

Development environment Set-up

Expo	<ul style="list-style-type: none"> 🔗 <i>For beginners</i> ✓ Simplifies the setup process ✓ Provides OTA updates ✗ Does not allow you to add custom native code ✗ Expo apps tend to have larger sizes
React Native CLI	<ul style="list-style-type: none"> 🔗 <i>For Experienced Developers</i> ✓ Supports integrating custom native modules ✓ Potentially better performance for complex applications ✗ Requires Xcode or Android Studio to get started. ✗ No OTA updates.

Creating an app

Initialize a new project	<code>npx create -ex po-app my-app</code>
Start development server	<code>cd my-app</code> <code>npm start</code>

Running app

Android	Use the Expo Go app to scan the QR code from your terminal to open your project.
iPhone	Use the built-in QR code scanner of the default iOS Camera app.

🔗 *Connect to the same wireless network as your computer.*

Metro

➡ When you run your app, the Expo CLI starts Metro Bundler. It's a JavaScript bundler that takes all your JavaScript files and assets, bundles them, and transforms them using Babel. This process converts the code into a format that can be executed by the platform running the app (iOS or Android).

Expo

Expo	A set of tools and services to make development with React Native easier.
Expo SDK	A modular set of packages that provides access that provides access to native APIs, like Camera or Notifications.
Expo CLI	A command-line tool that is the primary interface between a developer and other Expo tools.
Expo Go	An open-source sandbox app you can download on your phone to view your app in development.
Expo Snack	A web-based playground where you can write React Native snippets and run them in the browser.
Expo Tunnel	For establishing a connection that allows devices to access the app even if they're not on the same wireless network. <code>npx expo start --tunnel</code>

Finding Libraries

📁 React Native Directory is a searchable database of libraries built specifically for React Native.



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StyleSheet

- ^ An abstraction similar to CSS StyleSheets.
- ^ Declare styles in a structured and optimized manner.
- ^ You can use an array of styles to combine multiple style objects- the last style in the array has precedence, or mix predefined styles with inline styles.
- ^ All of the core components accept a prop named **style**.

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

const App = () => (
  <View style={styles.container}>
    <Text style={ [styles.container, styles.boldText] }>
      This is bold and black text
    </Text>
    <Text style={ [styles.container, { color: 'blue' } ]}>
      This is blue and normal weight text
    </Text>
  </View>
);

const styles = StyleSheet.create({
  container: { flex: 1,
    padding: 24,
    backgroundColor: '#eaeaea' },
  baseText: { fontSize: 16,
    color: 'black' },
  boldText: { fontWeight: 'bold' }
});

export default App;
```

useWindowDimensions Hook

- ^ Used to get the dimensions of the device window.
- ^ It returns an object containing the window's width and height.
- ^ Useful for creating responsive designs and layouts that adapt to different screen sizes.

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

const App = () => {
  const {height,width,scale,fontScale}=useWindowDimensions();
  return (
    <View style={styles.container}>
      <Text> Window Dimension Data</Text>
      <Text> Height: {height}</Text>
      <Text> Width: {width}</Text>
      <Text>Font scale: {fontScale}</Text>
      <Text> Pixel ratio: {scale}</Text>
    </View>
  );
};

const styles = StyleSheet.create({
  container: {
    flex: 1,
    justifyContent: 'center',
    alignItems: 'center'},
});

export default App;
```

Button

- ^ A basic button component that should render on any platform.
- ^ Supports a minimal level of customization.

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

const ExampleButton = () => {
  const handlePress = () => {console.log('Button pressed')}
  return (
    <View>
      <Button title= " Click Me" onPress={ handlePress }
        style={ styles.button } />
    </View>
  );
};

export default ExampleButton;
```

⚠ Required props: title and onPress

Pressable

- ^ Provides and subscribes to color scheme updates from the appearance module in react native.
- ^ It returns the current color scheme preference of the user's device.
- ^ Supported color schemes: "light", "dark", null.

```
import React from 'react';
import {Text, StyleSheet, useColorScheme, View}
from 'react-native';
const App = () => {
  const colorScheme = useColorScheme();
  return (
    <View style={styles.container}>
      <Text> useColorScheme(): {colorScheme}</Text>
    </View>
  );
};
const styles = StyleSheet.create({
  container: {
    flex: 1,
    alignItems: 'center',
    justifyContent: 'center'
  });
export default App;
```

- ^ Used for users press interactions.
- ^ Detects various stages of press interactions on any of its child components.
- ^ Highly customizable and flexible way to handle touch-based input.
- ^ Inherits all the styles of the View component.



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Pressable (cont)

```
import React from 'react';
import { Pressable, Text } from 'react-native';
const ExamplePressable = () => {
  return (
    <Pressable onPress={() => console.log('Pressed!')}
      style={({ pressed }) => [
        { backgroundColor: pressed ? 'light sky blue' : 'lightgray' },
        { padding: 10, alignItems: 'center' }
      ]}
      hitSlop={{ top: 10, bottom: 10, left: 10, right: 10 }}
      pressRetentionOffset={{ top: 20, bottom: 20, left: 20, right: 20 }}
    <Text> Press Me</Text>
    </Pressable>
  );
};
export default ExamplePressable;
```

⚠ props:

- ➡ **onPressIn:** method called when a press is activated.
- ➡ **onPressOut:** method called when the press gesture is deactivated.
- ➡ **onLongPress:** method called when user leaves their finger longer than 500 milliseconds before removing it, customize this time period using the `delayLongPress` prop.
- ➡ **pressed:** state that refers to a boolean value provided to the style and children functions of Pressable, to check if component is being pressed.
- ➡ **hitSlop:** prop to increase the area where touch gestures are recognized. (extended interactive area "HitRect").
- ➡ **pressRetentionOffset:** prop to specify the area in which the touch can move while maintaining the press's active state. ("PressRect").

Stack Navigator

⬆ Allows transition between screens where each new screen is placed on top of a stack.

⬆ **NavigationContainer:** Component container for your app's navigation structure.

⬆ **Navigator:** Manages the navigation tree and contains the navigation state.
 ▶ Should be only used once in your app at the root.

⬆ **createNativeStackNavigator:** Function that returns an object containing two properties.

▶ **Navigator:** Takes Screen elements as its children to define the configuration for routes.

initialRouteName: prop for the Navigator specify what the initial route in a stack is.

screenOptions: prop to Navigator to specify common options.

▶ **Screen:** Component takes 2 required props name and component.

name: prop which refers to the name of the route.

component: prop which specifies the component to render for the route.

options: prop to Screen to specify screen-specific options.

⬆ **navigation and route props:** are automatically provided to each screen component by the navigator.

navigation: prop is available to all screen components and allows you to control navigation actions.

route: prop contains information about the route, including parameters passed to that screen.

You can read the params through **route.params** inside a screen.

Params should contain the minimal data required to show a screen.

Navigation

React Navigation

- ⬆ React Native does not come with built-in navigation capabilities.
- ➡ *React Navigation* is the most popular third-party library.
- ⬆ Enable developers to implement various navigation patterns.
- ⬆ Provides a set of navigators, such as stack, tab, and drawer navigators.



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Stack Navigator (cont)

```
import * as React from 'react';
import { View, Text, Button } from 'react-native';
import { createStackNavigator } from '@react-navigation/stack';
import { NavigationContainer } from '@react-navigation/native';

const HomeScreen = ({ navigation }) => {
  return (
    <View style={{ flex: 1, alignItems: 'center', justify
    <Text>Home Screen</Text>
    <Button title= "Go to Details"
      onPress={() => navigation.navigate('Details', { someParam: 'Hello!' })} />
    </View>
  );
};

const DetailScreen = ({ route }) => {
  return (
    <View style={{ flex: 1, alignItems: 'center', justify
    <Text>Details Screen</Text>
    <Text>Parameter: {route.params.someParam}</Text>
    </View>
  );
};

const Stack = createStackNavigator();

function App() {
  return (
    <NavigationContainer>
      <Stack.Navigator initialRouteName="Home"
        screenOptions={{ headerStyle: { backgroundColor: '#f451le' }}} >
        <Stack.Screen name="Home" component={HomeScreen} options={{ title: 'My Home' }} />
        <Stack.Screen name="Details" component={DetailScreen} options={{ title: 'Detail View' }} />
      </Stack.Navigator>
    </NavigationContainer>
  );
}

export default App;
```

Navigation actions:

🔗 **navigation.navigate('RouteName')**: Pushes a new route to the native stack navigator if it's not already in the stack.

❗ If you navigate to a route that is not defined in the navigator, it will print an error in the development mode and will not show errors in production mode.

🔗 **navigation.push('RouteName')**: Used to navigate to a screen in the stack navigator, adding a new route to the navigation regardless of the existing navigation history.

🔗 **navigation.goBack()**: Is used to programmatically go back to the previous screen.

🔗 **navigation.popToTop()**: Used to go back to the first screen in the stack.

Drawer Navigator (cont)

⬆ **drawerContent**: prop in the Drawer Navigator that allows you to provide a custom drawer content.

⬆ **CustomDrawerContent**: refer to a user-defined React component that will be rendered as the drawer content.

⬆ **DrawerItem**: in a custom drawer allows for more flexibility and customization.

```
import * as React from 'react';
import { View, Text } from 'react-native';
import { NavigationContainer } from '@react-navigation/native';
import { createDrawerNavigator } from '@react-navigation/drawer';

function CustomDrawerContent() {
  return (
    <DrawerContentScrollView {...props}>
      <Text>Welcome</Text>
    </DrawerContentScrollView>
  );
}

function HomeScreen() { // ... }

function NotificationScreen() { // ... }

const Drawer = createDrawerNavigator();

function App() {
  return (
    <NavigationContainer>
      <Drawer.Navigator initialRouteName="Home"
        screenOptions={{ drawerPosition: 'right',
          drawerContent: () => <CustomDrawerContent />
        }} >
        <Drawer.Screen name="Home" component={HomeScreen} options={{ title: 'My Home' }} />
        <Drawer.Screen name="Notifications" component={NotificationScreen} options={{ title: 'Detail View' }} />
      </Drawer.Navigator>
    </NavigationContainer>
  );
}

export default App;
```

⚠ The following are also available:

🔗 **navigation.jumpTo('RouteName')**: go to a specific screen in the drawer.

🔗 **navigation.openDrawer**: open the drawer.

🔗 **navigation.closeDrawer**: close the drawer.

🔗 **navigation.toggleDrawer**: toggle the state, ie. switch from closed to open.

Tab Navigator

Common style of navigation

⬆ Can be tabs on the bottom of the screen or on the top below the header.

⬆ **Bottom tab navigation**: A simple tab bar on the bottom of the screen that lets you switch between different routes.

⬆ Routes are lazily initialized -- their screen components are not mounted until they are first focused.

Drawer Navigator

^ Renders a navigation drawer on the side of the screen which can be opened and closed via gestures.

^ You cannot use the `useNavigation` hook inside the `drawerContent` since `useNavigation` is only available inside screens. You get a `navigation` prop for your `drawerContent` which you can use instead.

^ **drawerPosition**: prop typically set in the `screenOptions` to specify the position of the drawer, such as `left` or `right`.



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Tab Navigator (cont)

⬆ You cannot use the `useNavigation` hook inside the `tabBar` since `useNavigation` is only available inside screens. You get a **navigation prop** for your `tabBar` which you can use instead.

```
import React from 'react';
import { View, Text } from 'react-native';
import { NavigationContainer } from '@react-navigation/native';
import { createBottomTabNavigator } from '@react-navigation/bottom-tabs';

import Ionicons from 'react-native-vector-icons/Ionicons';

const HomeScreen = () => {
  return (
    <View>
      <Text>Home Screen</Text>
    </View>
  );
};

const SettingsScreen = () => {
  return (
    <View>
      <Text>Settings Screen</Text>
    </View>
  );
};

const Tab = createBottomTabNavigator();

function App() {
  return (
    <NavigationContainer>
      <Tab.Navigator
        screenOptions={({ route }) => ({
          tabBarIcon: ({ focused, color, size }) => {
            let iconName;

            if (route.name === 'Home') {
              iconName = focused ? 'ios-home' : 'ios-home-outline';
            } else if (route.name === 'Settings') {
              iconName = focused ? 'ios-settings' : 'ios-settings-outline';
            }

            return <Ionicons name={iconName} size={size} color={color} />;
          },
        })
      >
        <Tab.Screen name="Home" component={HomeScreen} />
        <Tab.Screen name="Settings" component={SettingsScreen} />
      </Tab.Navigator>
    </NavigationContainer>
  );
};

export default App;
```

⚠ The following are also available:

🔗 **`navigation.jumpTo('RouteName')`**: is a method that directly switches to a specified screen within the tab navigator.

Text

⬆ All components that display text. Supports nesting, styling, and touch handling.

⬆ Everything inside it is no longer using the Flexbox layout but using text layout.

⬆ Elements inside it are no longer rectangles, but wrap at the end of the line.

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

const ExampleText = () => {
  return (
    <Text style={{ fontSize: 18, color: 'blue' }}>
      Hello, this is a Text component!
    </Text>
  );
};

export default ExampleText;
```

⚠ You must wrap all the text nodes inside of a `<Text>` component

🔗 Will raise exception

```
<View> Some text </View>
```

🔗 Correct

```
<View>
  <Text> Some text </Text>
</View>
```

🔗 **Text container:** Text will be inline if the space allow it, otherwise, text will flow as if it was one.

```
<Text>
  <Text>First part and </Text>
  <Text>second part</Text>
</Text>
```

First part and second part

🔗 **View container:**

Each text is its own block, otherwise, the text will flow in its own block.

```
<View>
  <Text>First part and </Text>
  <Text>second part</Text>
</View>
```

First part and
second part

ScrollView

⬆ Creates a scrollable area when content exceeds screen's physical limits.

⬆ Can contain multiple components and views.

⬆ Can be scrolled vertically or horizontally.

⬆ Must have a bounded height in order to work.

⬆ Renders all its react child components at once.

View

- ^ A container that supports layout with flexbox, style, some touch handling, and accessibility controls.
- ^ Like a <div> in HTML.
- ^ Designed to be nested inside other views and can have 0 to many children of any type.

```
import React from 'react';
import { View, Text } from 'react-native';
const ExampleView = () => {
  return (
    <View style={{ flex: 1, justifyContent: 'center', alignItems: 'center' }}>
      <Text> Hello from View!</Text>
    </View>
  );
};
export default ExampleView;
```



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ScrollView (cont)

```
import React from 'react';
import { ScrollView, Text, View } from 'react-native';
const ExampleScrollView = () => {
  return (
    <ScrollView indicatorStyle="white"
      style={{ flex: 1 }}
      horizontal={true}> { / horizontal scrolling / }
    <Text>Item 1</Text> { / Repeat more components for more items / }
  )
</ScrollView>
};
export default ExampleScrollView;
```

⚠ **Performance Issues with Large Lists:** Slow rendering times for large lists.

⚠ **Memory Consumption:** Consume a significant amount of memory with large lists or complex item views.

FlatList

- ⬆ Used to efficiently render long lists.
- ⬆ Offers features like pull-to-refresh, infinite scrolling, and easy item separators.
- ⬆ **Lazy rendering:** renders items only when they appear on the screen and are scrolled within the user scrolls away from them.
- ⬆ Internal state is not preserved when content scrolls out of the render window.
- ⬆ Inherits the props of the ScrollView component.

```
import React from 'react';
import { FlatList, Text, View } from 'react-native';
const ExampleFlatList = () => {
  const data = [{ id: '1', name: 'Item 1' }, { id: '2', name: 'Item 2' }];
  return (
    <FlatList data={data}
      renderItem={({ item }) => <Text>{item.name}</Text> }
      keyExtractor={item => item.id} />
  );
};
export default ExampleFlatList;
```

⚠ **Two required props:**

🔗 **data:** accepts a plain array that contains the list of items to display.

🔗 **renderItem:** a function that goes over each item in the array and renders it into the list.

keyExtractor: It instructs the list to use the id of each item as React keys instead of the default key property.

SectionList

- ⬆ Used for rendering large lists with section headers.
- ⬆ Uses **lazy rendering** to achieve faster rendering.
- ⬆ Inherits the props of the ScrollView component.
- ⬆ Internal state is not preserved when content scrolls out of the render window.
- ⬆ Provides support for section headers and section separators.

```
import React from 'react';
import { SectionList, Text, View } from 'react-native';
const ExampleSectionList = () => {
  const sections = [ { title: 'Section 1', data: ['Item 1', 'Item 2'] },
    { title: 'Section 2', data: ['Item 3', 'Item 4'] } ];
  return (
    <SectionList
      sections={sections}
      renderItem={({ item }) => <Text>{item}</Text> }
      renderSectionHeader={({ section }) => <Text>{section.title}</Text> }
      keyExtractor={({ item, index }) => item + index} />
  );
};
export default ExampleSectionList;
```

⚠ **Two required props:**

🔗 **sections:** accepts the array that contains the list of items to display, and section headers.

🔗 **renderItem:** method which acts as the default renderer for every item in the list.

renderSectionHeader: prop, render each section's header.

TextInput

- ⬆ Used for inputting text into the app via a keyboard.

```
import React, { useState } from 'react';
import { TextInput } from 'react-native';
const ExampleTextInput = () => {
  const [inputValue, setInputValue] = useState('');
  return (
    <TextInput value={inputValue}
      onChangeText={text => setInputValue(text)}
      placeholder="Enter text here"
      style={{ height: 40, borderWidth: 1, margin: 10 }} />
  );
};
export default ExampleTextInput;
```

Image

- ▲ Used for displaying different types of images, network images, static resources, temporary local images, and images from local disk, such as the camera roll.
- ▲ You can also add style to an image.

```
import React from 'react';
import { Image } from 'react-native';

const ExampleImage = () => {
  return (
    <>
      {/ Remote Image /}
      <Image source={{ uri: 'https://example.com/image.jpg' }}
        style={{ width: 200, height: 200 }}
        resizeMode="contain" />
      {/ Local Image /}
      <Image source={require('./path-to-your-local-image.png')}
        style={{ width: 200, height: 200 }}
        resizeMode="cover" />
    </>
  );
};

export default ExampleImage;
```

resizeMode :

- 🕒 **'cover'**: Scales image to fill the container, maintaining its aspect ratio.
- 🕒 **'contain'**: Scales image to fit inside the container, maintain the image's aspect ratio ensuring the entire image is visible.
- 🕒 **'stretch'**: Stretches image to fill the container, possibly distorting the aspect ratio.
- 🕒 **'center'**: Centers image in the container without scaling. **'repeat'**: Repeats the image to cover the container.

⚠ For network and data images, you must specify the dimensions of the image.



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