CSE 331
Software Design & Implementation

Winter 2022

Section 8 – HW8 & React

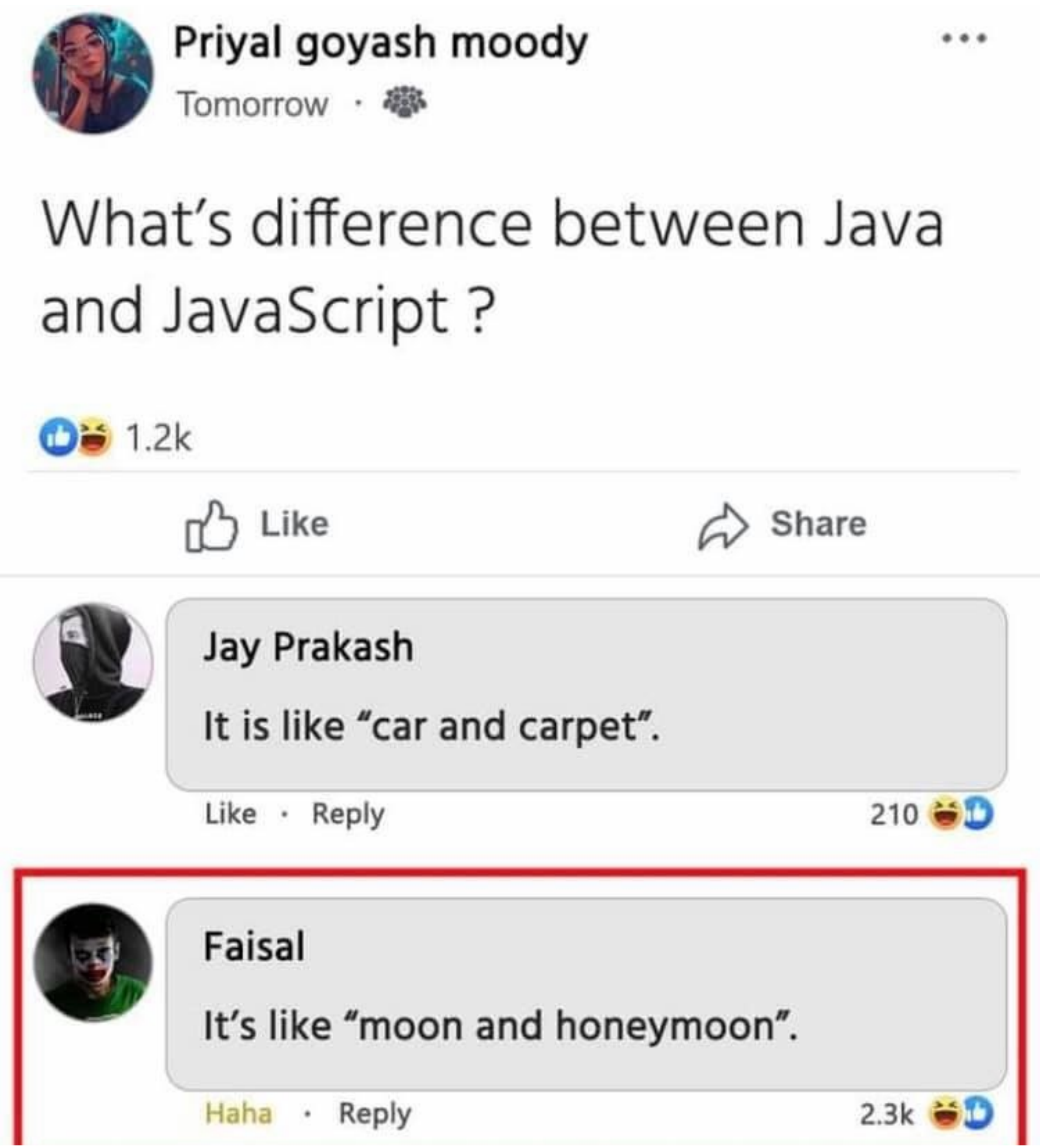
Administrivia

- HW7 due tonight!
  - Make sure to tag right!

- HW8 due next Thursday

Agenda

- Overview of HW8 – “Draw Lines”
- React examples
- Using Leaflet for Maps in React



Priyal goyash moody

Tomorrow ·

What’s difference between Java and JavaScript ?

1.2k

Jay Prakash

It is like “car and carpet”.

Faisal

It’s like “moon and honeymoon”.

React (JavaScript library)

- React (also known as React.js or ReactJS) is an open-source front-end JavaScript library

- React code is made of entities called components, which allow you to implement different UI in different classes
  - Think of a component like a synthetic HTML tag

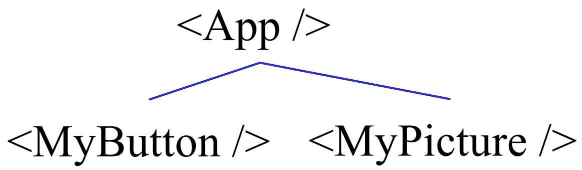
- Allow direct addition of HTML to the code

- Check HTML syntax (refer to the lecture material for this)

React Components

- Each component has a render method to determine what it looks like on the page

- Components form a tree:



<App />

<MyButton /> <MyPicture />

- Components can have **state**, which is local information used for rendering

- Components can receive information from its parent using **props**
  - Use functions as props as **callbacks**

React Components

```
<MyComponentName value={“Hello World”}
   onChange={() => doSomething()}/>
```

- `MyComponentName` is the name of your component/class

- In this case, the props are `value` and `onChange`

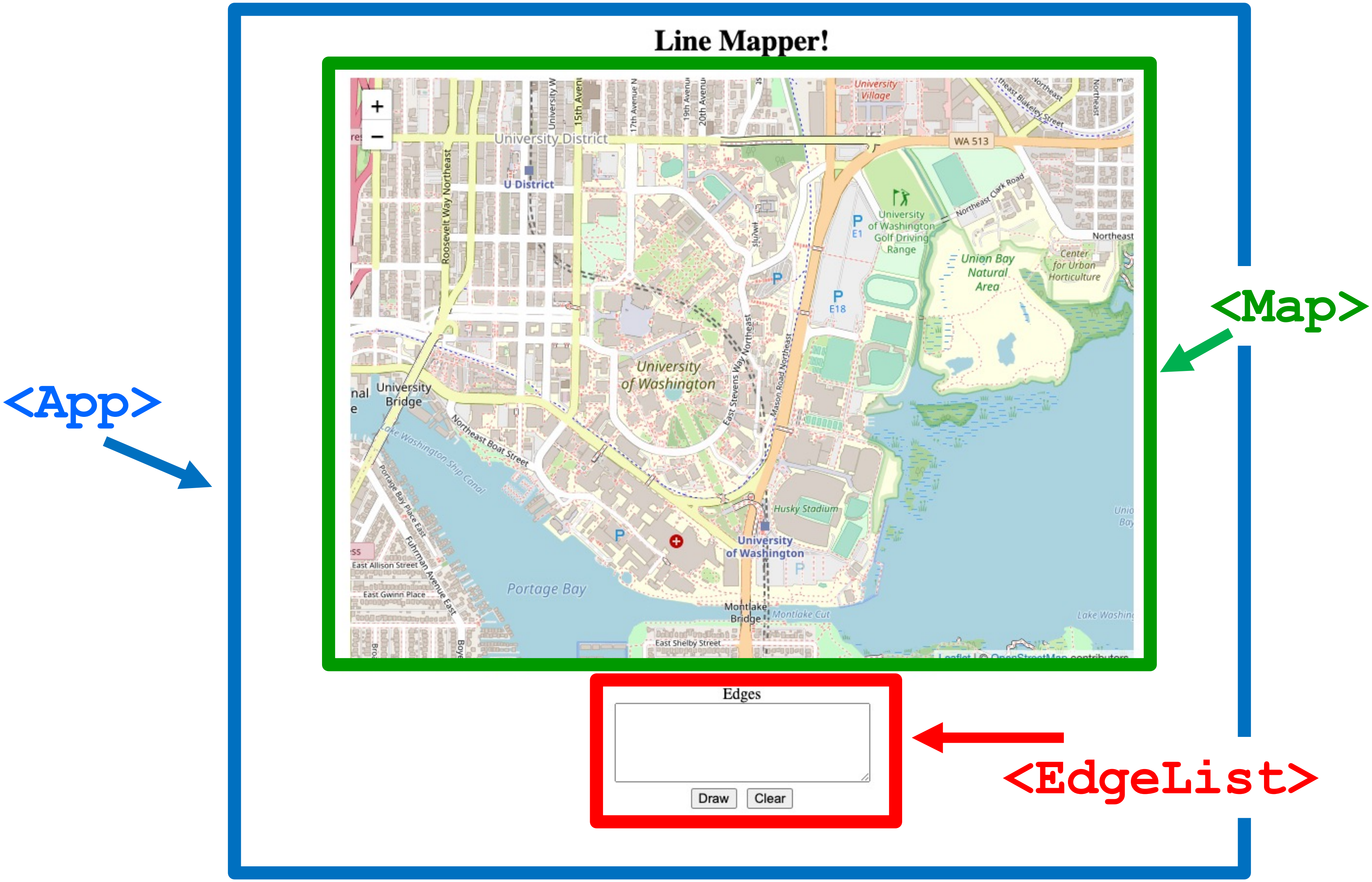
- `onChange` takes in a function, which we call a **callback**
  - this is how we can pass information up the tree, from a child to a parent

HW8

HW8 Overview

- Draw lines on a map in React
- Starter code has (most of) the pieces, but not much functionality.
  - Lots of hard-coded values, placeholders (console.log instead of doing stuff), etc..
- Your job: "wire all the pieces together"
  - Accept user input
  - Process/parse the data
  - Error check – users do weird stuff, make sure you can't crash
  - Move data between components as necessary
  - Add the actual functionality in response to user input.
- Structure:
  - Top-level <App> component, with three child components.

HW8 Component Structure



Line Mapper!

Edges

Draw Clear

<App>

<Map>

<EdgeList>

Running a React App

`npm`: Similar to gradle, but we need to install manually the first time.

In the terminal, change directory until you're in the same place as the "**package.json**" file for the project you want to run.

To Install (first time): **`npm install`**

To Run (every time): **`npm start`**

Once started, you can edit and save files and the page will automatically reload – no need to restart. Use Control-C to shut down when you're done developing.

Example 1:

React Boilerplate

- This is a React component with minimum parts needed to display a Hello World message.

Example 2:

Drawing on a Map

- We will use the React Leaflet plugin to display an interactive map of the campus using React.
- `<Map>` tag: creates an instance of the map component. This component is also provided with your HW8 starter code.
- We're using `<Map>` in HW8 and HW9 to draw lines/paths on top of images (like a map of campus!)
- `<MapContainer> -` Creates a container for the map with properties such as the default position and zoom level.
- `<MapLine> -` Represents an edge on the map.
  - Takes the source and destination coordinates as well as the color of each edge.
  - Map should be in the format provided in HW7.

Examples 3:

State

- We are initializing the information about our lines in our constructor.

- We are storing our lines and the color of our lines in our **state**.
  - Initialize state with `this.state = {…}`

- This state is never getting updated.

Examples 4:

Changing State

- `App` still stores a current color and a list of edges
- We have 3 buttons to update the color to red, blue, or green.
- `App` calls `setState` to change the color and cause a `re-render` when a button is clicked.

Examples 5:

Children and Props

- We have a new component that puts a title above the Map, called `ColorTitle`
  - `ColorTitleProps` includes a color that it will display
- We must include `ColorTitle` in `App`'s render method
- Current color is passed to child component in `props`

Examples 6:

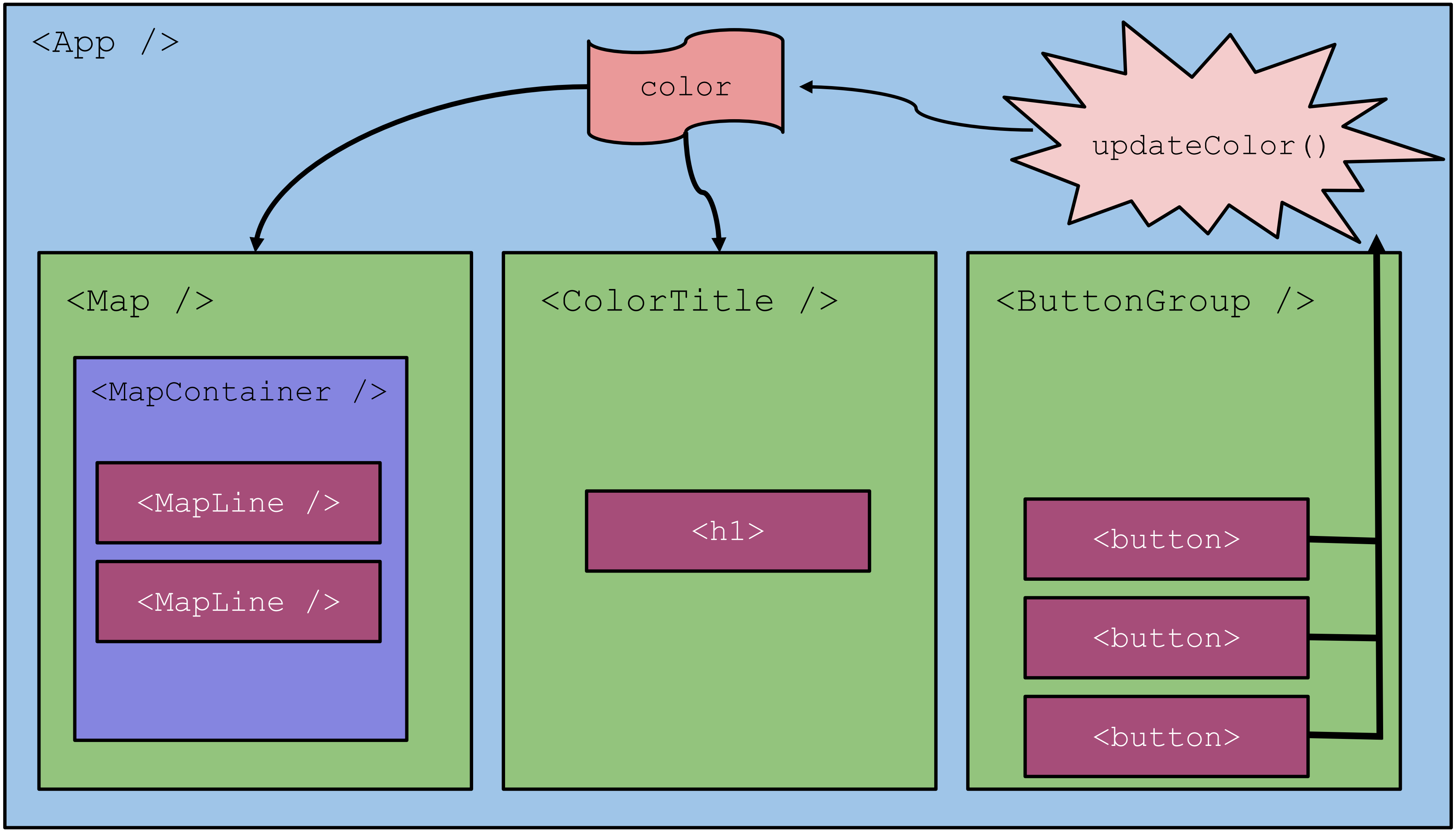
Callbacks

- We factor out the three buttons into `ButtonGroup`

- `ButtonGroup` uses a callback to notify `App` that a new color has been chosen

- Callback is passed in via `props` also

The *Flow*



Summary

- Components are reusable blocks of code that allow modular design and proper cohesion.
- Components contain other components and HTML tags to determine how they appear on a webpage.
  - React is responsible for managing the underlying webpage.
- Data owned/controlled by a component is stored it that component's state.
- Data flows *down* from parent to child through props.
- Data flows *up* from child to parent through callbacks from the child into the parent's code.
- React notifies components of changes to their data