

06016323 Mobile Device Programming

PREREQUISITE : OBJECT-ORIENTED PROGRAMMING

CREDIT : 3 (2-2-5)

TEACHERS : ดร.สุพันณดา โชคิพันธ์ / อ. พัฒนพงษ์ จันทร์มิตรօภาส

การประเมินผลรายวิชา

- ❖ การพัฒนาโครงการตามที่มอบหมาย 40% (3 คนต่อกลุ่ม)
- ❖ สอบกлаг囊ภาครีียน (ทฤษฎี) 25%
- ❖ สอบปลายภาครีียน (ทฤษฎี) 25%
- ❖ การมีส่วนร่วมในชั้นเรียน และ ทำแบบฝึกหัดในห้องปฏิบัติการคอมฯ 10%
- ❖ การตัดเกรด ตัดตามเกณฑ์มาตรฐาน

หัวข้อโครงการวิชา Mobile

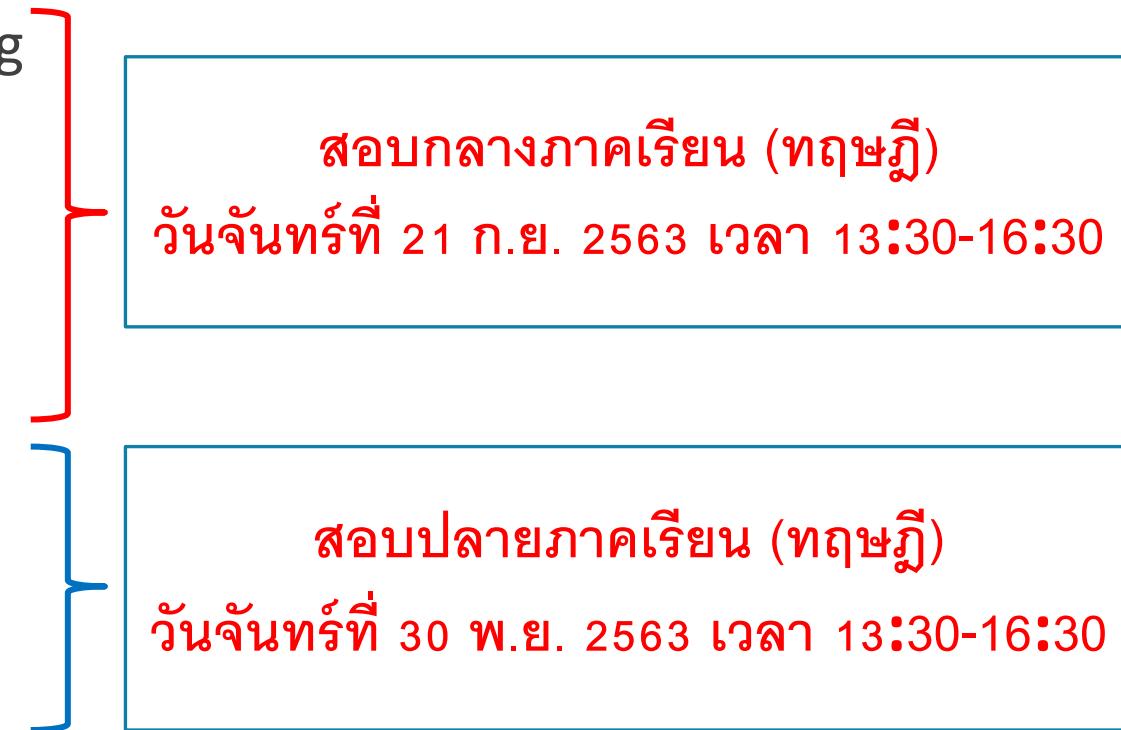
-
- ❖ **แอพพิเคชันทางสังคม** เช่น ระบบระบุตัวตนการเข้าออกอาคาร (ไทยชนะ) เป็นต้น
 - ❖ **แอพพิเคชันทางการเกษตร** เช่น ระบบจัดการหนอนเพลี้ยแมลง ในแปลงพืชผักผลไม้ เป็นต้น
 - ❖ **แอพพิเคชันทางการศึกษา** เช่น ระบบเช็คชื่อเข้าเรียน ระบบนัดหมายอาจารย์ที่ปรึกษา โครงการ หรือ ระบบช่วยสอน เป็นต้น
 - ❖ **แอพพิเคชันเพื่อความบันเทิง** เช่น เกมส์ เพื่อส่งเสริมความมั่ว เป็นต้น

งานที่ต้องส่ง	กำหนดส่ง	ลิงที่พิจารณา	คะแนน
ส่งเอกสารเสนอหัวข้อโครงการ	25 ส.ค. 2563	- ความเป็นไปได้ของโครงการ - ประโยชน์ของโครงการ	5%
นำเสนอหัวข้อโครงการ	26 ส.ค. 2563 (กลุ่มละ 5 นาที)	- ความคิดริเริ่มสร้างสรรค์ - การนำเสนอ	
ส่งรายงานความก้าวหน้า	7 ต.ค. 2563	- ปริมาณและคุณภาพของเนื้อหา - การออกแบบมีความสวยงาม เหมาะสม	10%
ส่งรายงานโครงการฉบับสมบูรณ์	24 พ.ย. 2563	- ความสมบูรณ์ของขึ้นงาน - ความซับซ้อนของการพัฒนา	
นำเสนอขึ้นงานโครงการ	25 พ.ย. 2563 (กลุ่มละ 10 นาที)	- ประโยชน์ของการนำไปใช้ - การนำเสนอ - ความสมบูรณ์ของรายงาน	25%

ตารางกำหนดส่ง โครงการ

หัวข้อการเรียนการสอน

- ❖ Introduction to mobile device programming
- ❖ Mobile programming fundamental
- ❖ Core Component (3 Parts)
- ❖ Core API (3 Parts)
- ❖ Navigation (2 Parts)
- ❖ Animation API (2 Parts)
- ❖ Gestures (2 Parts)



หนังสือและเอกสารประกอบการเรียน

- ❖ Abbott, B. et al., (2019), **Fullstack React Native : The complete Guide to React Native**, Fullstack.io, San Francisco, CA, USA
- ❖ Eisenman, B., (2018), **Leanring React Native 2nd**, O'Reilly Media., Inc. USA
- ❖ **React Native Notes for Professionals Book**,
<https://goalkicker.com/ReactNativeBook>, Access 30 June 2020
- ❖ เอกสารประกอบอื่น ๆ

บทเรียนที่ 1

INTRODUCTION MOBILE DEVICE PROGRAMMING :
SOFTWARE AND TOOLS

Learning Objectives

- ❖ Mobile Application Development (MAD)
- ❖ Software and Development tools
- ❖ Application building blocks
- ❖ First Project: Hello, Android

Introduction

- ❖ With the rapid advancement of technologies, it has become significant for all the business to create a foundation on web-based and social media platforms.
- ❖ Mobile app development contributes a huge part to the success of business.

Benefits to Customers

- ❖ Simple and easy to use
- ❖ Not much time consuming
- ❖ Hassle-free
- ❖ Multiple bookings from single device
- ❖ All the information on single device
- ❖ Easy to book tickets
- ❖ Fast and easy transaction
- ❖ Easy to keep records

SKILLS BREAKDOWN

FULL STACK DEVELOPER



Software Tools

- ❖ Yarn
- ❖ node.js
- ❖ NPM
- ❖ Expo Client
- ❖ VS CODE IDE
- ❖ Android Studio

Node.js

- ❖ Node.js® is a JavaScript runtime built on [Chrome's V8 JavaScript engine](#).
- ❖ As an asynchronous event-driven JavaScript runtime, Node.js is designed to build scalable network applications.
- ❖ Node.js is similar in design to, and influenced by, systems like Ruby's [Event Machine](#) and Python's [Twisted](#). Node.js takes the event model a bit further. It presents an [event loop](#) as a runtime construct instead of as a library.
- ❖ In other systems, there is always a blocking call to start the event-loop. Typically, behavior is defined through callbacks at the beginning of a script, and at the end a server is started through a blocking call like `EventMachine::run()`.
- ❖ In Node.js, there is no such start-the-event-loop call. Node.js simply enters the event loop after executing the input script. Node.js exits the event loop when there are no more callbacks to perform. This behavior is like browser JavaScript – the event loop is hidden from the user.
- ❖ HTTP is a first-class citizen in Node.js, designed with streaming and low latency in mind. This makes Node.js well suited for the foundation of a web library or framework.

Yarn Software

- ❖ Yarn is a package manager for your code. It allows you to use and share code with other developers from around the world. Yarn does this quickly, securely, and reliably.
- ❖ Yarn allows you to use other developers' solutions to different problems, making it easier for you to develop your software. If you have problems, you can report issues or contribute back, and when the problem is fixed, you can use Yarn to keep it all up to date.
- ❖ Code is shared through something called a **package**. A package contains all the code being shared as well as a **package.json** file (called a **manifest**) which describes the package.

<https://classic.yarnpkg.com/en/docs/install/#windows-stable>

Npm Software

- ❖ **npm** is the world's largest **Software Registry**.
- ❖ The registry contains over 800,000 **code packages**.
- ❖ **Open-source** developers use **npm** to **share** software.
- ❖ Many organizations also use npm to manage private development.

```
npm install -g yarn
```

```
admin — bash — 80x24
Last login: Thu Jul  9 21:35:44 on console
(base) Admins-MacBook-Pro:~ admin$ brew install yarn
Updating Homebrew...
==> Auto-updated Homebrew!
Updated Homebrew from 146eca460 to 6d2c39579.
Updated 2 taps (homebrew/cask and homebrew/core).
==> New Formulae
chrony
==> Updated Formulae
bit          freetds      grafana      snakemake
exploitdb    gnupg       rustup-init
==> Updated Casks
goland      kui         opera        rider

Warning: yarn 1.22.4 is already installed and up-to-date
To reinstall 1.22.4, run `brew reinstall yarn`
(base) Admins-MacBook-Pro:~ admin$ sudo port install yarn
```

Expo

- ❖ Expo is a framework and a platform for universal React applications. It is a set of tools and services built around React Native and native platforms that help you develop, build, deploy, and quickly iterate on iOS, Android, and web apps from the same JavaScript/TypeScript codebase.

```
#install the command line tools  
C:\> npm install --global expo-cli
```

```
#Create a new project  
C:\> expo init my-project
```

- ❖ **Expo client** is the tool you will use to run your projects while you're developing them. When you serve your project with Expo CLI, it generates a development URL that you can open in Expo client to preview your app.

<https://play.google.com/store/apps/details?id=host.exp.exponent>

<https://itunes.com/apps/exponent>

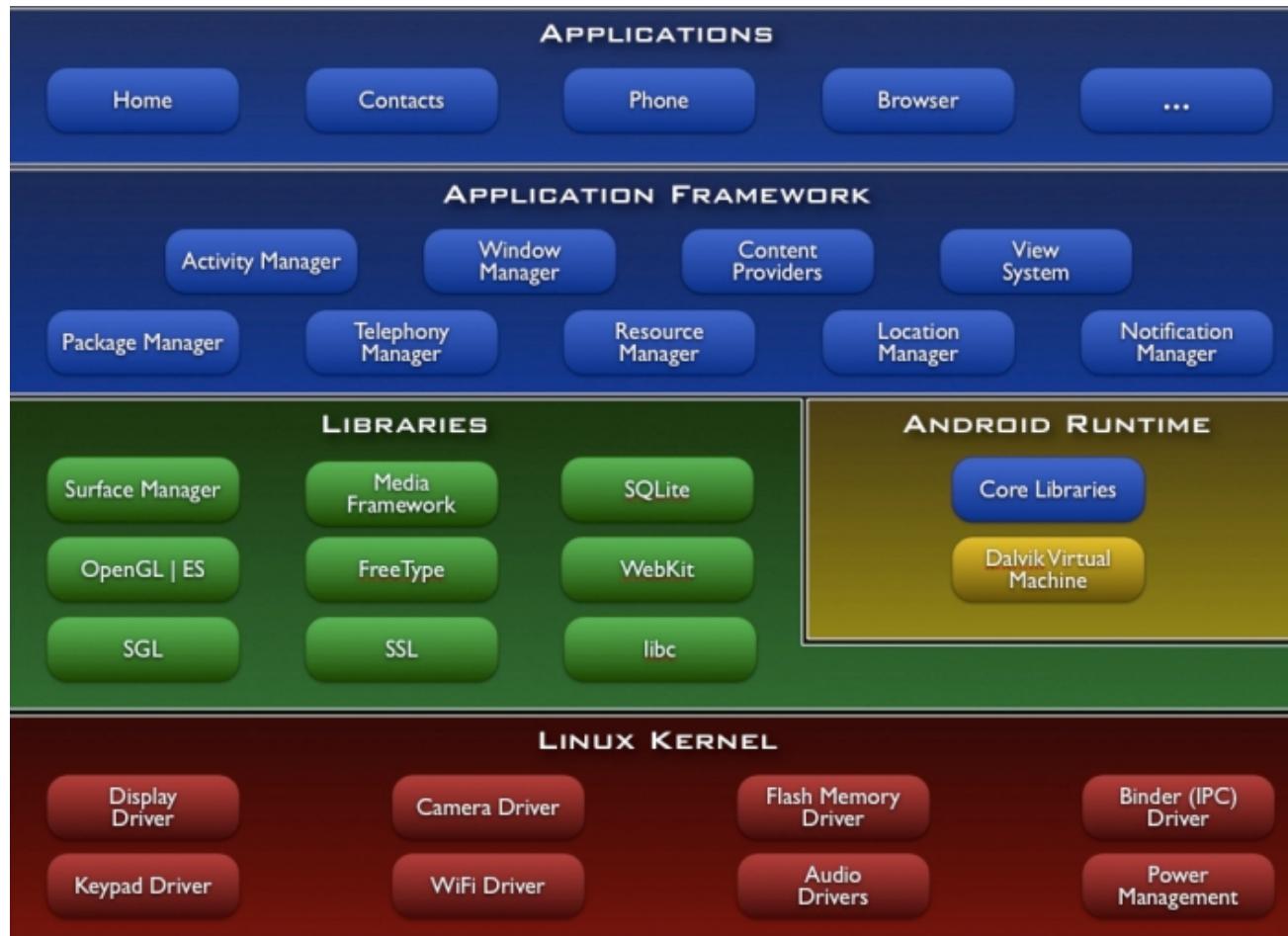
```
● ● ● admin — npm MONGO_HOME=/Users/admin/Desktop/mongodb-osx-x86_64-...
No matching version found for expo-template-blank@sdk-36--yarn
Set EXPO_DEBUG=true in your env to view the stack trace.
[(base) Admins-MacBook-Pro:~ admin$ npm install -g expo-cli
npm WARN deprecated @hapi/boom@7.4.11: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/joi@16.1.8: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/hoek@8.5.1: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/pinpoint@1.0.2: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/formula@1.2.0: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/address@2.1.4: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated @hapi/topo@3.1.6: This version has been deprecated and is no longer supported or maintained
npm WARN deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
( [ ] ) i: loadDep:core-js: sill resolveWithNewModule @jimp/types@0
```

What is Android?



Android is a software stack for mobile devices that includes an operating system, middleware and key applications.

Architecture



Android Studio

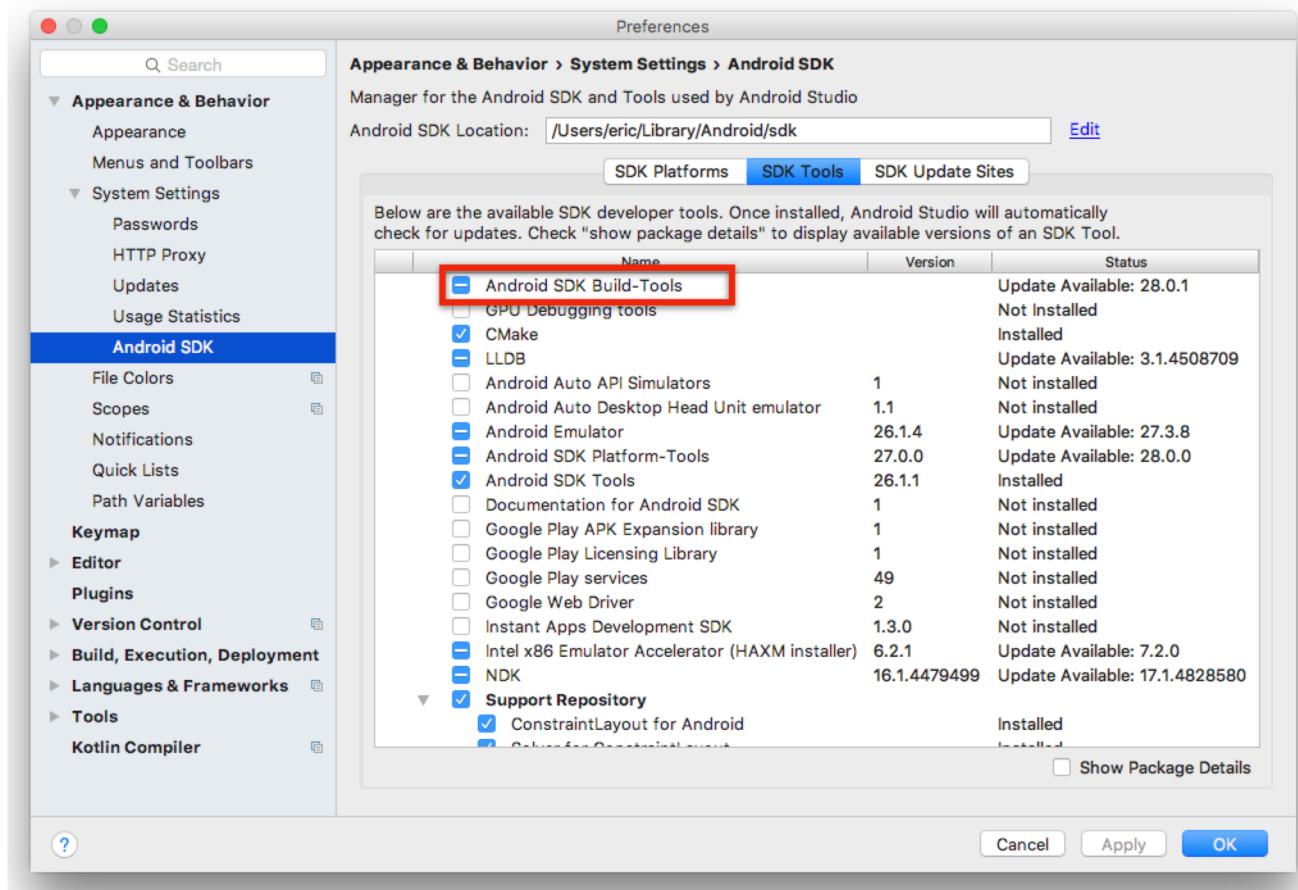
- ❖ Android Studio is the official Integrated Development Environment (IDE) for Android app development, based on [IntelliJ IDEA](#). On top of IntelliJ's powerful code editor and developer tools, Android Studio offers even more features that enhance your productivity when building Android apps, such as:
 - A flexible Gradle-based build system
 - A fast and feature-rich emulator
 - A unified environment where you can develop for all Android devices
 - Apply Changes to push code and resource changes to your running app without restarting your app
 - Code templates and GitHub integration to help you build common app features and import sample code
 - Extensive testing tools and frameworks
 - Lint tools to catch performance, usability, version compatibility, and other problems
 - C++ and NDK support
 - Built-in support for [Google Cloud Platform](#), making it easy to integrate Google Cloud Messaging and App Engine

What is the Android SDK?

The Android SDK is a [software development kit](#) provided by Google for Windows, Mac OS X, and Linux computers. The Android SDK is primarily intended to help developers create, test, and debug their Android apps. To that end, the SDK provides documentation, example code, virtual Android machines for running apps, framework code, support for development environments, debugging tools, and more.

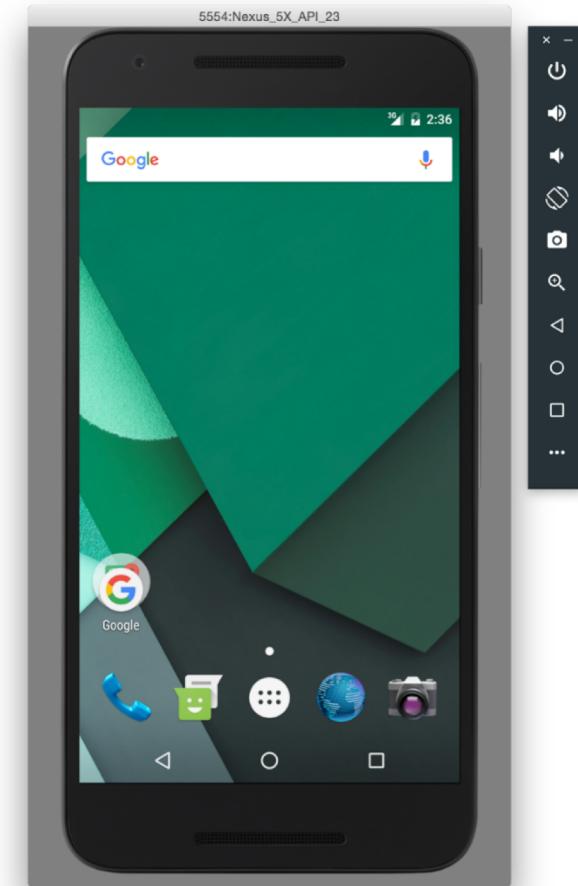
Android Studio is the official Integrated Development Environment (IDE) for Android app development, based on [IntelliJ IDEA](#). On top of IntelliJ's powerful code editor and developer tools, Android Studio offers even more features that enhance your productivity when building Android apps, such as:

The Android SDK?



Android Emulator

- ❖ **Android Emulator** is used to run, debug and test the android application. If you don't have the real device, it can be the best way to run, debug and test the application.
- ❖ It uses an open source processor emulator technology called **QEMU**.



Why real device is better Emulator?

The disadvantage of using emulator:

- ❖ No support for placing or receiving actual phone calls. You can simulate phone calls (placed and received) through the emulator console, however.
- ❖ No support for USB connections
- ❖ No support for camera/video capture (input).
- ❖ No support for device-attached headphones
- ❖ No support for determining connected state
- ❖ No support for determining battery charge level and AC charging state
- ❖ No support for determining SD card insert/eject
- ❖ No support for Bluetooth

Virtual device

- ❖ An Android Virtual Device (AVD) is a configuration that defines the characteristics of an Android phone, tablet, Wear OS, Android TV, or Automotive OS device that you want to simulate in the [Android Emulator](#). The AVD Manager is an interface you can launch from Android Studio that helps you create and manage AVDs.

To open the AVD Manager, do one of the following:

- Select **Tools > AVD Manager**.

- Click **AVD Manager**



in the toolbar.

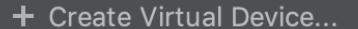
- ❖ An AVD contains a hardware profile, system image, storage area, skin, and other properties.

Android Virtual Device Manager

Your Virtual Devices

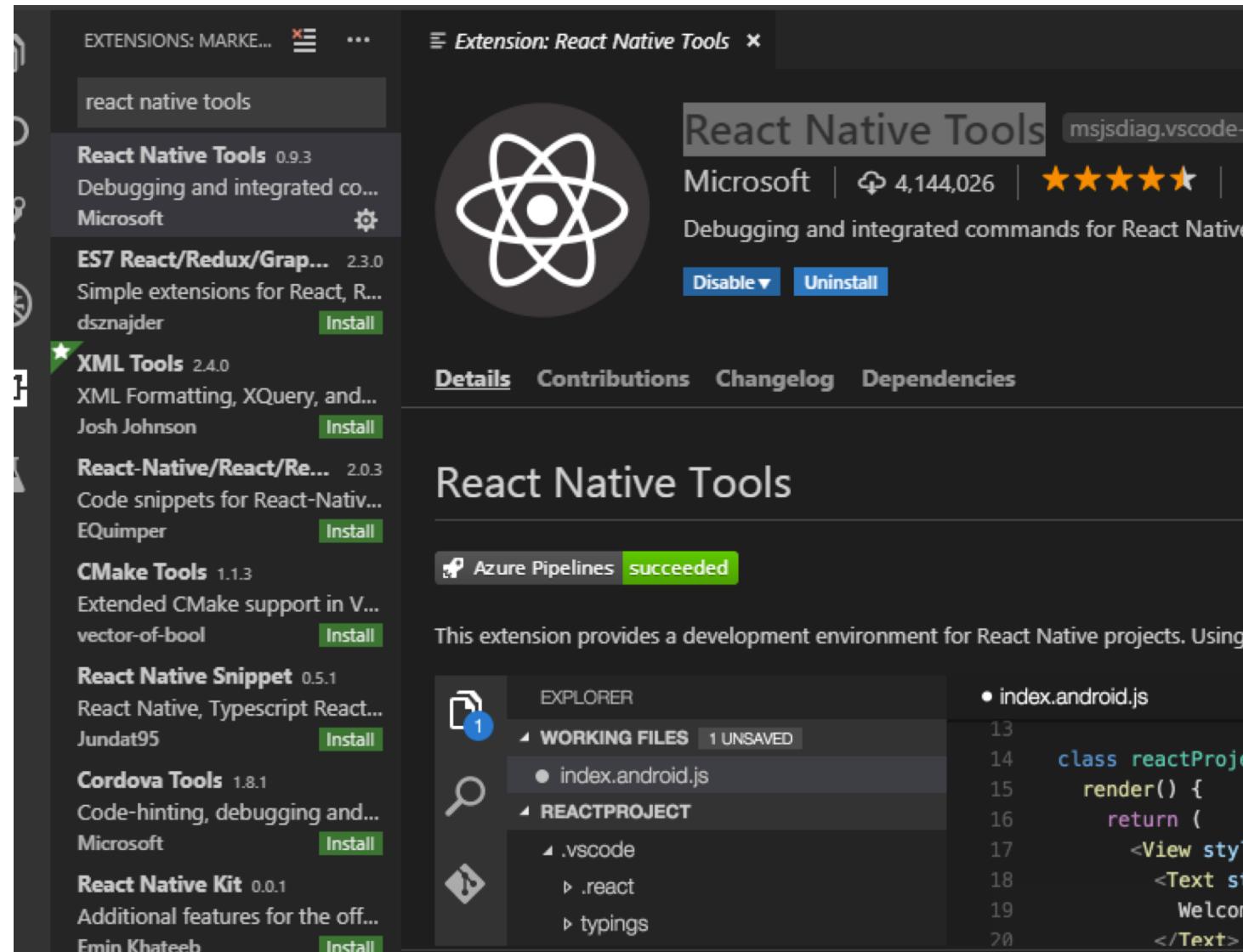
Android Studio

Type	Name ▲	Play Store	Resolution	API	Target	CPU/ABI	Size on Disk	Actions
Tablet	10.1 WXGA (Tablet) ...		800 × 1280: mdpi	28	Android 9.0 (Google APIs)	x86	513 MB	  
TV	Android TV (1080p) ...		1920 × 1080: xhdpi	28	Android 9.0 (Android TV)	x86	513 MB	  
Wear	Android Wear Round ...		320 × 320: hdpi	28	Android 9.0 (Wear OS)	x86	513 MB	  
Automotive	Automotive (1024p la...)		1024 × 768: mdpi	28	Android 9.0 (Automotive)	x86	513 MB	  
Phone	Pixel 3 API 28		1080 × 2160: 440dpi	28	Android 9.0 (Google Play)	x86	8.1 GB	  

?  

VSCODE IDE

- ❖ Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, Go) and runtimes (such as .NET and Unity).



VS CODE - Extension

- ❖ React Native Tools
- ❖ React-Native /React/Redux....
- ❖ Prettier-Format
- ❖ Material icon theme

App.js — Project_test

EXPLORER

> OPEN EDITORS

✓ PROJECT_TEST

> .expo

> .expo-shared

{ } assets.json

> .vscode

> .react

{ } launch.json

> assets

favicon.png

icon.png

splash.png

> node_modules

.gitignore

{ } app.json

App.js 2, M

b babel.config.js

package.json

package-lock.json

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL 1: bash

(base) Admins-MBP:Project_test admin\$

App.js

App.js > styles

```
1 import { StatusBar } from 'expo-status-bar';
2 import React from 'react';
3 import { StyleSheet, Text, View } from 'react-native';
4
5 export default function App() {
6   return (
7     <View style={styles.container}>
8       <Text>Open up App.js to start working on your app!</Text>
9       <StatusBar style="auto" />
10    </View>
11  );
12}
13
14 const styles = StyleSheet.create({
15   container: {
16     flex: 1,
17     backgroundColor: '#fff',
18     alignItems: 'center',
19     justifyContent: 'center',
20   },
21 }
22 });
23});
```

Ln 20, Col 5 Spaces: 2 UTF-8 LF JavaScript Prettier ⚡ ⚡

Mobile Application Structure

```
└── components/
    ├── App.js
    └── 1/
        ├── components/
        │   └── App.js
    └── 2/
        ├── components/
        │   └── App.js
    └── 3/
        ├── components/
        │   └── App.js
// ...
```

Java Scripts

weather/1/App.js

```
render() {
  return (
    <View style={styles.container}>
      <Text>Open up App.js to start working on your app!</Text>
    </View>
  );
}
```

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

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

export default class StyledText extends React.Component {
  render() {
    return (
      <Text style={styles.text}>{this.props.content}</Text>
    );
  }
}

const styles = StyleSheet.create({
  text: {
    color: 'red',
    fontWeight: 'bold',
  },
});
```

App.js — Project_test

EXPLORER ...

OPEN EDITORS

PROJECT_TEST

- .expo
- .expo-shared
 - assets.json
- .vscode
 - .react
 - launch.json
- assets
 - favicon.png
 - icon.png
 - splash.png
- node_modules
- .gitignore
- app.json
- App.js 2, M
- babel.config.js
- package.json
- package-lock.json U

App.js > [o] styles

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13
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15   container: {
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18     alignItems: 'center',
19     justifyContent: 'center',
20   },
21 ]
22 });
23 );
```

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL 1: bash

(base) Admins-MBP:Project_test admin\$ npm start

master* 2 △ 0 React Native Packager

Ln 20, Col 5 Spaces: 2 UTF-8 LF JavaScript Prettier

EXPLORER

> OPEN EDITORS

PROJECT_TEST

- > .expo
- > .expo-shared
 - {...} assets.json
- > .vscode
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App.js

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17     backgroundColor: '#fff',
18     alignItems: 'center',
19     justifyContent: 'center',
20   },
21 ],
22 );
23 });
24
```

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL

There is a new version of expo-cli available (3.23.2).
You are currently using expo-cli 3.11.7
Install expo-cli globally using the package manager of your choice; for example: `npm install -g expo-cli` to get the latest version

Starting project at /Users/admin/Project_test
Expo DevTools is running at <http://localhost:19002>
Opening DevTools in the browser... (press shift-d to disable)
Starting Metro Bundler on port 19001.
<exp://10.110.192.33:19000>



master* 2 ▲ 0 ▶ React Native Packager

Ln 20, Col 5 Spaces: 2 UTF-8 LF JavaScript Prettier

localhost:19002

(1) Project_test on Expo Developer Tools

METRO BUNDLER

LOGGED IN AS

PROCESS (1) - 6:46:13 PM

METRO BUNDLER

INFO Starting Metro Bundler on port 19001.
18:46

Run on Android device/emulator

Run on iOS simulator

Run in web browser

Send link with email...

Publish or republish project... 

PRODUCTION MODE 

CONNECTION   

exp://10.110.192.33:19000 