MPR – Fall 2021

Tutorial 1: Hello Android

General tutorial instruction

If you have any question, feel free to ask a TA for help, have a look on lecture slides or find answers on the Internet.

You are not expected to finish all of the exercises. Just do as much as you can in the allotted time.

Objectives

- Setting up working environment ready for creating your future awesome apps.
- Getting familiar with Android Studio
- Creating your first app: Hello Android

Tutorial Exercises

Activity 1: Chat with your tutor (30 mins)

Understanding between learners and instructors is very important. In this first tutorial, spend about a half of an hour (even more) to introduce yourself.

You are expected to be in the best mood when you finish this activity and be ready to the next one.

Activity 2: Setting up the working environment at the lab and in your computers (30 mins)

Programming Tools

- We are going to use Android Studio as the main programing tool.

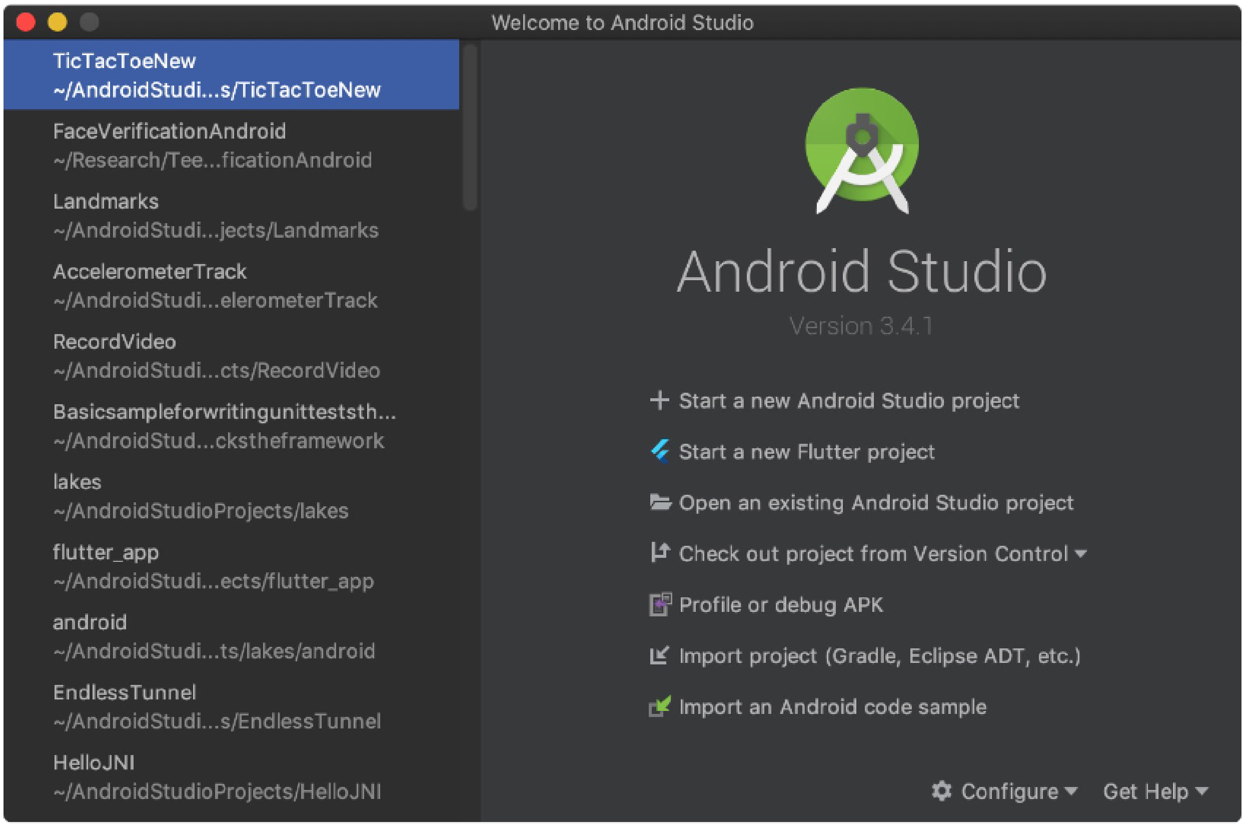
JDK

- Need to install Java Dev. Kit (JDK) *version ^8* to write Java (Android) programs
  - Don’t install Java Runtime Env. (JRE); JDK is different!
  - Newer versions of JDK can cause issues with Android
- You can download JDK (free): https://adoptopenjdk.net/

    - Oracle's JDK (http://java.oracle.com) free for dev. only; payment for commercial use
- Alternatively, for macOS, Linux:
    - macOS: Install Homebrew (http://brew.sh), then type `brew cask info adoptopenjdk8` at command line
    - Linux: Type `sudo apt install default-jdk` at command line (Debian, Ubuntu)

Android Studio (including Android SDK)

- Follow this link to download: https://developer.android.com/studio.
- Install Android Studio directly (Windows, Mac); unzip to directory android-studio, then run `./android-studio/bin/studio.sh` (Linux)
- You should see this:


Welcome to Android Studio
TicTacToeNew
~/AndroidStudi...s/TicTacToeNew
FaceVerificationAndroid
~/Research/Tee...ficationAndroid
Landmarks
~/AndroidStudi...jects/Landmarks
AccelerometerTrack
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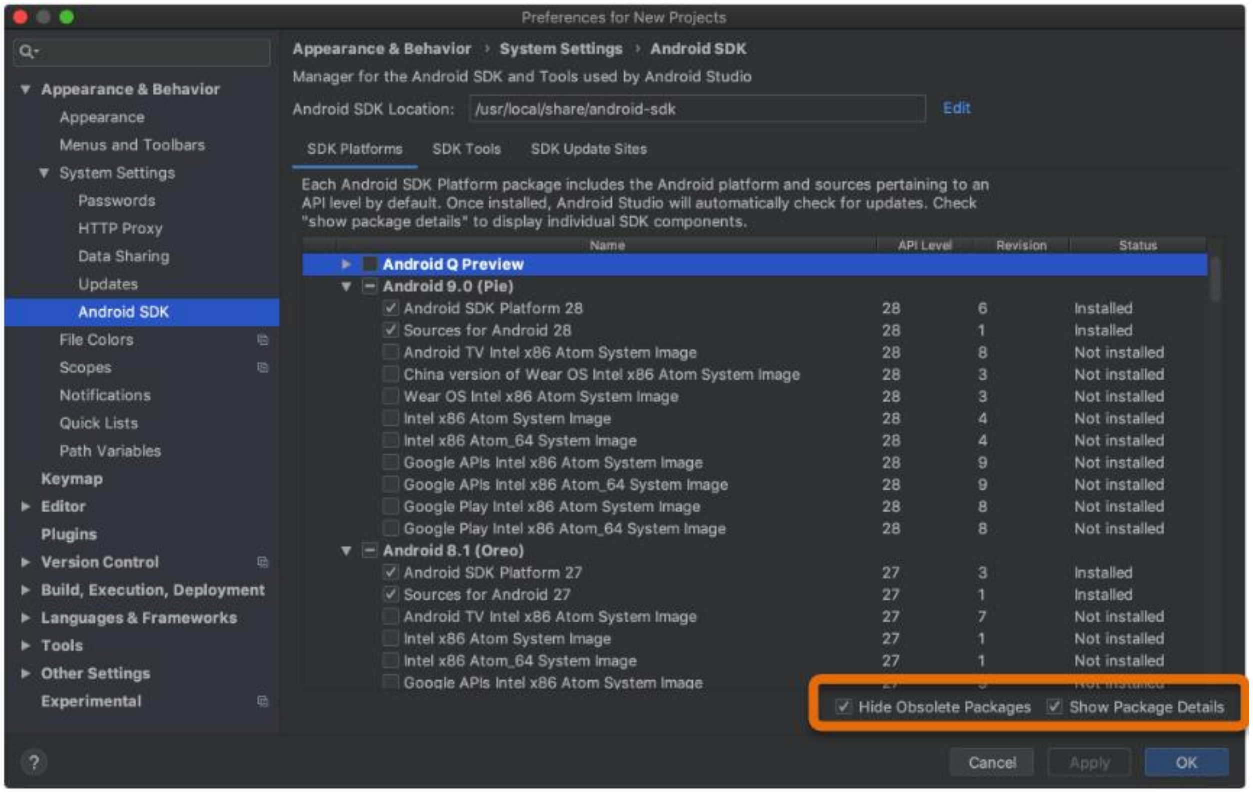
HelloJNI
~/AndroidStudioProjects/HelloJNI
Android Studio
Version 3.4.1
+ Start a new Android Studio project
Start a new Flutter project
Open an existing Android Studio project
Check out project from Version Control ▾
Profile or debug APK
Import project (Gradle, Eclipse ADT, etc.)
Import an Android code sample
Configure ▾
Get Help ▾

Emulator

- Strongly recommend testing with real Android device
    - Android emulator slow; Genymotion faster
    - Install USB drivers for your Android device!
- Go to File
    - Recommended: Install Android 5-8 APIs

- Don’t worry about system images for non-86 arch.



Appearance & Behavior › System Settings › Android SDK

Manager for the Android SDK and Tools used by Android Studio

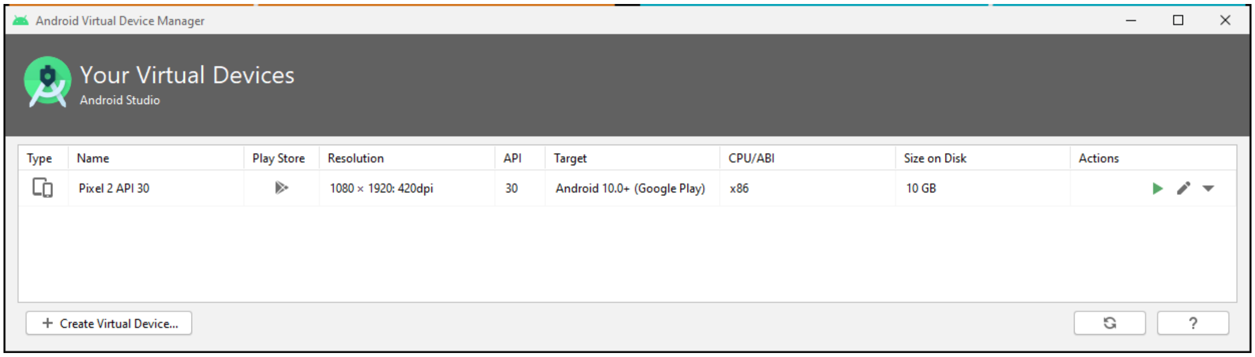
Android SDK Location: /usr/local/share/android-sdk

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

Name	API Level	Revision	Status
▶ □ Android Q Preview			
▼ ⊟ Android 9.0 (Pie)			
☑ Android SDK Platform 28	28	6	Installed
☑ Sources for Android 28	28	1	Installed
□ Android TV Intel x86 Atom System Image	28	8	Not installed
□ China version of Wear OS Intel x86 Atom System Image	28	3	Not installed
□ Wear OS Intel x86 Atom System Image	28	3	Not installed
□ Intel x86 Atom System Image	28	4	Not installed
□ Intel x86 Atom_64 System Image	28	4	Not installed
□ Google APIs Intel x86 Atom System Image	28	9	Not installed
□ Google APIs Intel x86 Atom_64 System Image	28	9	Not installed
□ Google Play Intel x86 Atom System Image	28	8	Not installed
□ Google Play Intel x86 Atom_64 System Image	28	8	Not installed
▼ ⊟ Android 8.1 (Oreo)			
☑ Android SDK Platform 27	27	3	Installed
☑ Sources for Android 27	27	1	Installed
□ Android TV Intel x86 Atom System Image	27	7	Not installed
□ Intel x86 Atom System Image	27	1	Not installed
□ Intel x86 Atom_64 System Image	27	1	Not installed
□ Google APIs Intel x86 Atom System Image	27	5	Not installed

☑ Hide Obsolete Packages ☑ Show Package Details

- Create a virtual device (optional)
  - Menu *Tools* → *AVD Manager* → *Create virtual device…*



Type	Name	Play Store	Resolution	API	Target	CPU/ABI	Size on Disk	Actions
	Pixel 2 API 30	▶	1080 × 1920: 420dpi	30	Android 10.0+ (Google Play)	x86	10 GB	▶ ✎ ▾

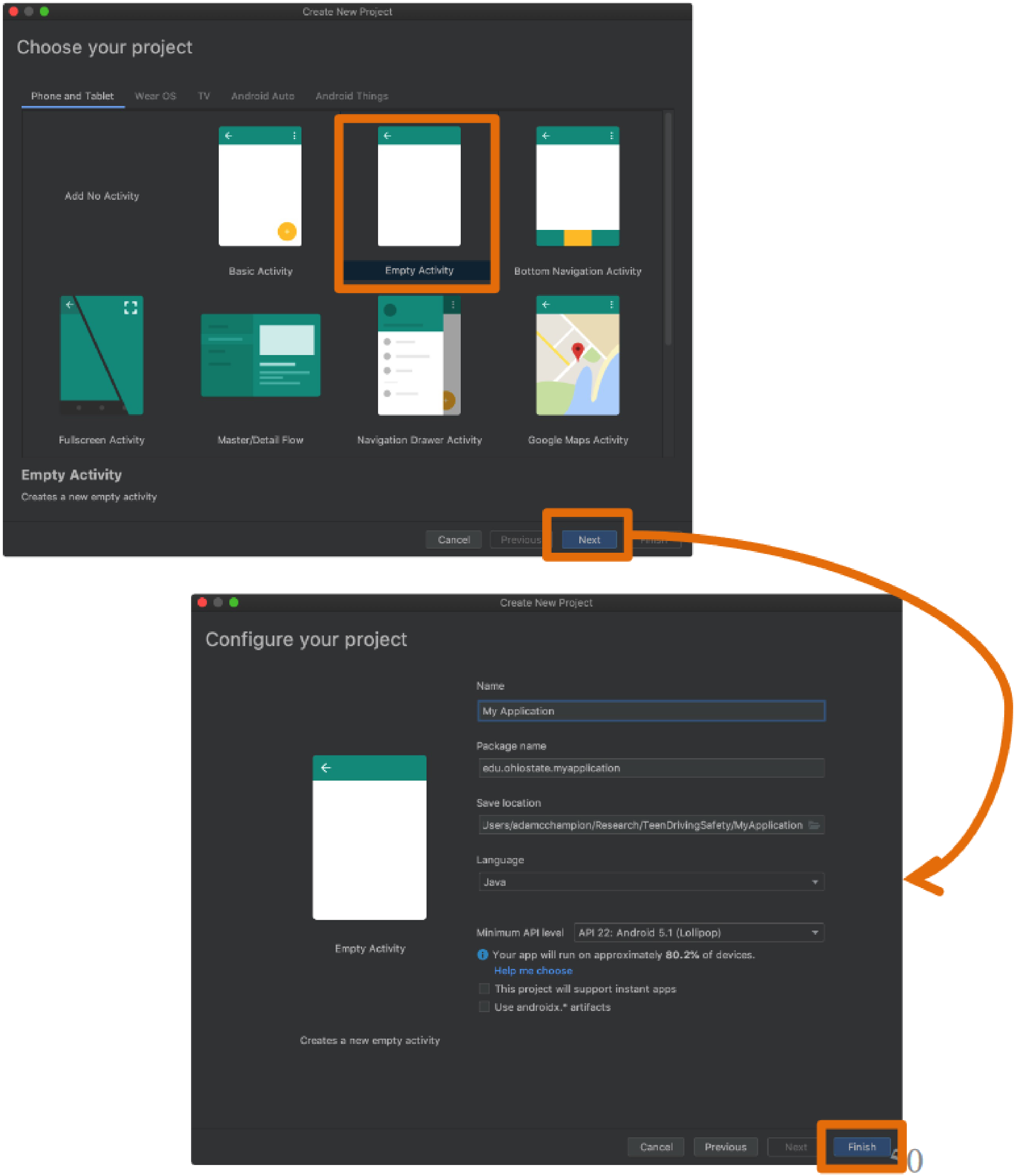
Exercise 1 – Getting familiar with Android Studio (30 mins)

Let’s walk through together!

Creating Android app

- Creating Android app project (Android Studio):
  - Go to *File* → *New Project*

- Select what kind of Activity to create (we’ll use Empty activity)
- Choose package name using “reverse DNS” style (*e.g.*, `edu.hanu.myapp`)
- Choose APIs for app
- Click Finish to create “Hello World” app



Choose your project

Empty Activity

Creates a new empty activity

Configure your project

Name: My Application

Package name: edu.ohiostate.myapplication

Save location: Users/adamcchampion/Research/TeenDrivingSafety/MyApplication

Language: Java

Minimum API level: API 22: Android 5.1 (Lollipop)

Your app will run on approximately **80.2%** of devices.

Help me choose

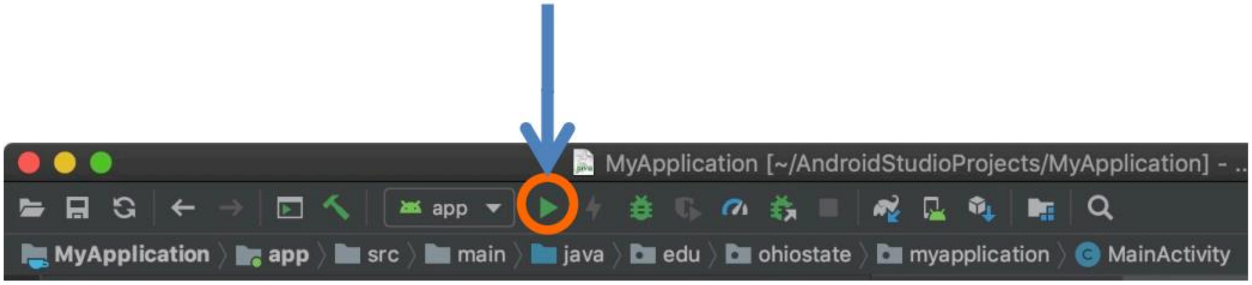
□ This project will support instant apps

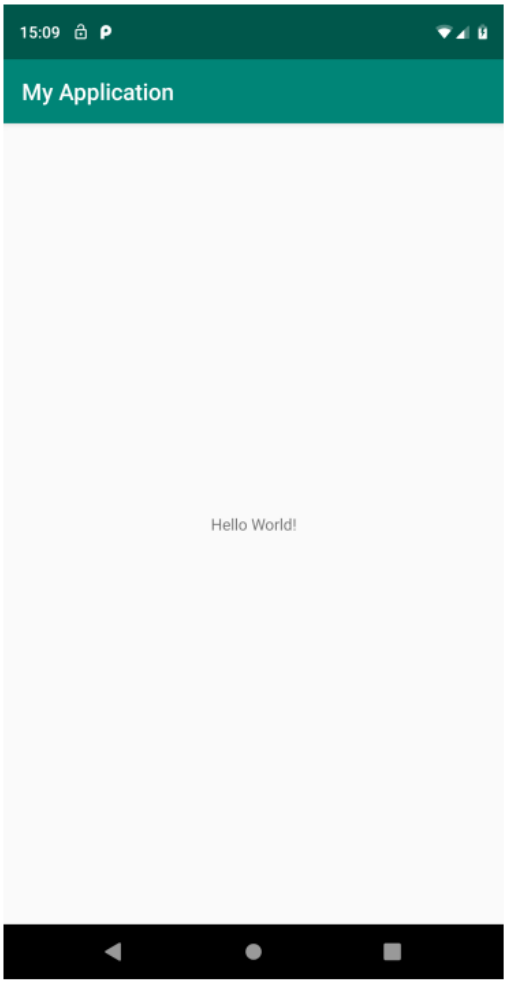
□ Use androidx.* artifacts

Creates a new empty activity

Deploying the App

- Two choices for deployment:
    - Real Android device
    - Android virtual device
- Plugin your real device; otherwise, create an Android virtual device
- Emulator is slow. Try Intel accelerated version, or perhaps http://www.genymotion.com/
- Run the app: press “**Run**” button in toolbar



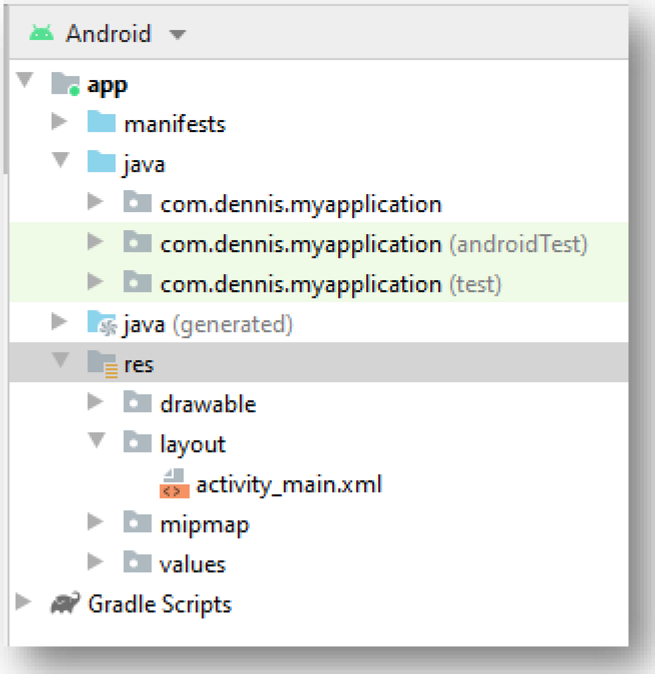


My Application

Hello World!

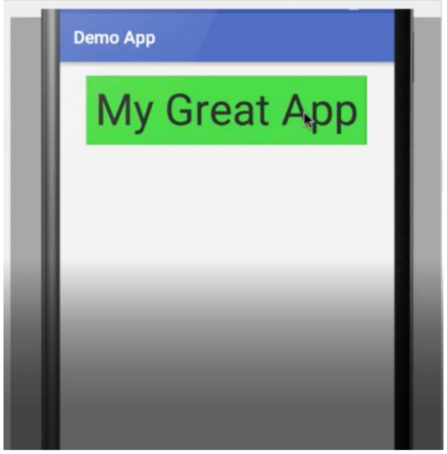
Exploring Android Studio

- Quick overview **project structure**



```
Android
app
  manifests
  java
    com.dennis.myapplication
    com.dennis.myapplication (androidTest)
    com.dennis.myapplication (test)
  java (generated)
  res
    drawable
    layout
      activity_main.xml
    mipmap
    values
Gradle Scripts
```

- Layout **Design view**:
  - Open `res/layout/activity_main.xml`
  - **Palette**:
    - To use any view element, drag-and-drop it into the frame of mobile screen
  - **Attributes**:
    - Click to select a view element in the frame of mobile screen for configurable attributes
    - Change configuration as per required
- **Practice**



FYI: App creation checklist

- If you own an Android device:
    - Ensure drivers are installed
    - Enable developer options on device under *Settings*, specifically *USB Debugging*
        - Android 4.2+: Go to *Settings* → *About phone*, press *Build number* 7 times to enable developer options
    - For Android Studio:
        - Under *File* → *Settings* → *Appearance*, enable “Show tool window bars”, “Widescreen tool window layout”
        - Programs should log states via `android.util.Log’s Log.d(APP_TAG_STR, “debug”)`, where `APP_TAG_STR` is a `final String` tag denoting your app
        - Other commands: `Log.e()` (error); `Log.i()` (info); `Log.w()` (warning); `Log.v()` (verbose) –same parameters

If you finish them all...

If you finish all the exercises, you can explore more with Android Studio, especially the Design view. Give it a try: other widgets, layouts, different attributes…

Posting them on our Facebook group with *#I’m_Android_developer* for discussion mark. **Note**: feel free if it somehow not so special – you know, we are all beginners :D

Good bye!