

React Native 1

CS571: Building User Interfaces

Cole Nelson & Yuhang Zhao

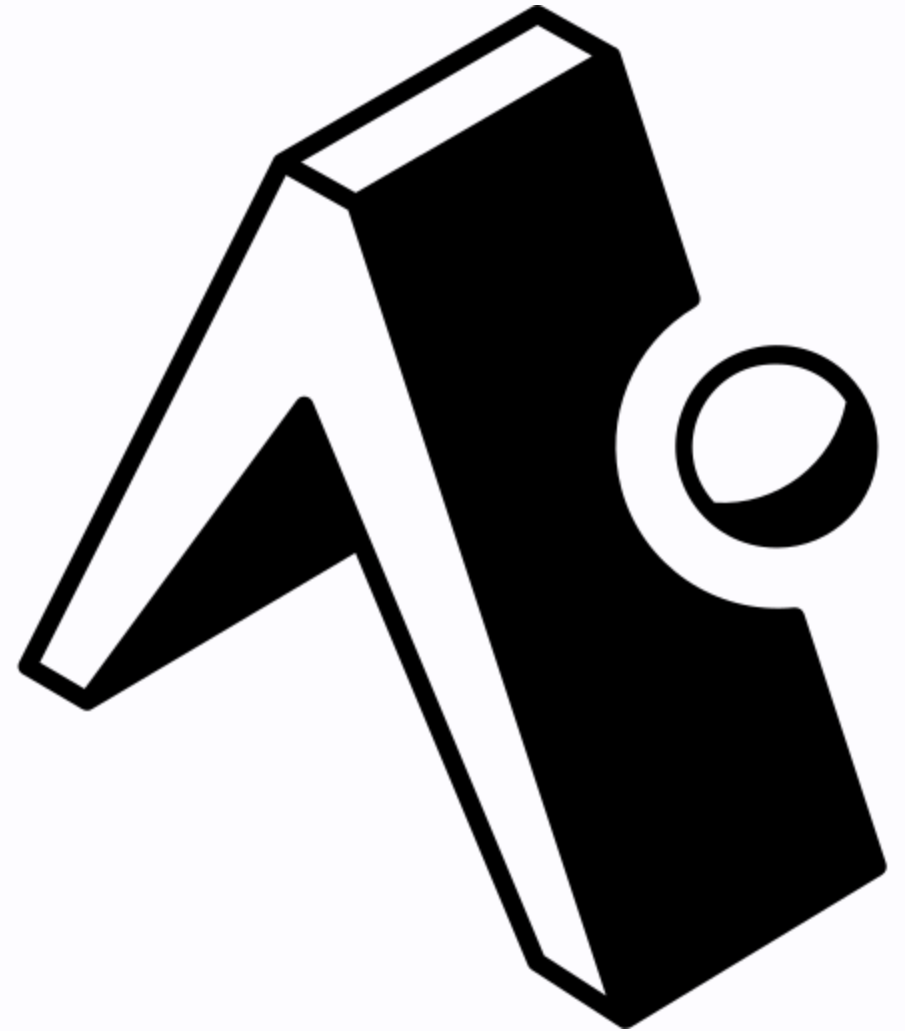
Today's Warmup

- Download Expo for your mobile device (see next slide for details).
- Clone [today's code](#) to your machine.
 - Run the command `npm install` inside of the `starter` and `solution` folders.
- **Optional:** Set `EXPO_PUBLIC_CS571_BADGER_ID` to be your Badger ID!
 - This may require a restart.

Download Expo

Download Expo!

- Download for [iOS](#)
- Download for [Android](#)
- Don't have a smart phone? You can use an emulator like [AVD](#) or [XCode](#)



Announcements

Thank you for the mid-semester feedback!

Great job on the midterm!

- Scores will be released in the next week.
- Final Exam will be 40 multiple-choice worth 20 pts over 90 minutes with a double-sided notesheet.

Academic Integrity Matters

Midterm Exam Review

See Canvas.

What will we learn today?

- What is mobile development?
- How does React Native fit into mobile development?
- How can we use React Native and Expo?

Mobile Development

Native development and its alternatives

What is "True Native" Development?

Building specifically for the device (e.g. Android or iOS) that you want to support.

iOS: Objective-C or Swift w/ Cocoapods

Android: Java or Kotlin w/ Maven or Gradle

Pros and Cons of True Native

Pros

- Organic User Experience
- Optimized Apps
- Fine-Grained Control

Cons

- Expensive
- Little Code Reuse
- Less Sense of Abstraction

Alternatives to True Native

No mobile app! Do we really need an app? Could a responsive webpage be just as effective?

WebView! Can we take our existing code and just slap it into a WebView? e.g. Apache Cordova

Cross-Platform! Can we use a library or framework that will make our code work natively on Android *and* iOS? e.g. React Native

Who is using React Native?

- Facebook
- Microsoft
- Shopify
- Coinbase
- Discord
- Dave

... among many others. Other companies may be doing pure-native or hybrid development.

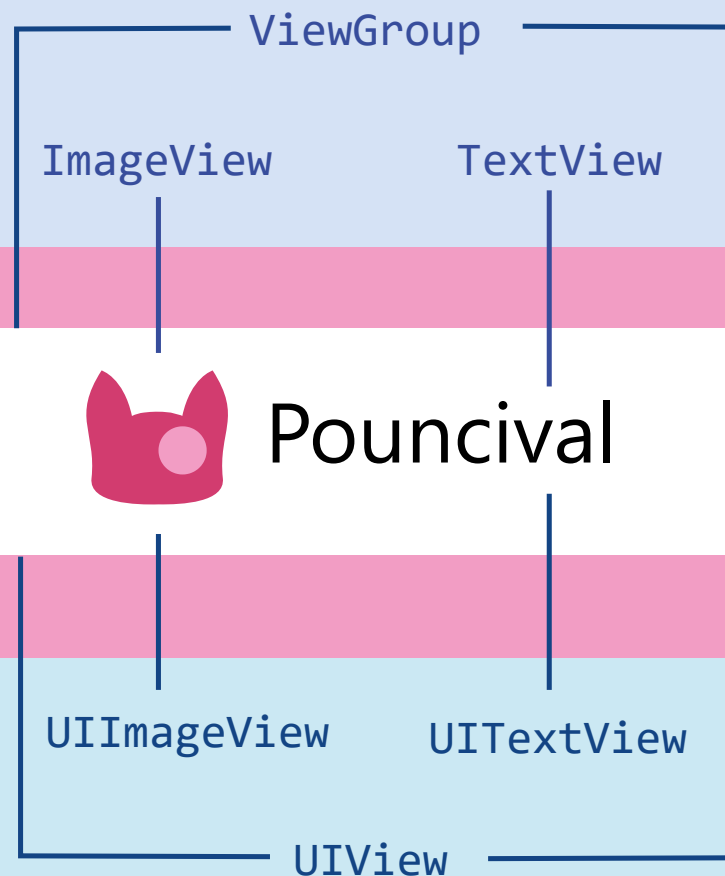
What is React Native?

A JS framework for building native, cross-platform mobile applications using React, developed by Facebook in 2015.

Unlike ReactJS, which was a library, React Native is a framework that includes everything* that we will need to build mobile applications.

React Native supports iOS and Android development.

Android



iOS

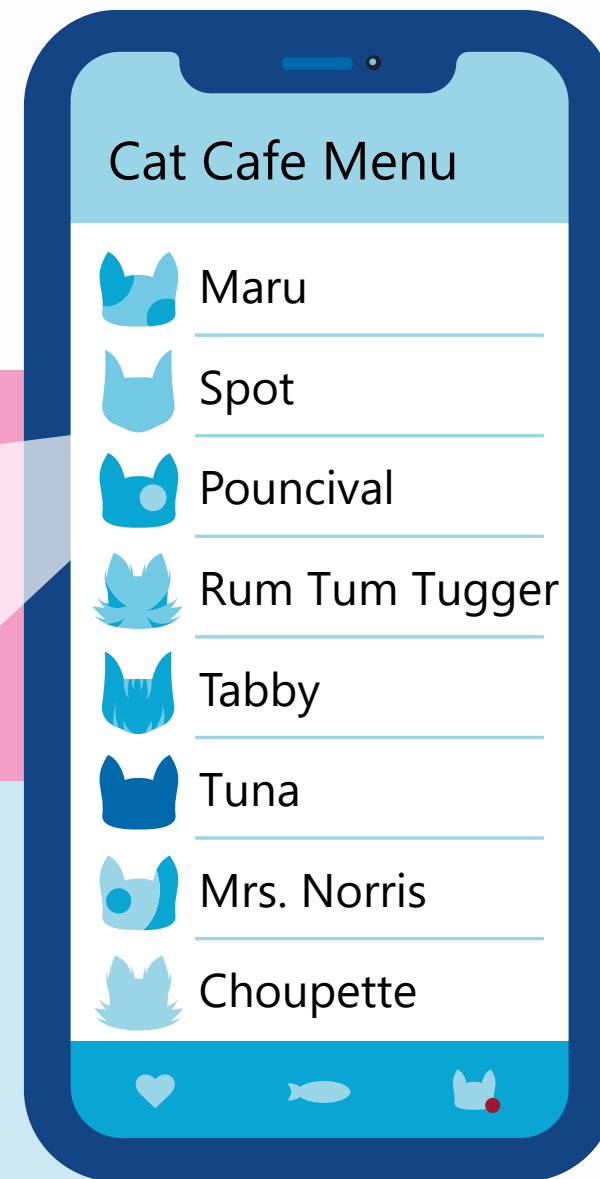


Image Source

React Native

- No more browser!
- No more DOM!
- Hermes is used to translate your JS components to iOS/Android components.

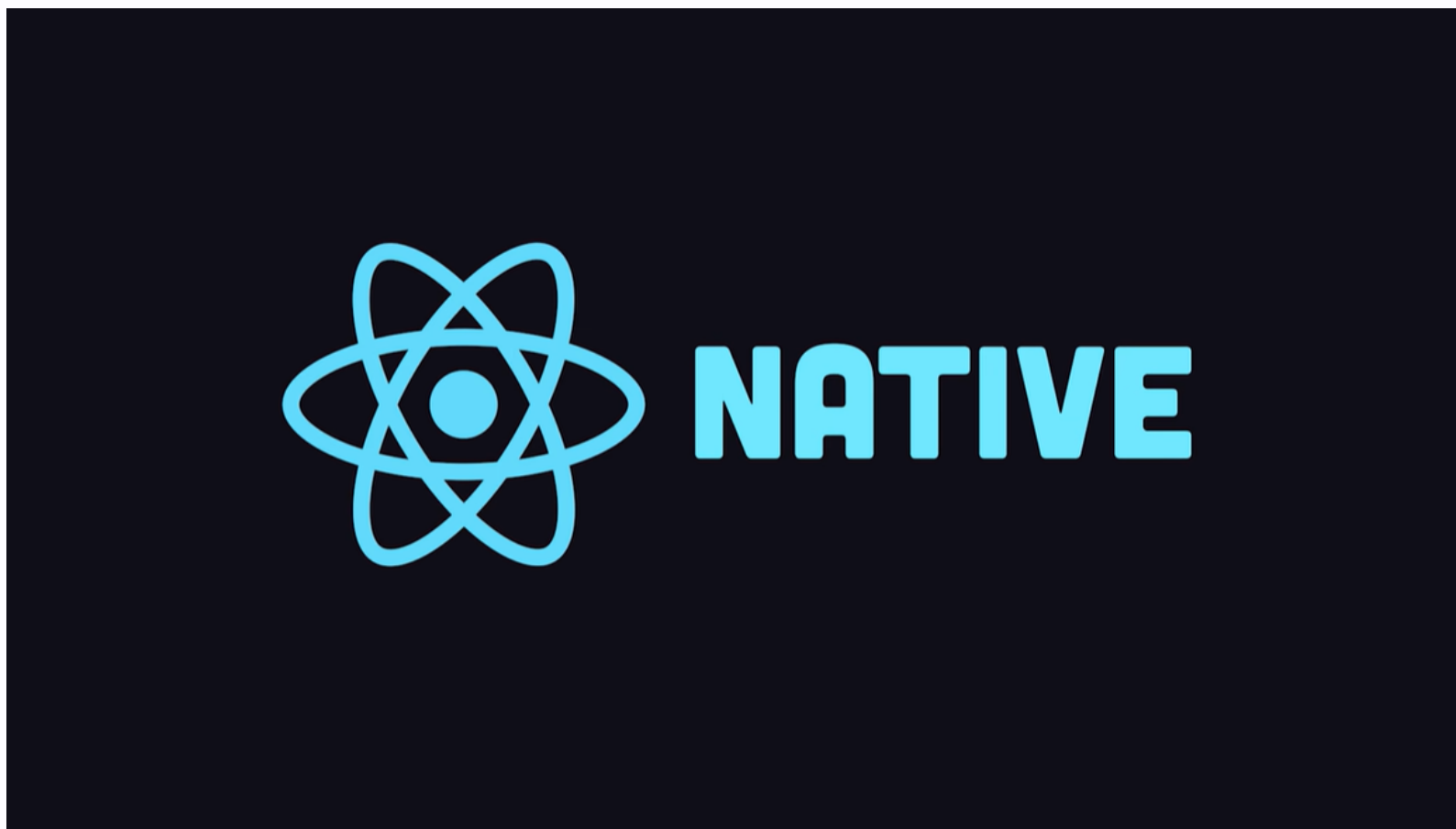
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CS571 Building User Interfaces | Cole Nelson & Yuhang Zhao | Lecture 15: React Native 1



React Native

React for Mobile Devices!



React Native in 100 seconds

A Review of *Implementation* So Far

| Lecture | Takeaway |
|---------|----------------------------------|
| Intro | The web runs on HTTP |
| JS1 | Basics of HTML, CSS, and JS |
| JS2 | APIs and Declarative Programming |
| JS3 | Data Copying and Bootstrap |

A Review of *Implementation* So Far

Lecture Takeaway

| | |
|---------|--------------------------------|
| React 1 | Intro, useState, and useEffect |
|---------|--------------------------------|

| | |
|---------|---------------------------------------|
| React 2 | Many Components and Controlled Inputs |
|---------|---------------------------------------|

| | |
|---------|--|
| React 3 | State Management, Context, and Routing |
|---------|--|

| | |
|---------|------------------------------------|
| React 4 | Complex APIs and Secret Management |
|---------|------------------------------------|

| | |
|---------|----------------------------------|
| React 5 | Memoization, Deployment, and NPM |
|---------|----------------------------------|

What stays the same?

- Using NPM for our library management
- Using complex APIs
- Core React features
 - React Hooks (useEffect, useState, etc.)
 - Passing props and state management
 - Controlled vs Uncontrolled Inputs
 - Memoization

What changes?

- This isn't a browser!
 - No more DOM!
 - No more CSS!
 - No more Bootstrap!
 - No more sessionStorage, localStorage, or cookies.
- Wider variety of inputs
 - Sensors
 - Gestures
- **React Navigation** vs **React Router**

Conversions to Know

| REACT NATIVE UI COMPONENT | ANDROID VIEW | IOS VIEW | WEB ANALOG | DESCRIPTION |
|---------------------------------|---------------------------------|-----------------------------------|---|---|
| <code><View></code> | <code><ViewGroup></code> | <code><UIView></code> | A non-scrolling <code><div></code> | A container that supports layout with flexbox, style, some touch handling, and accessibility controls |
| <code><Text></code> | <code><TextView></code> | <code><UITextView></code> | <code><p></code> | Displays, styles, and nests strings of text and even handles touch events |
| <code><Image></code> | <code><ImageView></code> | <code><UIImageView></code> | <code></code> | Displays different types of images |
| <code><ScrollView></code> | <code><ScrollView></code> | <code><UIScrollView></code> | <code><div></code> | A generic scrolling container that can contain multiple components and views |
| <code><TextInput></code> | <code><EditText></code> | <code><UITextField></code> | <code><input type="text"></code> | Allows the user to enter text |

Image Source

Other Good Questions to Ask...

- Can we declaratively program using RN? **YES**
- Can we use JSX with RN? **YES**
- Can we use React hooks in RN? **YES**
- Can we do styling in RN? **YES**-ish
- Is it *truly* cross-platform? **MAYBE**-ish

Hello World!

```
import React from 'react';
import { Text, View } from 'react-native';

function MyApp() {
  return (
    <View style={{ flex: 1, justifyContent: "center", alignItems: "center" }}>
      <Text>
        Try editing me! 🎉
      </Text>
    </View>
  );
}

export default MyApp;
```

Expo Snack

React Native for React Devs

How can we write our mobile apps with React Native?

Getting Started

Using [Expo](#), similar to vite!

Run for each new project...

```
npx create-expo-app my-cool-app  
cd my-cool-app  
npm start
```

Getting Started: A Special Note

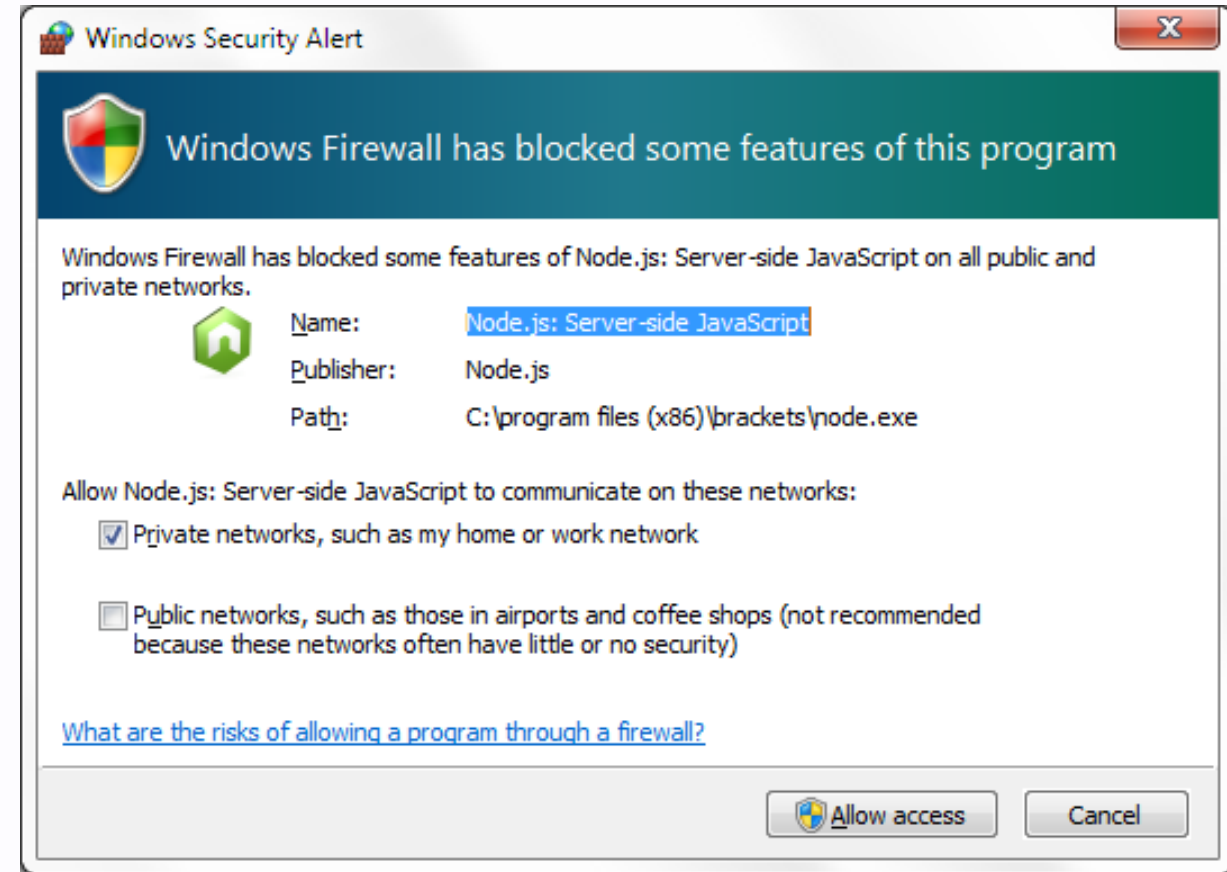
By default, Expo uses "lan" to host your app. This may cause issues on certain networks. Try using "localhost" or "tunnel" by modifying scripts of `package.json` ...

```
"scripts": {  
  "start": "expo start --localhost",  
  "android": "expo start --android",  
  "ios": "expo start --ios",  
  "web": "expo start --web"  
}
```

You will need to be wired in to your computer!

Getting Started: Another Note

Your computer will act like a server for your phone; be sure to allow connections!



Styling

Because React Native does not use a "browser", we can't use CSS styles. Instead, we create JavaScript stylesheets.

```
const styles = StyleSheet.create({
  container: {
    flex: 1,
    justifyContent: 'center',
    backgroundColor: '#ecf0f1',
    padding: 40,
  },
  ...
});
```

Styling

Style definitions can be done inline or via stylesheets. You can also combine both methods.

```
<View>
  <Text style={styles.label}>First label</Text>
  <Text style={{fontSize: 28, color:'tomato'}}>Second label</Text>
  <Text style={[styles.label, {fontSize: 20, color:'gray'}]}>Third label</Text>
</View>
```

Snack Solution

Images

`Image` not `img` (must be imported!)

Must specify a width and height: the default is 0!

`source` not `src` which takes an object (not a string)

```
<Image
  style={{
    width: 100,
    height: 100
  }}
  source={{
    uri: "https://example.com/me.png"
  }}
/>
```

Buttons

Two minor changes...

- `title` is specified with a prop
- `onPress` rather than `onClick`

```
<Button title="Speak!" onPress={doSpeak}/>
```

Also, anything can be made a `Pressable` ... we'll cover this next time!

Welcome to Badger Bakery!

PREVIOUS

NEXT



cupcake

\$1.50

You can order up to 12 units!



Order Total: \$0.00

PLACE ORDER

Expo Demo

Tackling HW7...

Your Turn!

Using [today's starter code](#)...

1. Get your expo app running!
2. Display the bio data to the phone screen.
3. When the button is pressed, display a message from the API.

```
https://cs571.org/api/f23/weekly/week09/bio  
https://cs571.org/api/f23/weekly/week09/message
```

What did we learn today?

- What is mobile development?
- How does React Native fit into mobile development?
- How can we use React Native and Expo?

Questions?