OBJECT
COMPUTING

WEBINAR

React Native Navigation

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NAVIGATION ...

OBJECT COMPUTING

- Like routing in a React app
  - manages screen transitions and tracks navigation history
  - unlike web pages, React Native screens do not have URLs
- Kinds of navigation
  - **stack**- go forward and backward by pushing pages onto and popping pages from a stack
  - **switch** - vertical set of buttons that navigate to different screens when pressed
  - **tab** - set of taps at top or bottom that navigate to different screens when pressed
  - **drawer** - side menu of options like a hamburger menu

... NAVIGATION

- Top app component can be a navigation component
- Can combine approaches within an app
  - ex. top navigation can be tab-based and some tabs can use stack-based for sub-pages

NAVIGATION LIBRARIES

- None provided by React Native
- **React Native Navigation**
- **React Navigation**

REACT NATIVE NAVIGATION

- Cross-platform library at https://github.com/wix/react-native-navigation
- Not as easy, but provides native look and feel
- Not covered here

REACT NAVIGATION

- Cross-platform library at https://facebook.github.io/react-native/docs/navigation#react-navigation
- Can be used with React Native AND React
- Easy to use
- Our focus

REACT NAVIGATION SETUP

OBJECT COMPUTING

- **`npm install react-navigation`**
- If using Expo CLI, no other steps needed
- If using React Native CLI
  - **`react-native link react-native-gesture-handler`**
- Additional steps are needed to support Android
  - see https://reactnavigation.org/docs/en/getting-started.html

SCREENS

- Each "screen" in navigation is implemented by a React component
- These are passed props **`navigation`** and **`screenProps`**
- **`navigation`** prop has many methods used to navigate to other screens
  - **`navigation.navigate(`*`screenName, params`*`)`**
    - optional second argument is object containing data to be passed
    - destination component can access params in **`navigation.state.params`**
  - **`navigation.goBack(fromS`*`creenName`*`)`**
    - omit ***`fromSreenName`*** to go back one screen in history

if history contains **`A`**, **`B`**, and **`C`** where **`C`** is current screen, to go back to **`A`** use **`navigation.goBack('B')`**

stack navigators use **`pop`** method instead of **`goBack`**

NAVIGATION OPTIONS ...

- Some options that can be specified
  - **`title`** - title text
  - **`headerTitle`** - set to component instance to use that instead of string **`title`** (ex. **`<icon ... />`**)
  - **`headerBackTitle`** - defaults to screen name; define in "back" component
  - **`headerStyle`** - style object (ex. can set **`backgroundColor`**)
  - **`headerTintColor`** - font color for title and back button
  - **`headerTitleStyle`** - style object applied to header title
  - and many more; see
    https://reactnavigation.org/docs/en/stack-navigator.html#navigationoptions-for-screens-inside-of-the-navigator

... NAVIGATION OPTIONS

- Options on previous slide can go in two places
- 1) navigator config object passed as second argument to a **`create*Navigator`** function
  - **`defaultNavigationOptions`** property is an object containing navigation options
- 2) static **`navigationOptions`** property of each screen component
- Both are used in stack navigator example next

NAVIGATION LIFECYCLE METHODS

- Can optional implement these methods in components to execute code at before/after focus changes
- **`willFocus`** - called before component gains focus
- **`didFocus`** - called after component gains focus
- **`willBlur`** - called before component loses focus
- **`didBlur`** - called after component loses focus

ROUTE PARAMETERS

OBJECT COMPUTING

- To pass params to a component when navigating to it

```
this.props.navigation.navigate(route-name, params-object);
```

params-object is an object whose properties are the params to pass

- To access params inside a component

```
this.props.navigation.getParam(param-name, default-value);
```

default-value is returned if ***param-name*** is not found

- To modify params inside a component

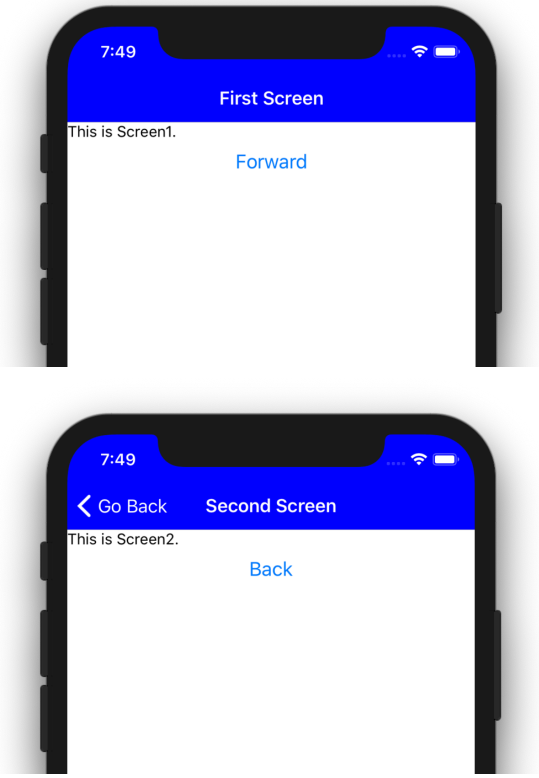
```
this.props.navigation.setParams({param-name: value, ...});
```

passed an object whose properties are the params to be set

  - component will re-render

STACK NAVIGATOR ...

- Push/pop screens on/off stack
- Only navigator option that supports a header at top of all screens
  - to get a header in screens of other navigators, nest them inside a stack navigator or use **`Header`** component from React Native Elements
- This example has two pages in stack
  - **`Screen1`** and **`Screen2`**



OBJECT COMPUTING

STACK NAVIGATOR ...

OBJECT COMPUTING

- **`navigation`** prop is passed to all stack components
- Methods specific to stack navigator
  - **`push`** - new route onto stack
  - **`pop`** - go back in stack
  - **`popToTop`** - go to top of stack
  - **`replace`** - replace current route with new one rather than add to stack
  - **`reset`** - wipe navigator state and replace with result of several "actions" (specified with an array)
  - **`dismiss`** - used in a nested stack to return to parent stack

most commonly used are **`push`**, **`pop`**, and **`popToTop`**

... STACK NAVIGATOR ...

OBJECT COMPUTING

```
import React, {Component} from 'react';
import {Button, StatusBar, Text, View} from 'react-native';
import {createAppContainer, createStackNavigator} from 'react-navigation';

class Screen1 extends Component {
  static navigationOptions = {
    headerBackTitle: 'Go Back',
    title: 'Screen1'
  };

  render() {
    const {navigation} = this.props;
    const params = {foo: true, bar: 1, qux: 'text'};
    return (
      <View>
        {/* make time and signal indicator in status bar light */}
        <StatusBar barStyle="light-content" />

        <Text>This is Screen1.</Text>
        <Button
          onPress={() => navigation.push('Screen2', params)}
          title="Forward"
        />
      </View>
    );
  }
}
```

defining a screen component with a class

navigationOptions value can also be a function that is passed props (including **navigation**) and returns an object containing navigation options

without this status bar text will be black which is hard to read against a blue background

... STACK NAVIGATOR ...

OBJECT COMPUTING

```
// params passed from Screen1 are in navigation.state.params
const Screen2 = ({navigation}) => (
  <View>
    <Text>This is Screen2.</Text>
    <Button onPress={() => navigation.pop()} title="Back" />
    {/* "< screen-name" button is also provided in header */}
  </View>
);
Screen2.navigationOptions = {
  title: 'Screen2'
};
```

defining a screen component with an arrow function

alternative to using a static property

... STACK NAVIGATOR

OBJECT COMPUTING

keys are screen names and values are screen components

```
const StackNav = createStackNavigator(
  {
    Screen1, // can add options to each of these
    Screen2: {screen: Screen2} // long form
  },
  {
    defaultNavigationOptions: {
      headerStyle: {
        backgroundColor: 'blue'
      },
      headerTintColor: 'white'
    }
  }
});
```

defaults for all screen components that do not override these

can add **`transitionConfig`** property here to customize screen transitions

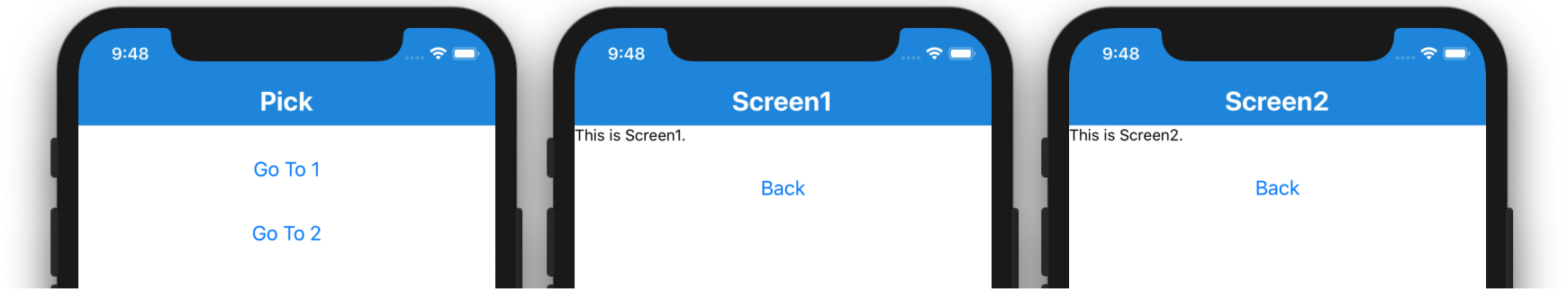
... STACK NAVIGATOR


```
const AppContainer = createAppContainer(StackNav);

export default class App extends Component {
  // Can add use of things like Redux and Context API.
  render() {
    return <AppContainer />;
  }
}
```

SWITCH NAVIGATOR

- Shows one screen at a time
- Does not support going back to previous screen
  - **must** use **navigator.navigate** to go to an explicit screen
- Does not provide a header
  - can use **Header** element from React Native Elements

SWITCH NAVIGATOR EXAMPLE ...



... SWITCH NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
import React from 'react';
import {Button, StatusBar, Text, View} from 'react-native';
import {Header} from 'react-native-elements';
import {createAppContainer, createSwitchNavigator} from 'react-navigation';

const getHeader = navigation => (
  <>
    <StatusBar barStyle="light-content" />
    <Header
      centerComponent={{
        text: navigation.state.routeName,
        style: {color: 'white', fontSize: 24, fontWeight: 'bold'}
      }}
    />
  </>
);
```

React fragment

... SWITCH NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const getNavButton = (navigation, text, screenName) => (
  <View style={{marginTop: 20}}>
    <Button onPress={() => navigation.navigate(screenName)} title={text} />
  </View>
);

const Pick = ({navigation}) => (
  <View>
    {getHeader(navigation)}
    {getNavButton(navigation, 'Go To 1', 'Screen1')}
    {getNavButton(navigation, 'Go To 2', 'Screen2')}
  </View>
);
```

... SWITCH NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const Screen1 = ({navigation}) => (
  <View>
    {getHeader(navigation)}
    <Text>This is {navigation.state.routeName}.</Text>
    {getNavButton(navigation, 'Back', 'Pick')}
  </View>
);

const Screen2 = ({navigation}) => (
  <View>
    {getHeader(navigation)}
    <Text>This is {navigation.state.routeName}.</Text>
    {getNavButton(navigation, 'Back', 'Pick')}
  </View>
);
```

... SWITCH NAVIGATOR EXAMPLE

OBJECT COMPUTING

```
const SwitchNav = createSwitchNavigator({Pick, Screen1, Screen2});

const AppContainer = createAppContainer(SwitchNav);

export default () => <AppContainer />;
```

TAB NAVIGATOR

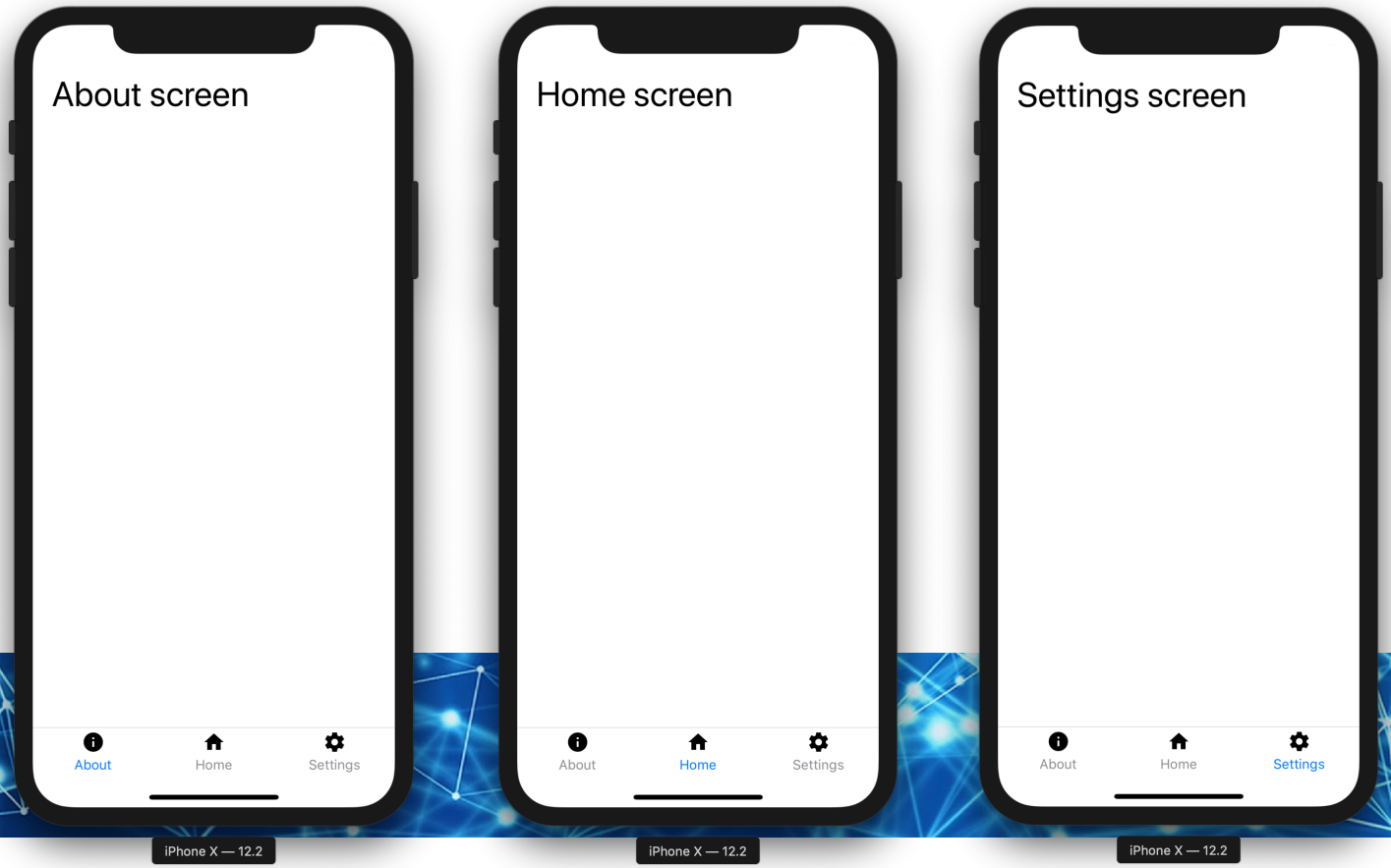
- Top tab options
  - `createTabNavigator` - deprecated
  - `createMaterialTopTabNavigator` - uses Material Design; appropriate for Android
- Bottom tab options
  - `createBottomTabNavigator` - best option in most cases
  - `createMaterialBottomTabNavigator` - uses Material Design; appropriate for Android

BOTTOM TAB NAVIGATOR

OBJECT COMPUTING

- Common to have white background with colored text and/or icons
  - gray for inactive
- Can use Icon element from React Native Elements

BOTTOM TAB NAVIGATOR EXAMPLE ...



BOTTOM TAB NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
import React from 'react';
import {StyleSheet, Text, View} from 'react-native';
import {Icon} from 'react-native-elements';
import {createBottomTabNavigator, createAppContainer} from 'react-navigation';

const getTitle = text => <Text style={styles.title}>{text}</Text>;

const About = () => (
  <View style={styles.container}>{getTitle('About screen')}</View>
);

const Home = () => (
  <View style={styles.container}>{getTitle('Home screen')}</View>
);

const Settings = () => (
  <View style={styles.container}>{getTitle('Settings screen')}</View>
);
```

... BOTTOM TAB NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const getRouteConfig = (screen, icon) => ({
  screen,
  navigationOptions: {
    tabBarIcon: <Icon name={icon}/>
  }
});

const tabBarOptions = {
  initialRouteName: 'Home',
  tabBarOptions: {
    labelStyle: {fontSize: 14}
  }
};
```

... BOTTOM TAB NAVIGATOR EXAMPLE

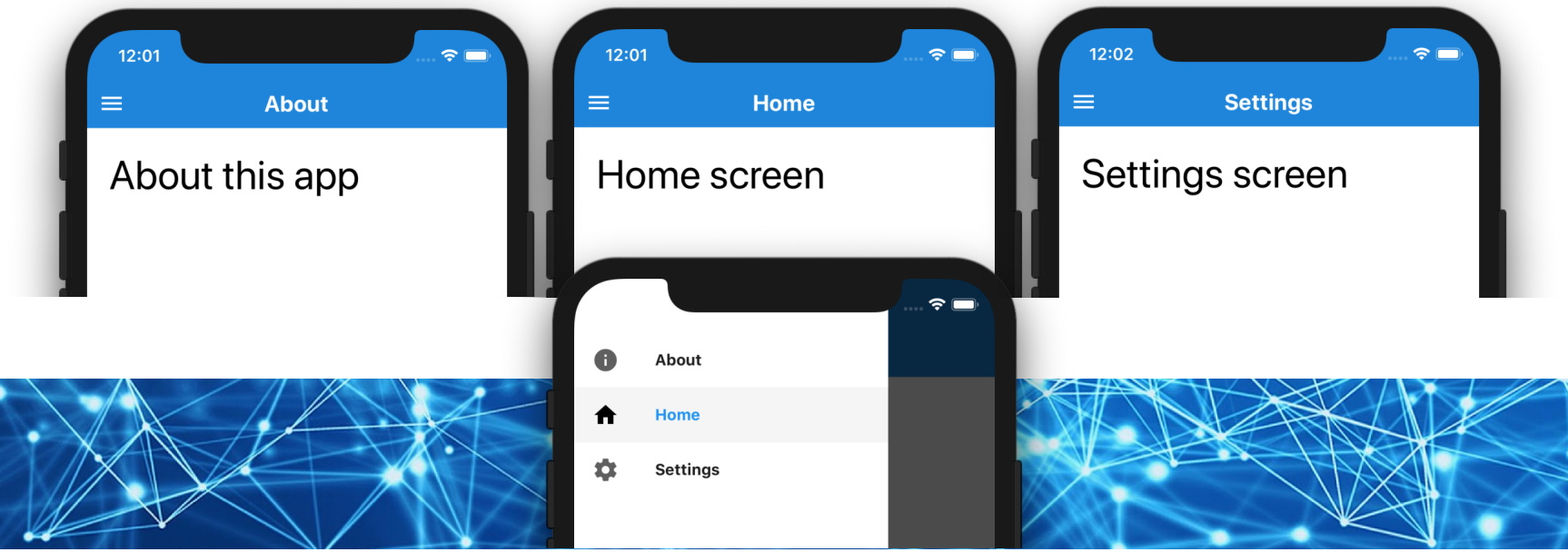
OBJECT COMPUTING

```
const TabNav = createBottomTabNavigator(
  {
    About: getRouteConfig(About, 'info'),
    Home: getRouteConfig(Home, 'home'),
    Settings: getRouteConfig(Settings, 'cog')
  },
  tabBarOptions
);

const styles = StyleSheet.create({
  container: {
    paddingHorizontal: 20,
    paddingTop: 50
  },
  title: {fontSize: 36}
});

export default createAppContainer(TabNav);
```

DRAWER NAVIGATOR

OBJECT COMPUTING

- Provides drawer that slides out from right containing navigation buttons



DRAWER NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
import React from 'react';
import {Button, StyleSheet, Text, View} from 'react-native';
import {Header, Icon} from 'react-native-elements';
import {createAppContainer, createDrawerNavigator} from 'react-navigation';

const Hamburger = ({navigation}) => (
  <Icon color="white" name="menu" onPress={() => navigation.toggleDrawer()} />
);
```

... DRAWER NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const MyHeader = ({navigation, title}) => {
  return (
    <Header
      leftComponent={<Hamburger navigation={navigation} />}
      centerComponent={{
        text: title,
        style: {color: 'white', fontSize: 20, fontWeight: 'bold'}
      }}
      statusBarProps={{barStyle: 'light-content'}}
    />
  );
};

const getTitle = text => <Text style={styles.title}>{text}</Text>;
```

... DRAWER NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const About = ({navigation}) => (
  <View style={styles.container}>
    <MyHeader navigation={navigation} title="About" />
    {getTitle('About this app')}
  </View>
);
About.navigationOptions = {
  drawerIcon: <Icon name="info" />
};

const Home = ({navigation}) => (
  <View style={styles.container}>
    <MyHeader navigation={navigation} title="Home" />
    {getTitle('Home screen')}
  </View>
);
Home.navigationOptions = {
  drawerIcon: <Icon name="home" />
};
```

... DRAWER NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const Settings = ({navigation}) => (
  <View style={styles.container}>
    <MyHeader navigation={navigation} title="Settings" />
    {getTitle('Settings screen')}
  </View>
);
Settings.navigationOptions = {
  drawerIcon: <Icon name="settings" />
};

const drawerOptions = {initialRouteName: 'Home'};
const DrawerNav = createDrawerNavigator(
  {About, Home, Settings},
  drawerOptions
);
```

... DRAWER NAVIGATOR EXAMPLE ...

OBJECT COMPUTING

```
const styles = StyleSheet.create({
  container: {},
  title: {
    fontSize: 36,
    padding: 20
  }
});

export default createAppContainer(DrawerNav);
```

COMBINING NAVIGATORS

TRY THIS!

OBJECT COMPUTING

```
import {createBottomTabNavigator, createStackNavigator} from 'react-navigation';
const options = {
  navigationOptions: {
    headerStyle: {
      backgroundColor: someColor
    },
    headerTintColor: someColor
  }
};
const StackNav = createStackNavigator({
  Name1: {screen: Component1},
  Name2: {screen: Component2}
}, options);
const Tabs = createBottomTabNavigator({
  Tab1Text: {screen: StackNav},
  Tab2Text: {screen: SomeComponent}
});
export default Tabs;
```

import **Tabs** in another component and render it

```
<Tabs screenProps={someObj} />
```

someObj is passed to all screens; can include data and callback functions

```
import {createDrawerNavigator} from 'react-navigation';
const DrawerNav = createDrawerNavigation(screens);
```