ReactJS

Build amazing Apps

and go have a drink

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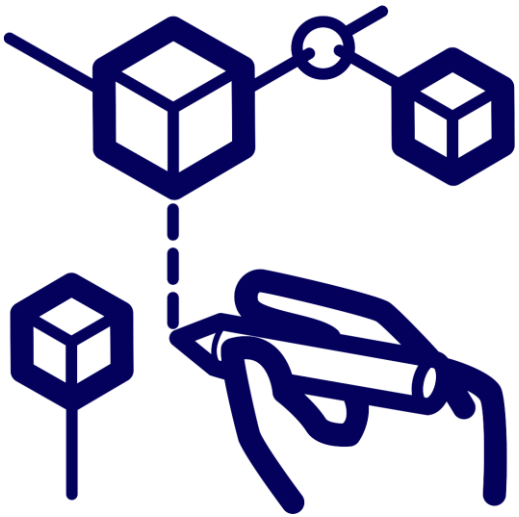
The enter of the JS frameworks

- Web development has changed…
- Most of the apps today are built using web technologies
- For large scale projects, we just cannot get around with plain *javascript* or *jquery* any more
- We need a powerful framework to support all various aspects and life cycle of a web application



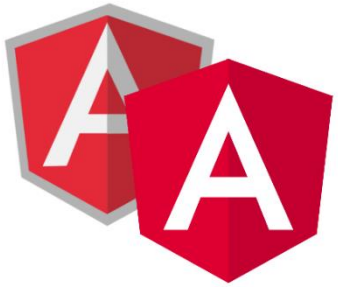
Good frameworks bring along

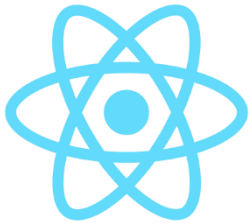


- A solid foundation so we can focus on our unique challenge
- Good separation of concerns
- Making the app easier to extend, maintain, and test

The enter of the JS frameworks

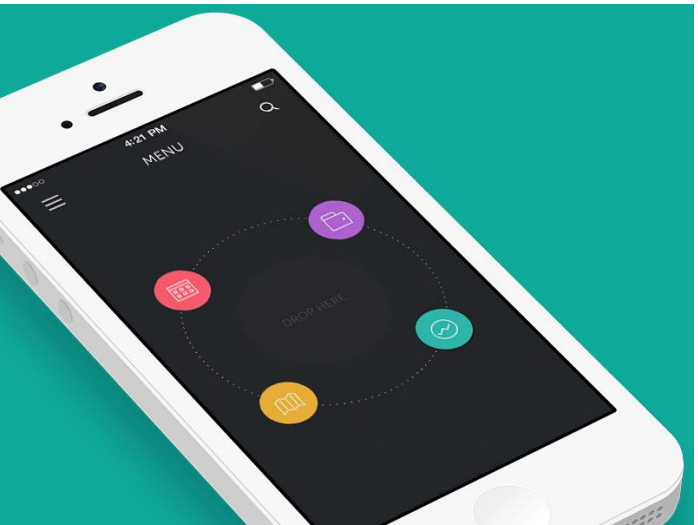
- We had Angular1 (now called angularJS)
  - It was great but had built-in problems
- Vue took Angular and made it a lot better
  - It has *underlying magic*
- New Angular has entered the scene
  - But its complicated
- React is powerful and the most popular choice today!

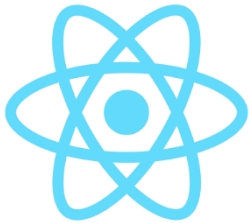




What’s ReactJS

- Framework (library) for building user interfaces
- It's capable of building modern applications
  - such as (whatsapp, facebook, Instagram, Netflix, Dropbox, etc..)





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Why ReactJS

- It’s the most common
- Its battle tested
  - Used in large successful projects
- It can be used to build any app
  - simple to large applications
- It has a huge active community
  - thousands of supporting libraries

React - low-level-API

Here is the *React RAW (low-level) API* :

```
const MyApp = React.createElement(
    'h1',                                          // Type of element
    { className: 'header', title: 'Hola!' },       // Props and attributes
    'Hello World!'                                 // Children
)
```

```
const elContainer = document.getElementById('root')
const root = ReactDOM.createRoot(elContainer)
root.render(<MyApp />)
```

This is no fun :(

JSX

JSX is a syntax extension commonly used in React.

So instead of writing this:

```
const HelloWorld = React.createElement(
    'h1',
    { className: 'header', id: 'hello-world' },
    'Hello World!’
)
```

We will use **JSX**

(which is later compiled to the RAW React API)

```
const HelloWorld =
    <h1 className="header" id="hello-world">Hello World!</h1>
```

Babel & JSX

We code our View layer with JSX and Babel compiles it into JS that the browser can read.

```
const HelloWorld =
      <h1 className="header" id="hello-world">
        Hello World!
      </h1>
```

```
const HelloWorld = React.createElement(
  'h1',
  { className: 'header', id: 'hello-world' },
  'Hello World!'
)
```

Note the usage of: className instead of class
(class is a reserved word in Javascript)

```
▶ Warning: Invalid DOM property `class`. Did you mean `className`?
```

Index.html

Here is the <head> of our: *index.html* :

```
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <script src="lib/react.development.js"></script>
    <script src="lib/react-dom.development.js"></script>

    <link rel="stylesheet" href="assets/style/main.css">
    <title>React Project</title>
</head>
```

- React is composed from two libraries: React & ReactDOM
- Separating React from ReactDOM allows using react outside the browser (react-native)

- ReactDOM is the glue between React and the **DOM**

Index.html

Here is the <body> of our: *index.html* :

```
<body>
    <div id="root"></div>

    <script type="module/babel" data-presets="ca-preset" src="app.js"></script>

    <script src="lib/loadBabelModules.js"></script>
    <script src="lib/babel.js"></script>
    <script src="lib/babel-preset.js"></script>
</body>
```

```
// app.js
import { RootCmp } from './RootCmp.jsx'

const elContainer = document.getElementById('root')
const root = ReactDOM.createRoot(elContainer)
root.render(<RootCmp />)
```

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JSX Examples

```
const heading = <h1>Hello JSX</h1>

const games =
    <ul>
        <li>Car</li>
        <li>Doll</li>
        <li>Puzzle</li>
    </ul>
```

JSX Rule: Single top-most element

JSX expressions have a single top-most element

```
// This is valid.
const fruits = <ul>
                  <li>Apple</li>
                  <li>Orange</li>
               </ul>
```

```
// This is not valid.
const fruits = <h3>Fruits</h3>
               <ul>
                  <li>Apple</li>
                  <li>Orange</li>
               </ul>
```

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JSX Syntax

Embedding JavaScript expressions:

```
const fullName = 'Puki Ma'
const greeting = <h1>Hello {fullName}!</h1>
```

```
const imgIdx = (Math.random() > 0.5)? 1 : 2
const img = <img src={`./assets/img/${imgIdx}.gif`} />
```

Dynamic Attributes

We can assign dynamic attributes such as:

```
const dynSrc = 'someImgSrc.png'
const dynClass = 'special'

const HelloWorld =
    <div>
        <h2 className={dynClass}>Some Header</h2>
        <img src={dynSrc} alt=""/>
    </div>
```

Conditional Rendering

Option 1, Just use ifs in JS:

```
if (Math.rand() > 0.5) {

    btn = <button> Go Dark  </button>

} else {

    btn = <button> Go Light </button>
}
```

Conditional Rendering

Option 2, the Ternary Operator (short if)

```
const msg = <h1>
                {(age >= 18) ? 'Old enough' : 'Too young'}
            </h1>
```

Conditional Rendering

Option 3 – short circuit, using &&:

```
const age = 46
const baby = true
const cute = false

const tasty = <div>
                <h1>Conditional rendering - short circuit</h1>
                <ul>
                  <li>Chips</li>
                  {(baby && cute) && <li>Chocolate</li>}
                  {age > 15 && <li>Shakshuka</li>}
                  {age > 40 && <li>Soda</li>}
                </ul>
              </div>
```

Loops

Looping through an array:

```
const NamesList =  <ul>
                     {
                        names.map(name => <li>{name}</li>)
                     }
                    </ul>
```

For every name in the names array,
an <li> will be created

List Rendering - the key

- When rendering in a loop, we use the "key" attribute
- It helps React with rendering performance
- Key should be a unique and constant value for each item
- Usually, we will use the `item.id`

```
<ul>
    {users.map(currUser =>
        <li key={currUser.id}>
            {currUser.fullname}
        </li>
    )}
</ul>
```

Handling Events

Event handling in React is very similar to HTML , but:

- React events are named using **camelCase**, rather than lowercase
- With JSX you pass a function as the event handler, rather than a string

```
const btn = <button
                    onClick={() => {
                      alert('I Was Clicked!')
                    }}>
                       Click Me!
            </button>
```

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Handling Events

Here is another option

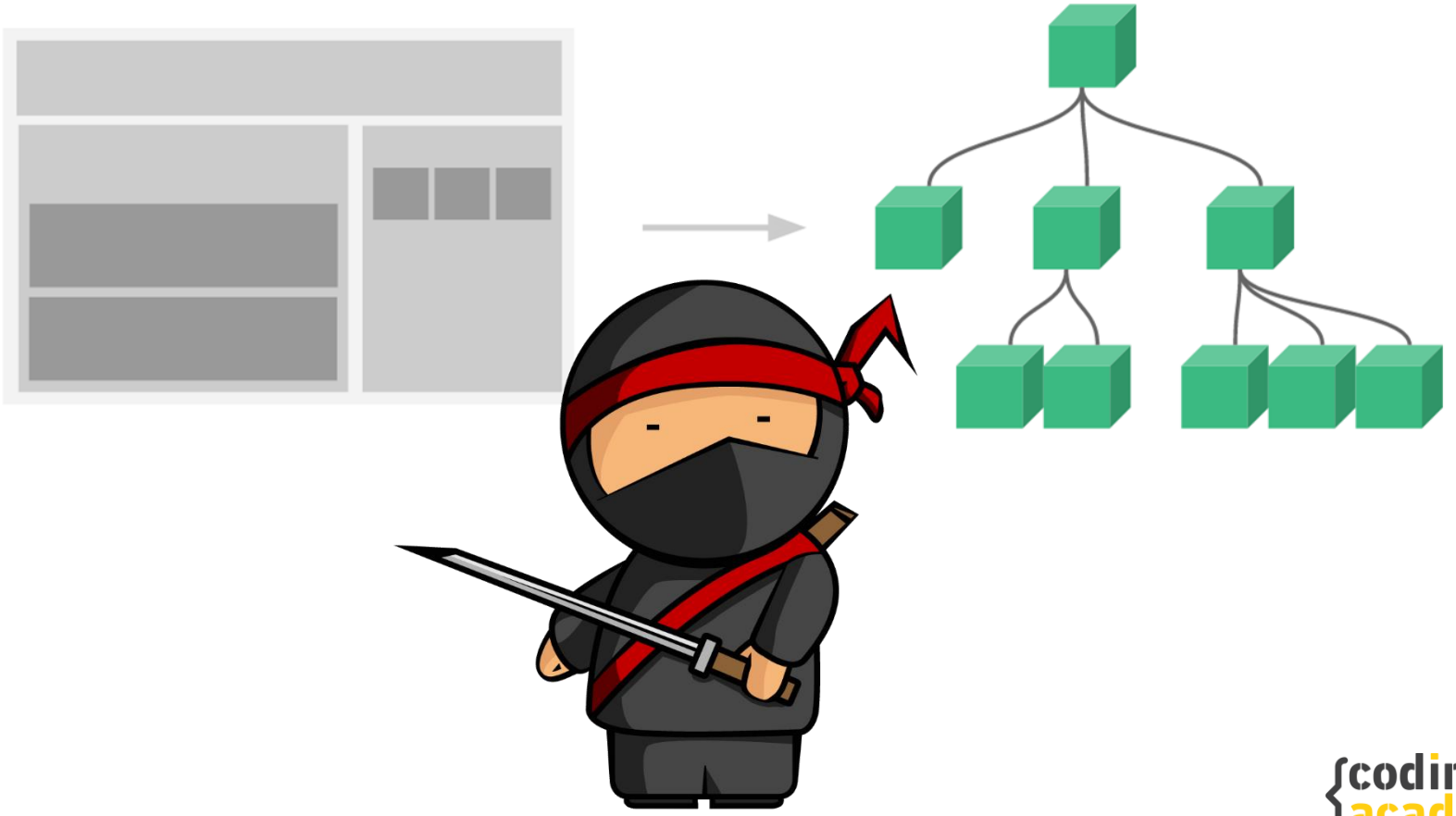
```
function handleClick(ev) {
    alert('I Was Clicked!')
}

const btn =
    (<button onClick={handleClick}>
        Click Me!
    </button>)
```

Level Done

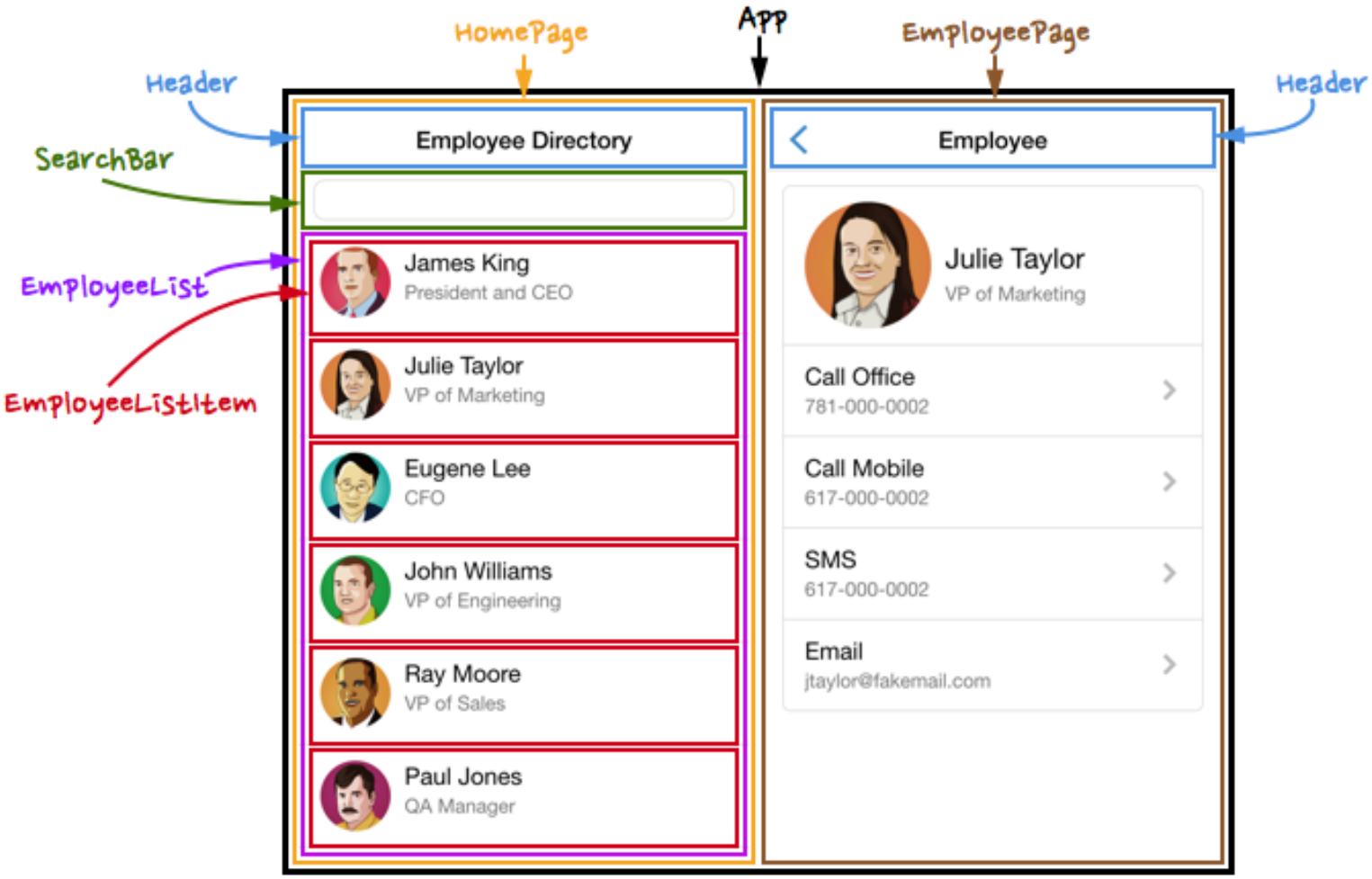
React and JSX

Components



Building UI with Components

Web apps today are made of components:



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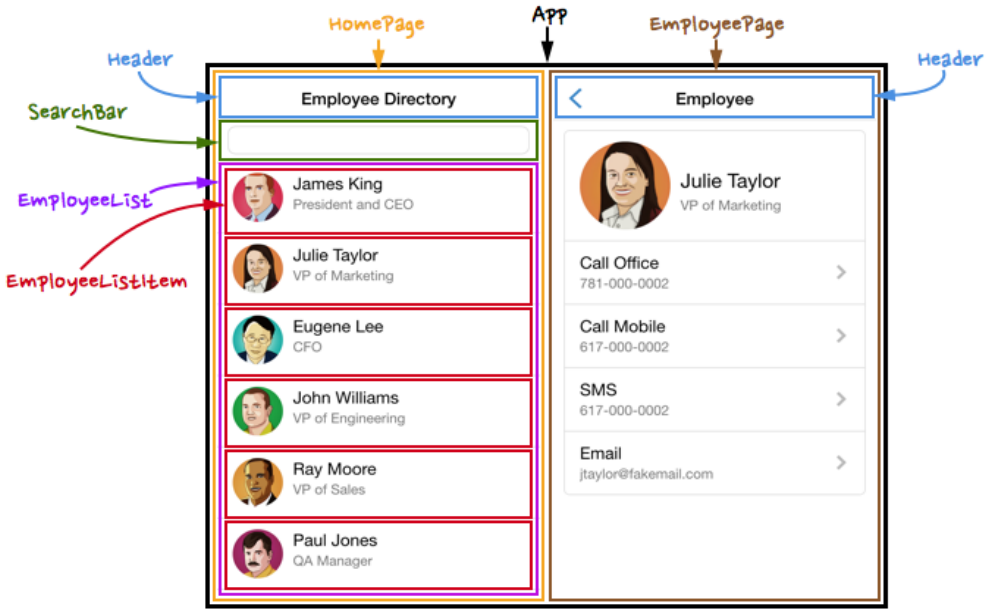
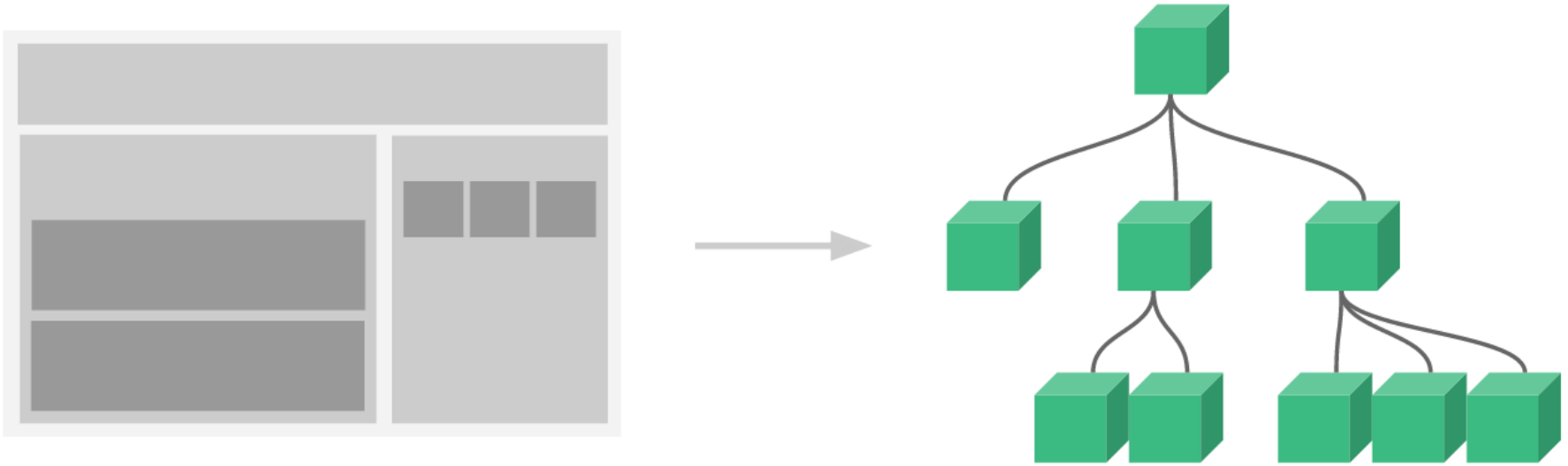
Define: Component

- A component is a small, reusable chunk of code, markup and style that is responsible for one job.
- That job is usually to render a piece of the User-Interface and handle it's events



Components architecture

Building big applications from small, self-contained, reusable components.



React Components

React components are functions
that returns a JSX

```
function SomeFuncCmp() {
    return <h1>Hello React Component</h1>
}
```

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Components

We "call those functions" in a special way:

```
function SomeFuncCmp() {
    return <h1>Hello Function Component</h1>
}


<SomeFuncCmp/>
<SomeFuncCmp/>
```

Component's Props

- "props" (properties) are passed to a component from its <Parent>
- Its like calling a function and sending some params

```
function Welcome(props) {
    return <h1>Welcome {props.name}!</h1>
}
```

```
<Welcome name={'Puki'} />
```

```
<Welcome name={'Muki'} />
```

Welcome Puki!

Welcome Muki!

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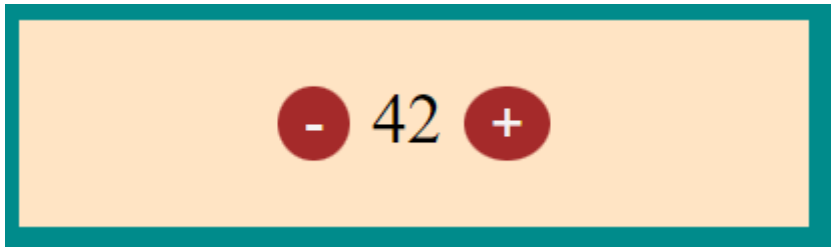
props are read-only

A component should not change its props
(only the <Parent> component is allowed)

```
function Welcome(props) {
    // This is not allowed!
    props.name = 'Baba'
    return <h1>Hello there {props.name}</h1>
}
```

Lets code a <SimpleCounter /> component



SimpleCounter.jsx

Components - State

- When coding components we need a place to hold the state
- Its like "local variables" of the component instance
- Changing the state causes the component to re-render

```
function Counter() {

  const [count, setCount] = useState(0)

  return <div>
           <p>You clicked {count} times</p>
           <button onClick={() => setCount(count + 1)}>
              Click me
           </button>
         </div>
}
```

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Components - State

Changing the state in such way causes the component to re-render and display the updated value

```
const { useState } = React

export function Counter() {
    const [count, setCount] = useState(0)

    return <section className="counter">
        <p>You clicked {count} times</p>
        <button onClick={() => setCount(count + 1)}>
            Click me
        </button>

    </section>
}
```

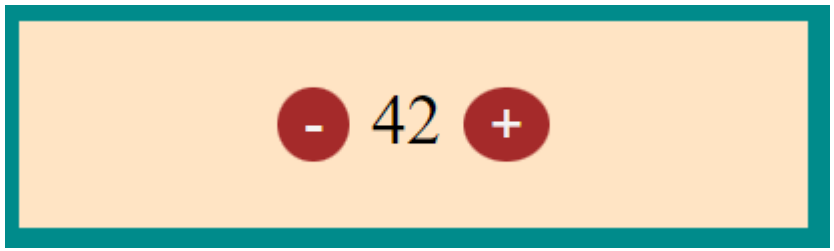
Lets code a <SimpleCounter />

```jsx
const { useState } = React

export function SimpleCounter() {
    const [count, setCount] = useState(0)

    return <section className="simple-counter">
        <button onClick={() => setCount(count - 1)}>-</button>
        {count}
        <button onClick={() => setCount(count + 1)}>+</button>

    </section>
}
```



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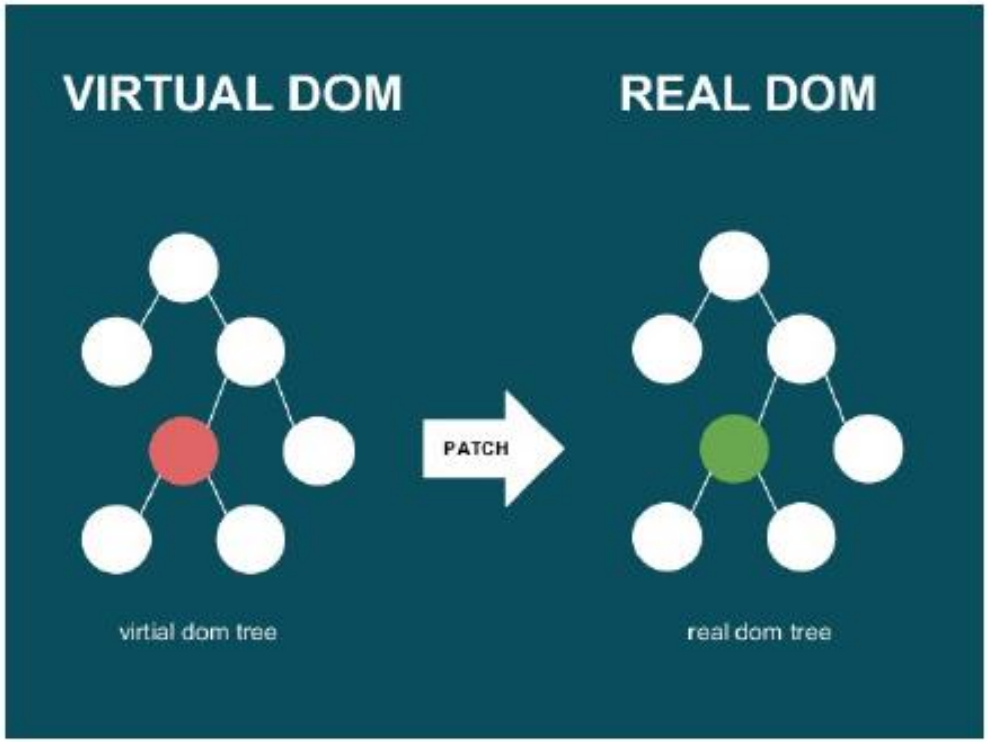
Virtual DOM

In React, for every DOM Object, there is a corresponding "virtual DOM object."

- Its like a lightweight copy
- Manipulating the virtual DOM is fast, because nothing gets drawn onscreen
- React than can optimize what to change in the real DOM



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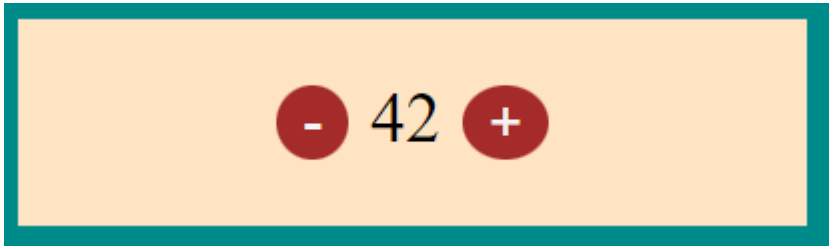
So when we change something in the DOM:

- The entire virtual DOM gets updated.
- The virtual DOM gets compared to what it looked like before the update.
- React figures out which objects have changed.
- DOM Updates get optimized
  (e.g. – replace the all <tbody> if all <td>s were changed)
- The changed objects, get updated on the *real* DOM.
- Change appear on screen

Let's add an initial value prop




```
const { useState } = React

export function SimpleCounter(props) {
    const [count, setCount] = useState(props.val || 0)

    return <section className="simple-counter">
        <button onClick={() => setCount(count - 1)}>-</button>
        {count}
        <button onClick={() => setCount(count + 1)}>+</button>

    </section>
}
```

```
<SimpleCounter val={42} />
```

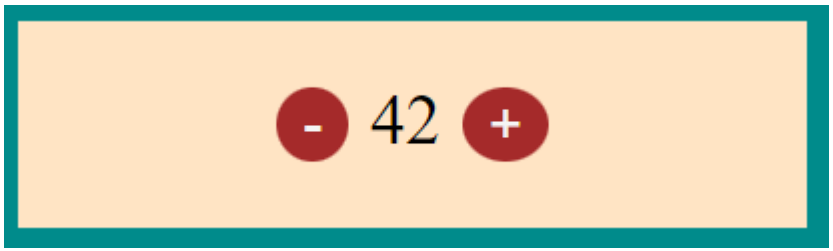
Let's add a callback prop

```
export function SimpleCounter(props) {
    const [count, setCount] = useState(props.val || 0)

    function handleClick(diff) {
        setCount(count + diff)
        props.onModified && props.onModified(count + diff)
    }

    return <section className="simple-counter">
        <button onClick={() => handleClick(-1)}>-</button>
        {count}
        <button onClick={() => handleClick(1)}>+</button>

    </section>
}
```



Destructering props

It is better to use `Destructering` with the `props` so the API of the component is more obvious to parent components:

```
export function SimpleCounter(props) {}

// Destructering the props
export function SimpleCounter({val, onModified}) {}
```

Let's use our <SimpleCounter /> component in some parent component


```
const { useState } = React
import {SimpleCounter} from './SimpleCounter.jsx'

export function UserPreview() {

    const [user, setUser] = useState({fullname: 'Puki Reactof', score: 7})

    function whenModified(newScore){
        setUser({...user, score: newScore})
    }
    return <section className="user-preview">
        <h2>{user.fullname}</h2>
        <h3>Score: {user.score}</h3>
        <SimpleCounter onModified={whenModified} val={user.score} />
    </section>
}
```

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Emitting to <Parent>

Child component may emit (report)
an event to it's <Parent>

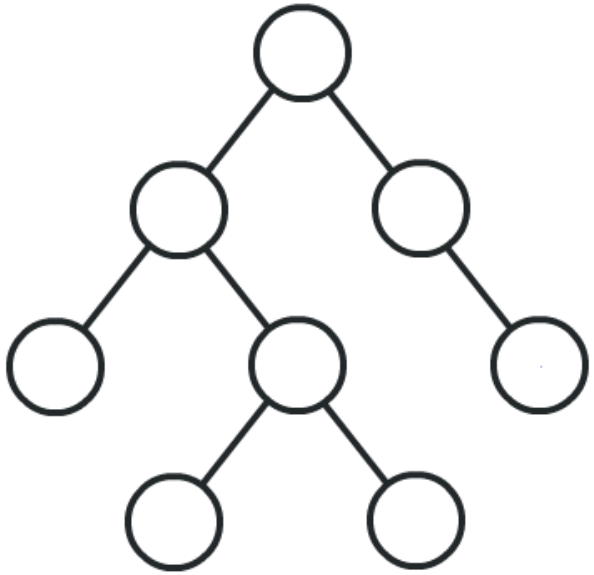
This is done by passing a **callback function** from the <Parent>

```
<SimpleCounter onModified={whenModified} val={someVal} />
```

The <Child> can call that function:

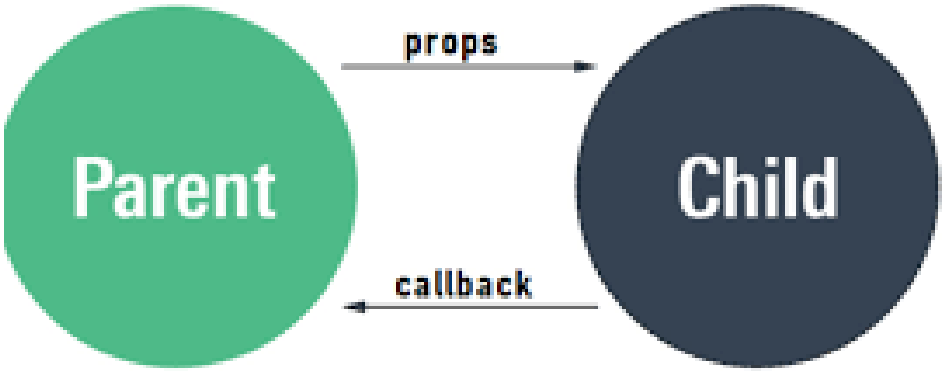
```
props.onModified('someData')
```

This call might lead to updated props…



Composing components

- Components are meant to be used together, most commonly in a parent - child relationship.
- This is achieved via: passing props and executing callbacks



Passing Callbacks to Components

It is common to pass a callback function as a prop to a child component, so it can notify the parent component when a certain event occurs

```
function ParentCmp() {
    function handleSomething() {
        alert('Something happened in ChildCmp')
    }
    return <section>
        <ChildCmp onSomething={handleSomething} />
    </section>

}

function ChildCmp({onSomething}) {
    return <button onClick={onSomething}>
        Do Something
    </button>
}
```

React devtools

Let's review React Dev-Tool extension:

component's life cycle

- There are few stages in the life of a component:
  - When it is initially **mounted** to the DOM
  - When it is **updated**
  - When it is being **unmounted** (removed from DOM)

- For those, we will use the hook: useEffect

Those life-cycle hooks allow hooking into the component's lifecycle

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component's life cycle - mounted

The initialization logic of a component is usually placed here:

```
function Cmp() {

    useEffect(()=>{
        console.log('Cmp mounted')
    }, [])

    return <div>Cmp!</div>
}
```

component's life cycle - updated

We can register a function to run whenever some `state` or some `prop` is changed:

```
function Counter() {
    const [count, setCount] = useState(0)

    useEffect(() => {
        document.title = count
    }, [count])

    return <div>
              <p>You clicked { count } times</p>
              <button onClick={ () => setCount(count + 1) }>
                   Click me
              </button>
           </div>

}
```

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component's life cycle - unmounted

We can register a function to run when the component is being removed from the DOM:

```
const { useState, useEffect } = React

export function MouseMonitor() {
    const [pos, setPos] = useState({ x: 0, y: 0 })
    useEffect(() => {
        document.onmousemove = (ev) => {
            setPos({ x: ev.clientX, y: ev.clientY })
        }
        return () => {
            document.onmousemove = null
        }
    }, [])
    return <div>
        x:{pos.x} y:{pos.y}
    </div>
}
```

The effect function will run when component mounts
and the function we return will run when component unmounts

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Using Refs

- Sometimes we need a direct access to a DOM element, we will use a Ref
- Refs are available after the component is mounted to DOM

```
function DemoRef() {
    const inputEl = useRef(null)
    const onButtonClick = () => {
      // `current` points to the mounted input element
      inputEl.current.focus()
    }
    return <div>
             <input ref={inputEl} type="text" />
             <button onClick={onButtonClick}>Focus the input</button>
           </div>

  }
```

a <SimpleTimer> component

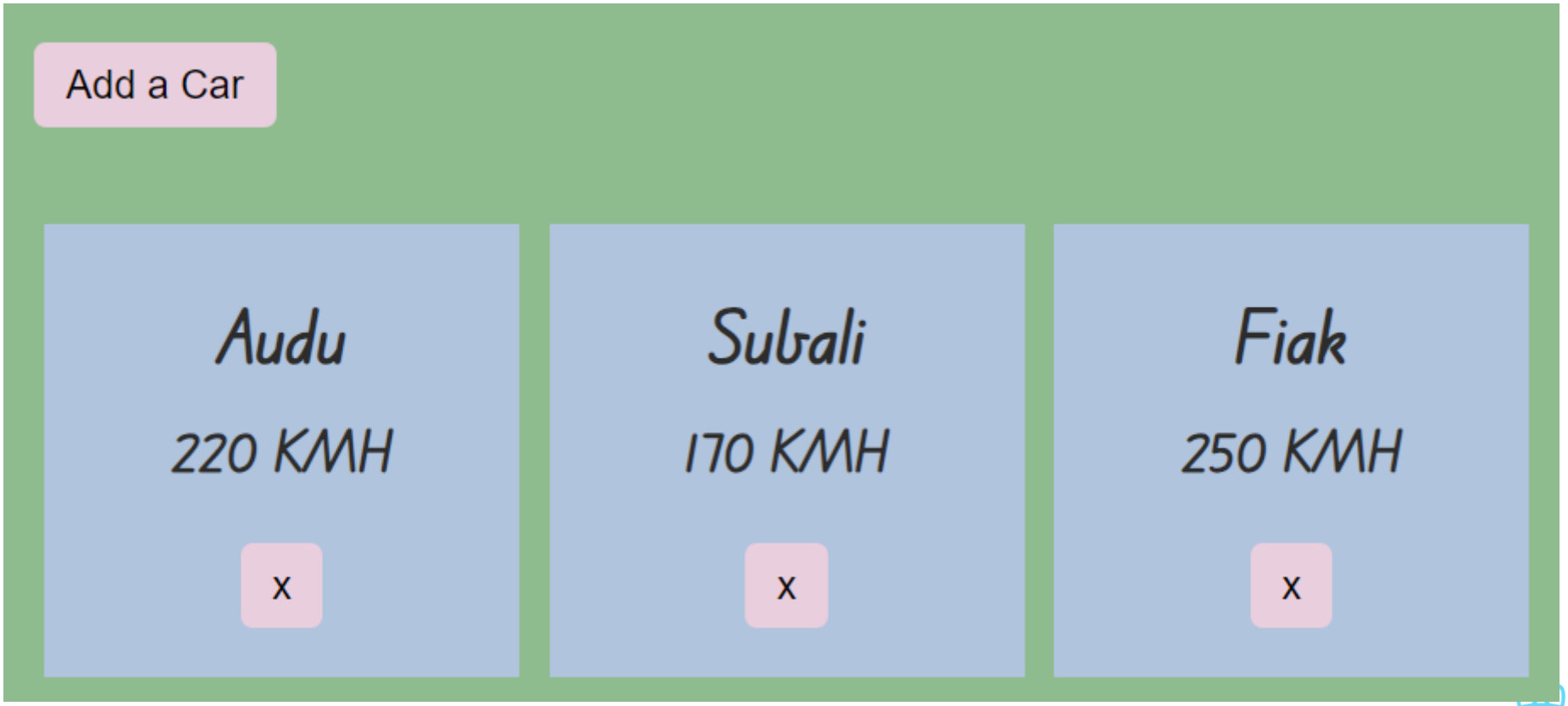
useRef can also be used for keeping some mutable values around, as the same ref pointer is received on every render

```
const {useEffect, useRef, useState} =  React
export function SimpleTimer() {
    const [count, setCount] = useState(0)
    const intervalIdRef = useRef()
    useEffect(() => {
        console.log('Counter Mounted')
        intervalIdRef.current = setInterval(() => {
            setCount((prevCount) => prevCount + 1)
        }, 1000)

        return () => {
            console.log('Counter going down')
            clearInterval(intervalIdRef.current)
        }
    }, [])
    function stopCounting() {
        clearInterval(intervalIdRef.current)
    }
    return <section>
        <span>{count}</span>
        <button onClick={stopCounting}>Stop</button>
    </section>
}
```

Example

Let's setup a basic car app



Car App - Model

Let's get some data from a service

```
const { useState, useEffect } = React
import {carService} from '../services/car.service.js'

export function CarIndex() {
    const [cars, setCars] = useState([])

    useEffect(()=>{
        carService.query()
            .then(setCars)
    }, [])

    return (
        <section className="car-index">
            <h2>List of Cars</h2>
            <ul>
                {cars.map(car => <li key={car.id}>{car.vendor}</li>)}
            </ul>
        </section>
    )
}
```

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Example

```
const { useState, useEffect } = React
import { carService } from '../services/car.service.js'

export function CarIndex() {
    const [cars, setCars] = useState([])

    useEffect(() => {
        carService.query()
            .then(setCars)
    }, [])

    function onRemoveCar(carId) {
        carService.remove(carId)
            .then(() => {
                setCars(cars.filter(c => c.id !== carId))
            })
    }

    return (
        <section className="car-index">
            <h2>List of Cars</h2>
            <ul>
                {cars.map(car => <li key={car.id}>
                    <h3>{car.vendor}</h3>
                    <h4>{car.maxSpeed} KMH</h4>
                    <button onClick={() => onRemoveCar(car.id)}>x</button>
                </li>)}
            </ul>
        </section>
    )
}
```

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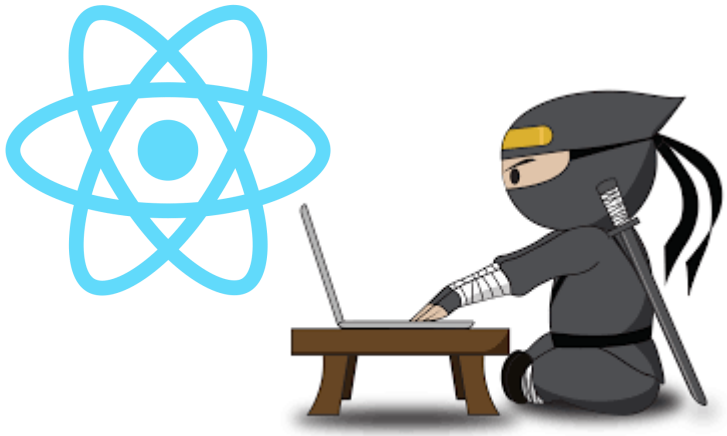
Level Done

React Components

Handson Time



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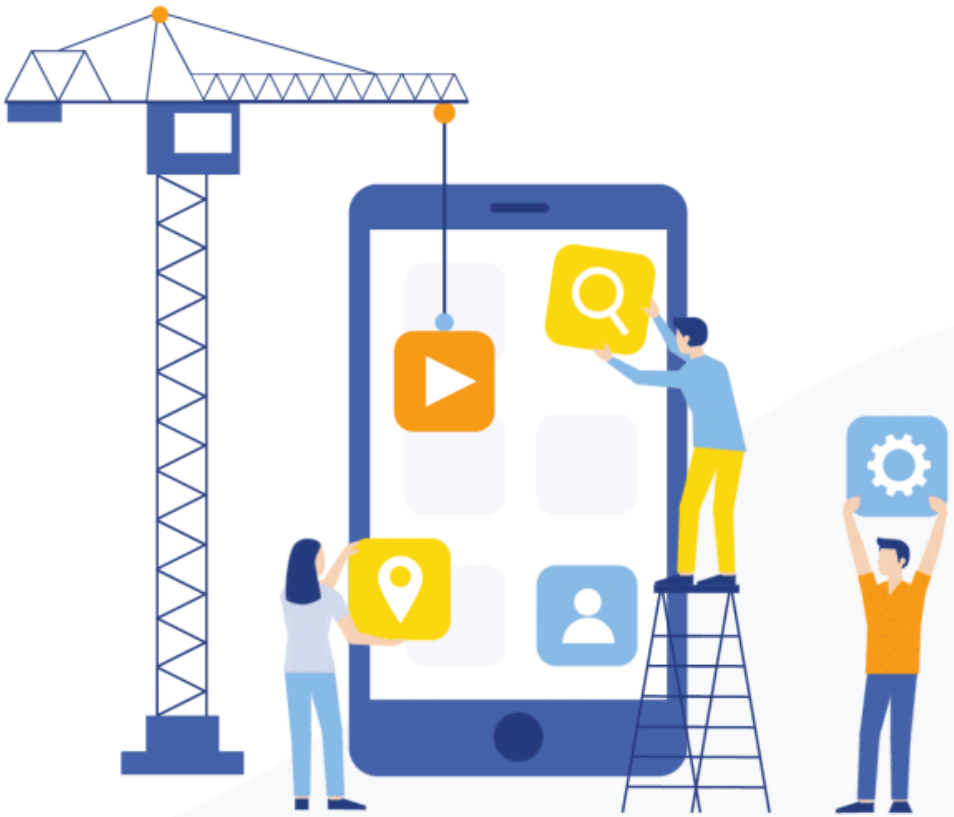
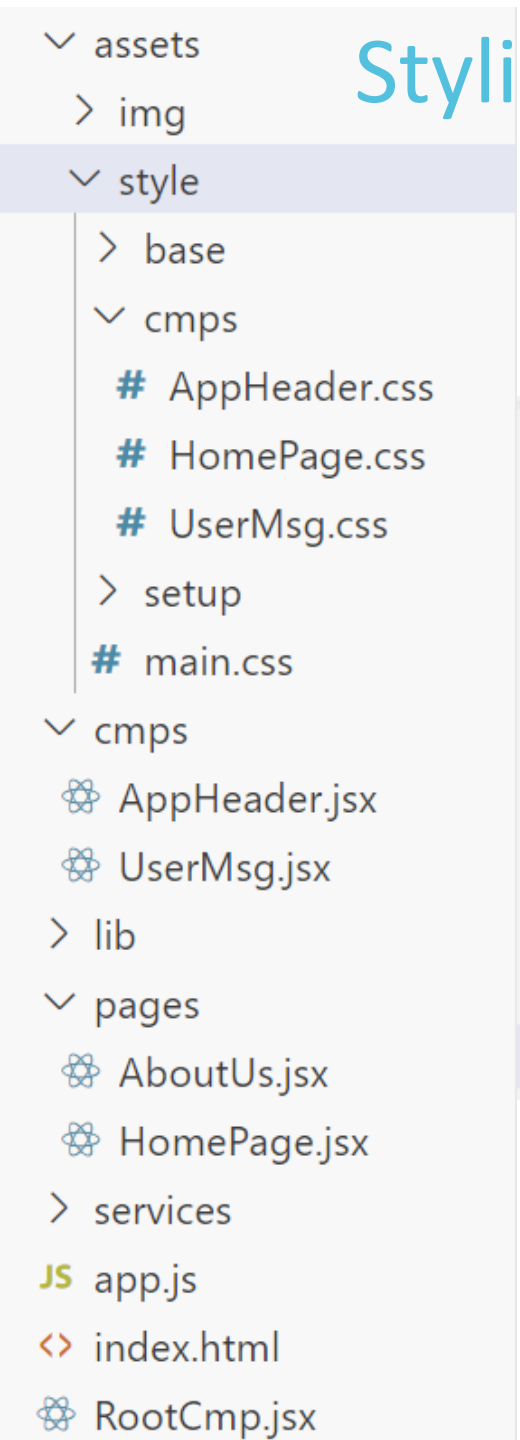
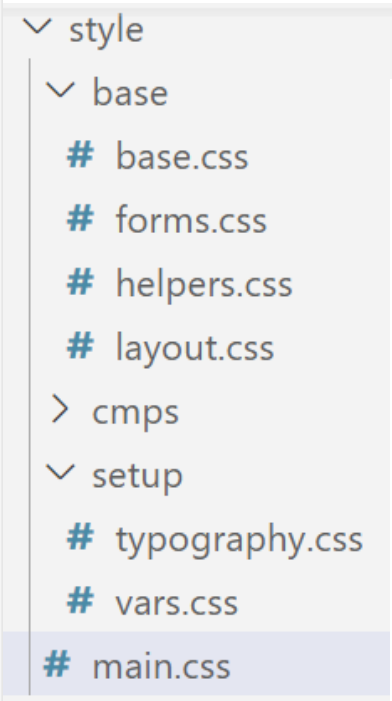
App Structuring



Styling architecture





main.css

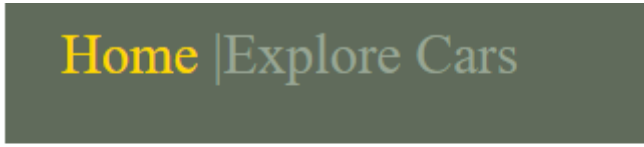
assets > style > # main.css

```
1   /* Setup */
2   @import 'setup/vars.css';
3   @import 'setup/typography.css';
4
5   /* Base */
6   @import 'base/base.css';
7   @import 'base/helpers.css';
8   @import 'base/layout.css';
9   @import 'base/forms.css';
10
11  /* Components */
12  @import 'cmps/UserMsg.css';
13  @import 'cmps/HomePage.css';
14  @import 'cmps/AppHeader.css';
```

```jsx
const { useState} = React

import { Home } from './pages/Home.jsx'
import { CarIndex } from './pages/CarIndex.jsx'

export function RootCmp() {
    const [page, setPage] = useState('home')

    function onSetPage(ev, page) {
        ev.preventDefault()
        setPage(page)
    }

    return <section className="main-layout app">
        <header className="app-header">
            <h1>React Car App</h1>
            <nav>
                <a href="" className={(page === 'home') ? 'active' : ''}
                    onClick={(ev) => onSetPage(ev, 'home')}>
                    Home
                </a> |
                <a href="" className={(page === 'car') ? 'active' : ''}
                    onClick={(ev) => onSetPage(ev, 'car')}>
                    Explore Cars
                </a>
            </nav>
        </header>
        <main>
            {page === 'home' && <Home />}
            {page === 'car' && <CarIndex />}
        </main>
    </section>
}
```

Basic Routing

Let's setup *kind-of* routing in our root component



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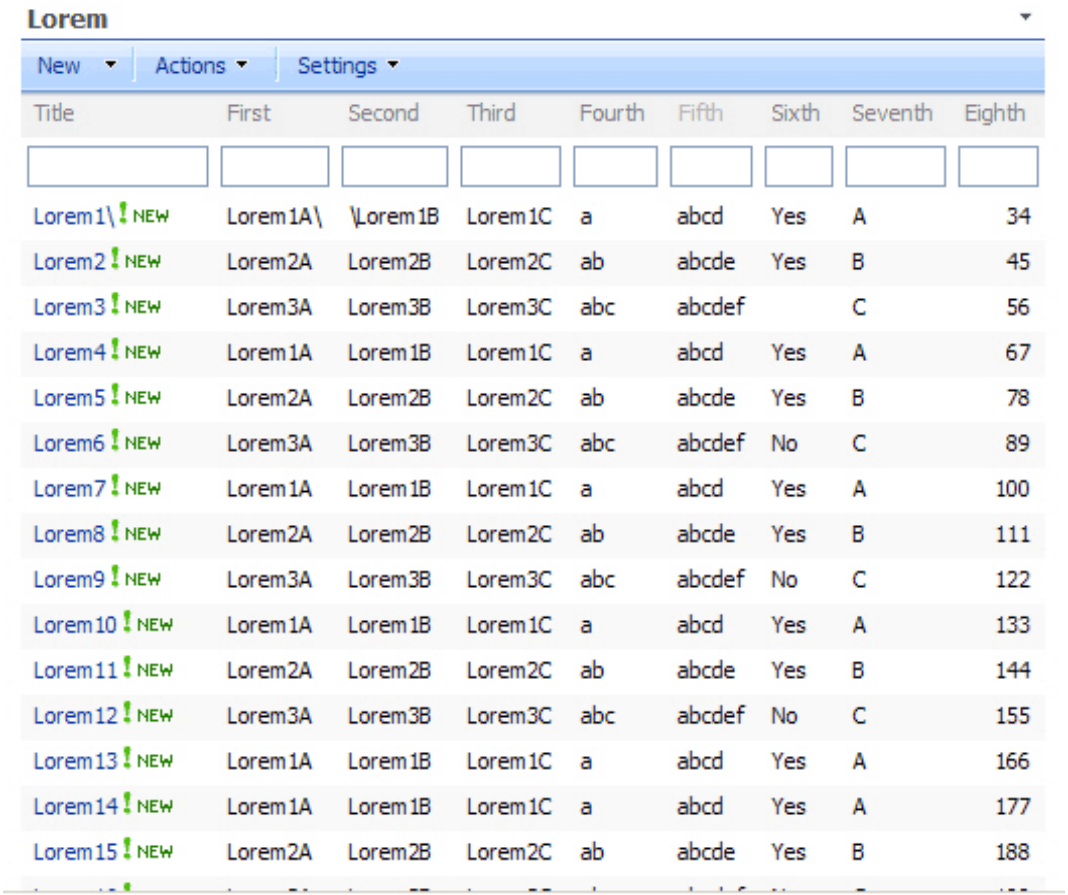
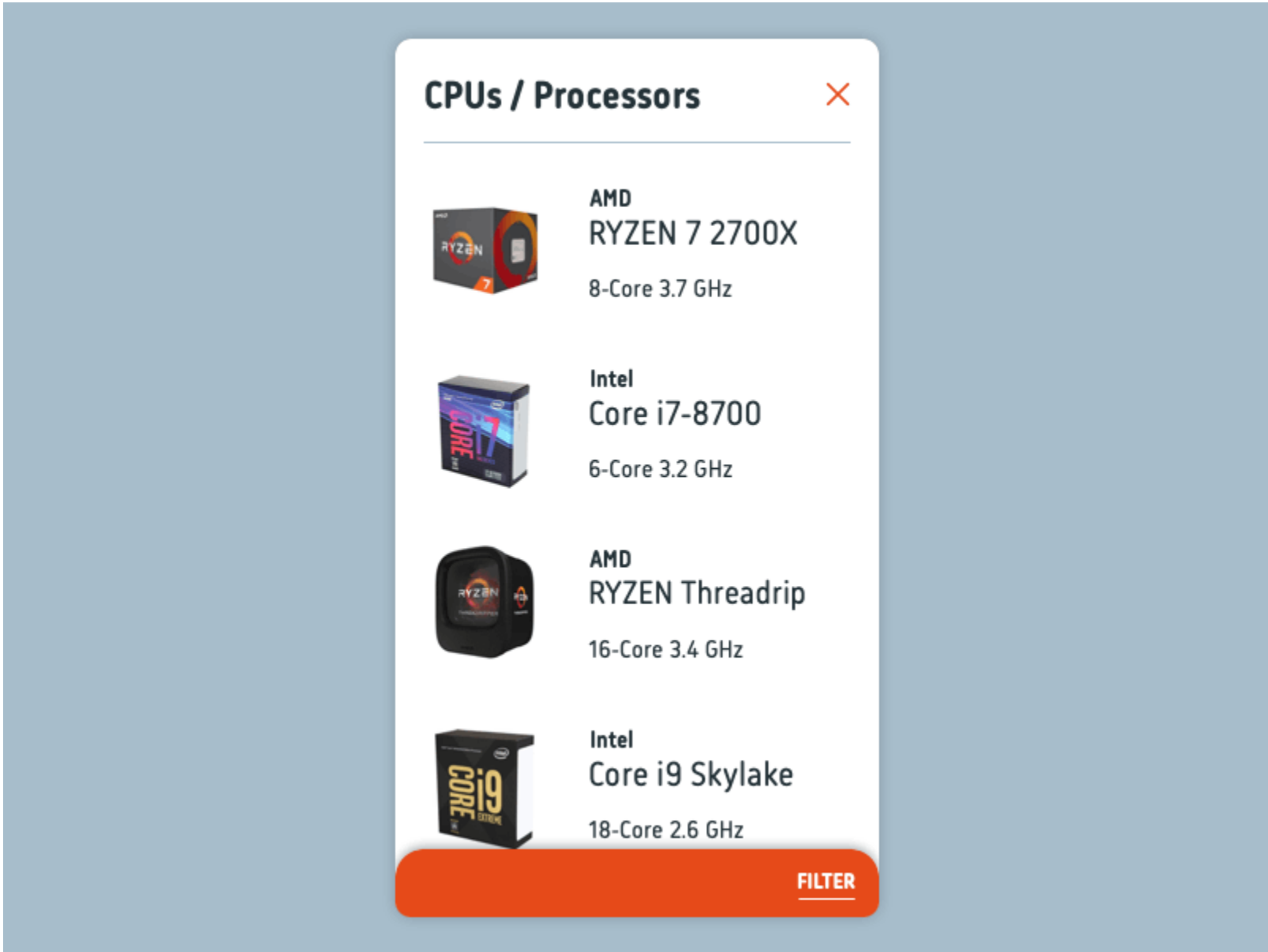
List of items

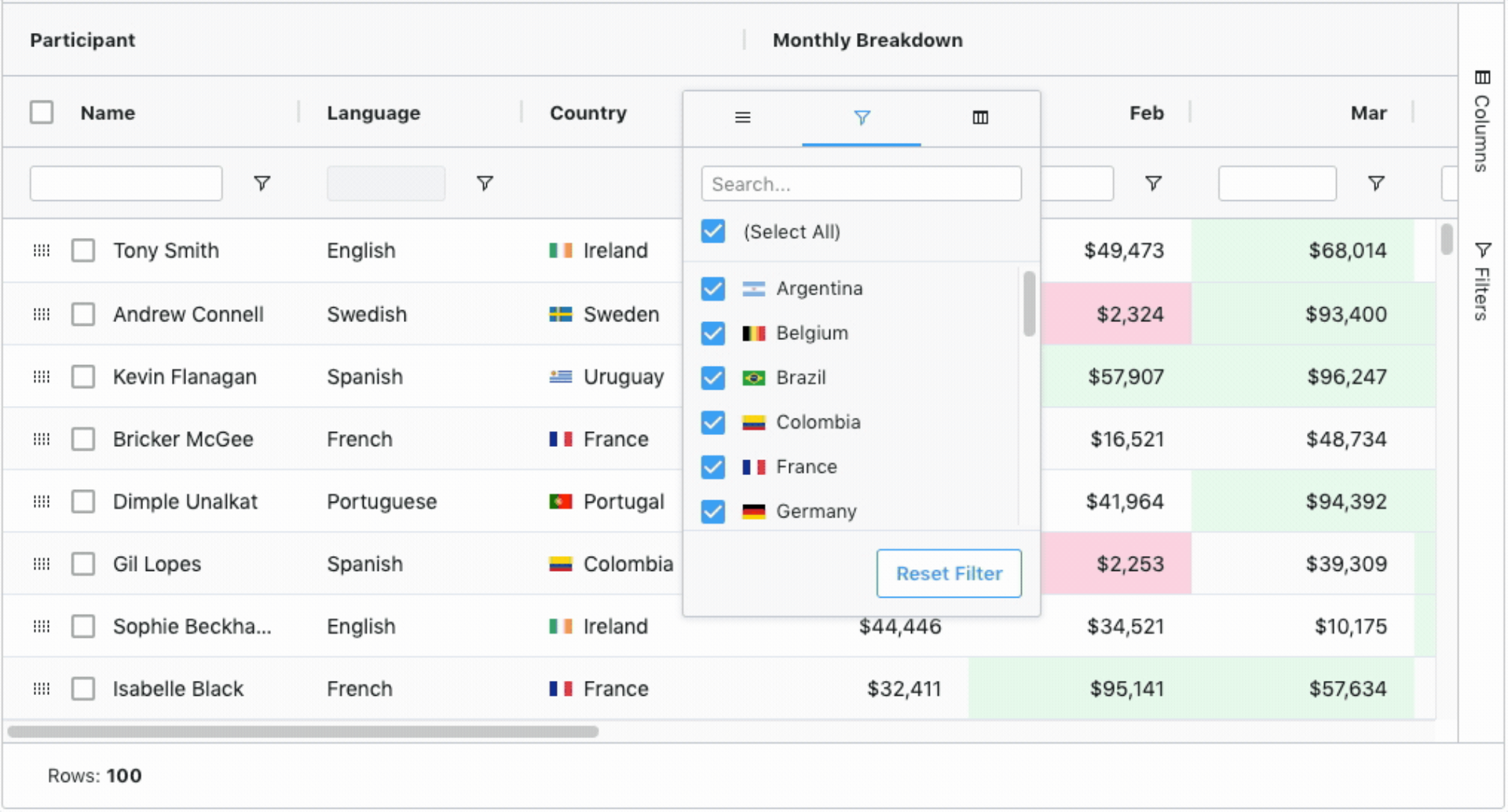
- In many application, we will have the need to present a list of items
- We usually also need to filter and sort that list



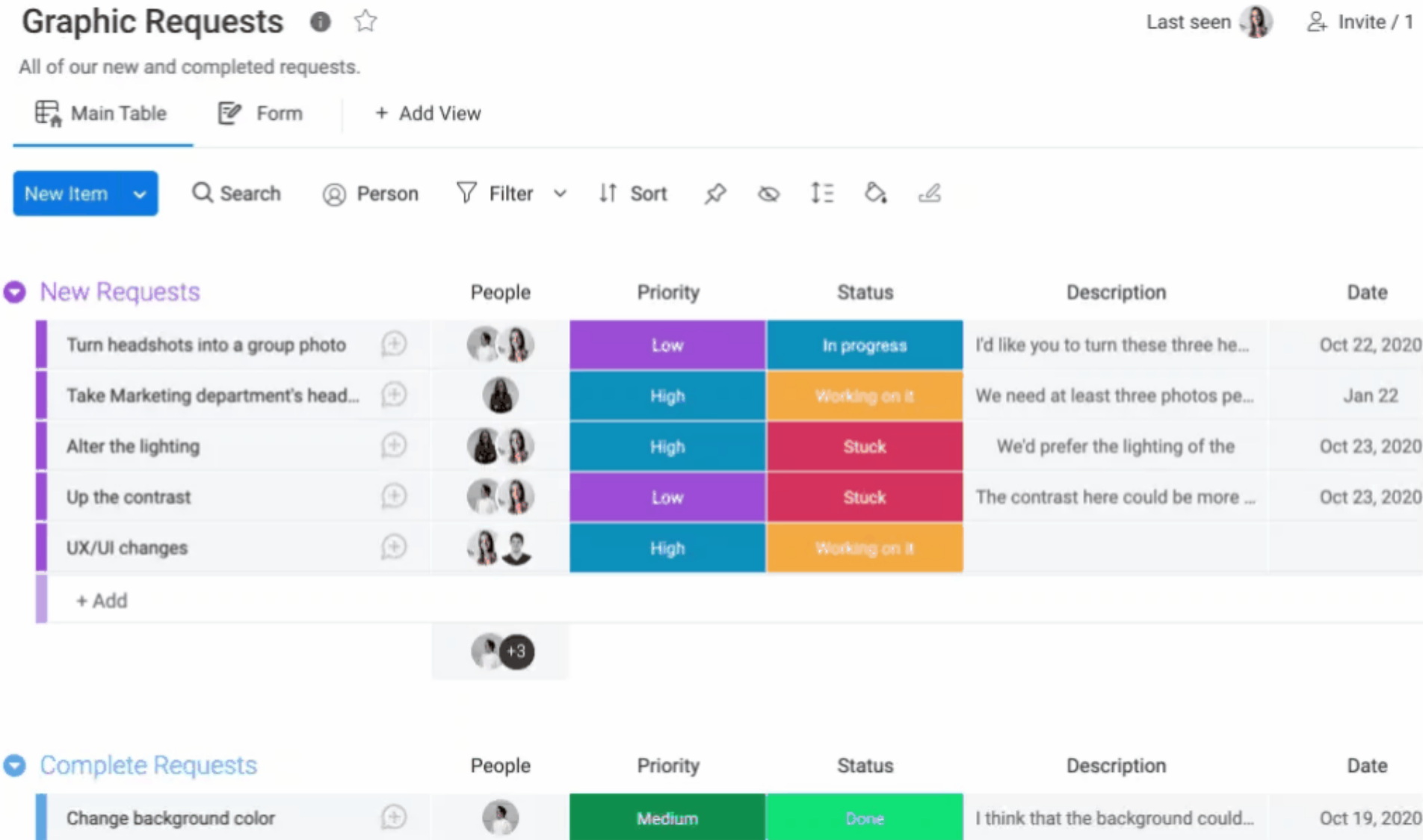
Another example



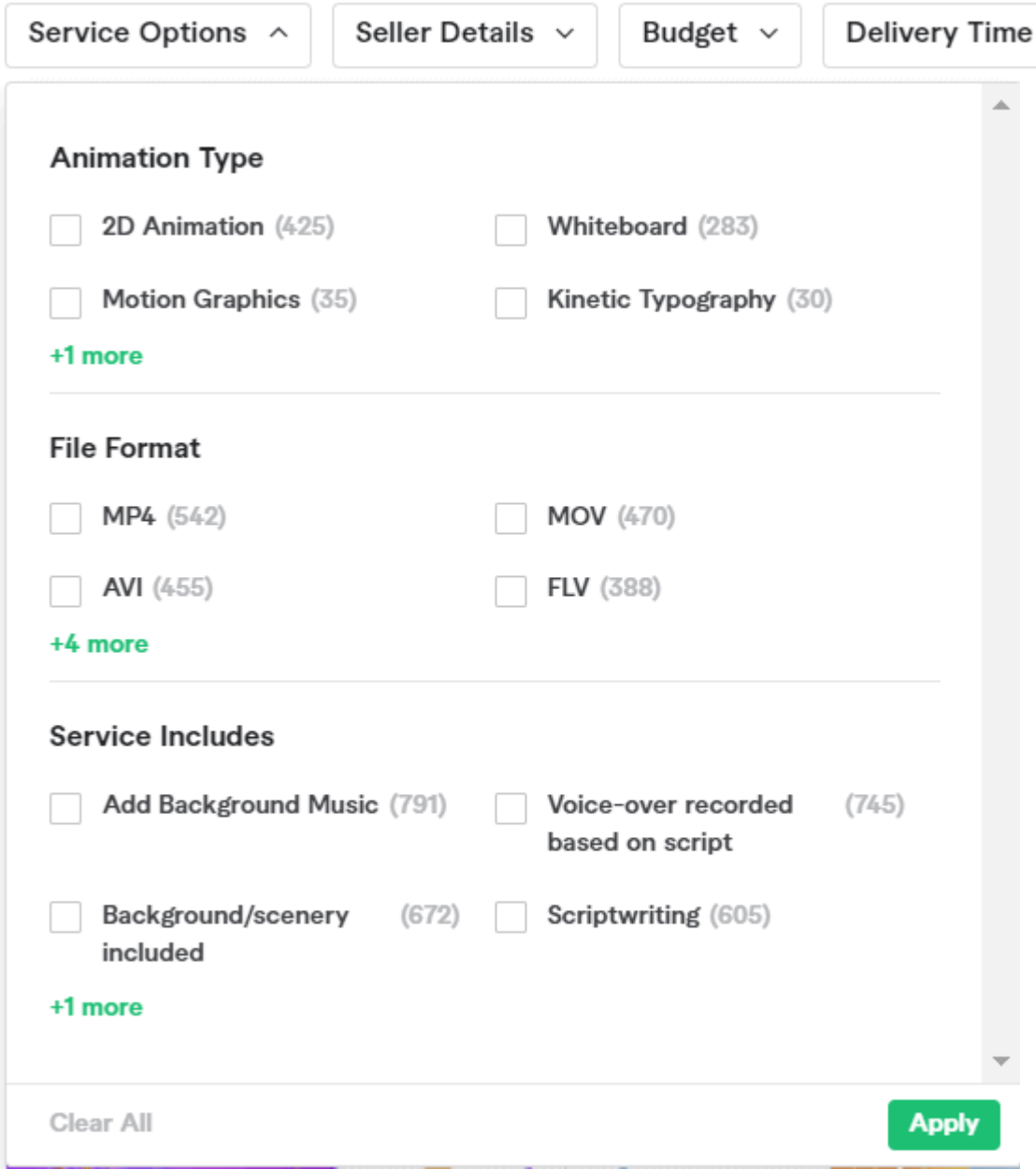
Another example



Example - Monday



Example - Fiverr



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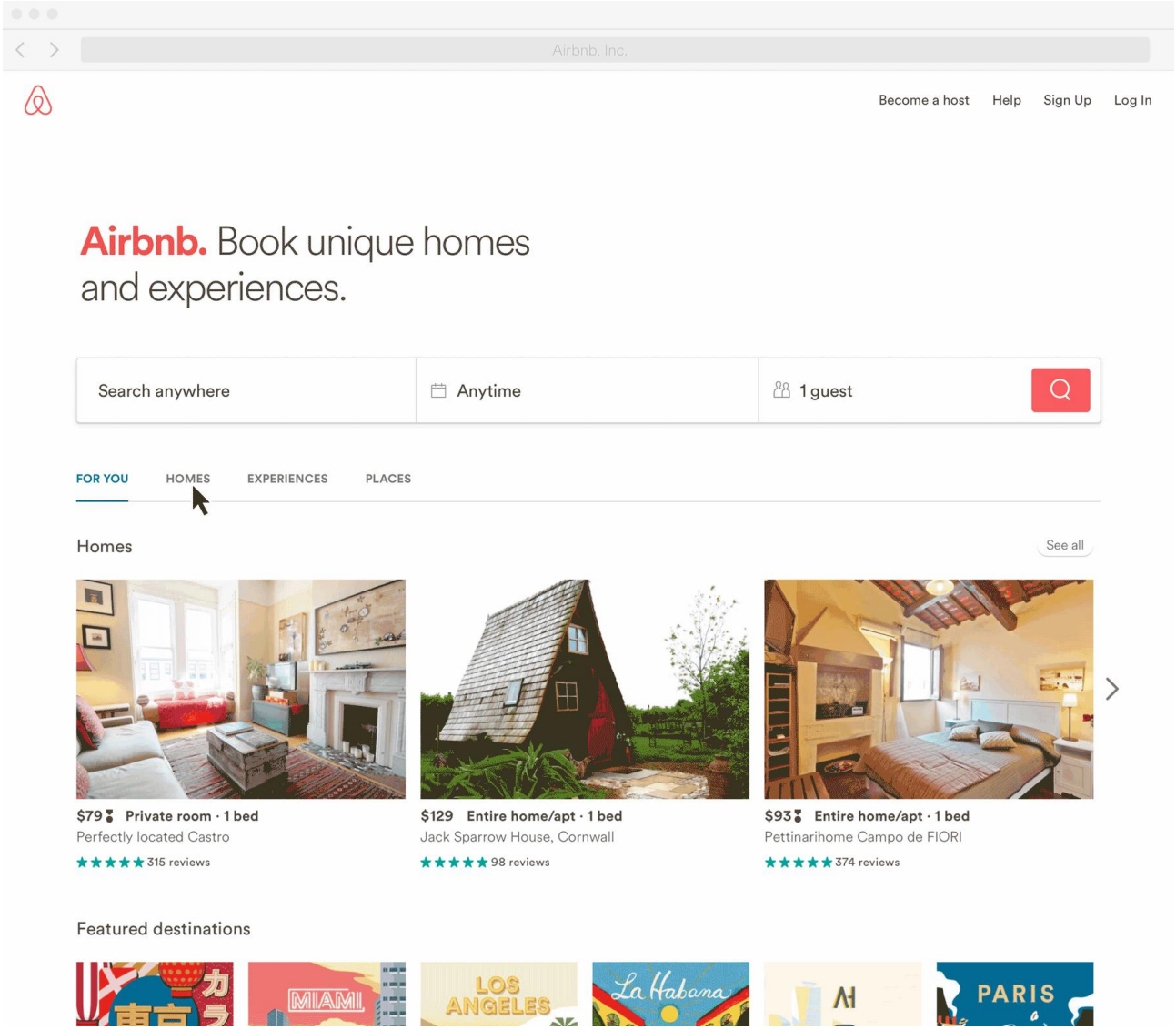
Example - airbnb



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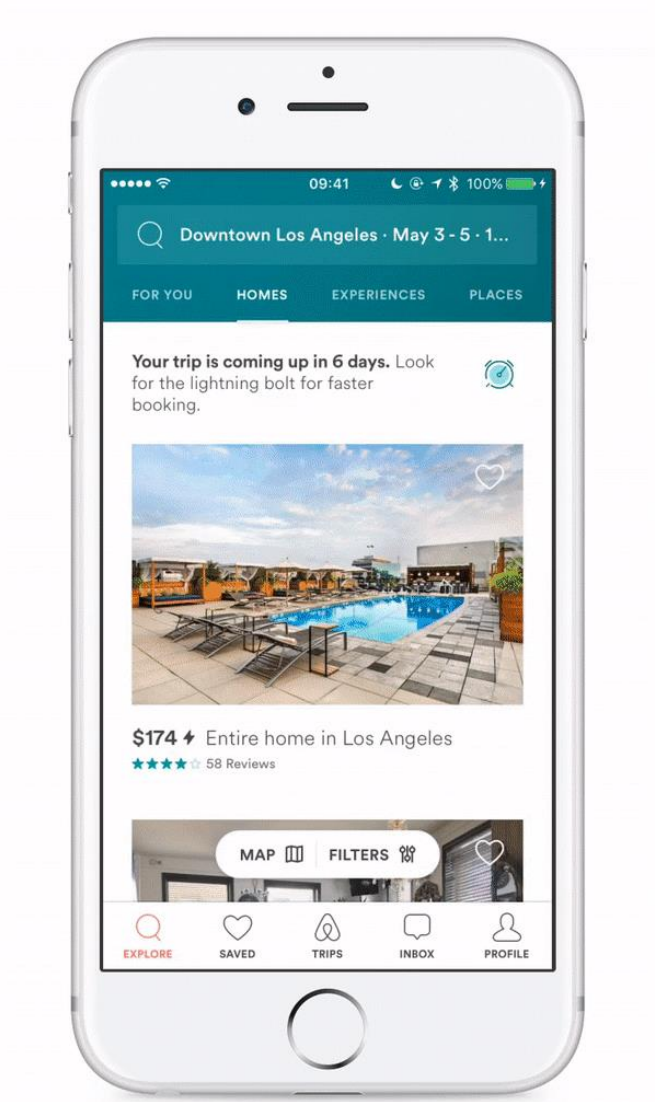
Example - airbnb



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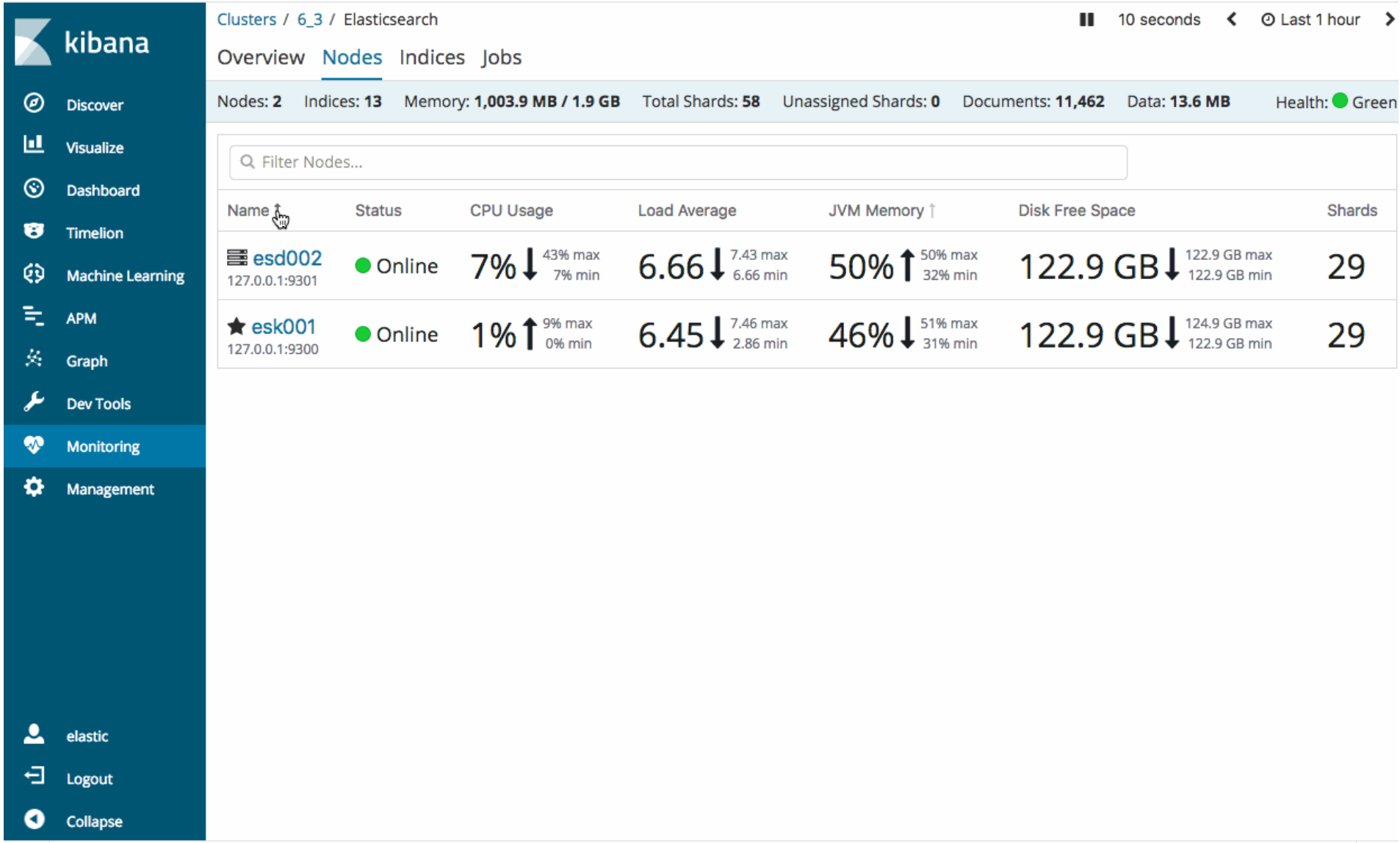
Example - sorting



Many applications share the following structure

- It is common to have an <ItemIndex> component, getting a list of items from an itemService
- It then renders an <ItemList>, rendering <ItemPreview> in a loop.
- It also uses an <ItemFilter> for filtering/sorting the list
- In addition, we will usually have a <ItemDetails> and <ItemEdit> as separate pages

the <ItemIndex>

- This is a smart component and usually the most complex one
- It gets the item list from the service

- It renders <ItemList> to show the items and sends down callbacks for the needed actions which will use the itemService to perform

- It also renders <ItemFilter> and when updated, it sends down an updated list to <ItemList>

the <ItemIndex>

- This is a smart component and usually the most complex one.
- It starts by getting the item list from the service:

```
const [cars, setCars] = useState([])

useEffect(()=>{
    carService.query()
        .then(setCars)
}, [])
```

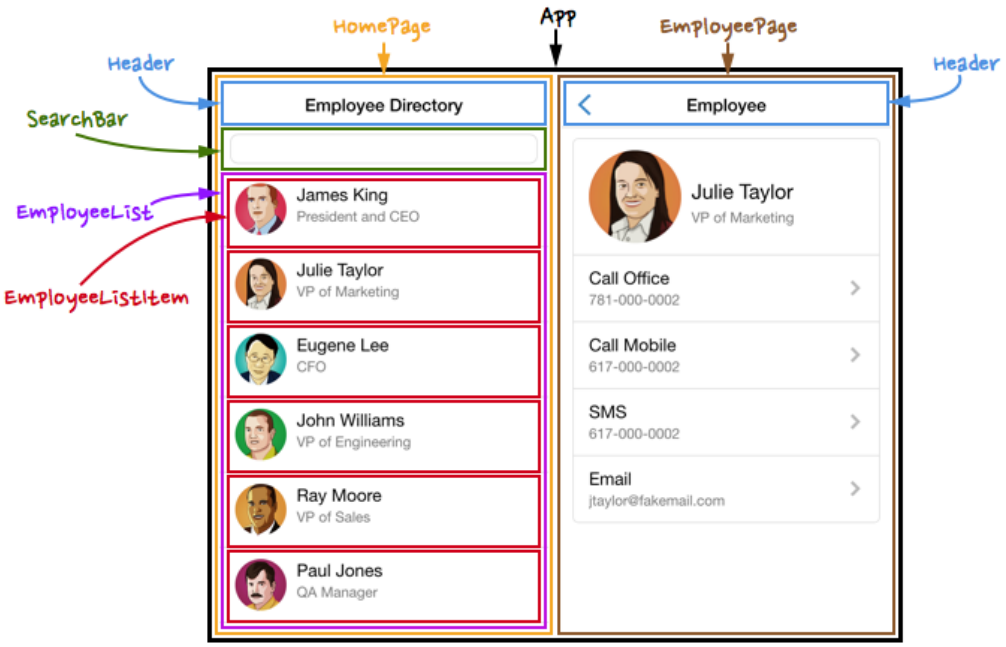
the <ItemIndex>

Here is a basic structure

```
export function CarIndex() {
    const [cars, setCars] = useState([])
    const [filterBy, setFilterBy] = useState({})
    const [selectedCar, setSelectedCar] = useState(null)

    useEffect(() => {
        carService.query(filterBy)
            .then(setCars)
    }, [filterBy])

    return (
        <section className="car-index">
            <h2>Cars</h2>
            {!selectedCar && <section>
                <CarFilter onFilter={setFilterBy} />
                <CarList cars={cars} onSelect={setSelectedCar} />
            </section>}
            {selectedCar && <section>
                <h2>Selected Car</h2>
                <pre>{JSON.stringify(selectedCar, null, 2)}</pre>
                <button onClick={()=>setSelectedCar(null)}>Close</button>
            </section>}
        </section>
    )
}
```

the <ItemList>

It’s where the user sees a list of preview items



the <ItemList>

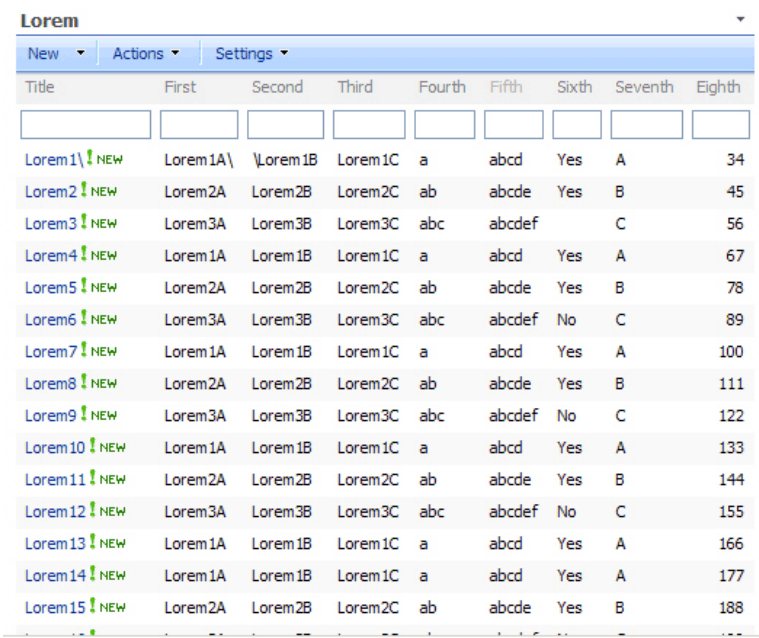
It is usually a simple component getting items as prop and mapping them to <Preview> component

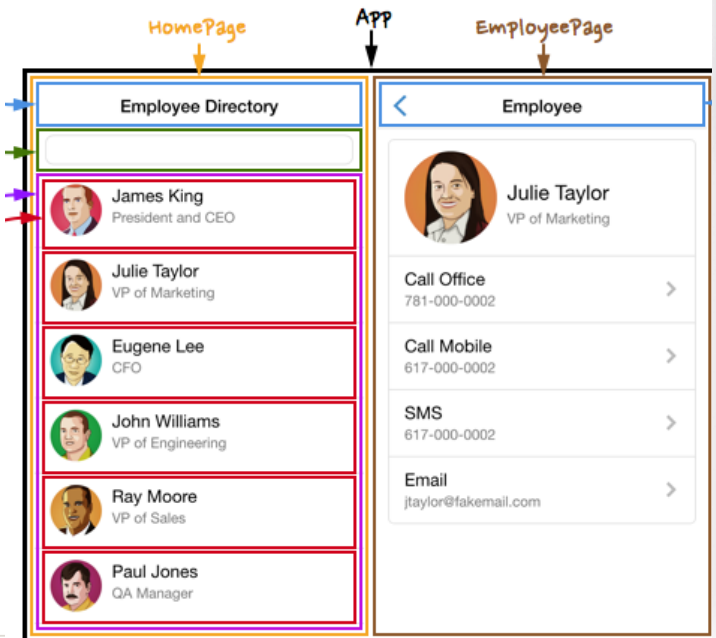
For example – a car list:

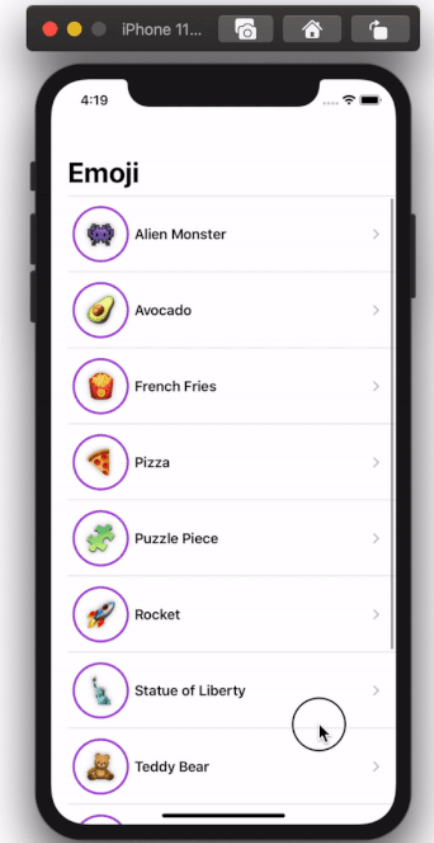
```
import { CarPreview } from './car-preview.jsx'

export function CarList({ cars, onSelectCar }) {
    return <section className="car-list">
        {cars.map(car =>
            <CarPreview key={car.id} car={car}
                onSelectCar={onSelectCar} />
        )}
    </section>
}
```

the <ItemPreview>

- It's a preview of the item, usually links to another page with the full details
- It gets an item as a prop and renders
- Commonly reports back to his parent (emits) for any important task

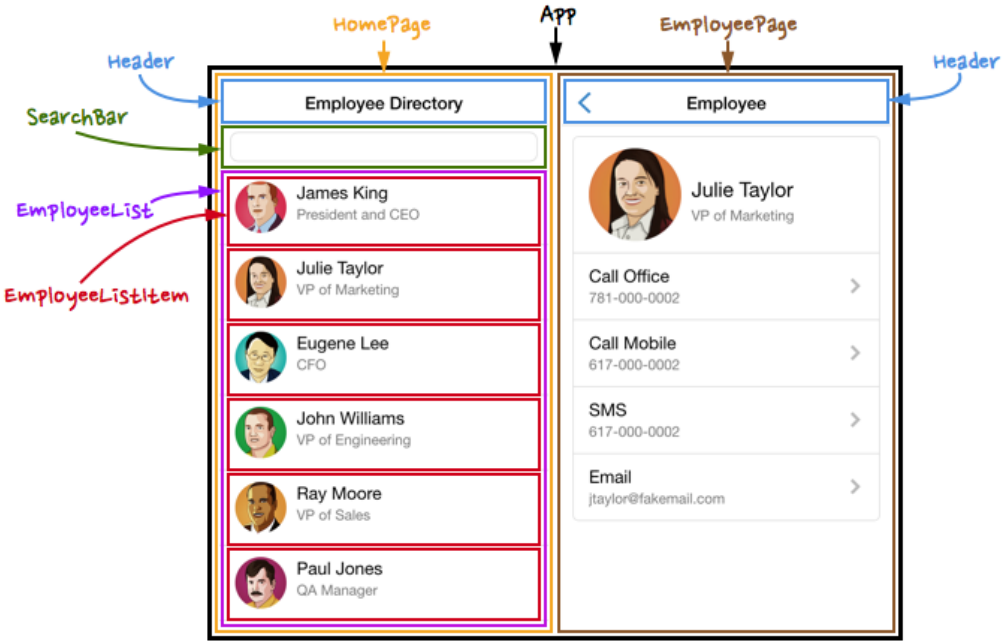


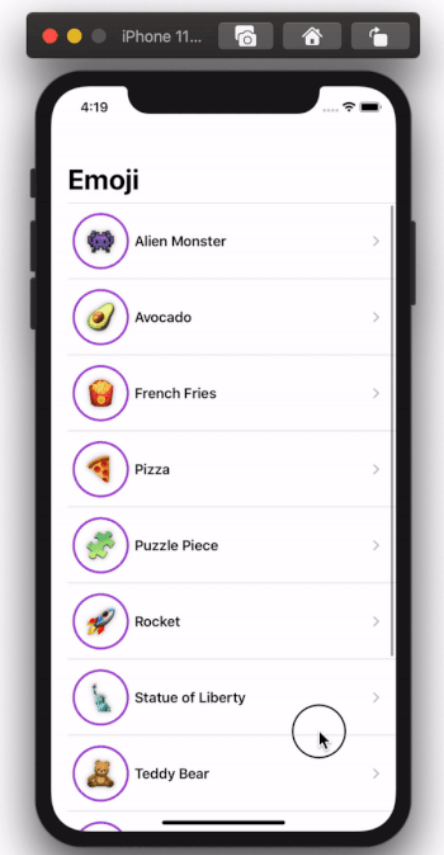




the <ItemDetails>

- Display the entire details of the items
  - Including reviews, and more
- It works directly with the service for getting fresh full details for the item





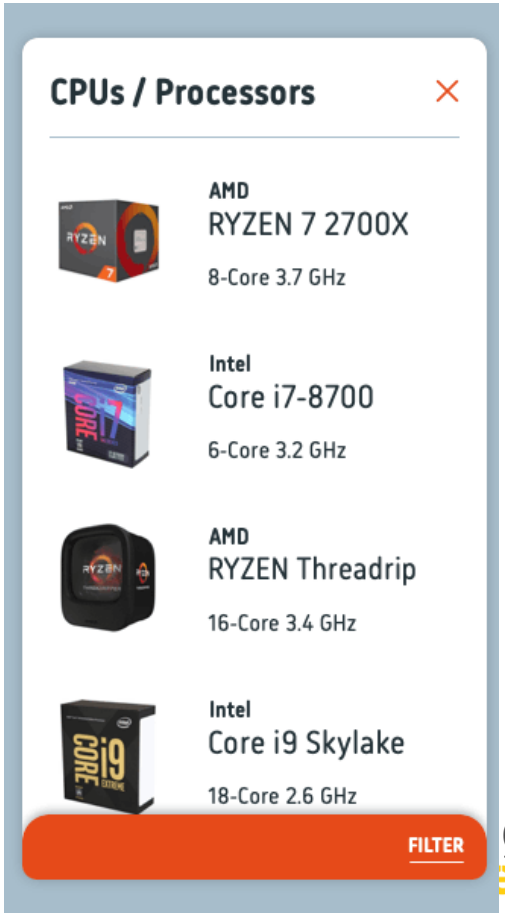
the <ItemFilter>

- It's where the user filters the list
- It usually reports an updated filter to his parent component (calls a provided callback)

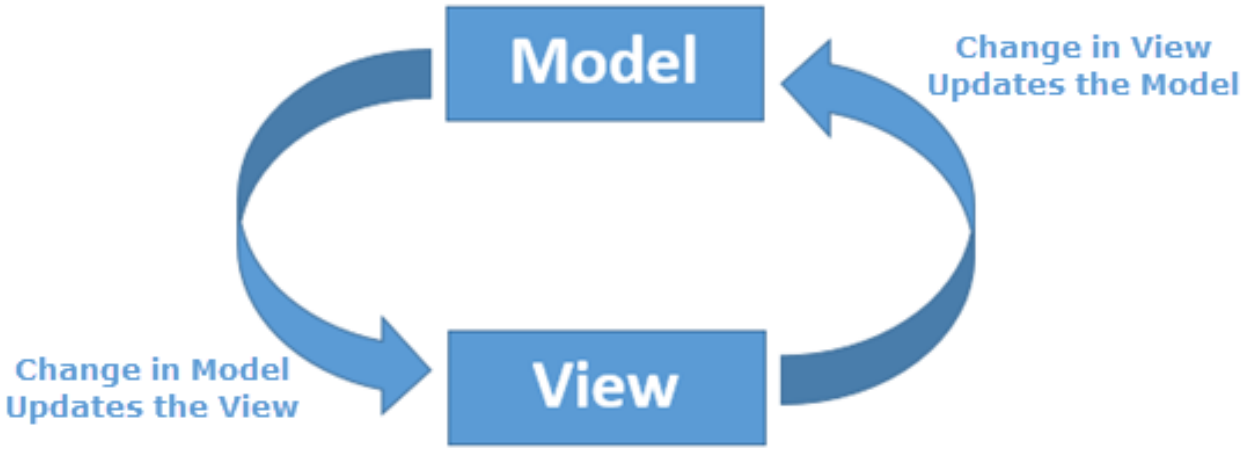
Lorem

New ▾ | Actions ▾ | Settings ▾

Title	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
Lorem1\ NEW	Lorem1A\	\Lorem1B	Lorem1C	a	abcd	Yes	A	34
Lorem2 NEW	Lorem2A	Lorem2B	Lorem2C	ab	abcde	Yes	B	45
Lorem3 NEW	Lorem3A	Lorem3B	Lorem3C	abc	abcdef		C	56
Lorem4 NEW	Lorem1A	Lorem1B	Lorem1C	a	abcd	Yes	A	67
Lorem5 NEW	Lorem2A	Lorem2B	Lorem2C	ab	abcde	Yes	B	78
Lorem6 NEW	Lorem3A	Lorem3B	Lorem3C	abc	abcdef	No	C	89
Lorem7 NEW	Lorem1A	Lorem1B	Lorem1C	a	abcd	Yes	A	100
Lorem8 NEW	Lorem2A	Lorem2B	Lorem2C	ab	abcde	Yes	B	111
Lorem9 NEW	Lorem3A	Lorem3B	Lorem3C	abc	abcdef	No	C	122
Lorem10 NEW	Lorem1A	Lorem1B	Lorem1C	a	abcd	Yes	A	133
Lorem11 NEW	Lorem2A	Lorem2B	Lorem2C	ab	abcde	Yes	B	144
Lorem12 NEW	Lorem3A	Lorem3B	Lorem3C	abc	abcdef	No	C	155
Lorem13 NEW	Lorem1A	Lorem1B	Lorem1C	a	abcd	Yes	A	166
Lorem14 NEW	Lorem1A	Lorem1B	Lorem1C	a	abcd	Yes	A	177
Lorem15 NEW	Lorem2A	Lorem2B	Lorem2C	ab	abcde	Yes	B	188



two-way-data-binding



When working with inputs we need to create a two-way data bindings:

- The data is placed in the input value
- When user modifies its reflected in the model

two-way-data-binding

When using `<input>`, `<textarea>` and `<select>` we bind the value and the onChange event

Changes in the component's state are automatically reflected into the view and vise-versa

```
export function SimpleInput() {

    const [user, setUser] = useState({ fullname: 'Puki', score: 87 })
    function handleNameChange(ev) {
        const { value } = ev.target
        setUser((prevUser) => ({ ...prevUser, fullname: value }))
    }

    return <input type="text"
                  value={user.fullname}
                  onChange={handleNameChange}
    />

}
```

A simple form

Let's review

```
export function SimpleForm() {

    const [user, setUser] = useState({ fullname: 'Puki Reactof'})
    function handleNameChange(ev) {
        const { value } = ev.target
        setUser((prevUser) => ({ ...prevUser, fullname: value }))
    }

    function saveUser(ev) {
        ev.preventDefault()
        console.log('Saving user', user)
    }

    return <form onSubmit={saveUser}>
        <input type="text"
            name="fullname"
            value={user.fullname}
            onChange={handleNameChange}
            placeholder="Full name"
        />
        <button>Save</button>
    </form>
}
```

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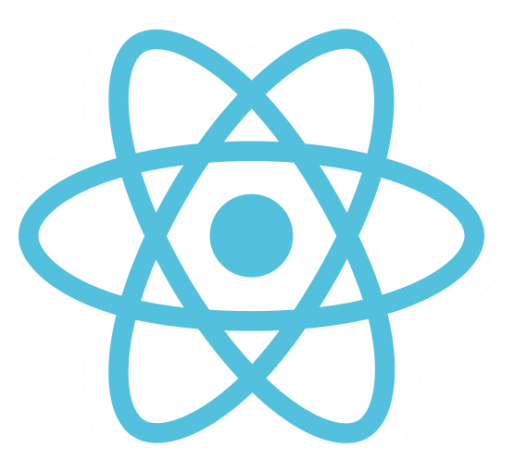
ReactJS



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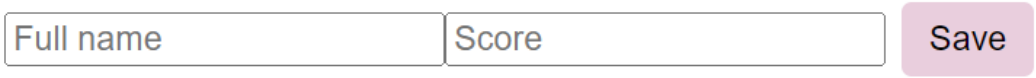
```jsx
export function SimpleForm() {

    const [user, setUser] =
       useState({ fullname: 'Puki Reactof', score: 87 })

    function handleChange(ev) {
        let { value , type , name: field } = ev.target
        value = (type === 'number') ? (+value || '') : value
        setUser((prevUser) => ({ ...prevUser, [field] : value }))
    }
    function saveUser(ev) {
        ev.preventDefault()
        console.log('Saving user', user)
    }

    return <form onSubmit={saveUser}>
        <input type="text"
            name="fullname"
            value={user.fullname}
            onChange={handleChange}
            placeholder="Full name"
        />
        <input type="number"
            name="score"
            value={user.score}
            onChange={handleChange}
            placeholder="Score"
        />
        <button>Save</button>
    </form>
}
```

A simple form

Let's review



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Forms are tricky

The `handleChange` function should handle different types of inputs: and can look a bit different for different forms.

For example, in the previous example, we need to handle numbers correctly:

```
const [user, setUser] = useState({ fullname: 'Puki Reactof', score: 87 })
function handleChange(ev) {
    let { value , type , name: field } = ev.target
    value = (type === 'number') ? (+value || '') : value
    setUser((prevUser) => ({ ...prevUser, [field] : value }))
}
```

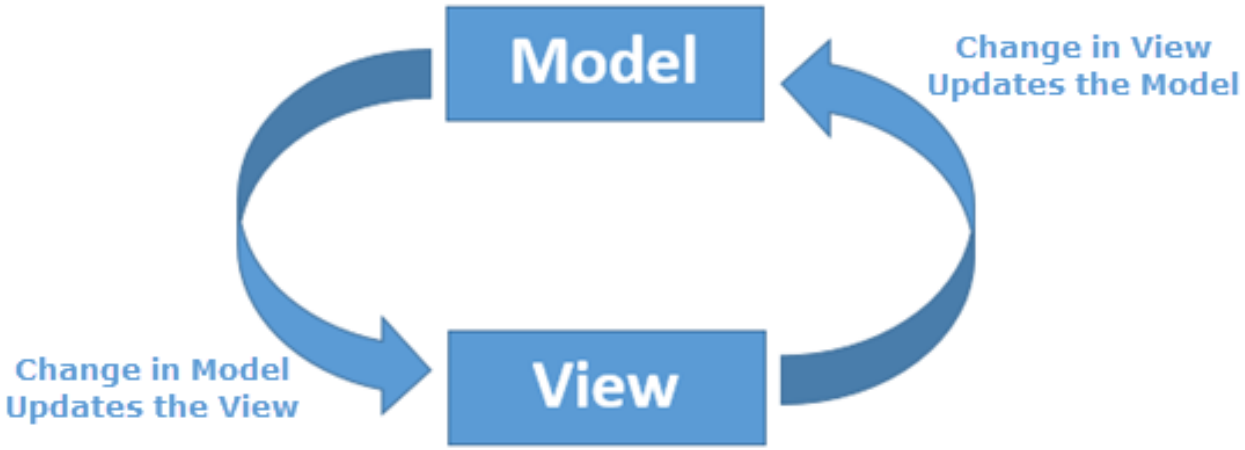
Forms are tricky

If we add a checkbox and a range inputs,
we will add some more conditions:

```
function handleChange({target}) {
    var {value, name: field} = target
    switch (target.type) {
        case 'range':
        case 'number':
            value = +target.value || 0
            break
        case 'checkbox':
            value = target.checked
            break

    }
    setUser((prevUser) => ({ ...prevUser, [field] : value }))
}
```

Revisit: two-way-data-binding



We created a two-way data bindings:

- The data is placed in the input value
- When user modifies its reflected in the model

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Form validity

The validity of the form, can be computed:

```
const isValid = user.fullname && user.score >= 0

<button disabled={!isValid}>Save</button>
```

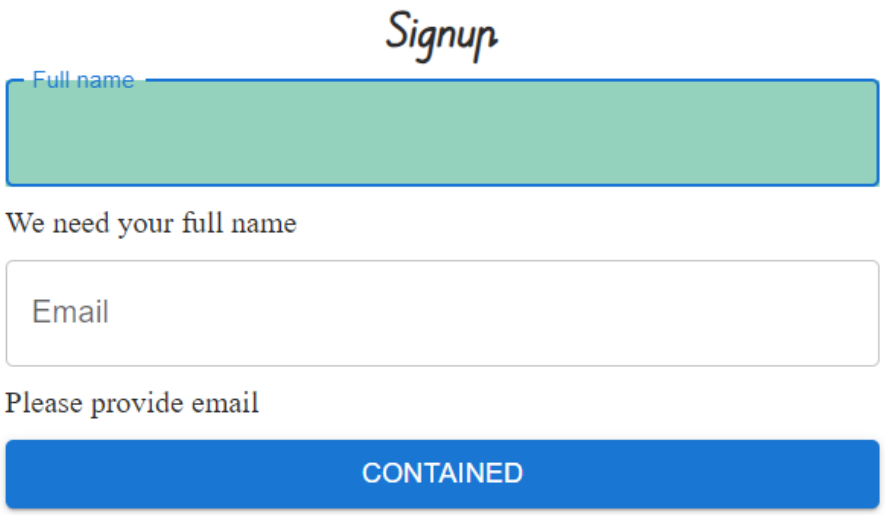
Forms

Forms are sometimes more complex

We will later meet libraries that focus on forms, such as:

```
const SignupSchema = Yup.object().shape({
    fullName: Yup.string()
        .min(2, 'Too Short!')
        .max(50, 'Too Long!')
        .required('We need your full name'),
    email: Yup.string().email('Invalid email').required('Please provide email'),
})
```

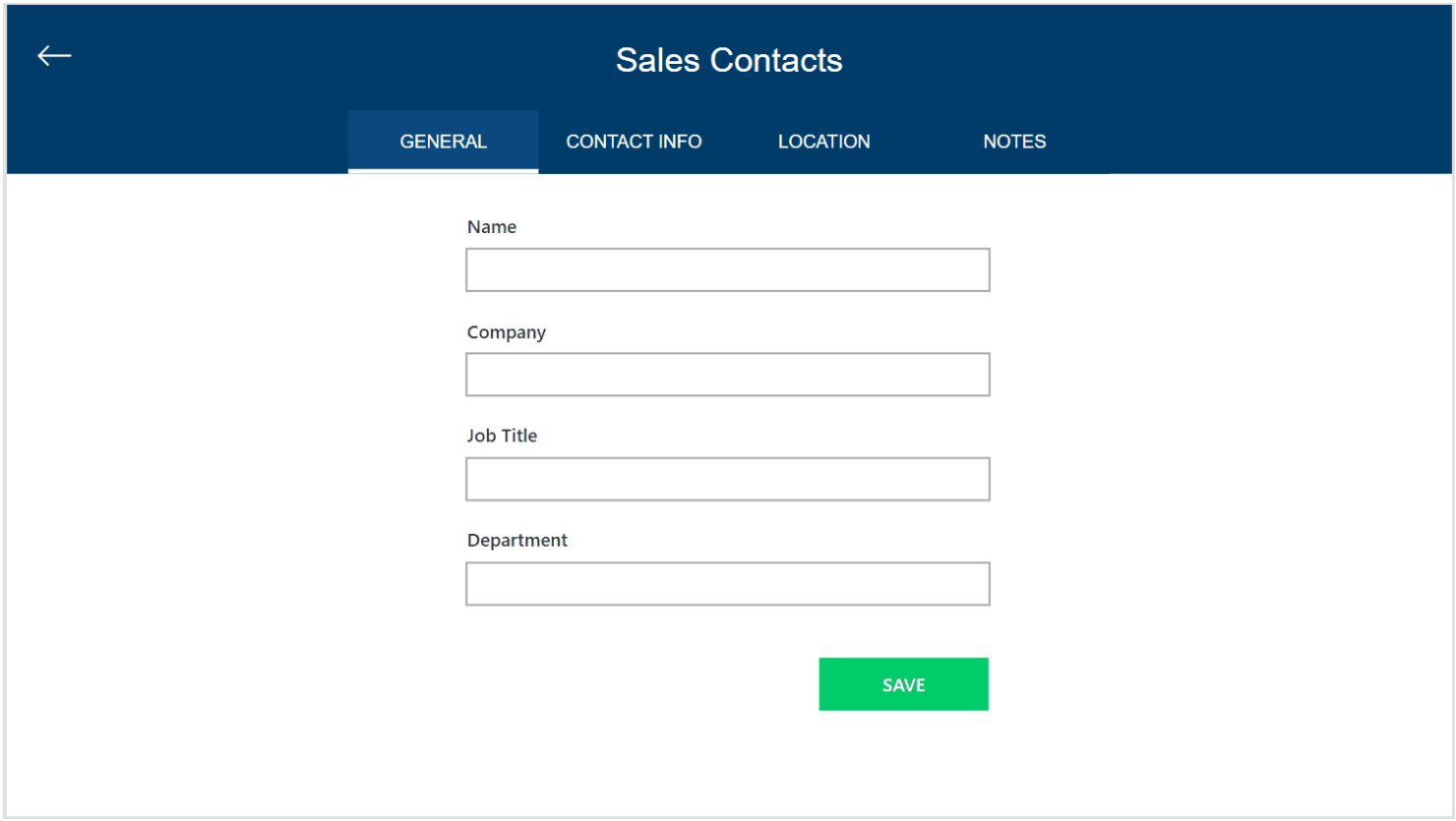
But for now we are good



the <ItemEdit>

It’s where the user edits the item

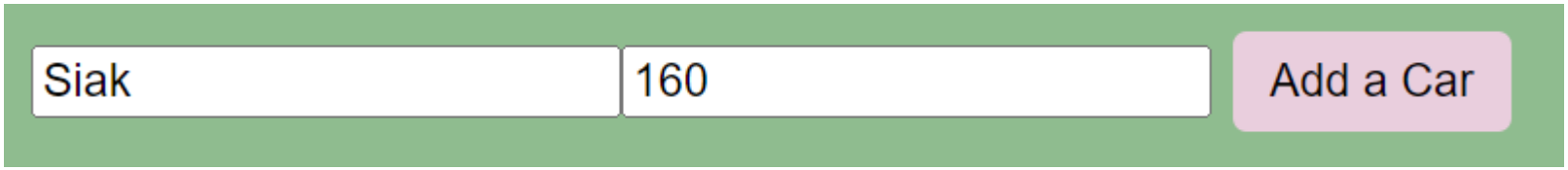
It usually works directly with the service for adding and updating an item



Form Submit

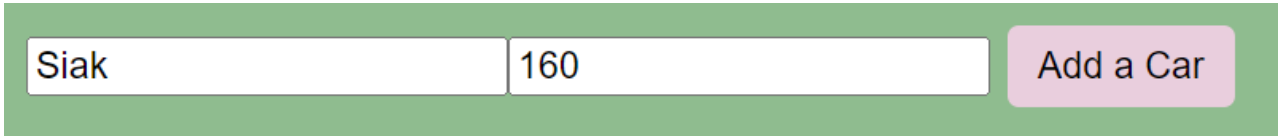
We will usually wrap inputs inside a form, handle the submit event and prevent the default reload

```
function addCar(ev) {
    ev.preventDefault()
    console.log('Saving car', car)
}
```



Form Submit

Let’s add a car



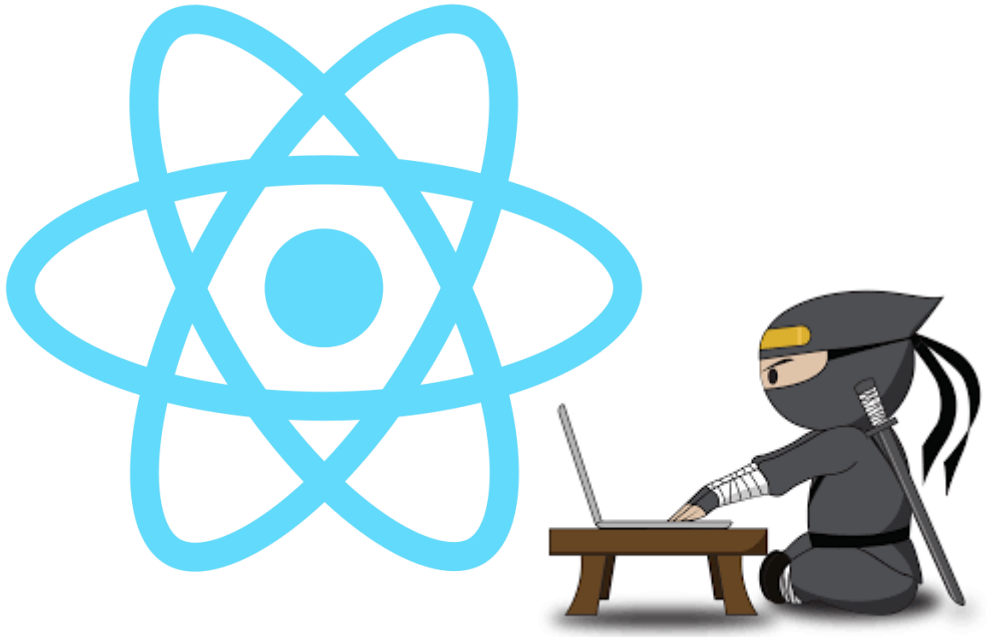

```
function addCar(ev) {
    ev.preventDefault()
    carService.save(this.carToEdit)
        .then(savedCar => {
           setCars([...cars, savedCar])

        })
        .catch(err => {
            console.error('Failed to save car', err)
            // TODO: show error msg to user
        })
}
```

Level Done

App Structuring

Handson Time



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Animations

Animations are an important tool, lets use animate.css

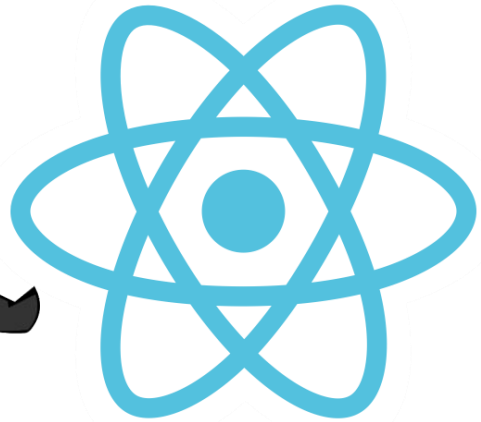
```
// In our utilService

function animateCSS(el, animation) {
    const prefix = 'animate__'
    return new Promise((resolve, reject) => {
        const animationName = `${prefix}${animation}`

        el.classList.add(`${prefix}animated`, animationName)

        function handleAnimationEnd(event) {
            event.stopPropagation()
            el.classList.remove(`${prefix}animated`, animationName)
            resolve('Animation ended')
        }

        el.addEventListener('animationend', handleAnimationEnd, { once: true })
    })
}
```

Animations

Now, we can easily animate elements

```
// use a ref to animate some element
const titleRef = useRef()
…
<h3 ref={titleRef}>Here is some Ipsum</h3>
…
function onSomething() {
   utilService.animateCSS(titleRef.current, 'pulse')
}
```

ReactJS



Routing

and Single Page Applications

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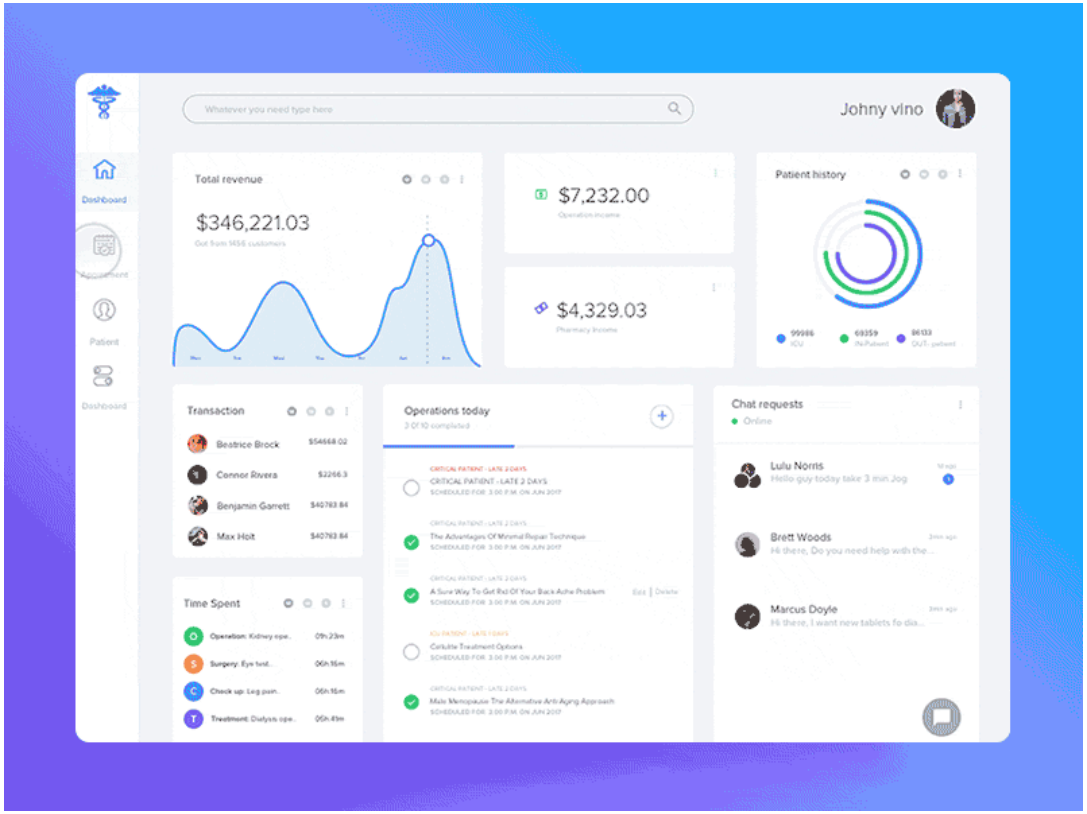
Single Page Apps (SPA)

Single page application (SPA) allows the user to navigate between views without reloading the entire page



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Routing in Single Page Application

- Add the needed libs to your project
  - react-router, react-router-dom, history

```
// in RootCmp.js
const Router = ReactRouterDOM.HashRouter
const { Route} = ReactRouterDOM

<Router>
    <section className="app"></section>
</Router>
```

<Routes> and <Route>

Next, we match paths with components (pages):

```
import { Home } from './pages/Home.jsx'
import { About } from './pages/About.jsx'

const { Routes, Route } = ReactRouterDOM
//...

<Routes>
    <Route path="/" element={<Home />} />
    <Route path="/about" element={<About />} />
</Routes>
```

Navigation with <Link>

We use the <Link> component

```
const { Link } = ReactRouterDOM

//...
<Link to='/car'>Back to list</Link>
```

We can examine the DOM, it renders <a> elements

Navigation with <NavLink>

In our main navigation, let's show the user which link (page) is currently active

we will use NavLinks:


```
const { NavLink } = ReactRouterDOM

export function AppHeader() {
    return <header className="app-header"
        <h1>React Car App</h1>
        <nav>
            <NavLink to='/'>Home</NavLink> |
            <NavLink to='/about'>About</NavLink> |
            <NavLink to='/car'>Explore Cars</NavLink>
        </nav>
    </header>
}
```

Home Sweet Home

```
nav a.active {
    color: yellow;
}
```

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Route Params

- Setting Up Route Parameters:

```
<Route path="/car/:carId" component={CarDetails}/>
```

- Getting the Route Parameters in the matched component:

```
// in CarDetails.jsx
const { carId } = useParams()
```

Imperative Navigation

```
export function MyCmp() {
    const navigate = useNavigate()

    function onSaveCar() {
        // save the car
        // then navigate
        navigate('/car')
    }
}
```

- Meaning - Navigating from Code instead of using <Link> or <NavLink>
- For example – in the EditItem page, after the ItemService reports a successful save, we want to navigate back to the list

<CarDetails>

Let's examine

```
import { carService } from '../services/car.service.js'
const { useParams, useNavigate, Link } = ReactRouterDOM

export function CarDetails() {

    const [car, setCar] = useState(null)
    const params = useParams()
    const navigate = useNavigate()

    useEffect(() => {
        loadCar()
    }, [])

    function loadCar() {
        carService.get(params.carId)
            .then(setCar)
            .catch(err => {
                console.error('err:', err)
                showErrorMsg('Cannot load car')
                navigate('/car')
            })
    }
```

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<CarDetails>

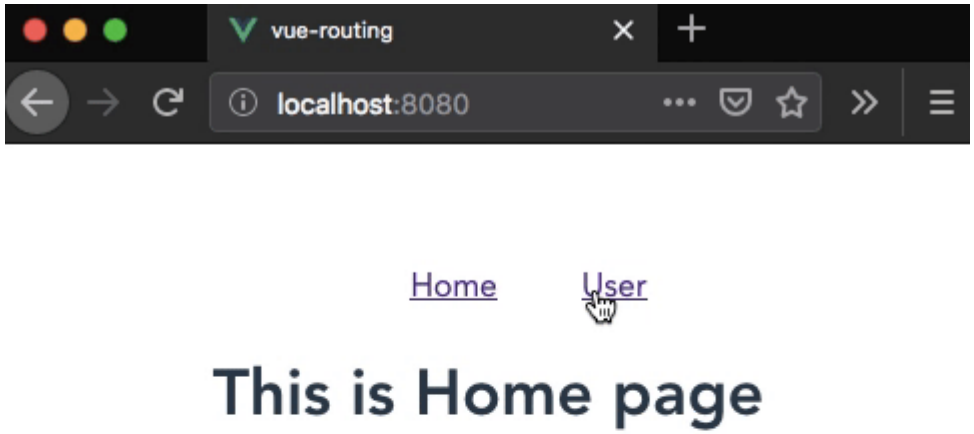
Let's examine

```
    function onBack() {
        // If nothing to do here, better use a Link
        navigate('/car')
        // navigate(-1)
    }

    if (!car) return <div>Loading...</div>
    return (
        <section className="car-details">
            <h1>Car Vendor: {car.vendor}</h1>
            <h1>Car Speed: {car.maxSpeed}</h1>
            <button onClick={onBack}>Back</button>
        </section>
    )
}
```

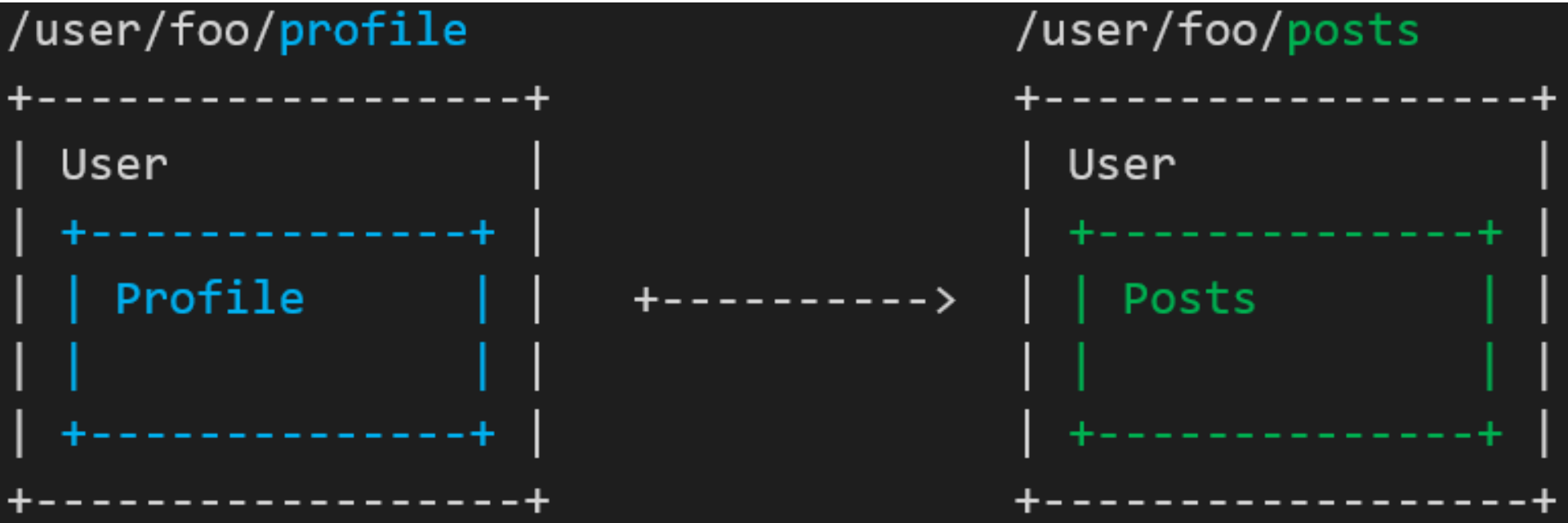
Nested Routes

Larger apps may be composed of several levels of routing.



Nested Routes

Segments of the URL corresponds to a certain structure of nested components



Nested Routes

Let's add some nested routes in our app:

```
<Routes>
    <Route element={<Home />} path="/" />
    <Route element={<AboutUs />} path="/about" >
        <Route element={<AboutIndex />} path="/about" />
        <Route element={<AboutTeam />} path="/about/team" />
        <Route element={<AboutGoal />} path="/about/goal" />
    </Route>
    <Route element={<CarIndex />} path="/car" />
</Routes>
```

The Next / Previous scenario

- We want to add: Previous car and Next car buttons to our app
- This will provide the user another navigation method between different cars

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Getting the next/prev cars

When getting a full car by id,
let's add the needed data:

```
// car.service.js
function get(carId) {
    return storageService.get(CAR_KEY, carId)
        .then(_setNextPrevCarId)
}


function _setNextPrevCarId(car) {
    return storageService.query(CAR_KEY).then((cars) => {
        const carIdx = cars.findIndex((currCar) => currCar.id === car.id)
        const nextCar = cars[carIdx + 1] ? cars[carIdx + 1] : cars[0]
        const prevCar = cars[carIdx - 1] ? cars[carIdx - 1] : cars[cars.length-1]

        car.nextCarId = nextCar.id
        car.prevCarId = prevCar.id
        return car
    })
}
```

The Next / Previous scenario

- In our <CarDetails> Let's add a link to the next car:

```
<Link to={`/car/${car.nextCarId}`}>Next car</Link>
```

- Note that when routing from '/car/xxx' to '/car/yyy' the Route's path remains '/car/:id'

- So, the component stays alive and doesn't re-mount

- Still, we need to get the data of another car and update the cmp's data accordingly

- Let's see how

Reacting to Route Params changes

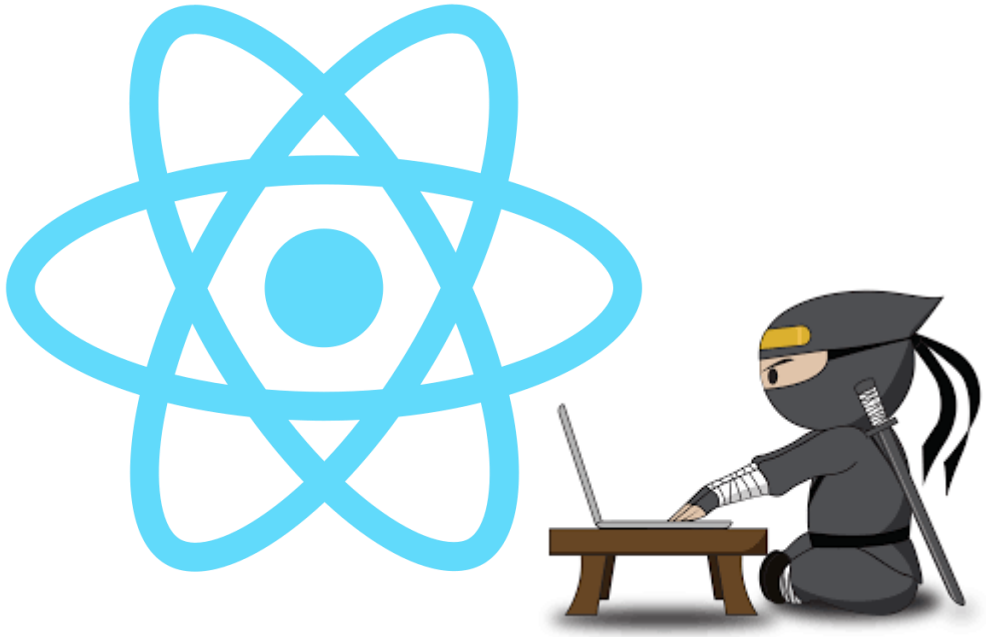
Whenever the `carId` changes –
we reload the data:

```
const [car, setCar] = useState(null)
const params = useParams()

useEffect(() => {
    loadCar()
}, [params.carId])

function loadCar() {
    carService.get(params.carId)
        .then(setCar)
        .catch(err => {
            console.error('err:', err)
            showErrorMsg('Cannot load car')
            navigate('/car')
        })
}
```

Level Done

SPA Routing

Handson Time



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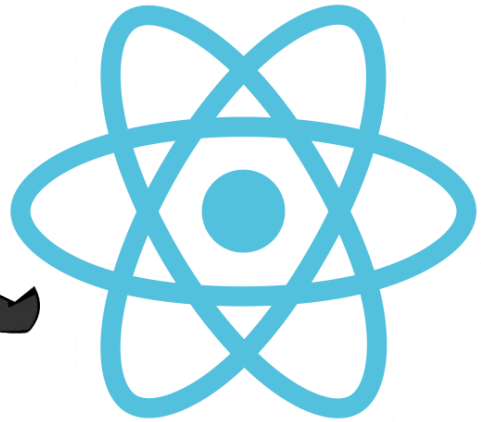
ReactJS



Some Extra Features

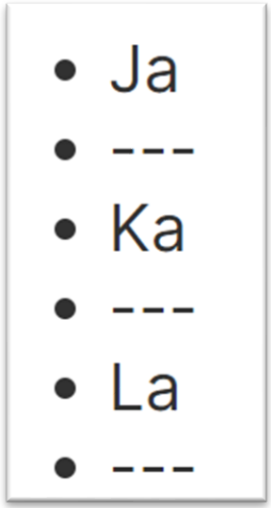
React.Fragment

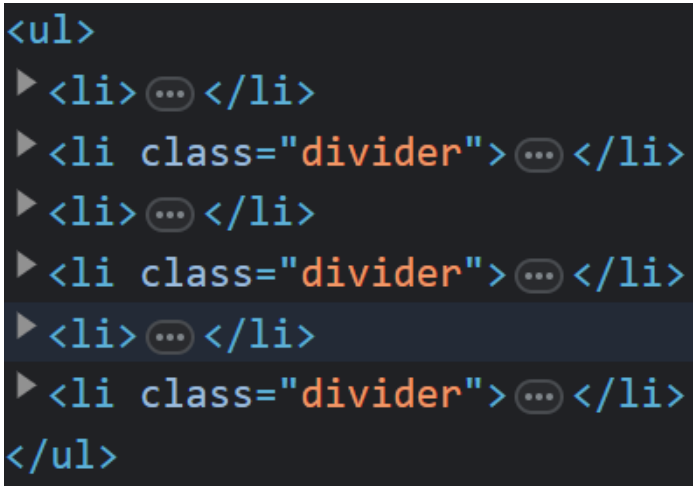
Sometimes it is needed for a component to return multiple elements.

Fragments are used to group some children without adding extra parent node to the DOM

Example:

```
<ul>
   {['Ja', 'Ka', 'La'].map(name =>
      <React.Fragment>
         <li>{name}</li>
         <li className="divider">---</li>
      </React.Fragment>)}
</ul>
```





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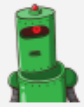
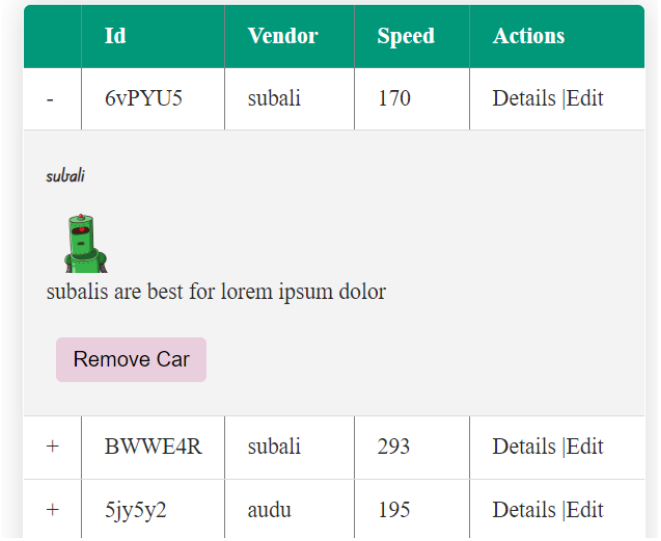
React.Fragment - Example

Let's look at another example
we need to build a table with an option to expand the row for extra details:

	Id	Vendor	Speed	Actions
-	6vPYU5	subali	170	Details |Edit
	subali  subalis are best for lorem ipsum dolor Remove Car			
+	BWWE4R	subali	293	Details |Edit
+	5jy5y2	audu	195	Details |Edit

Example: DataTable




```
import { DataTableRow } from "./DataTableRow.jsx"

export function DataTable({ cars, onRemoveCar }) {
    return <table border="1">
        <thead>
            <tr>
                <th></th>
                <th>Id</th>
                <th>Vendor</th>
                <th>Speed</th>
                <th>Actions</th>
            </tr>
        </thead>
        <tbody>
            {cars.map(car =>
               <DataTableRow key={car.id} car={car} onRemoveCar={onRemoveCar} />)}
        </tbody>
    </table>
}
```

```jsx
const { useState, Fragment } = React
const { Link } = ReactRouterDOM
export function DataTableRow({car, onRemoveCar}) {

    const [isExpanded, setIsExpanded] = useState(false)

    return <Fragment>
        <tr>
            <td onClick={() => {
                    setIsExpanded(!isExpanded)
                }}>
                {(isExpanded) ? '-' : '+'}
            </td>

            <td>{car.id}</td>
            <td>{car.vendor}</td>
            <td>{car.maxSpeed}</td>
            <td>
                <Link to={`/car/${car.id}`}>Details</Link> |
                <Link to={`/car/edit/${car.id}`}>Edit</Link>
            </td>
        </tr>
        <tr hidden={!isExpanded}>
            <td colSpan="5">
                <img src={`https://robohash.org/${car.id}`} style={{maxWidth: '50px'}} />
                <p>{car.vendor}s are best for lorem ipsum dolor</p>
                <button onClick={() => onRemoveCar(car.id)}>Remove Car</button>
            </td>
        </tr>
    </Fragment>
}
```

DataTableRow

	Id	Vendor	Speed	Actions
-	6vPYU5	subali	170	Details |Edit

subali

subalis are best for lorem ipsum dolor

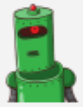
Remove Car

+	BWWE4R	subali	293	Details |Edit
+	5jy5y2	audu	195	Details |Edit

We have an expandable table!

	Id	Vendor	Speed	Actions
-	6vPYU5	subali	170	Details |Edit

subali



subalis are best for lorem ipsum dolor

Remove Car

+	BWWE4R	subali	293	Details |Edit
+	5jy5y2	audu	195	Details |Edit

Using Style

- Generally, we prefer using classNames over using the style attribute
- However, inline styling is sometimes needed for setting dynamically-computed values
- The style attribute accepts a JS object with camelCased properties

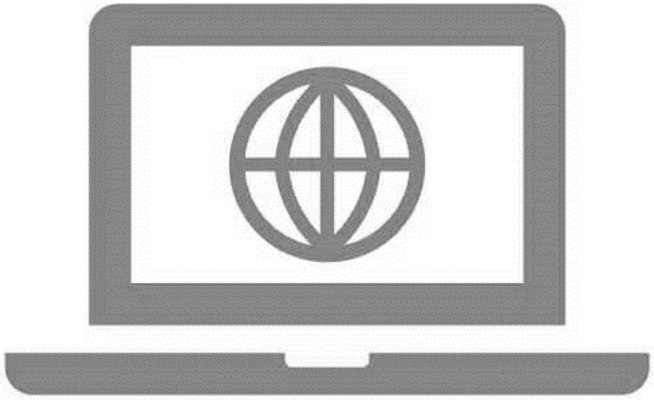
```
<span title={item.title}
   style={{ height: item.value + '%' }}>
       {item.value + '%'}
</span>
```

```
const msgStyle = {
    margin: '10px',
    backgroundImage: 'url(' + imgUrl + ')',
}

function Cmp() {
    return <div style={msgStyle}>Great day to be alive</div>
}
```

Car service

Let's add some grouping

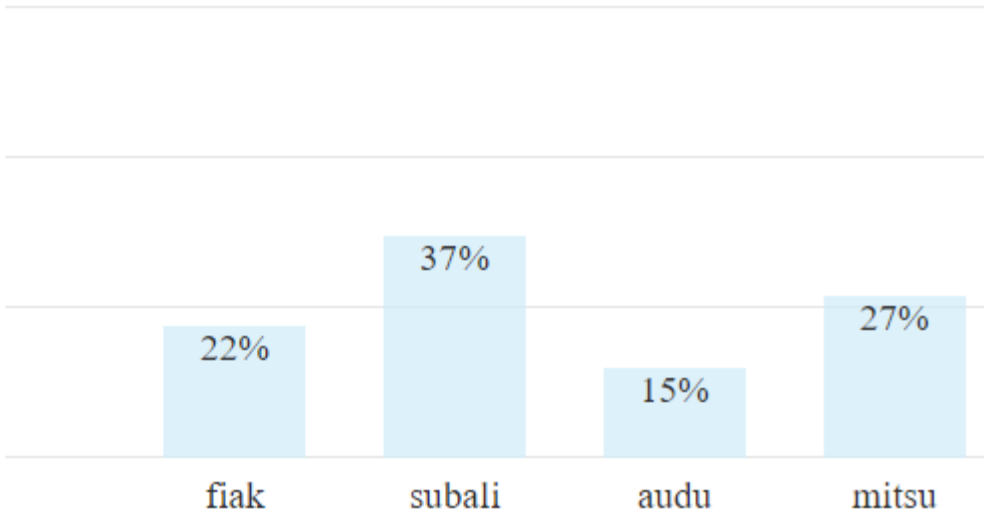


Example: Cars Dashboard

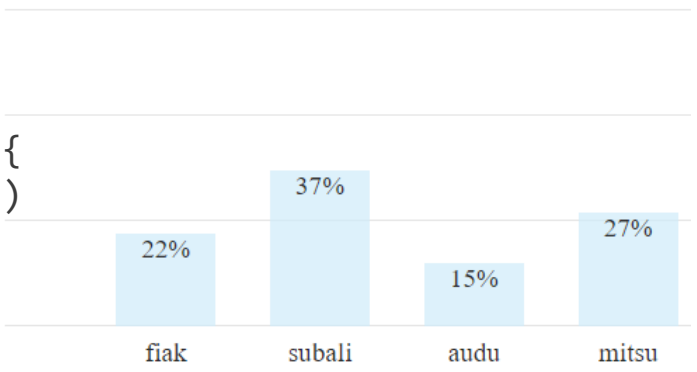
Dashboard

Statistics for 41 Cars

By Vendor



Cars Demo Data




```
// in car.service
function _createCar(vendor, maxSpeed = 250) {
    const car = getEmptyCar(vendor, maxSpeed)
    car.id = utilService.makeId()
    return car
}
```

```
function _createCars() {
    let cars = utilService.loadFromStorage(CAR_KEY)
    if (!cars || !cars.length) {
        cars = []
        const vendors = ['audu', 'fiak', 'subali', 'mitsu']
        for (let i = 0; i < 41; i++) {
            const vendor =
              vendors[utilService.getRandomIntInclusive(0, vendors.length - 1)]
            cars.push(_createCar(vendor, utilService.getRandomIntInclusive(80, 300)))
        }
        utilService.saveToStorage(CAR_KEY, cars)
    }
}
```

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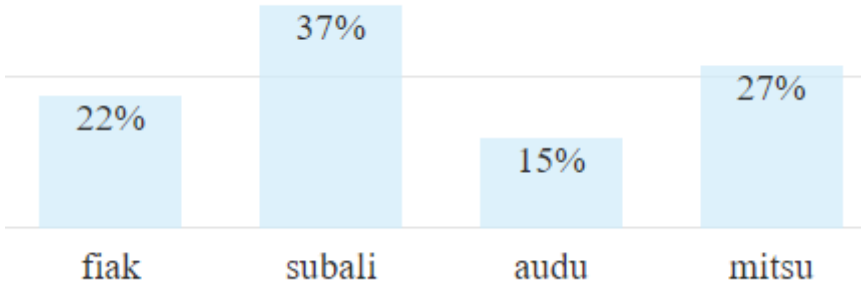
<Chart> component

```
▼ (4) [{…}, {…}, {…}, {…}] i
  ▶ 0: {title: 'fiak', value: 22}
  ▶ 1: {title: 'subali', value: 37}
  ▶ 2: {title: 'audu', value: 15}
  ▶ 3: {title: 'mitsu', value: 27}
    length: 4
```

```
export function Chart({ data }) {
    return (<ul className="chart">
        {
            data.map((item) => <li key={item.title}>
                <span title={item.title}
                      style={{ height: item.value + '%' }}>
                      {item.value + '%'}
                </span>
            </li>)
        }
    </ul>)
}
```



Example: Cars Dashboard

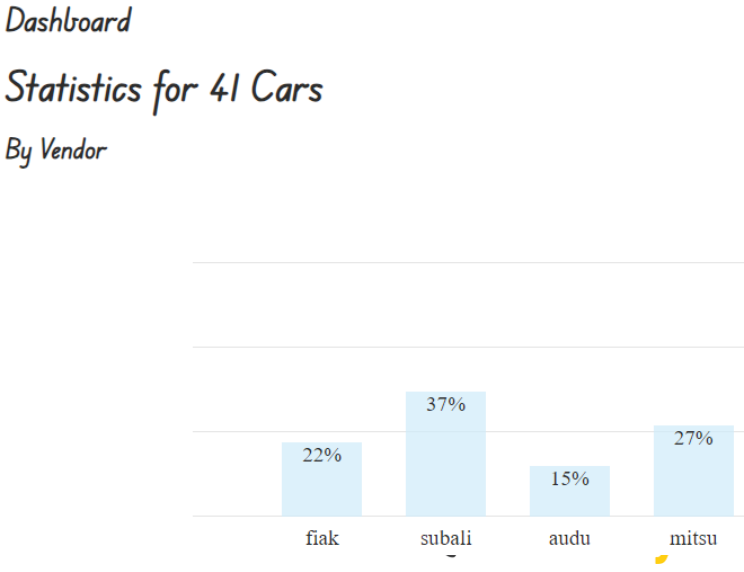
```jsx
const { useEffect, useState } = React
import {Chart} from '../cmps/Chart.jsx'
import { carService } from '../services/car.service.js'

export function Dashboard() {

    const [cars, setCars] = useState([])
    const [vendorStats, setVendorStats] = useState([])

    useEffect(()=>{
        carService.query()
            .then(setCars)
        carService.getVendorStats()
            .then(setVendorStats)
    }, [])


    return (
        <section className="dashboard">
            <h1>Dashboard</h1>
            <h2>Statistics for {cars.length} Cars</h2>
            <h4>By Vendor</h4>
            <Chart data={vendorStats}/>
        </section>
    )
}
```



Cars Grouped by Vendor

```
// in car.service
function _getCarCountByVendorMap(cars) {
    const carCountByVendorMap = cars.reduce((map, car) => {
        if (!map[car.vendor]) map[car.vendor] = 0
        map[car.vendor]++
        return map
    }, {})
    return carCountByVendorMap
}
```

```
{fiak: 9, subali: 15, audu: 6, mitsu: 11}
```

```
function getVendorStats() {
    return storageService.query(CAR_KEY)
        .then(cars => {
            const carCountByVendorMap = _getCarCountByVendorMap(cars)
            const data = Object.keys(carCountByVendorMap)
                .map(vendor =>
                    ({ title: vendor,
                       value: Math.round((carCountByVendorMap[vendor]
                                          / cars.length) * 100) }))
            return data
        })
}
```

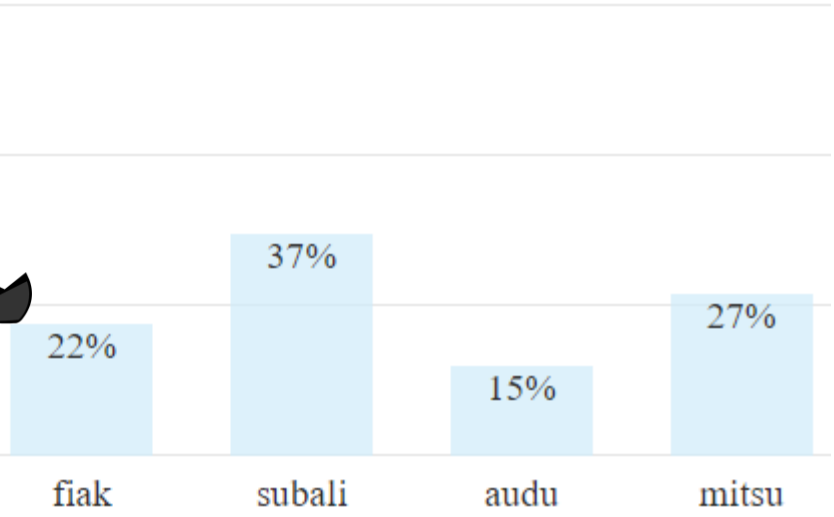
```
▼ (4) [{…}, {…}, {…}, {…}] i
  ▶ 0: {title: 'fiak', value: 22}
  ▶ 1: {title: 'subali', value: 37}
  ▶ 2: {title: 'audu', value: 15}
  ▶ 3: {title: 'mitsu', value: 27}
    length: 4
```

We have a Dashboard

Dashboard

Statistics for 41 Cars

By Vendor



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React - Search Params

Let's integrate

127.0.0.1:5502/index.html#/car?txt=f&minSpeed=200

Filter Cars

Vendor: f

Min Speed: 200

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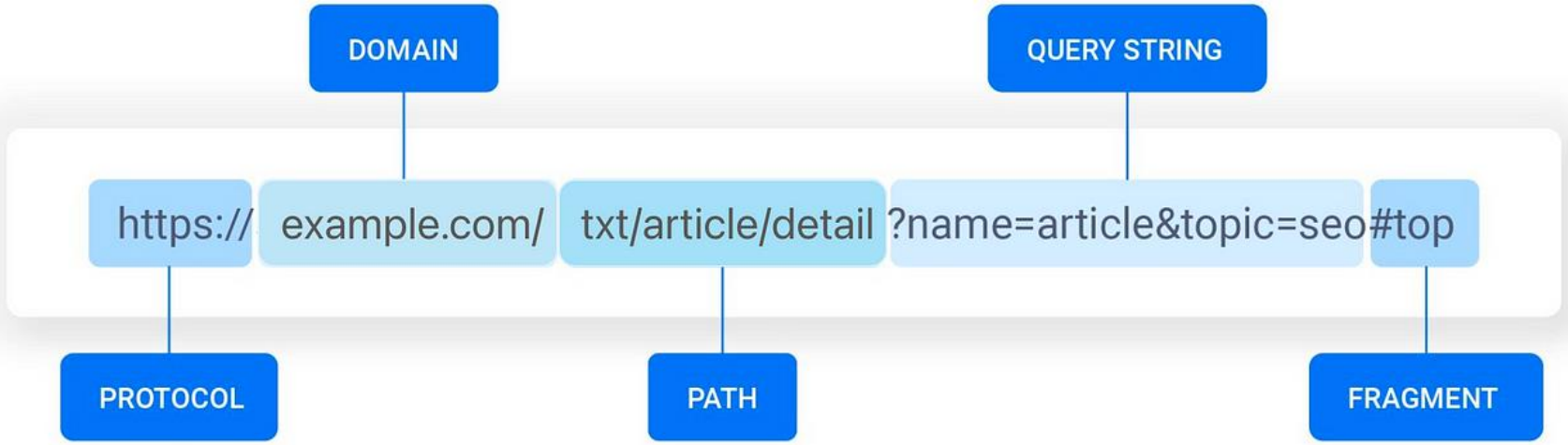
Working with Search Params

(AKA Query-Params, Query-String)

- Reminder: Search params are a defined set of parameters attached to the end of a url.
- They are used to help define specific content or actions based on the data being passed



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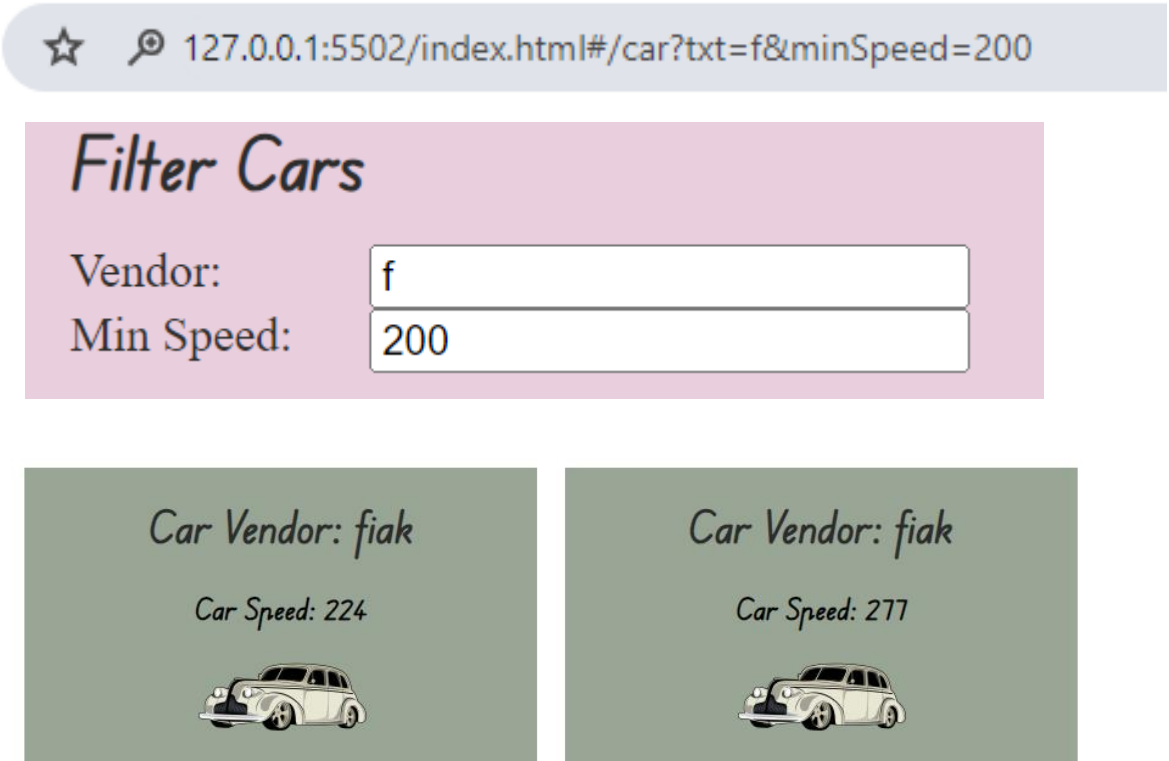
Working with Search Params

Let's integrate

- Let's integrate search params in our car filtering
- This will make the results - bookmarkable
- Meaning that I can send someone a link to filtered results



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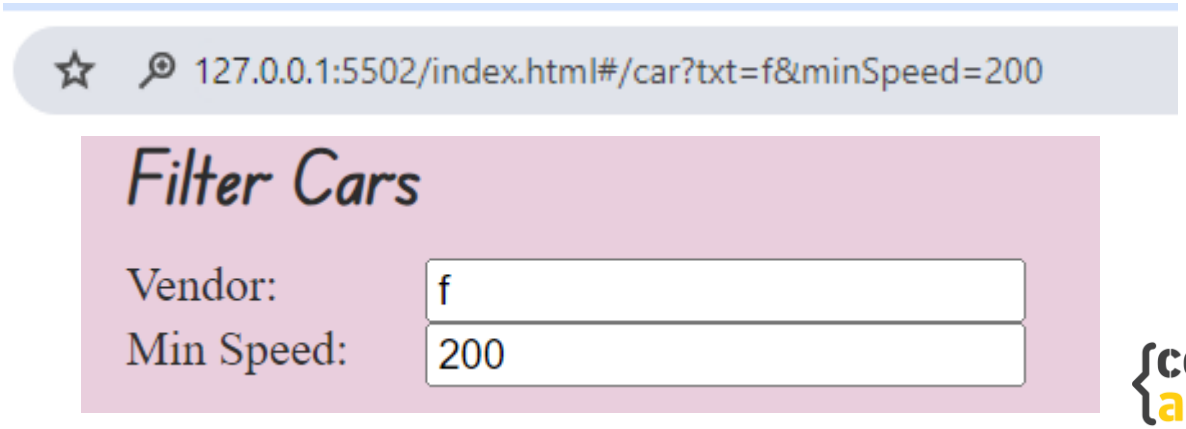
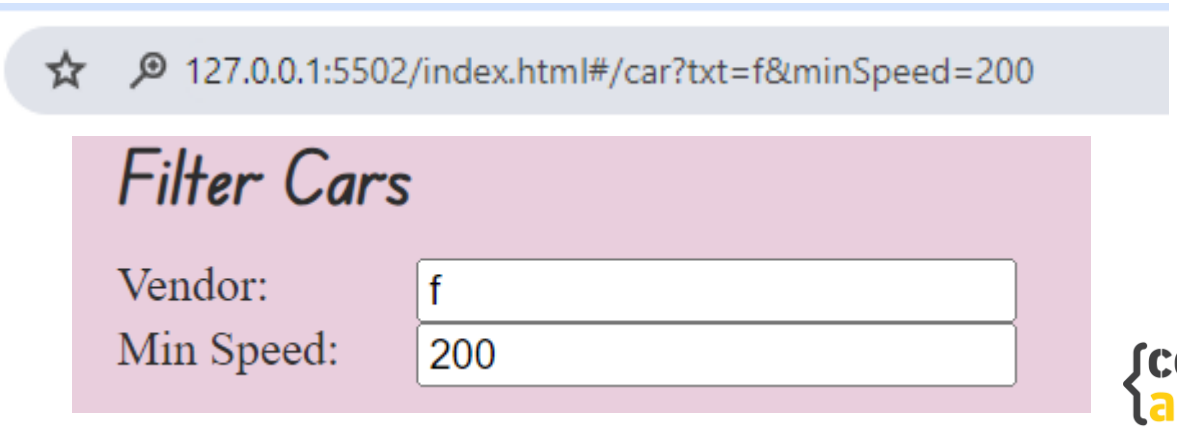
Working with Search-Params

```
// in CarIndex:

const { useSearchParams } = ReactRouterDOM

// Special hook for accessing search-params:
const [searchParams, setSearchParams] = useSearchParams()

const defaultFilter = carService.getFilterFromSearchParams(searchParams)

const [filterBy, setFilterBy] = useState(defaultFilter)

useEffect(() => {
        setSearchParams(filterBy)
        carService.query(filterBy)
            .then(cars => setCars(cars))
            .catch(err => {
                console.eror('err:', err)
                showErrorMsg('Cannot load cars')
            })
}, [filterBy])
```



Working with Search-Params

```
// in CarService:

function getDefaultFilter() {
    return { txt: '', minSpeed: 0 }
}

function getFilterFromSearchParams(searchParams) {
    const defaultFilter = getDefaultFilter()
    const filterBy = {}
    for (const field in defaultFilter) {
        filterBy[field] = searchParams.get(field) ||
                          defaultFilter[field]
    }
    return filterBy
}
```



We have search-params integration

127.0.0.1:5502/index.html#/car?txt=f&minSpeed=200

Filter Cars

Vendor: f

Min Speed: 200

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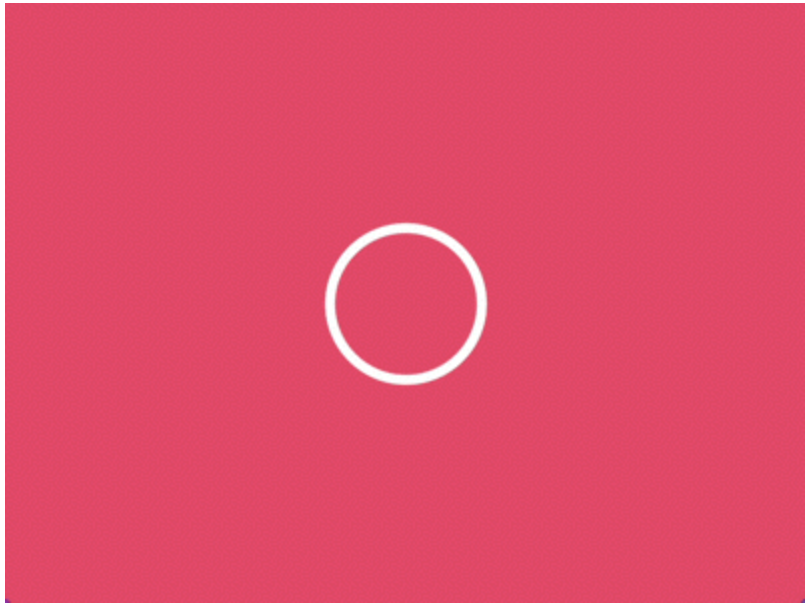


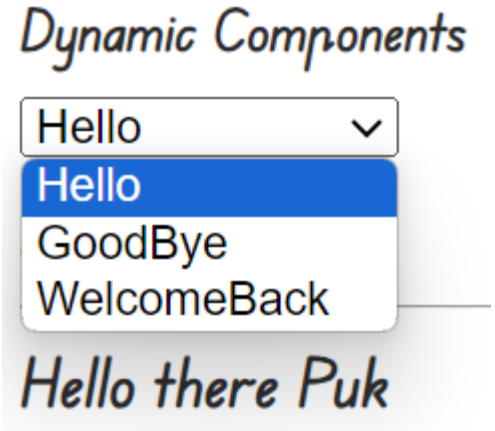
Dynamic Components

Dynamic Components

It is sometimes useful to work with dynamic components

Let's start with a simple example:

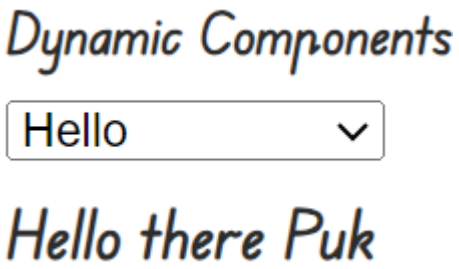
```
function Hello({ name }) {
    return <h1>Hello there {name}</h1>
}
function GoodBye({ name }) {
    return <h1>Bye {name}</h1>
}
function WelcomeBack({ name }) {
    return <h1>Welcome back {name}</h1>
}
```



Dynamic Components

The `DynamicCmp` is a component (function) that returns the correct component

```
function DynamicCmp(props) {
     switch (props.cmpType) {
          case 'Hello':
               return <Hello {...props} />
          case 'GoodBye':
               return <GoodBye {...props} />
          case 'WelcomeBack':
               return <WelcomeBack {...props} />
     }
}
```



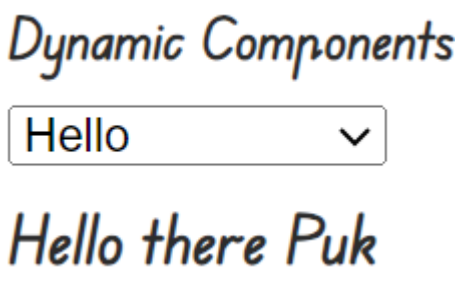
This idea is also called: Higher-Order-Component

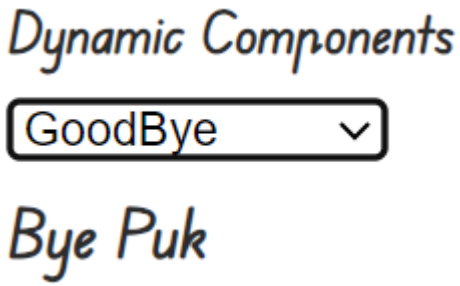
Dynamic Components

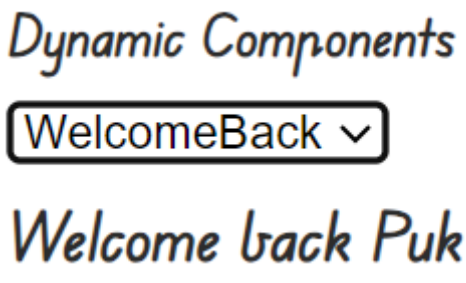
Let's allow the user to switch the component:

```
const [cmpType, setCmpType] = useState('Hello')
```

```
<h4>Dynamic Components</h4>
<select onChange={ev => setCmpType(ev.target.value)}>
    <option>Hello</option>
    <option>GoodBye</option>
    <option>WelcomeBack</option>
</select>
<DynamicCmp name="Puk" cmpType={cmpType} />
```







Dynamic Components

Here is another example, looping through some components:

```
const pageCmps = ['Hello', 'Hello', 'WelcomeBack']
```

```
{
    pageCmps.map((ct, idx) =>
        <DynamicCmp name="Puk" cmpType={ct} key={idx} />)
}
```

Hello there Puk

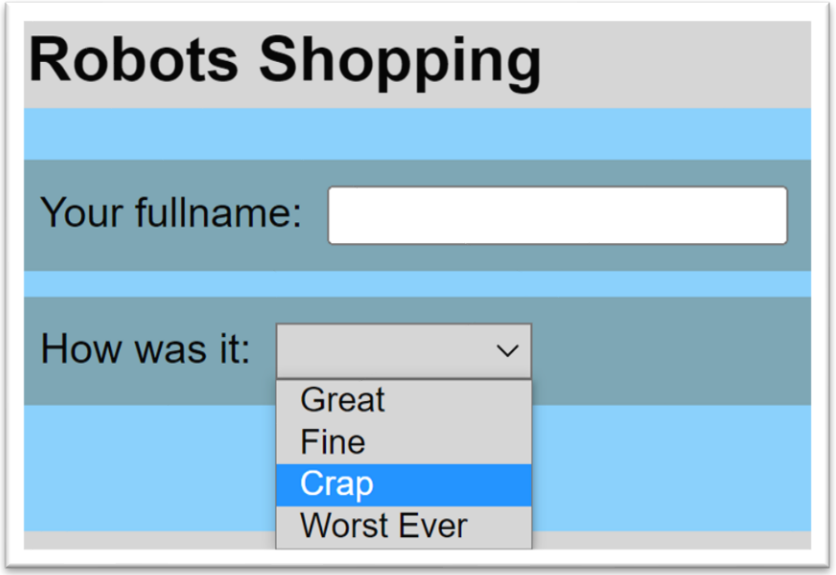
Hello there Puk

Welcome back Puk

Dynamic Components - Example

Let's build a dynamic survey based on the following JSON:

```
const survey = {
    title: 'Robots Shopping',
    cmps: [
        {
            type: 'TextBox',
            id: 'c101',
            info: {
                label: 'Your fullname:'
            }
        },
        {
            type: 'SelectBox',
            id: 'c102',
            info: {
                label: 'How was it:',
                opts: ['Great', 'Fine',
                'Crap', 'Worst Ever']
            }
        }
    ]
}
```



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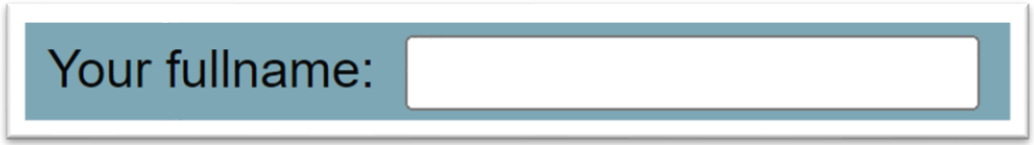
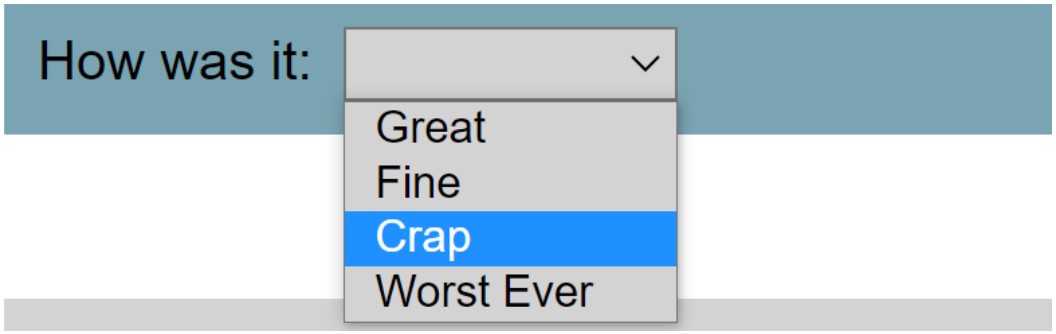
<TextBox> component




```
function TextBox({ info, val = '', onChangeVal }) {
    const { label } = info
    return (
        <label>
            {label}
            <input type="text" value={val} onChange={(ev) => {
                onChangeVal(ev.target.value)
            }} />
        </label>
    )
}
```

<SelectBox> component




```
function SelectBox({ info, val = '', onChangeVal }) {
    const { label, opts } = info
    return (
        <label>
            {label}
            <select value={val} onChange={(ev) => {
                onChangeVal(ev.target.value)
            }}>
                <option value=""></option>
                {
                    opts.map(opt => <option key={opt}>{opt}</option>)
                }
            </select>
        </label>
    )
}
```

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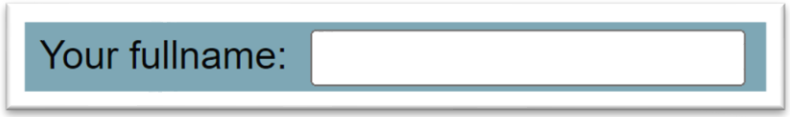
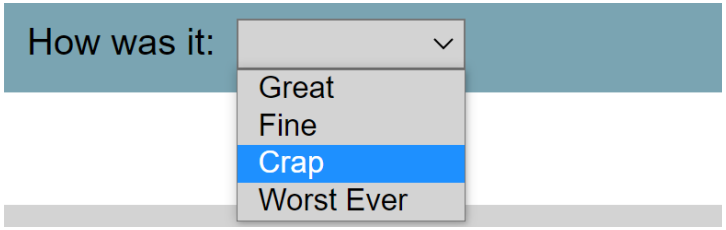
The Dynamic Component

Here is the (higher-order) <DynamicCmp>:

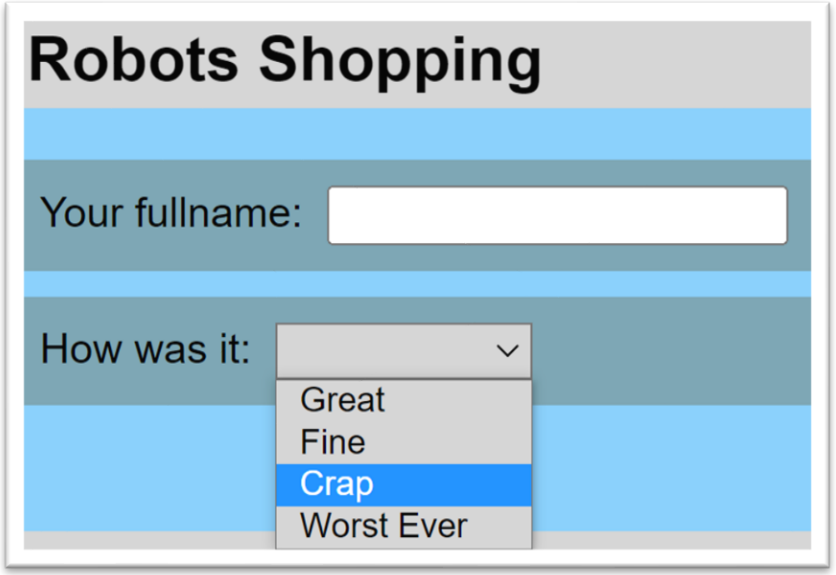
```
function DynamicCmp(props) {
    switch (props.type) {
        case 'TextBox':
            return <TextBox {...props} />
        case 'SelectBox':
            return <SelectBox {...props} />
    }
}
```





Back to our JSON

```
const survey = {
    title: 'Robots Shopping',
    cmps: [
        {
            type: 'TextBox',
            id: 'c101',
            info: {
                label: 'Your fullname:'
            }
        },
        {
            type: 'SelectBox',
            id: 'c102',
            info: {
                label: 'How was it:',
                opts: ['Great', 'Fine',
                'Crap', 'Worst Ever']
            }
        }
    ]
}
```



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Let's hold a map for the user answers

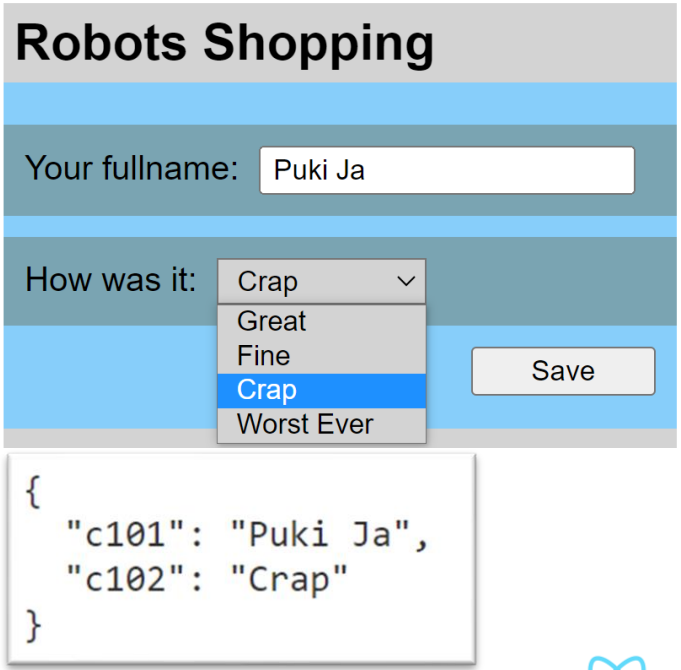
```
import { surveyService } from
     '../services/survey.service.js'

const { useState, useEffect } = React

export function SurveyIndex() {
    const [survey, setSurvey] = useState(null)
    const [answersMap, setAnswersMap] = useState({})

    useEffect(() => {
        surveyService.getById()
            .then(setSurvey)
    }, [])

    function onChangeVal(id, val) {
        const answersToSave = { ...answersMap }
        answersToSave[id] = val
        setAnswersMap(answersToSave)
    }

}
```

```
{
  "c101": "Puki Ja",
  "c102": "Crap"
}
```

The Survey

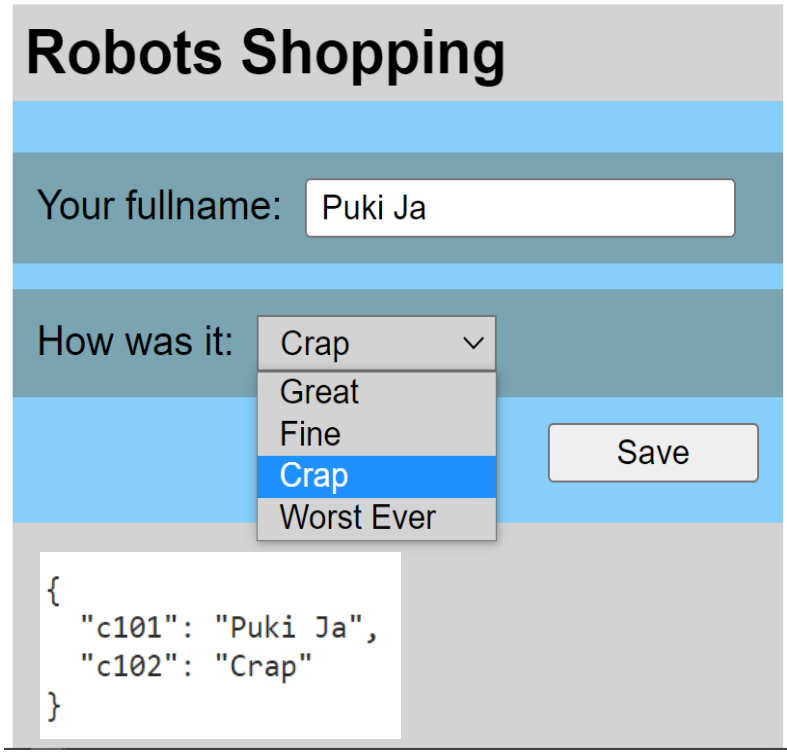
We render a component for each question:

```
<section className="survey-index">
    <h2>Survey - {survey.title}</h2>
    {
        survey.cmps.map(cmp => <div key={cmp.id} >
            <DynamicCmp
                type={cmp.type} info={cmp.info}
                val={answersMap[cmp.id] || ''}
                onChangeVal={(val) => {
                    onChangeVal(cmp.id, val)
                }}
            />
        </div>)
    }

    <pre>
        {JSON.stringify(answersMap, null, 2)}
    </pre>

</section >
```



We have a dynamic survey

```
const survey = {
    title: 'Robots Shopping',
    cmps: [
        {
            type: 'TextBox',
            id: 'c101',
            info: {
                label: 'Your fullname:'
            }
        },
        {
            type: 'SelectBox',
            id: 'c102',
            info: {
                label: 'How was it:',
                opts: ['Great', 'Fine',
                'Crap', 'Worst Ever']
            }
        }
    ]
}
```



Dynamic Components

Robots Shopping Today

Your fullname: Puki

Robot Type: FeedMeBob

Features: Responsive ☑ Accurate ☑ Resourceful ☐ Flexible ☐ Simple ☐

How was it: Fine

Quality: ○ 1 ○ 2 ◉ 3

Tune your photo:

Zoom:

Size:

Angle:

vignette:


```
[
  "Puki",
  "FeedMeBob",
  [
    "Responsive",
    "Accurate"
  ],
  "Fine",
  3,
  {
    "size": 200,
    "zoom": 1,
    "angle": 0,
    "vignette": "20"
  }
]
```

We can add more cmp-types and build various dynamic forms

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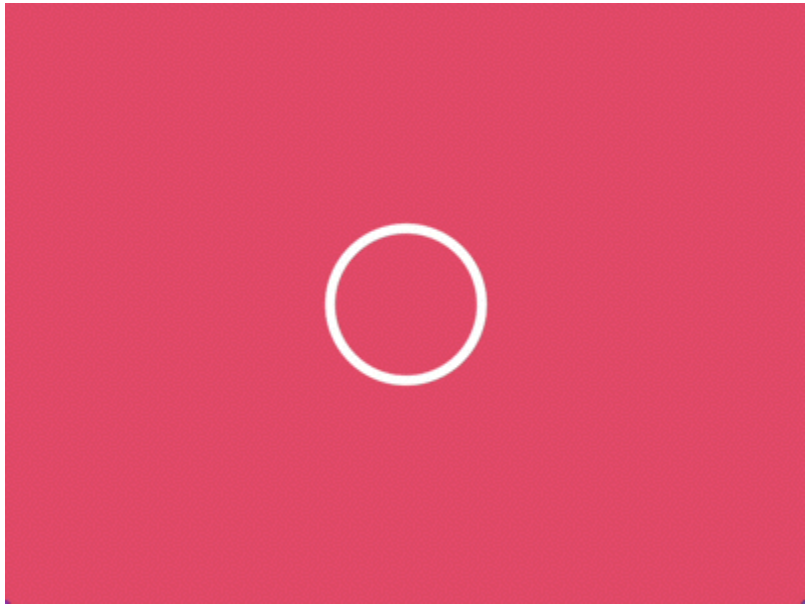

Dynamic Components

Done

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Having Children

```
<FancyBox>
   <h3>{someTitle}</h3>
   <button>Tell me More</button>
</FancyBox>
```

Having Children

We can pass in some content into the <Child> component

```
<FancyBox>
   <h3>{someTitle}</h3>
   <button>Tell me More</button>
</FancyBox>

// This cmp has no children:
<SomeCmp />
```

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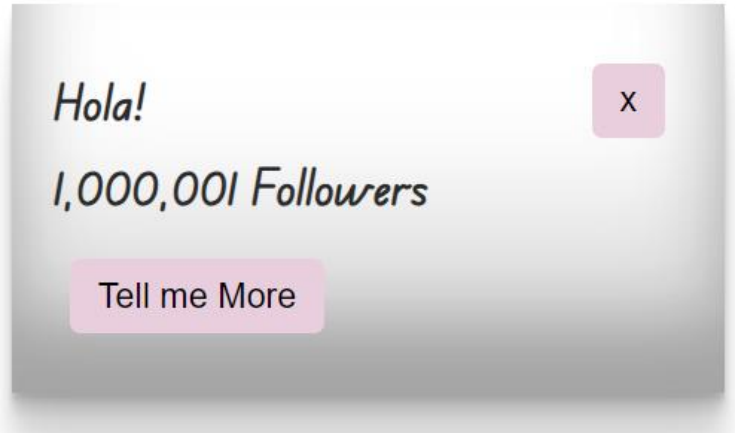
Having Children

This is especially common for container components such as <Sidebar> or <Dialog> that represent generic “boxes”




```
function FancyBox(props) {
    return <div className="fancy-box">
        <button style={{ float: 'right' }} onClick={props.onClose}>x</button>
        {props.children}
    </div>
}
```

```
<FancyBox onClose={() => console.log('ok, closing')}>
   <h3>{count.toLocaleString()} Followers</h3>
   <button onClick={onViewMore}>Tell me More</button>
</FancyBox>
```

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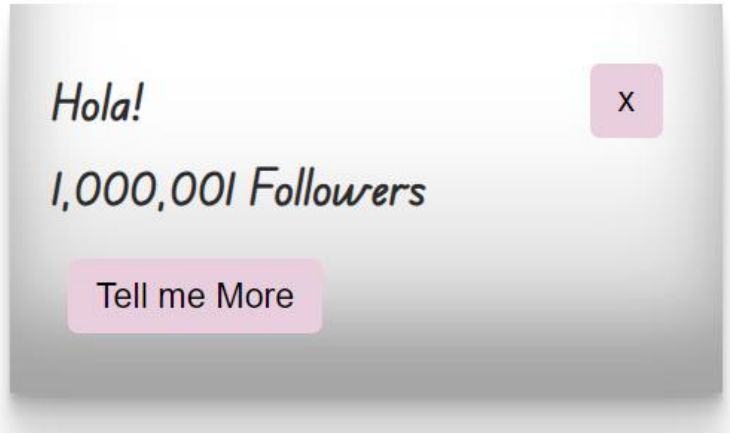
React Components API

```
<FancyBox title="Hola!" onClose={() => console.log('ok')}>
   <h3>{count.toLocaleString()} Followers</h3>
   <button onClick={onViewMore}>Tell me More</button>
</FancyBox>
```

The API for a React component comes in three parts:

- **props** allow the parent component to pass data into the component
- **events** allow the child component to trigger a function on the parent
- **children** allow the parent to compose the child component with extra content




```
function FancyBox(props) {
    return <div className="fancy-box">
        <button style={{ float: 'right' }} onClick={props.onClose}>x</button>
        <h3>{props.title}</h3>
        {props.children}
    </div>
}
```

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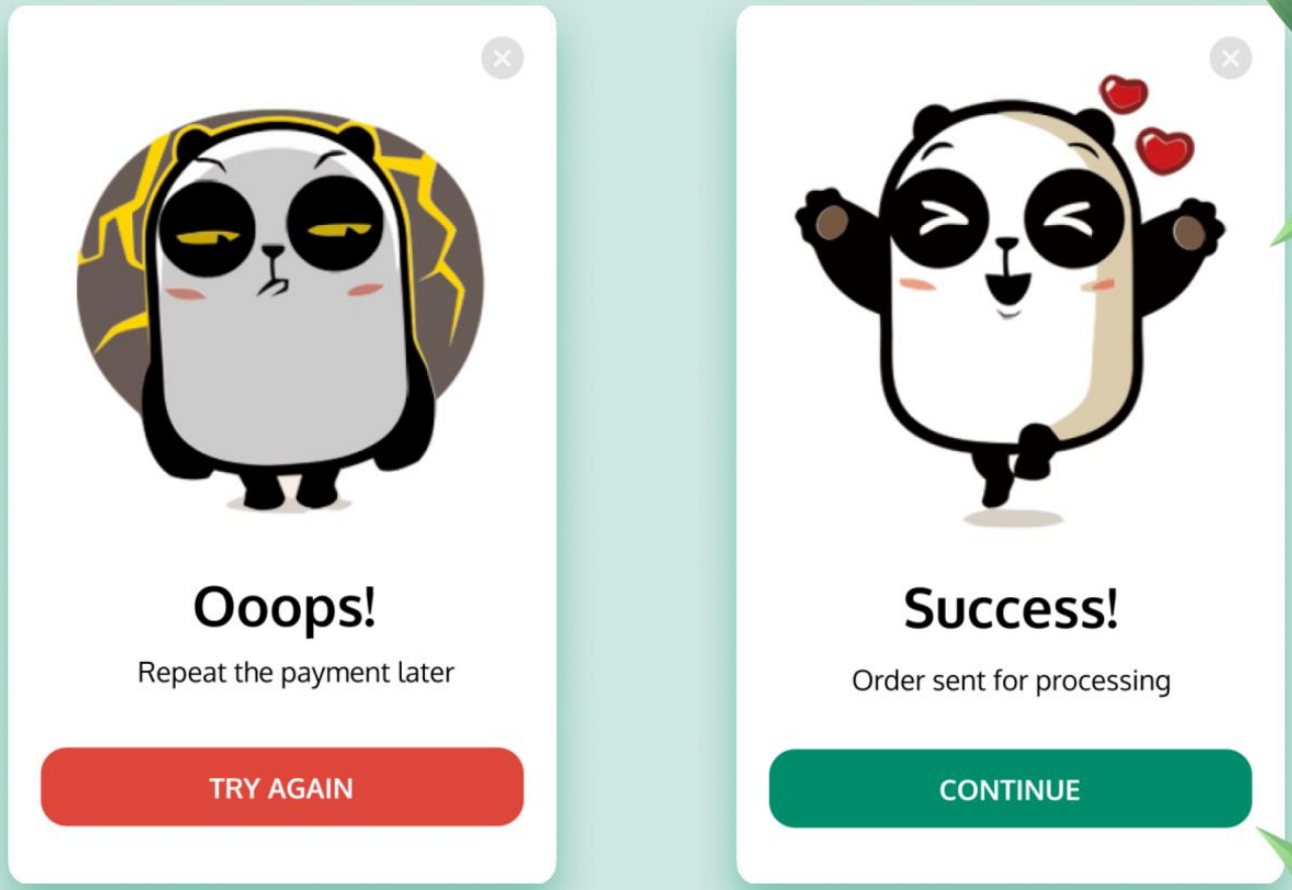

<UserMsg> component

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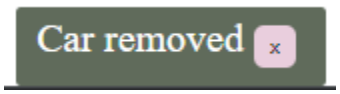
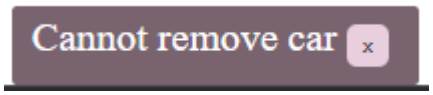
<UserMsg> component

- We need a way to display messages to the user
- Those can be success or error messages
- The message should have a close button
- The message will close itself after 3 seconds
- We need a way to activate the <UserMsg> from any component
- Using props-drilling everywhere is exhausting
- We need a **non-parent-child** communication
- We will use a technique called **event-bus**





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The event bus

- Let's meet the `eventBusService`
- It exposes two functions:

```
// Use this function to subscribe to an event
on(evName, listener){ ···
},
// Use this function to emit an event
emit(evName, data) { ···
}

// Example for using the service
eventBusService.on('some-event', (data)=>{
    console.log('Got some-event with data:', data)
})
eventBusService.emit('some-event', 100)
```

Unsubscribing

eventBusService.on() returns an unsubscribe() function we can call when the subscribing component is being unmounted

```
const unsubscribe = eventBusService.on('some-event', data=>{
    console.log('Mee too:', data)
})

// Just as example - unsubscribe after 2 secs
setTimeout(()=>{
    unsubscribe()
}, 2000)
```

Let's build a <UserMsg> component

```jsx
import { eventBusService } from "../services/event-bus.service.js"
const { useState, useEffect } = React

export function UserMsg() {

  const [msg, setMsg] = useState(null)

  useEffect(()=>{
    const unsubscribe = eventBusService.on('show-user-msg', (msg) => {
      setMsg(msg)
      setTimeout(closeMsg, 3000)
    })
    return unsubscribe
  }, [])

  function closeMsg(){
    setMsg(null)
  }

  if (!msg) return <span></span>
  return (
    <section className={`user-msg ${msg.type}`}>
      <button onClick={closeMsg}>x</button>
      {msg.txt}
    </section>
  )
}
```

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Showing user messages

We want an easy way to emit the `'show-user-msg'` msg

Lets add some useful functions to our `eventBusService`

```
export function showUserMsg(msg) {
    eventBusService.emit('show-user-msg', msg)
}
export function showSuccessMsg(txt) {
    showUserMsg({txt, type: 'success'})
}
export function showErrorMsg(txt) {
    showUserMsg({txt, type: 'error'})
}
```

Car removed x

Cannot remove car x

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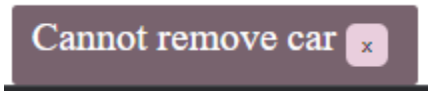
Using the <UserMsg> component

In the <CarIndex>:

```
import { showSuccessMsg, showErrorMsg }
   from '../services/event-bus.service.js'


    function onRemove(carId) {
        carService.remove(carId)
            .then(() => {
                showSuccessMsg('Car removed')
                const updatedCads = cars.filter(car => car.id !== carId)
                setCars(updatedCads)
            })
            .catch(err => {
                console.log('OOPS', err)
                showErrorMsg('Cannot remove car')
            })
    }
```



We can also use it in the <CarEdit>

Another example

we build a shop, and we want to show the shopping-cart items count at the page header:

```
// in my <AppHeader> component, useEffect:
eventBus.on('added-to-cart',
    (productId) => {/* Update count label */ }
)
```


```
// in my <Shop> component when user buy something:
eventBus.emit('added-to-cart', {productId: 't101'})
```

The event bus - summary

- So sometimes, far-away components need to communicate with one-another
- We will use an **event bus service** to connect those components

Level Done

Event Bus

We are Ready

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