CSCI 448 – Lab 00A
Friday, January 13, 2023
LAB IS DUE BY **Wednesday, January 18, 2023 11:59 PM**!!

There are three main goals for today's lab:

1. Create a "Hello World" app
2. Create an Android Virtual Device (AVD)
3. Run the app on the AVD

As you work through these steps, any snags please post to Ed Discussion. Everyone's set up is likely slightly different so there may need to be some troubleshooting during the installation process. Luckily, set up is a one-time event.

Step 0 – Launch Android Studio

This section is only for your personal machines, the campus computer labs are already set up to go.

Install from https://developer.android.com/studio and download the latest version.

Select custom install. Choose your UI theme. For SDK, choose API 33 Tiramisu (this is the latest). It will check for new/updated components and install. This step will take a while.

Hit Finish and we're ready to go!

Step 1 – Hello Android!

As previously stated, any time you create a new project in Android Studio it creates a Hello World! App for you by default. This step is therefore very simple. KMAD pages 32-37 (Chapter 1 Building a Compose-based Screen) walk you through the process and is outlined below. Be sure to follow the steps in our lab writeup as it will differ slightly from the book to use the latest settings/options. (The book's already outdated)

When prompted to choose an Activity, choose "**`Empty Compose Activity (Material3)`**" (it will say Preview on the icon).

Set the name to be "**`Monster Lab`**" (this will save time for Lab01 but you should obviously change this for every project you create).

The package name should match a reversed URL format. I suggest using your email ID in the format: `com.csci448.<yourID>.monsterlab`. The package is the unique identifier for the app.

"`Kotlin`" is should be selected.

When prompted for the Minimum SDK, choose "`API 29: Android 10.0 (Q)`."

Hit Finish!

Once the project loads, make sure your Kotlin version is up to date. Go to `Tools > Kotlin > Configuration Kotlin Plugin Updates` and check that the latest is installed.

Step 2 – Making an AVD

There may have been a default AVD (Android Virtual Device) already created, but it won't have all the features we need.

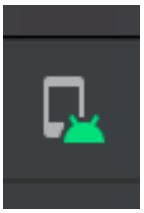
From the top menu, select `Tools > SDK Manager`. Go to the `SDK Tools` tab and check the boxes for

- `Google Play Licensing Library`
- `Google Play Services`

Hit `Apply` so these two components are installed.

Now select from the menu: Tools > Device Manager

Or click the icon for the Device Manager in the toolbar. The Device Manager has a phone with the Android's head, shown below.



Once the Device Manager window opens, there may be a Pixel 3 device. If there's one present, you'll likely note that it does not have Play Store support enabled. You can use this for a lightweight device but later in the semester we'll need the full Play Store environment.

We'll want to create a new device. Click "Create Device" to create a new device. Choose "Phone" and the device you want to emulate and system image with Play Store services (it will have an icon in the Play Store column). Download the appropriate Tiramisu API 33 w/ Google Play image. Finally name the device.

You will now see this device listed among your virtual devices. You can create as many devices as you need to simulate different runtime environments, hardware configurations, SDK versions, foldable devices, etc.

Click the green arrow to start the emulator (this may take a few minutes).

You will want to put the device into Developer Mode to unlock a number of useful debug features. You will want to do this on both a virtual and physical device if present. On the device, open up Settings and select "About phone." Then click on the "Build Number" seven times. You will see a Toast (we'll learn about these soon) saying you are "4 steps away from being a developer." After seven clicks, it will give you a success message. Go back to the Settings menu and search for "Developer Options." We will make use of these features later in the course.

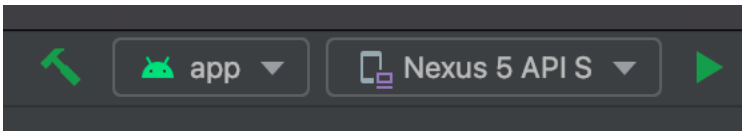
A few I like to have turned on are:

- USB Debugging (for physical devices)
- Show touches
- Pointer location

Next week, "Show layout bounds" will be a useful addition but we don't want it always on.

Step 3 – Running the App

From the toolbar, click the green arrow (shown below) next to "Android app" and "Device" dropdowns.



This may open a new window prompting you to select what device to launch the app on. You should see the device you started in Step 2 above. Select it and press OK. If you have the Build console open and Android Monitor, you will see output relating to the "gradle build" and launching to device.

Once finished, the app will launch on your virtual device. If you close down the app, you will see it installed on the App Finder Menu with a little Android icon.

Congratulations! You've created your very first app!

Optional Step 4 – Deploying to a Physical Device

Keep reading if you want to use a physical device. Connect your device to the computer via USB. Two steps you may need to do:

1. Wait for the device drivers to download to the computer
2. On the device itself, you may need to switch the USB mode to "PTP (Photo Transfer)" or "Midi". You can do this by swiping down from the top of the notifications bar to bring down the window shade. This step may not be needed, as you will hear me say often YMMV (your mileage may vary). If you are having trouble with this step, please use Ed Discussion to work together as someone else may have found a solution.

When you click the run icon, you should see your physical device listed in the device list now. Select that device and run.

If you go to your app menu, you will see your new Hello World app listed.

Step 5 – Submission

When Lab00 is complete and you've deployed the app to a device (virtual or physical), you will submit a video of your working app to Canvas. Android Studio provides you the ability to record the connected device. Once your app is running on a connected device, in Android Studio open the Logcat – something we'll be using very frequently in the course. You can open it from the menu View > Tool Windows > Logcat. In the Logcat panel that opened, from the left hand options, press "Screen Record." Leave the default options but be sure to check the "Show Taps" box. Press start recording and demonstrate the following actions on the device:

- Start from the home screen
- Open the app (either from a shortcut icon on the home screen or swiping up to all the installed apps)

Once the app opens and displays the default text, stop the recording. Save it as webm format and upload this file to Canvas Lab00.

Once you have your Hello World app running and submitted, move on to Lab01A to create your first *real* app.

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