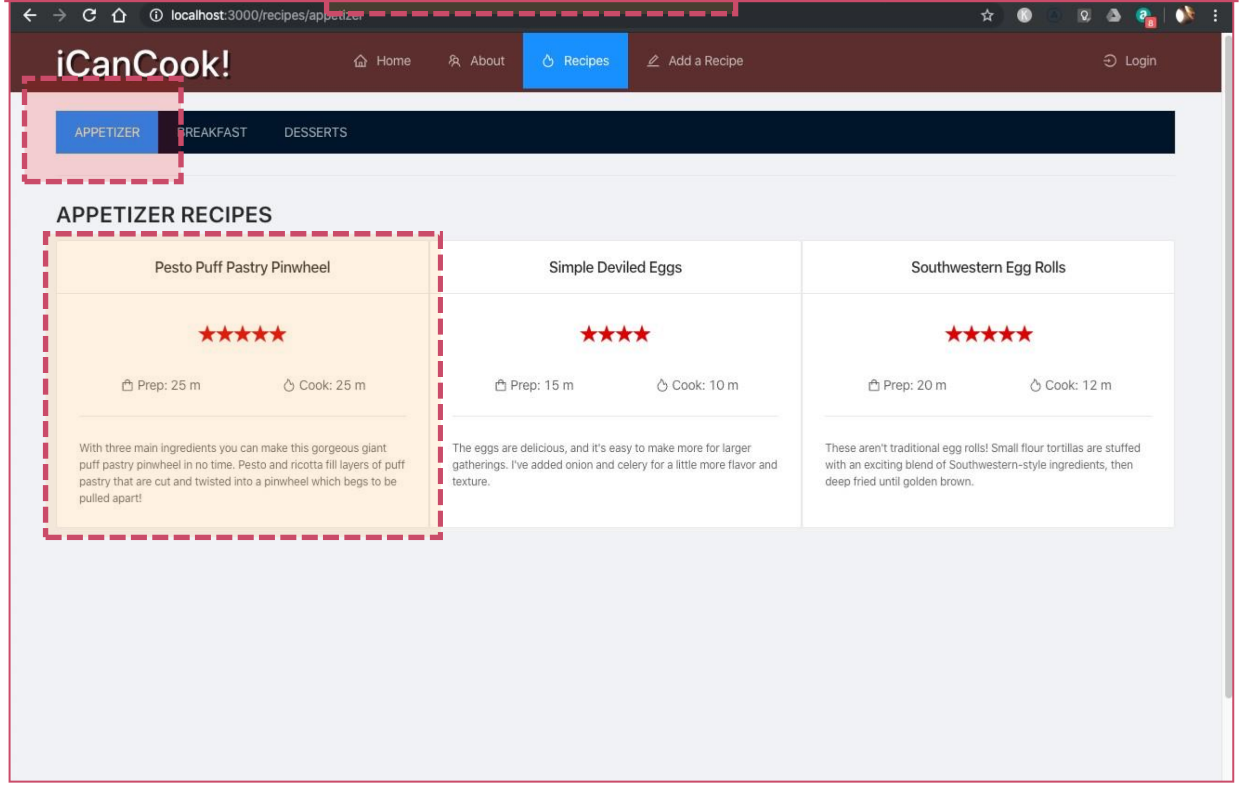
Prep: 20 m Cook: 12 m

These aren't traditional egg rolls! Small flour tortillas are stuffed with an exciting blend of Southwestern-style ingredients, then deep fried until golden brown.

This should update

## NESTED ROUTING ON THE RECIPES

http://localhost:3000/**recipes/appetizer/app01**


localhost:3000/recipes/appetizer

iCanCook!

APPETIZER RECIPES

Pesto Puff Pastry Pinwheel

★★★★★

Prep: 25 m Cook: 25 m

With three main ingredients you can make this gorgeous giant puff pastry pinwheel in no time. Pesto and ricotta fill layers of puff pastry that are cut and twisted into a pinwheel which begs to be pulled apart!

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Southwestern Egg Rolls

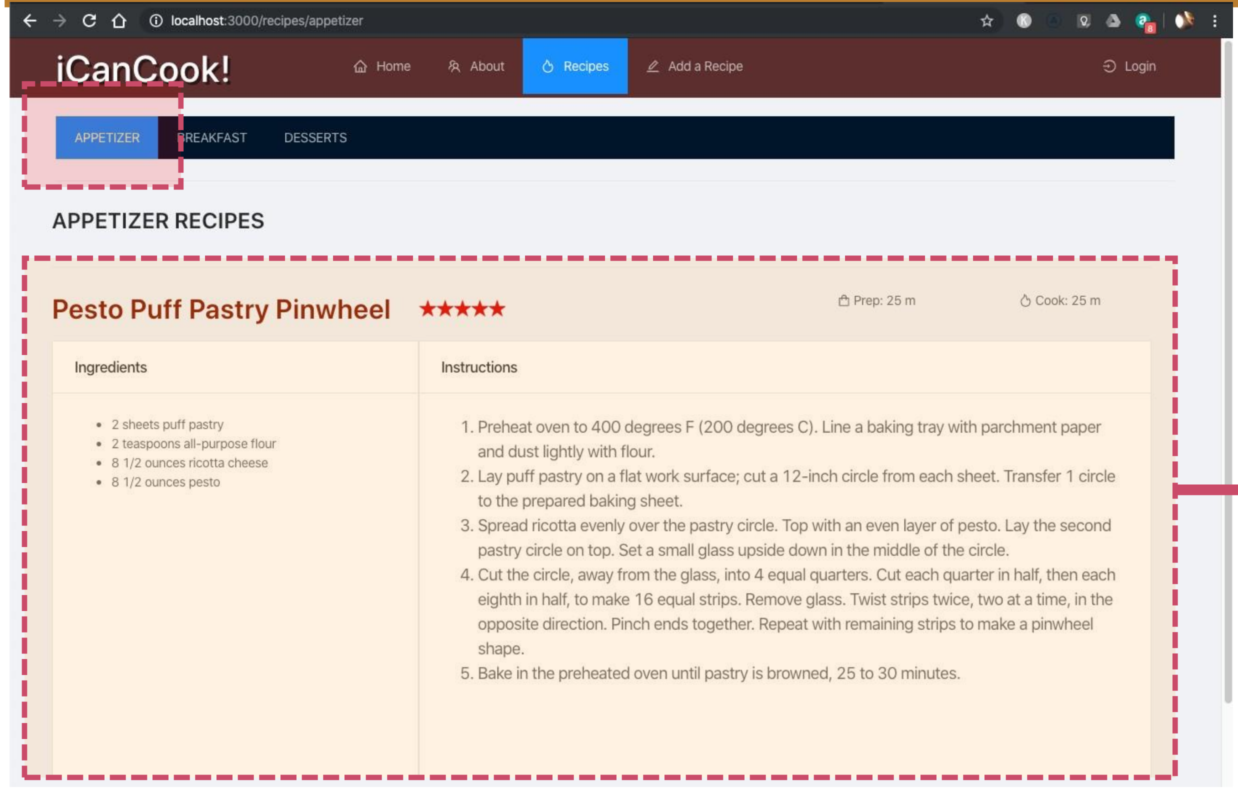
★★★★★

Prep: 20 m Cook: 12 m

These aren't traditional egg rolls! Small flour tortillas are stuffed with an exciting blend of Southwestern-style ingredients, then deep fried until golden brown.

# NESTED ROUTING ON THE RECIPES

http://localhost:3000**/recipes/appetizer/app01**



APPETIZER RECIPES

Pesto Puff Pastry Pinwheel ★★★★★

Prep: 25 m

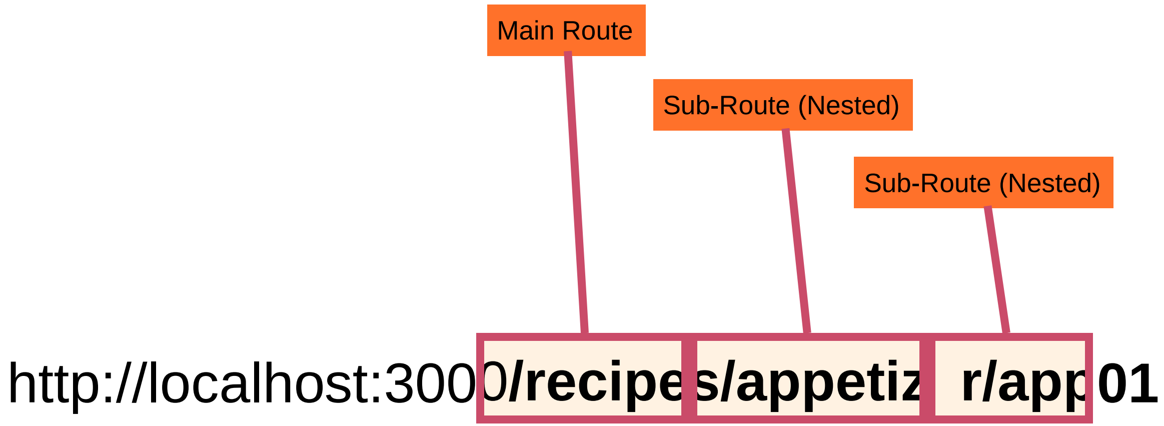
Cook: 25 m

| Ingredients | Instructions |
|---|---|
| • 2 sheets puff pastry<br>• 2 teaspoons all-purpose flour<br>• 8 1/2 ounces ricotta cheese<br>• 8 1/2 ounces pesto | 1. Preheat oven to 400 degrees F (200 degrees C). Line a baking tray with parchment paper and dust lightly with flour.<br>2. Lay puff pastry on a flat work surface; cut a 12-inch circle from each sheet. Transfer 1 circle to the prepared baking sheet.<br>3. Spread ricotta evenly over the pastry circle. Top with an even layer of pesto. Lay the second pastry circle on top. Set a small glass upside down in the middle of the circle.<br>4. Cut the circle, away from the glass, into 4 equal quarters. Cut each quarter in half, then each eighth in half, to make 16 equal strips. Remove glass. Twist strips twice, two at a time, in the opposite direction. Pinch ends together. Repeat with remaining strips to make a pinwheel shape.<br>5. Bake in the preheated oven until pastry is browned, 25 to 30 minutes. |

Recipe Details

## Download and Extract

## NESTED ROUTES



## HOOKS TO EASILY EXTRACT DATA FROM THE ROUTER

```
const { category, recipeId } = useParams();
```

Extracting URL Parameters

```
const { path, url } = useRouteMatch();
```

Extracting path and current URL

# Routing in a React App

## Protecting Routes

## User Accounts & Access Control

“Apps allow you to create accounts for customizing experience and offer private services & data”

## Protected Routes

/home

/products

**/dashboard**

**/profile**

/login

## Protected Routes

/home

/products

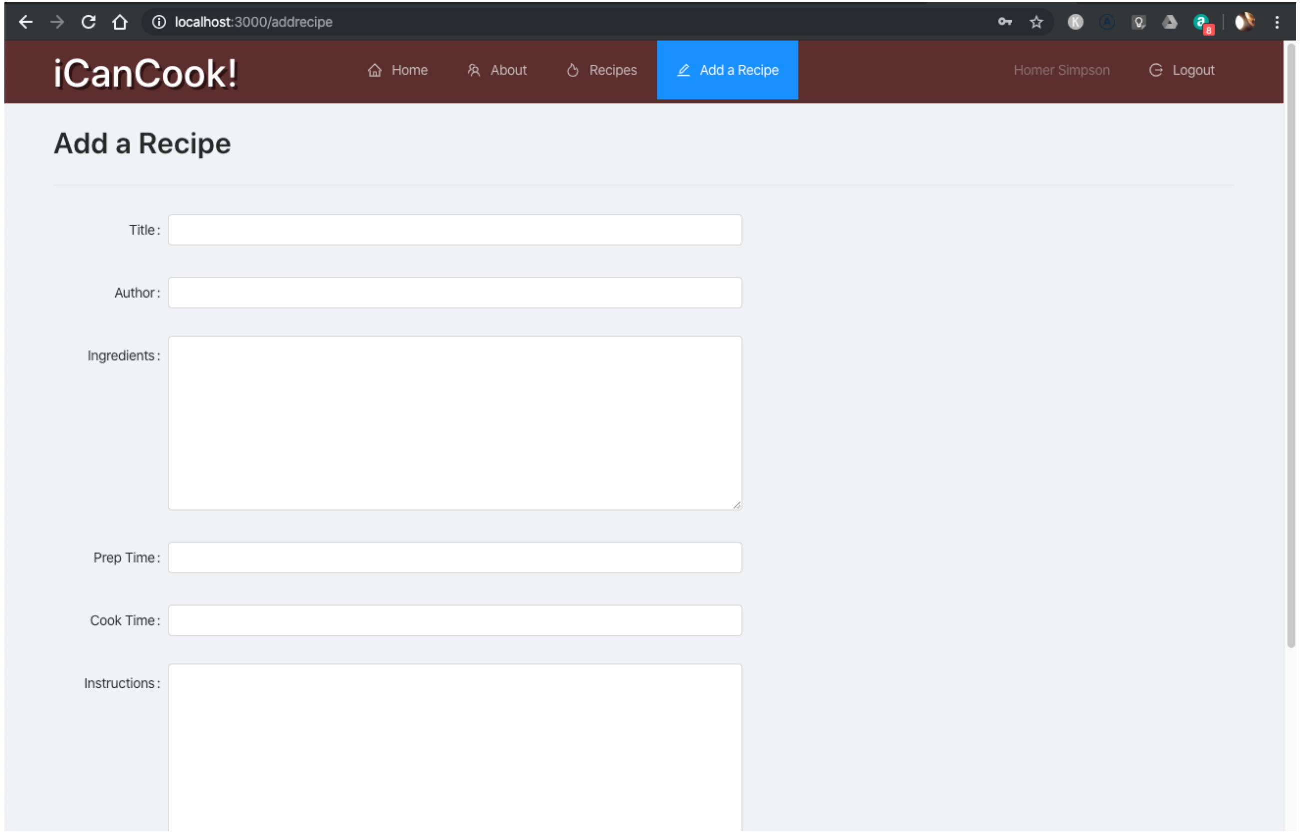
**/dashboard**

**/profile**

/login

**These routes should only be accessible to an authenticated user**

## Protecting the /addrecipe route



localhost:3000/addrecipe

iCanCook!

Home About Recipes Add a Recipe Homer Simpson Logout

Add a Recipe

Title :

Author :

Ingredients :

Prep Time :

Cook Time :

Instructions :

***/addrecipe*** should only be accessible to authenticated users

## Download and Setup

## Protecting Routes is Easy!

```
const Protected = ({ user, children, ...rest }) => (
  <Route
    {...rest}
    render={({ location }) =>
      user ? (
        children
      ) : (
        <Redirect
          to={{
            pathname: "/login",
            state: { from: location }
          }}
        />
      )
    }
  />
);
```

## Authenticated Users

If the user is logged in

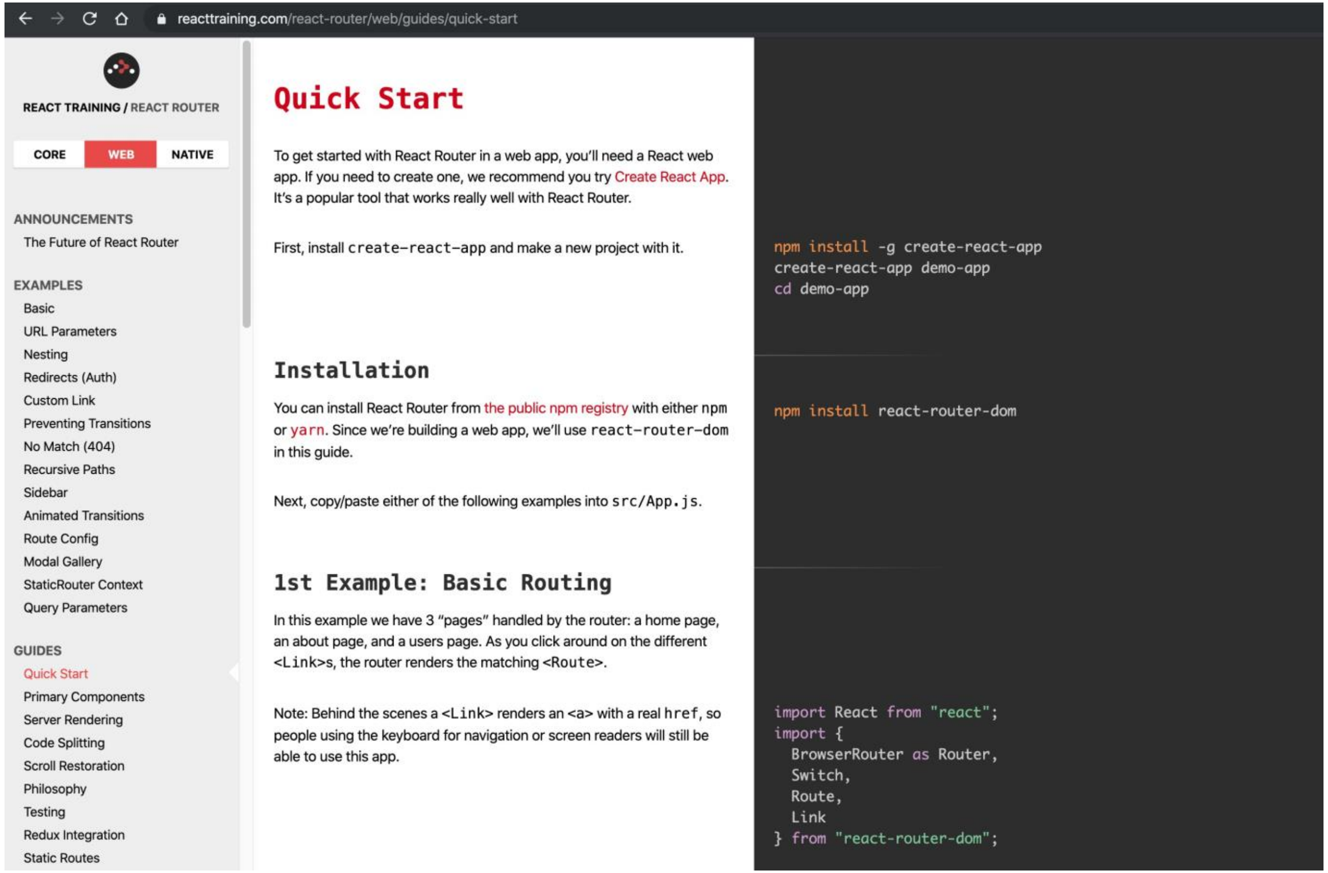
```
const Protected = ({ user, children, ...rest }) => (
  <Route
    {...rest}
    render={({ location }) =>
      user ? (
        children
      ) : (
        <Redirect
          to={{
            pathname: "/login",
            state: { from: location }
          }}
        />
      )
    }
  />
);
```

## Unauthenticated Users (Public Access)

If the user is NOT logged in

```
const Protected = ({ user, children, ...rest }) => (
  <Route
    {...rest}
    render={({ LOCATION }) =>
      user ? (
        children
      ) : (
        <Redirect
          to={{
            PATHNAME: "/login",
            STATE: { from: LOCATION }
          }}
        />
      )
    }
  />
);
```

## React Router offers a ton of features



reacttraining.com/react-router/web/guides/quick-start

REACT TRAINING / REACT ROUTER

ANNOUNCEMENTS
- The Future of React Router

EXAMPLES
- Basic
- URL Parameters
- Nesting
- Redirects (Auth)
- Custom Link
- Preventing Transitions
- No Match (404)
- Recursive Paths
- Sidebar
- Animated Transitions
- Route Config
- Modal Gallery
- StaticRouter Context
- Query Parameters

GUIDES
- Quick Start
- Primary Components
- Server Rendering
- Code Splitting
- Scroll Restoration
- Philosophy
- Testing
- Redux Integration
- Static Routes

Quick Start

To get started with React Router in a web app, you'll need a React web app. If you need to create one, we recommend you try Create React App. It's a popular tool that works really well with React Router.

First, install `create-react-app` and make a new project with it.

```
npm install -g create-react-app
create-react-app demo-app
cd demo-app
```

Installation

You can install React Router from the public npm registry with either `npm` or `yarn`. Since we're building a web app, we'll use `react-router-dom` in this guide.

```
npm install react-router-dom
```

Next, copy/paste either of the following examples into `src/App.js`.

1st Example: Basic Routing

In this example we have 3 "pages" handled by the router: a home page, an about page, and a users page. As you click around on the different `<Link>`s, the router renders the matching `<Route>`.

Note: Behind the scenes a `<Link>` renders an `<a>` with a real `href`, so people using the keyboard for navigation or screen readers will still be able to use this app.

```
import React from "react";
import {
  BrowserRouter as Router,
  Switch,
  Route,
  Link
} from "react-router-dom";
```

https://reacttraining.com/react-router/web/guides/quick-start thank you!