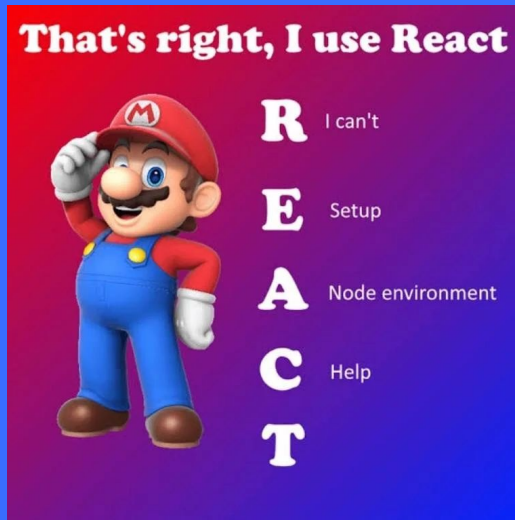
React Continued

Vincent Huang



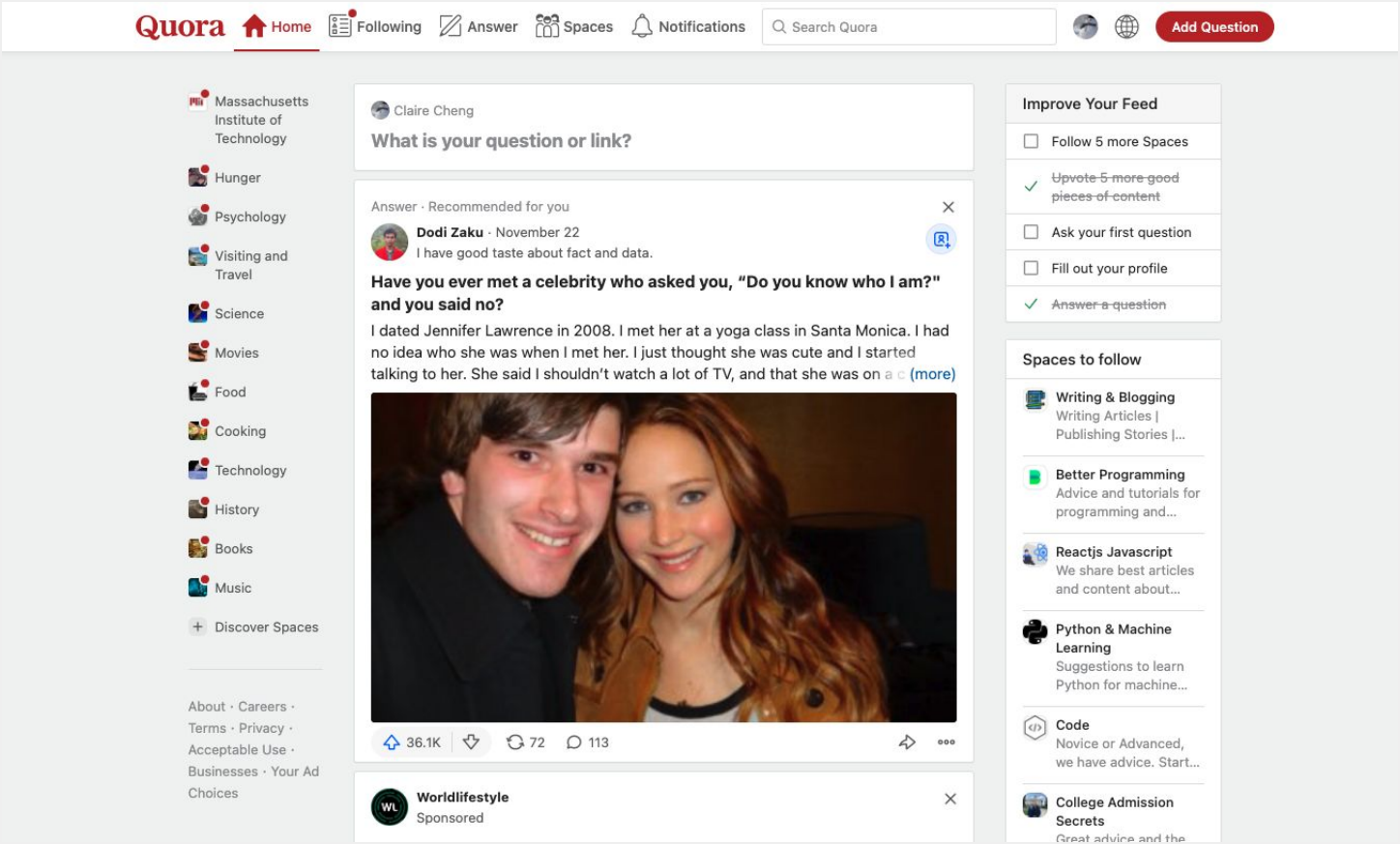
Review: Component Tree

Review: Component Tree

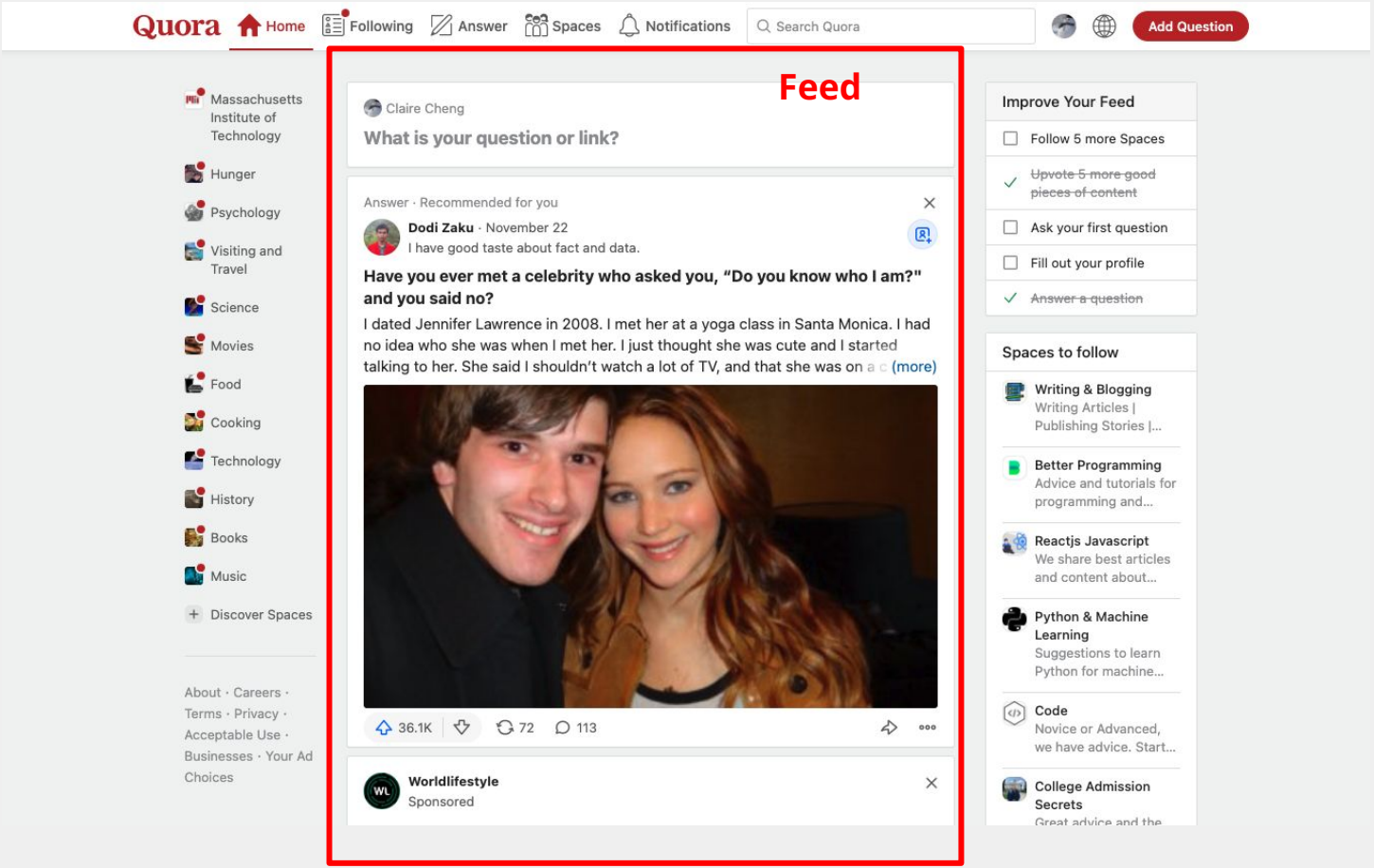
When should you break a component down into smaller parts?

- Code getting too long/hard-to-read
  - i.e. Building a house: instead of making the whole house-plan at once, you have specific plans for the bathroom, the master bedroom, the kitchen, etc.
- It conceptually “contains” parts that encapsulate their own functionality
  - i.e. In a shopping mall: each store has its own set of staff, merchandise, etc, so it would make sense to encapsulate a “store” as its own part.
- Controlling information flow between app sections!

Think... refactoring code to make your life easier as the *architect* of a web app.



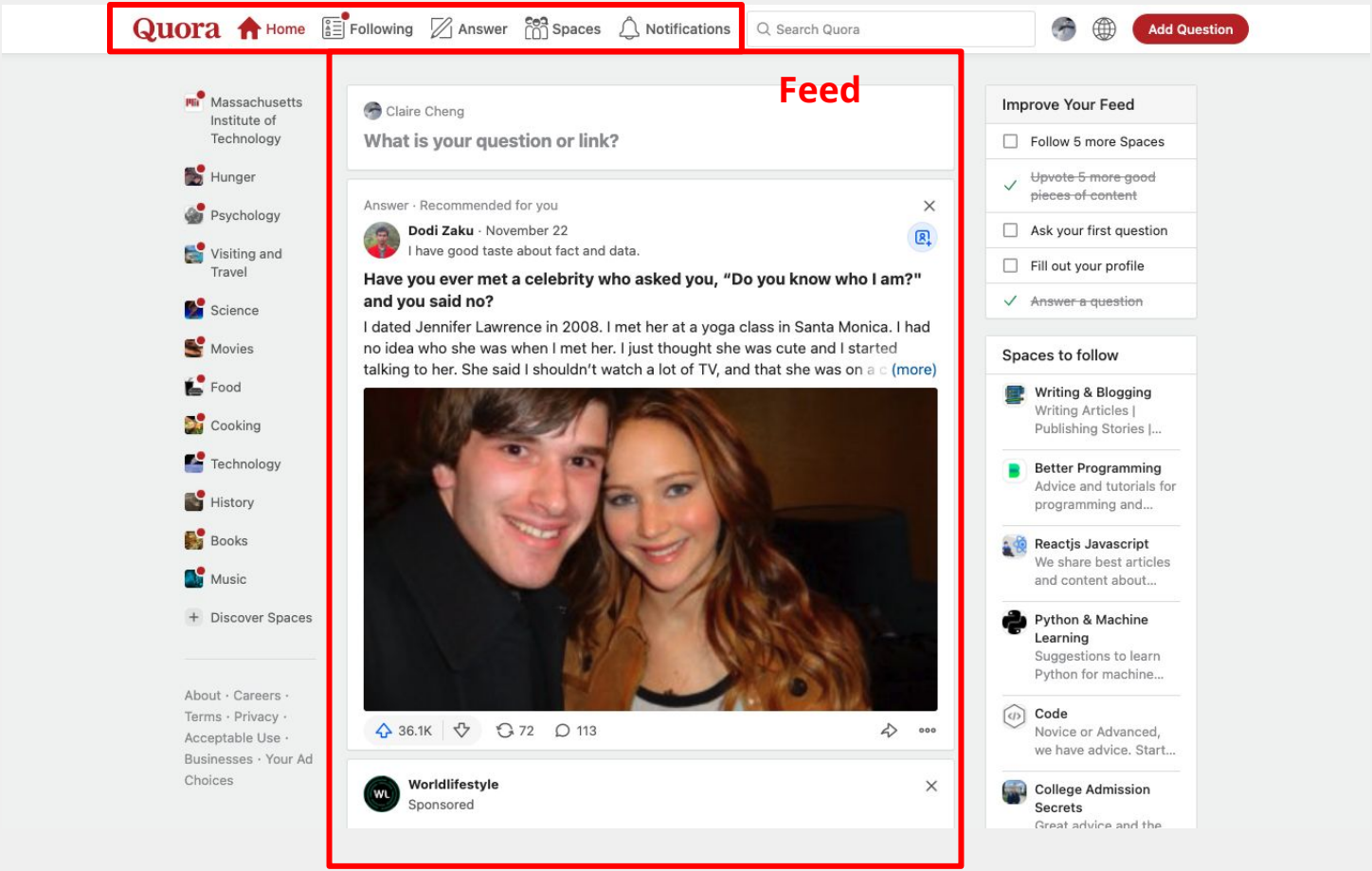
Quora: what are the underlying components?



Quora: what are the underlying components?

Navbar

Feed



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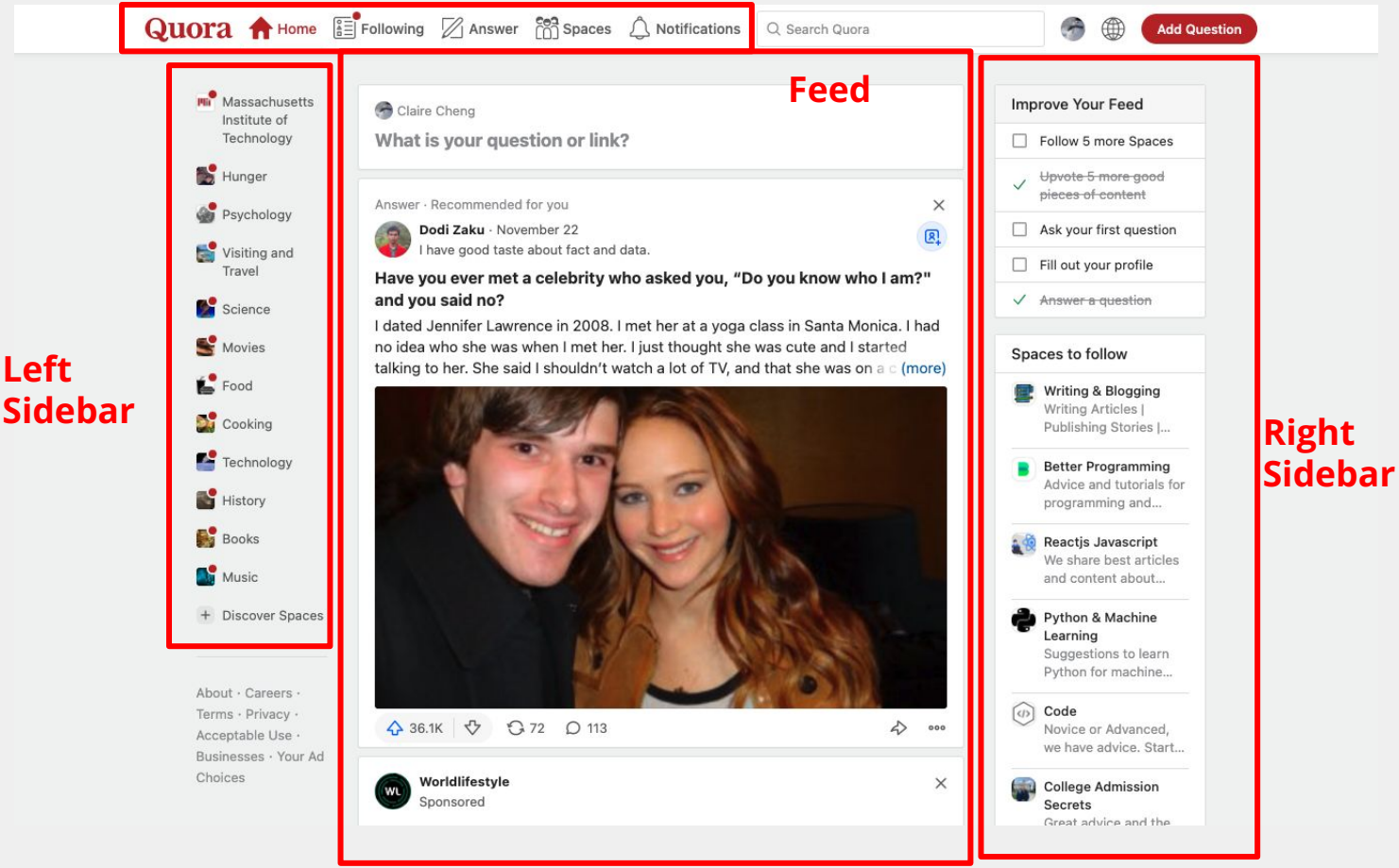

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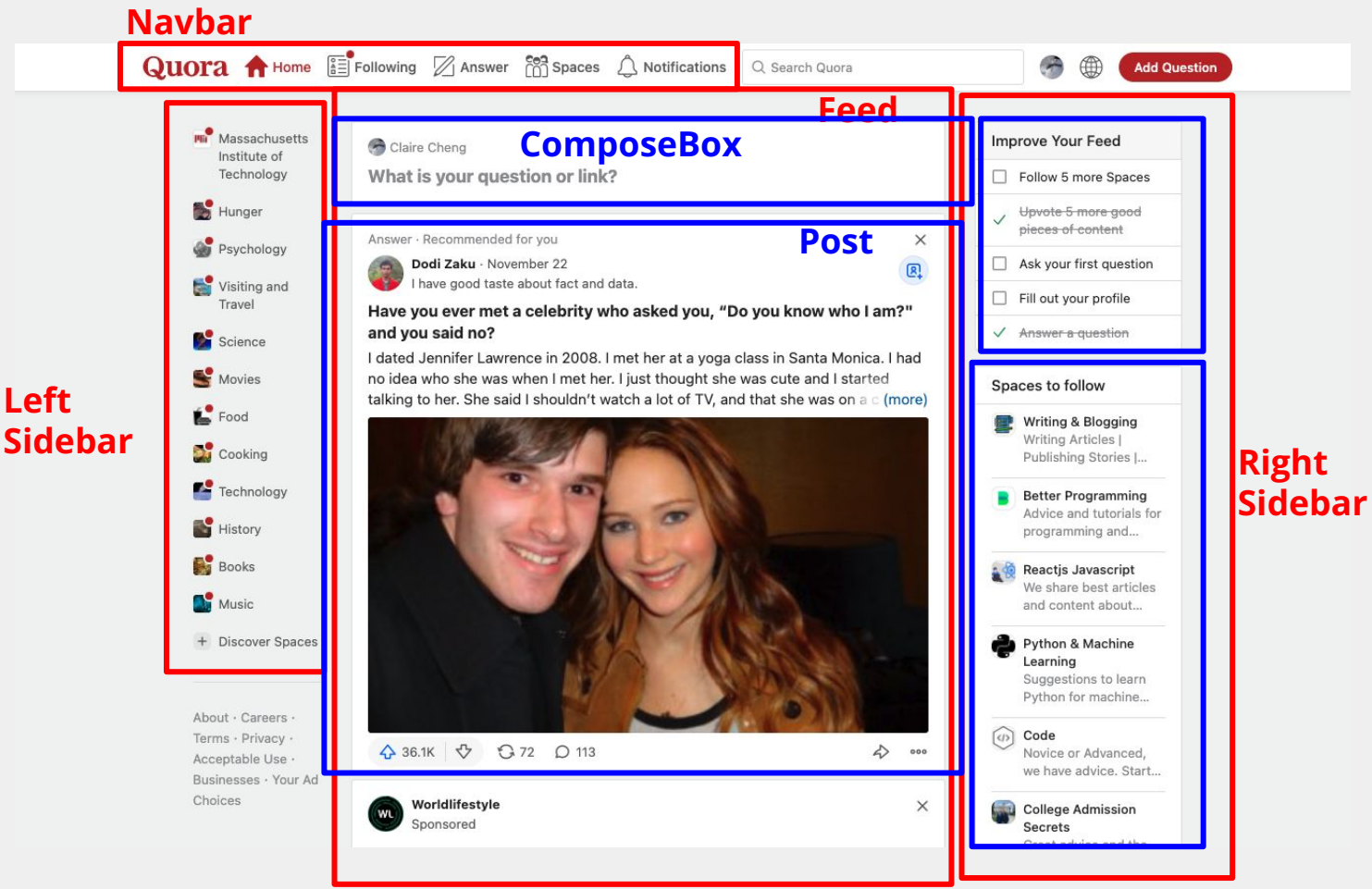
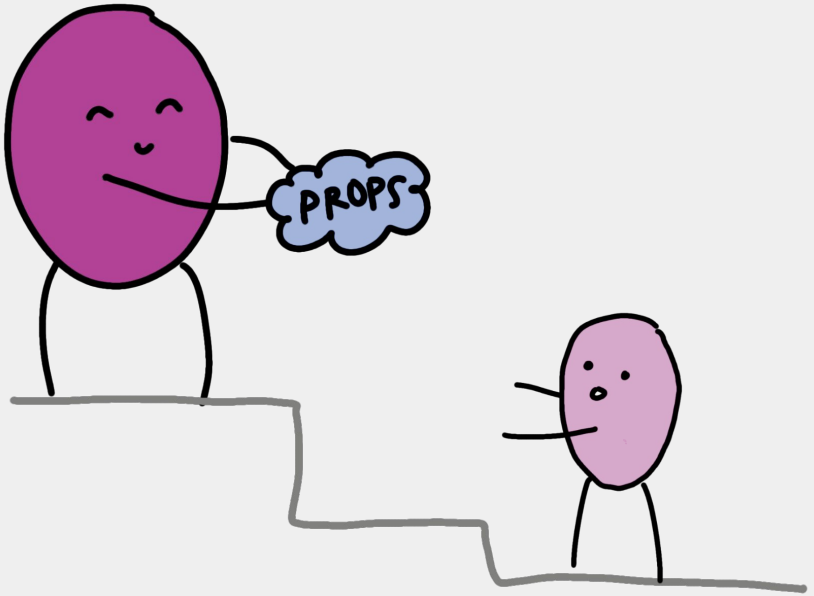


Quora: what are the underlying components?

Review: States & Props



Important!!!!!!!!!!!!

You can’t directly edit a component’s state from another component!

A Workaround: Callback Functions

passing setState function to child and then calling it from there

```
//ParentComponent
const changeCatHappiness = () => {
     setCatHappiness(catHappiness + 1);
}


return (
     <ChildComponent updateFunction={changeCatHappiness} />
);
```

```
//ChildComponent

props.updateFunction();
```

A workaround...

passing setState function to child and then calling it from there

```
//ParentComponent
const changeCatHappiness = () => {
    setCatHappiness(catHappiness+1);
}


return (
    <ChildComponent updateFunction={changeCatHappiness} />
);
```

keyword:
WORKAROUND

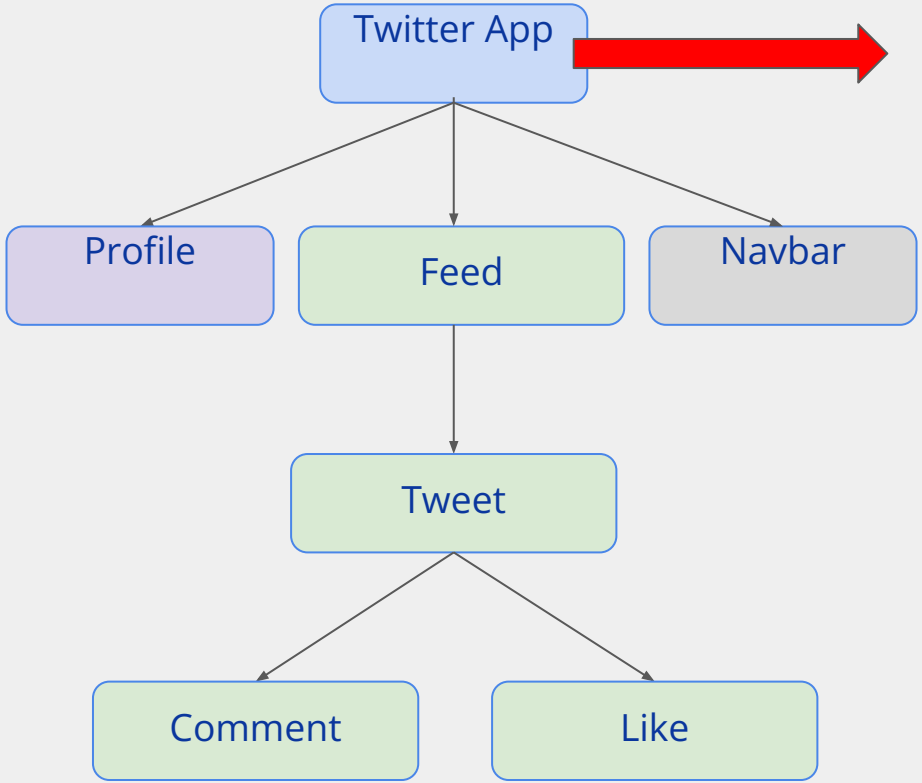
```
//ChildComponent

props.updateFunction();
```

Make states stay, make props pass

Make **states stay**, make **props pass**
(downwards)

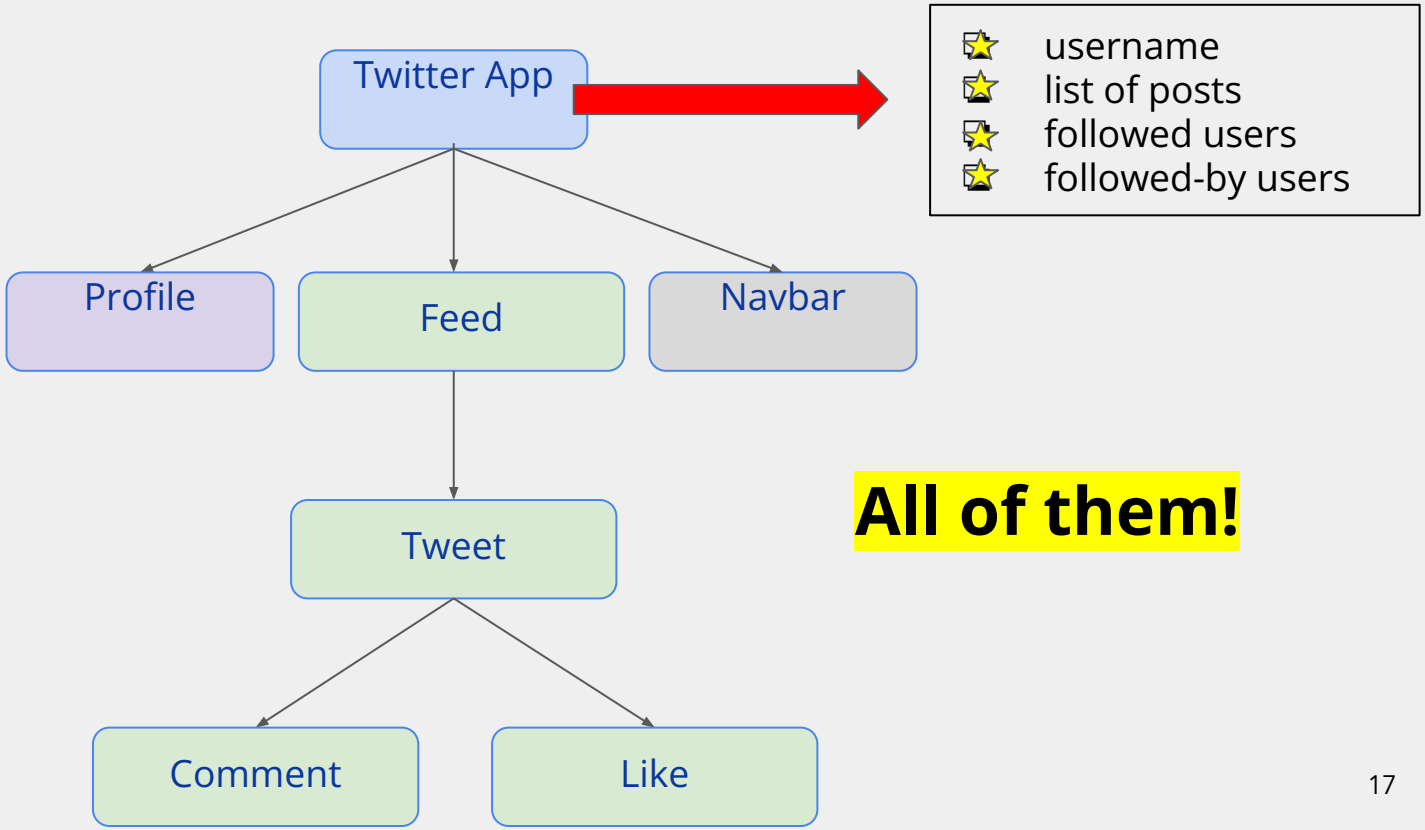
props practice

Which of these should be props?



- ❏ username
- ❏ list of posts
- ❏ followed users
- ❏ followed-by users

Which of these should be props?



All of them!

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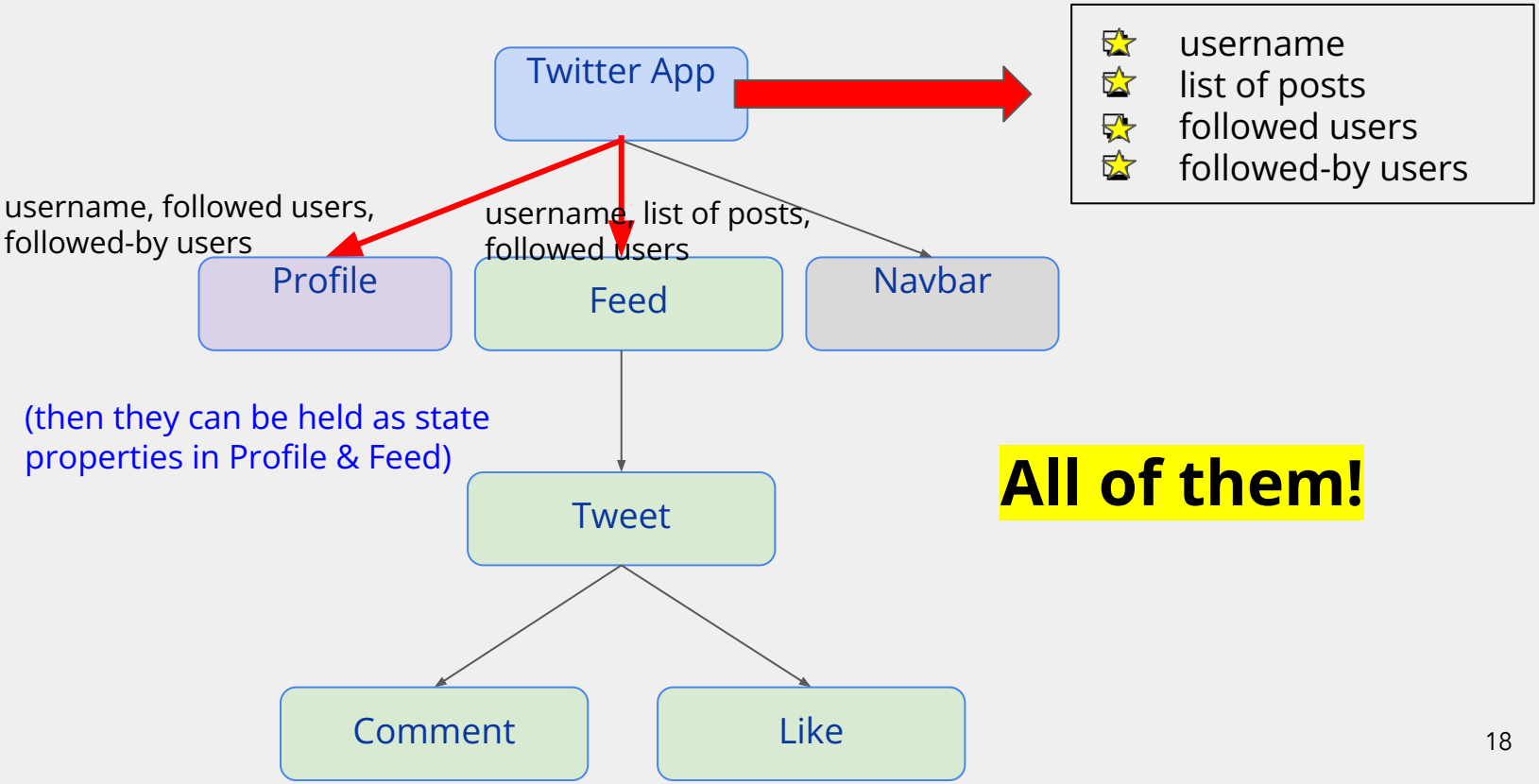

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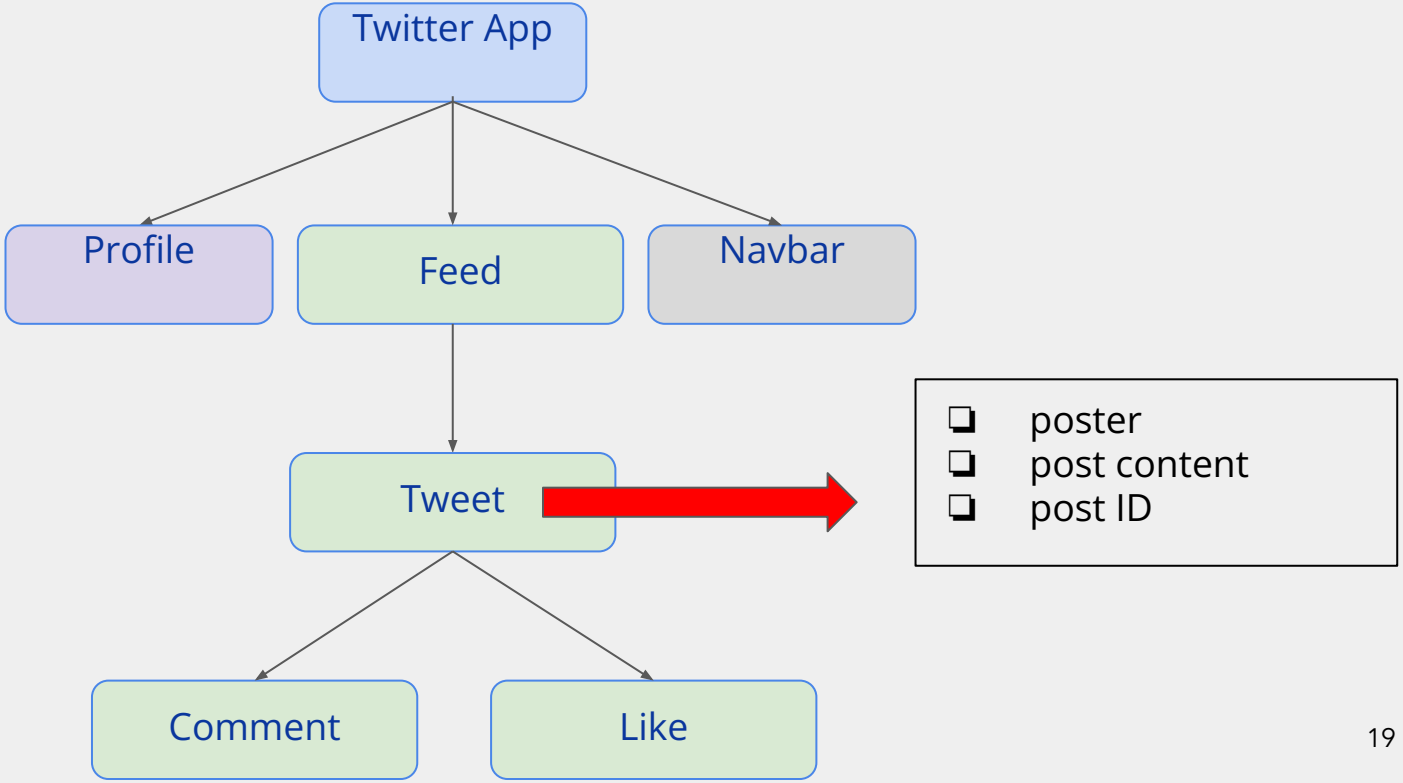

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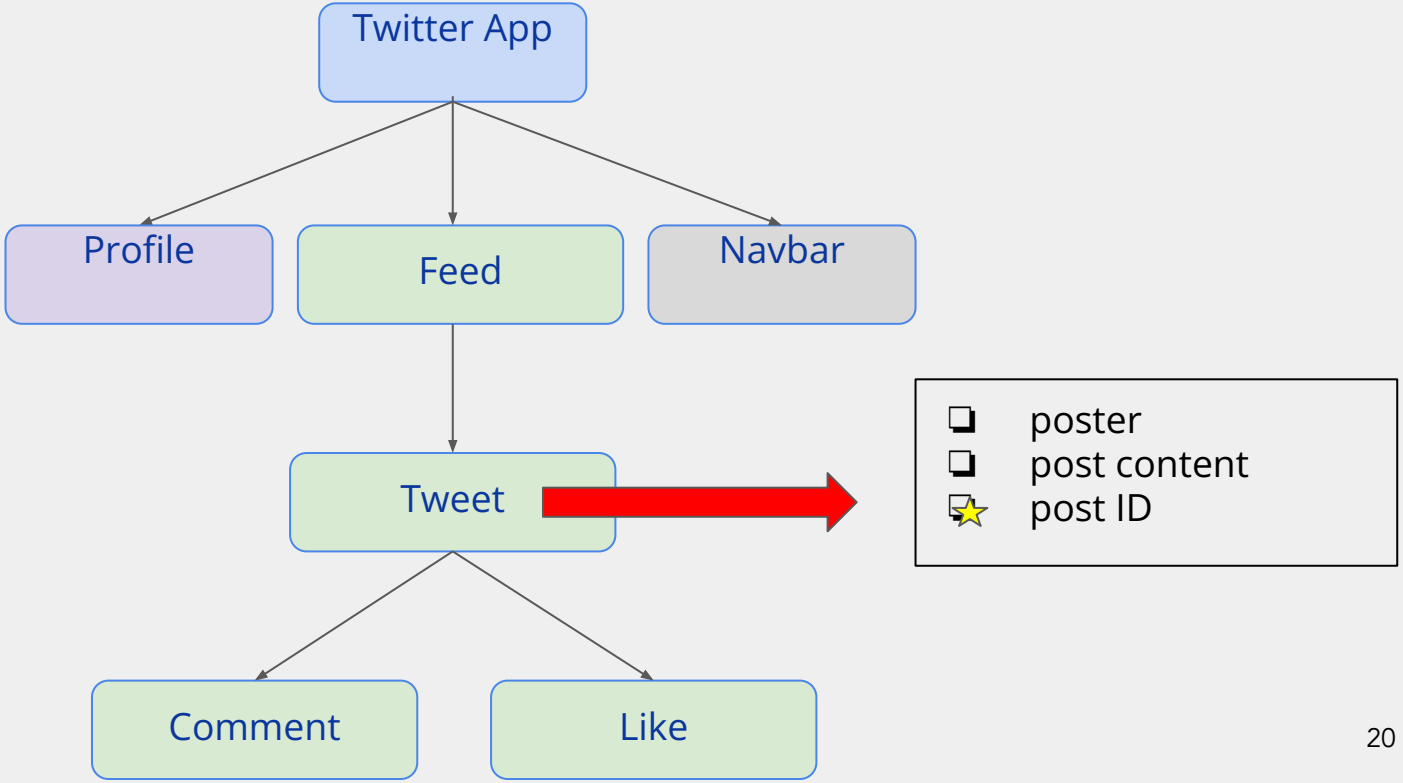
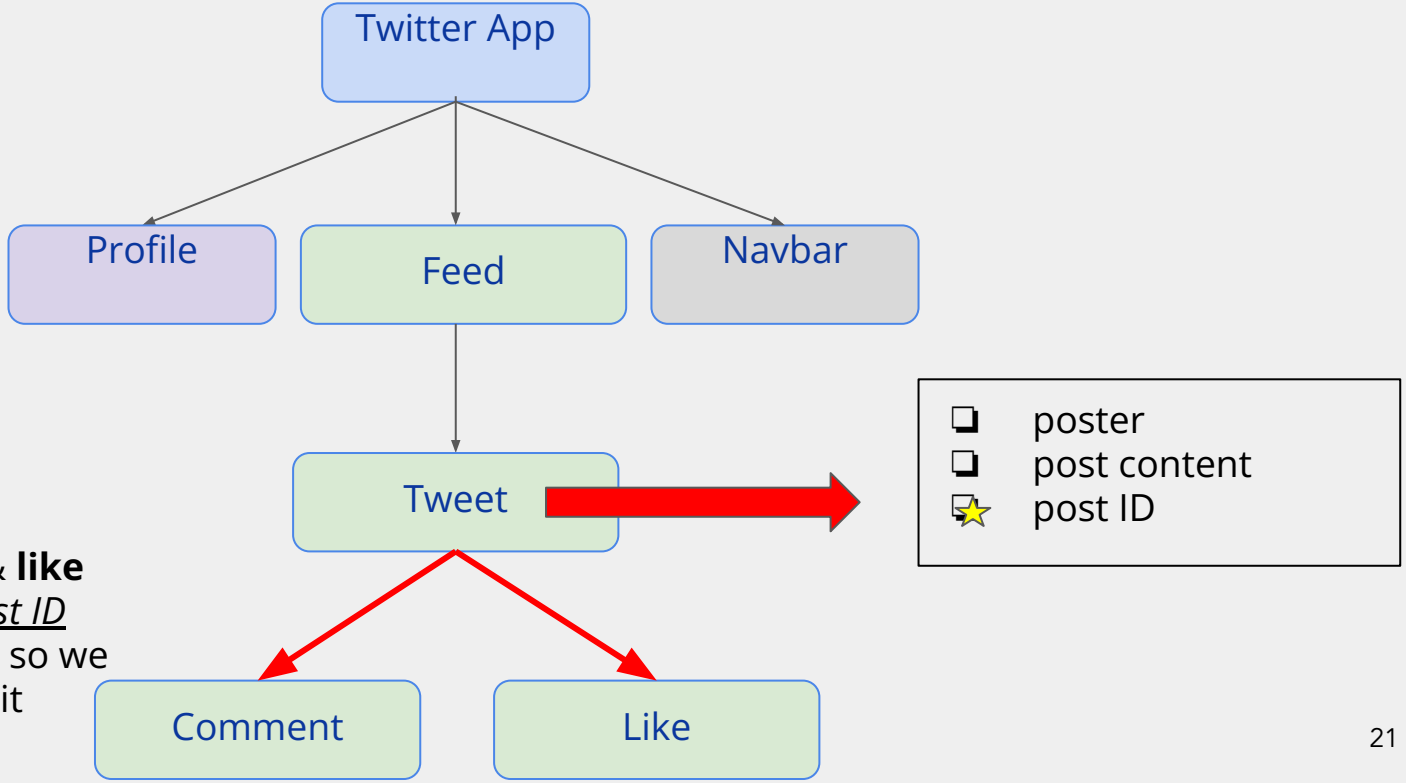


Which of these should be props?



each **comment** & **like** should have a *post ID* associated with it so we know which post it belongs to!

now… more on state

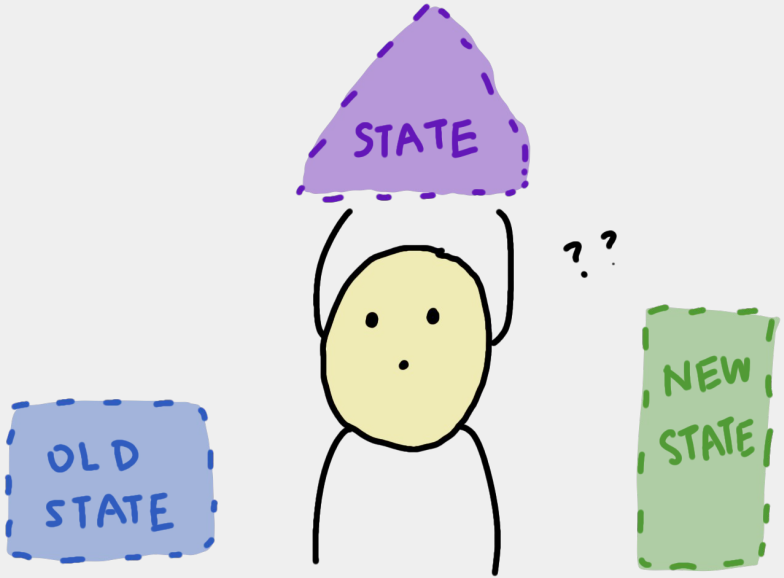
In-depth: Utilizing state

Scenario: Initializing state

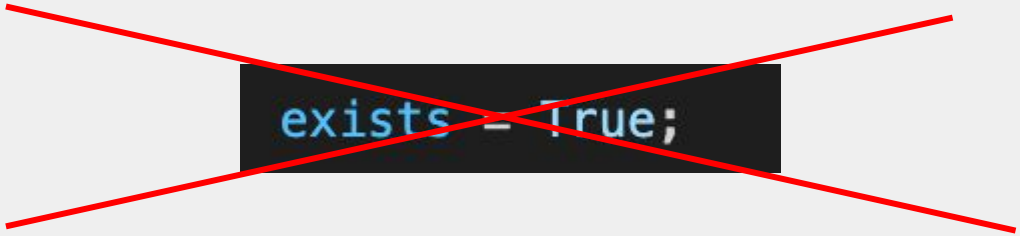
```
const MyHouse = (props) => {

    const [persons, setPersons] = useState([]);
    const [pets, setPets] = useState([]);
    const [exists, setExists] = useState(false);
```

In-depth: how to modify state



Modifying state → setting state



In-depth: Utilizing state

Scenario: Setting new values

```
setExists(true);
```

In-depth: Utilizing state

Scenario: Modifying original state

```
buyDog = () => {
    setPets(pets.concat["dog"]);
}
```

In-depth: Utilizing state

Scenario: Alternative way to update state with object destructuring (generally recommended)

```
buyDog = () => {
    setPets([...pets, "dog"]);
}
```

What is this function going to print?

```
testingStuff = () => {
    /* assume persons starts as an empty array [] */
    setPersons([...persons, "me"]);
    console.log(persons);
}
```

A. []

B. [“me”]

What is this function going to print?

```
testingStuff = () => {
    /* assume persons starts as an empty array [] */
    setPersons([...persons, "me"]);
    console.log(persons);
}
```

NO GUARANTEE!

A. []

B. [“me”]

Setting State is *ASYNC*.

What if we want to do something immediately after state is changed?

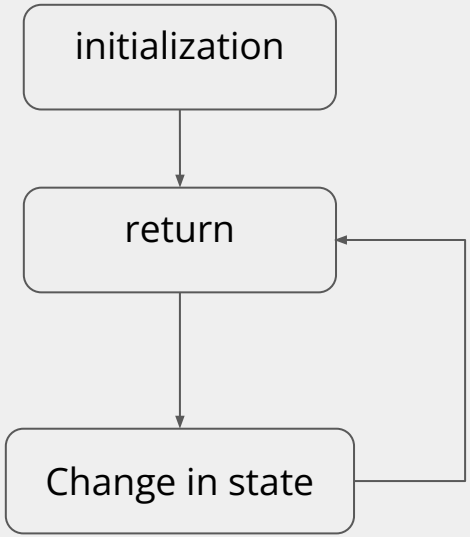
eg. add someone to persons and then print the persons array

We need a new React feature for this:
the useEffect hook!

But first...

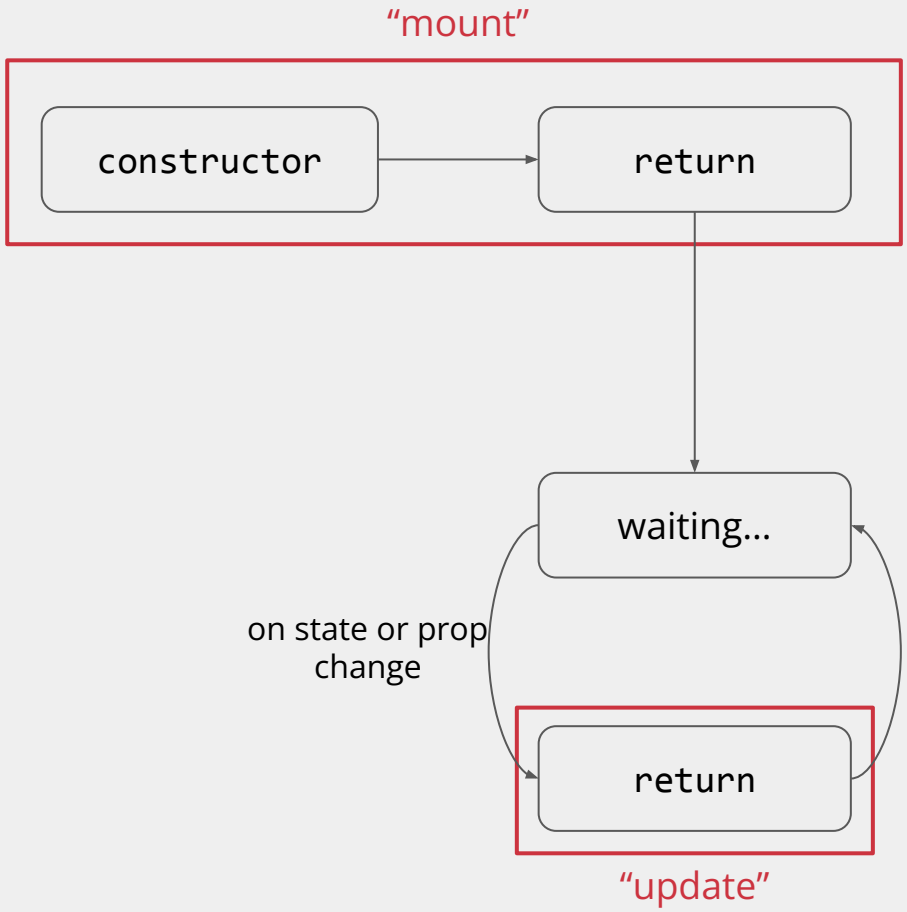
Review: Lifecycle Timeline

Lifecycle Timeline

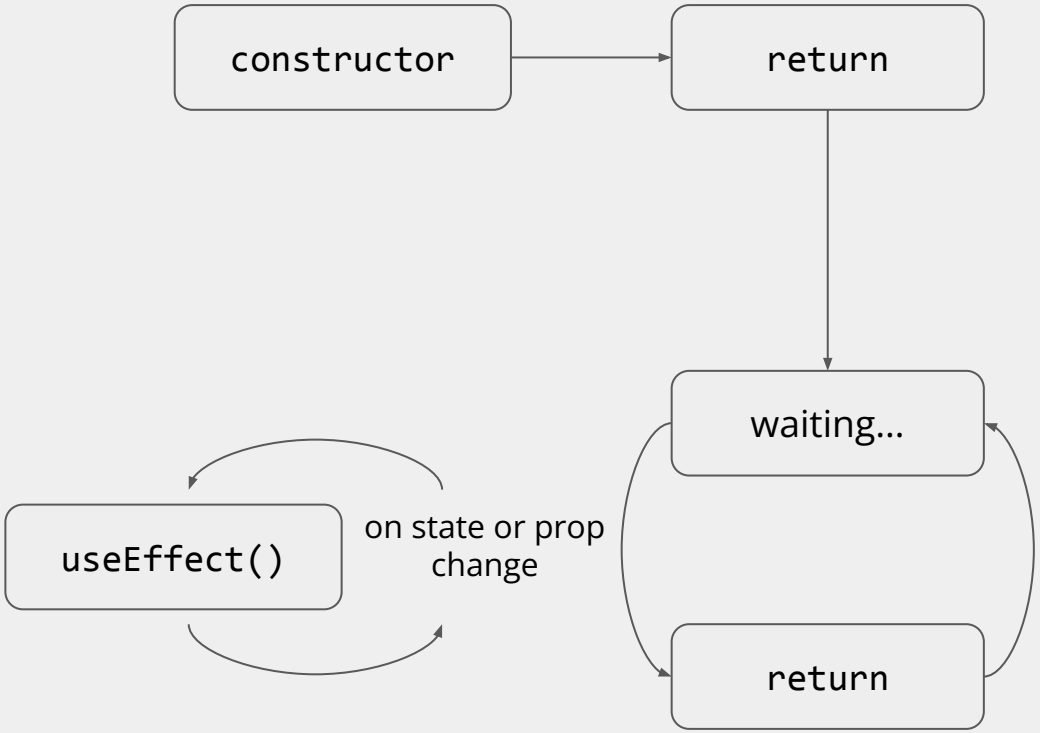


(continue to render after every state variable change)

Lifecycle Timeline



Lifecycle Timeline



`useEffect()` hook

- Runs after specific variables change
  - Can think of as response to state change
  - Commonly used to load data into state
  - Call an API/perform some computation/etc. at specific times

- syntax: `useEffect(function,` *optional* `dependency array)`
  - runs `function` every time a variable in `dependency array` changes

useEffect() example

```
testingStuff = () => {
    /* assume persons starts as an empty array [] */
    setPersons([...persons, "me"]);
    console.log(persons);
}
```

```
testingStuff = () => {
    setPersons([...persons, "me"]);
}

useEffect(() => {
    console.log(persons);
}, [persons])
```

`useEffect()` hook - dependency array examples

- `useEffect(function, [var1, var2])` runs `function` every time `var1` or `var2` changes
- `useEffect(function, [])` runs `function` once, immediately after initialization
- `useEffect(function)` runs every time *any* state variable changes

`get()` and `post()`

Nitty gritty details: utilities.js

```
get("/api/foo", { bar: 0 }).then((res) => console.log(res));
```

Fetching data

```
useEffect(() => {
    get("/api/packages").then((packageList) => {
        setPackages(packageList);
    })
}, [])
```

Sending data

```
<Button onClick={handleToggleAdmin} />
```

```
const handleToggleAdmin = () => {
    post("/api/user/admin", {admin: !admin}).then(() => {
        setAdmin(!admin);
    })
}
```

Review: JSX

Just a way to write HTML onto the page, but from JavaScript!

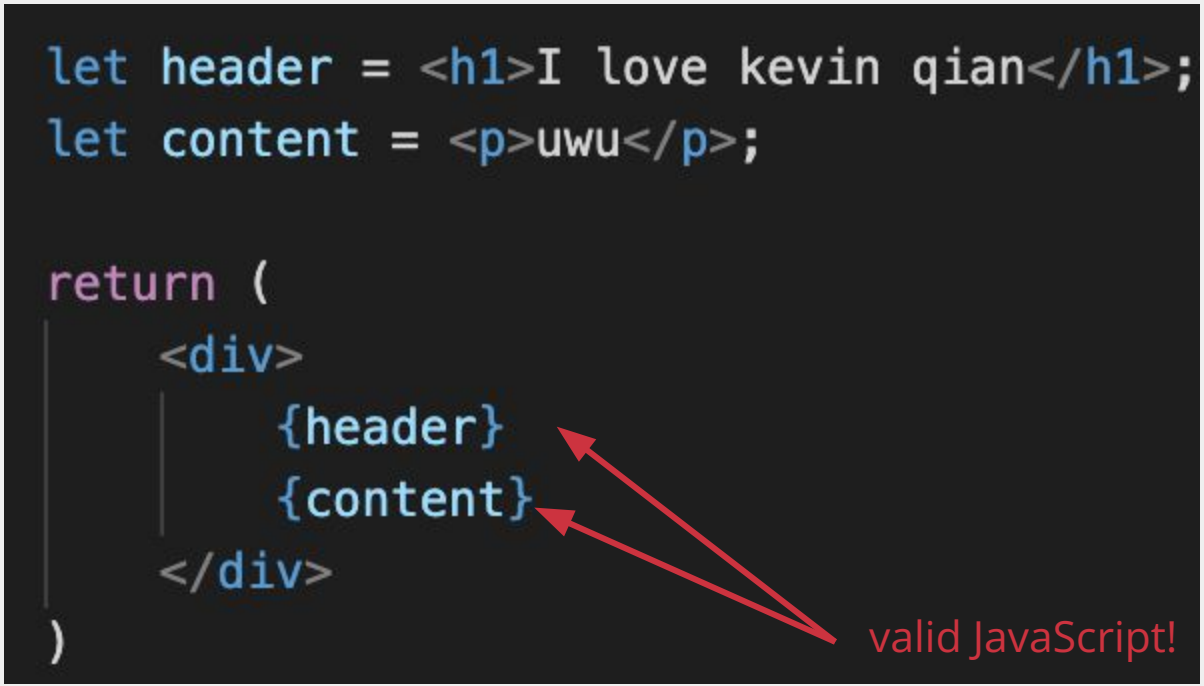
```
const element = <h1> Follow me at http://twitter.com/vvhuang_ </h1>;
```

Example: JSX for multiple pieces of content

```
let header = <h1>I love kevin qian</h1>;
let content = <p>uwu</p>;

return (
    <div>
        {header}
        {content}
    </div>
)
```

Example: JSX for multiple pieces of content



Example: display a loading indicator

Some state indicating if the page is still loading data or not

Show “Loading…” while page is loading data, otherwise the content

Conditional rendering

```
return loading ? (
  <div>
    <h1>Title</h1>
    <p>Loading... Buy bitcoin while waiting for the page to load</p>
  </div>
) : (
  <div>
    <h1>Title</h1>
    <p>Actual page content</p>
  </div>
);
```

```
condition ? resultIfTrue : resultIfFalse
```

More modular conditional rendering

```
let content = loading ? (
  <p>Loading... Buy bitcoin while waiting for the page to load</p>
) : (
  <p>Actual page content</p>
);

return (
  <div>
    <h1>Title</h1>
    {content}
  </div>
);
```

Concise conditional rendering

```
return (
  <div>
    <h1>Title</h1>
    <p>
      {loading
        ? "Loading... Buy bitcoin while waiting for the page to load"
        : "Actual page content"}
    </p>
  </div>
);
```

Loop rendering

- Common pattern: render an array of data in React
- Need a simple way to *map* data to HTML

Review: `map()`

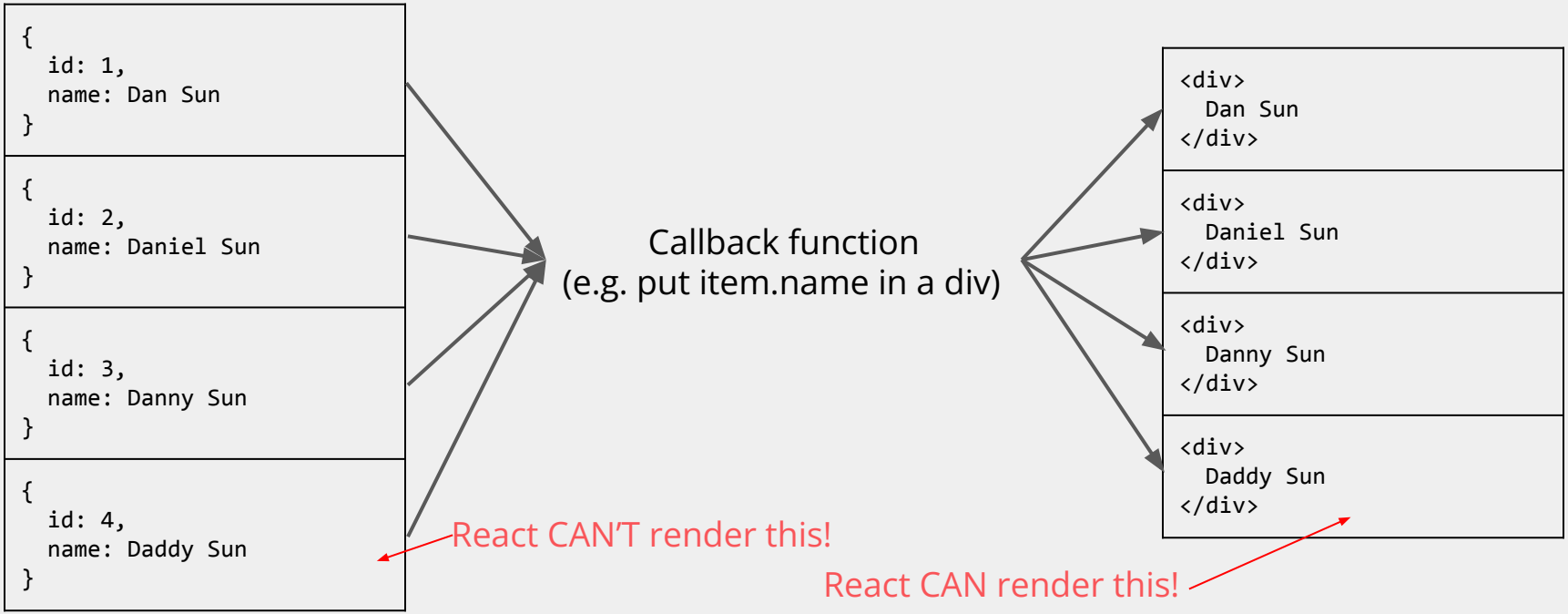
Creates a new array by applying the callback function to every element of the starting array.

```
let myArray = [1, 2, 3, 4, 5];
let modifiedArray = myArray.map(x => x * 3);
// modifiedArray === [3, 6, 9, 12, 15]
```

```
const celsiusToFahrenheit = tempC => {
    const tempF = tempC * 1.8 + 32;
    return tempF;
}

let celsius = [-40, -20, 0, 20, 40];
let fahrenheit = celsius.map(celsiusToFahrenheit);
// fahrenheit === [-40, -4, 32, 68, 104]
```

Using `map()` in React



Example: HTML

```
let data = [
  { id: 0, text: "My favorite food is doritos" },
  { id: 1, text: "I like nachos because they look like doritos" },
];
return data.map((item) => {
  return <div key={item.id}>{item.text}</div>;
});
//<>
//<div key={0}>My Favorite food is doritos</div>
//<div key={1}>I like nachos because they look like doritos</div>
//</>
```

Example: Components

```
let data = [
  { id: 0, text: "My favorite food is doritos" },
  { id: 1, text: "I like nachos because they look like doritos" },
];
return data.map((item) => {
  return <ItemComponent key={item.id}>{item.text}</ItemComponent>;
});
//<>
//<ItemComponent key={0}>My Favorite food is doritos</ItemComponent>
//<ItemComponent key={1}>I like nachos because they look like doritos</ItemComponent>
//</>
```

Example: Components (more concise)

Don't need to `return` if you skip the curly braces — otherwise you do!

```
let data = [
  { id: 0, text: "My favorite food is doritos" },
  { id: 1, text: "I like nachos because they look like doritos" },
];
return data.map((item) =>
  <ItemComponent key={item.id}>{item.text}</ItemComponent>
);
//<>
//<ItemComponent key={0}>My Favorite food is doritos</ItemComponent>
//<ItemComponent key={1}>I like nachos because they look like doritos</ItemComponent>
//</>
```

Questions?

Oh wait we still have extra time…
Let's talk more about JS and React!

(but feel free to zone out if you need a break)

Math

As with many languages, JS has a Math object with helpful methods:

- `Math.abs()`
- `Math.min(), Math.max()`
- `Math.PI, Math.sin()`
- etc.

Dates

JS has built-in Date objects that will save your life when making certain kinds of apps (eg. anything with a calendar):

```
let bday = new Date(1912, 10, 30) // Nov 30
let nextDay = new Date(bday);
let nextDay.setDate(nextDay.getDate() + 1); // nextDay is Dec 1
```

Sets

- Arrays and objects should be enough for storing most of your site data
- Sometimes you'll also want to use sets, which only store distinct values.

```
let s = new Set()
let s.add(1)
let s.add(2)
let s.add(1) // s = {1, 2}
```

JSON

Convert objects into strings and vice versa!

```
let x = {1: 2, foo: {uwu: 'owo'}}
let y = JSON.stringify(x) // y is '{"1":2,"foo":{"uwu":"owo"}}'
let z = JSON.parse(y) // retrieves x
```

- Useful if you need to store info as a string (eg. in a database) and then retrieve it later
- Our utilities.js get/post request code does this

Other React info if you're bored

Hooks reference: https://reactjs.org/docs/hooks-reference.html

- React provides other hooks besides `useState` and `useEffect` to support features like global context and memoization. (We won't cover these because they're used much less often.)

OK now we’re actually done