LabW01 – Android Basics

Objectives

1. Get familiar with Android Studio
2. Understand basic Android UI elements

Tasks

1. Install and configure Android Studio on your personal systems.
2. Create your first Android project for mobile.
3. Create your first Android Project for wearables.
4. Connect Android Studio with USYD Github

Task 1: Install and configure Android Studio on your personal systems

This tutorial is based on Android Studio. If you haven’t set up your environment for Android app development, please refer to the following link https://developer.android.com/studio/install

For Windows Users

To install Android Studio on Windows, proceed as follows:

1. Download the latest version of Android Studio using the following link https://developer.android.com/studio
2. If you downloaded a .exe file (recommended), double-click to launch it.

   If you downloaded a .zip file, unpack the ZIP, copy the **android-studio** folder into your **Program Files** folder, and then open the **android-studio** > **bin** folder and launch studio64.exe (for 64-bit machines) or studio.exe (for 32-bit machines).
3. Follow the setup wizard in Android Studio and install any SDK packages that it recommends.

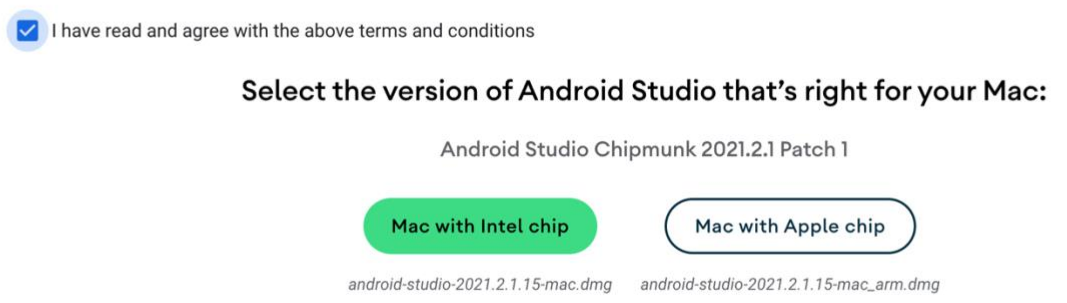
That's it. The following video shows each step of the setup procedure when using the recommended .exe download.
https://developer.android.com/static/studio/videos/studio-install-windows.mp4

For Mac Users

To install Android Studio on your Mac, proceed as follows:

1. Download the latest version of Android Studio using the following link https://developer.android.com/studio

Note: While downloading the DMG file, please ensure you select the right version for your Mac. If your Mac is with an Intel chip, please click on the button with the text Mac with Intel chip**.** However, if your Mac is with an Apple chip (M1/M2) please select the second option.



☑ I have read and agree with the above terms and conditions

Select the version of Android Studio that's right for your Mac:

Android Studio Chipmunk 2021.2.1 Patch 1

Mac with Intel chip
android-studio-2021.2.1.15-mac.dmg
Mac with Apple chip
android-studio-2021.2.1.15-mac_arm.dmg

2. Launch the Android Studio DMG file.
3. Drag and drop Android Studio into the Applications folder, then launch Android Studio.
4. Select whether you want to import previous Android Studio settings, then click **OK**.
5. The Android Studio Setup Wizard guides you through the rest of the setup, which includes downloading Android SDK components that are required for the development.

That's it. The following video shows each step of the recommended setup procedure. https://developer.android.com/static/studio/videos/studio-install-mac.mp4

Almost everybody today has a smartphone and is using apps on their smartphone. Some use wearables with apps. There are apps to check email, weather, play games, and so on.

In this tutorial, we will learn how to develop our first apps on the Android platform. To learn more about Android Studio, please refer to the following link https://developer.android.com/studio/intro

Note: Please backup your codes to your U: drive, OneDrive, GitHub, or USB key before you leave the lab.

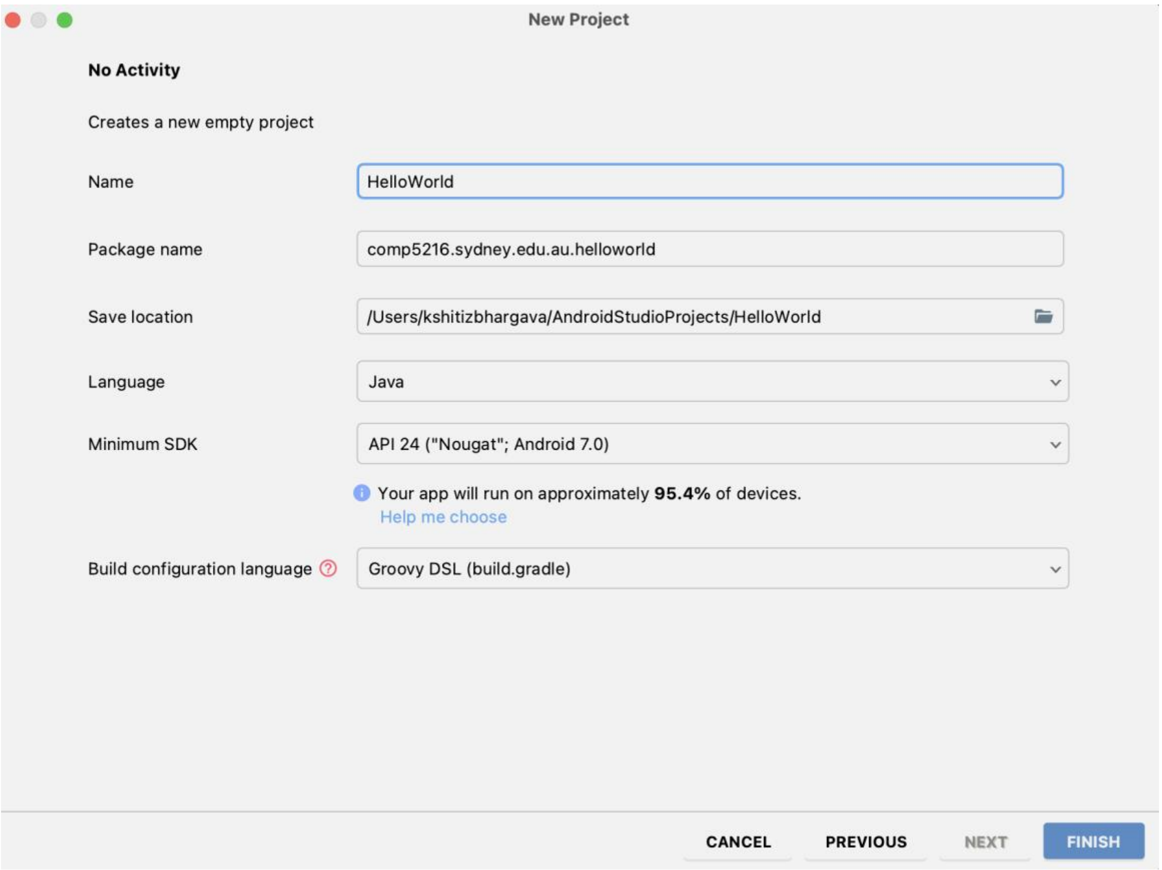
Task 2: Create your first Android project for mobile

1. Launch Android Studio.

2. In the ‘Welcome to Android Studio’ window, click 'New Project'.

3. In the ‘**New Project**’ window:
    - Under the “**Phone and Tablet**” tab, create a new empty activity by selecting “No Activity”.
    - Click Next

4. On the ‘**No Activity**’ screen, enter the following:
    - **Name:** HelloWorld
    - **Package name:** comp5216.sydney.edu.au.helloworld
    - **Save location:** (leave as is or change to your preferred location)
    - **Language:** Java
    - **Minimum SDK:** API 24: Android 7.0 (Nougat)
    - **Build configuration language:** Groovy DSL (build.gradle)
    - Click Finish



New Project

No Activity

Creates a new empty project

Name: HelloWorld

Package name: comp5216.sydney.edu.au.helloworld

Save location: /Users/kshitizbhargava/AndroidStudioProjects/HelloWorld

Language: Java

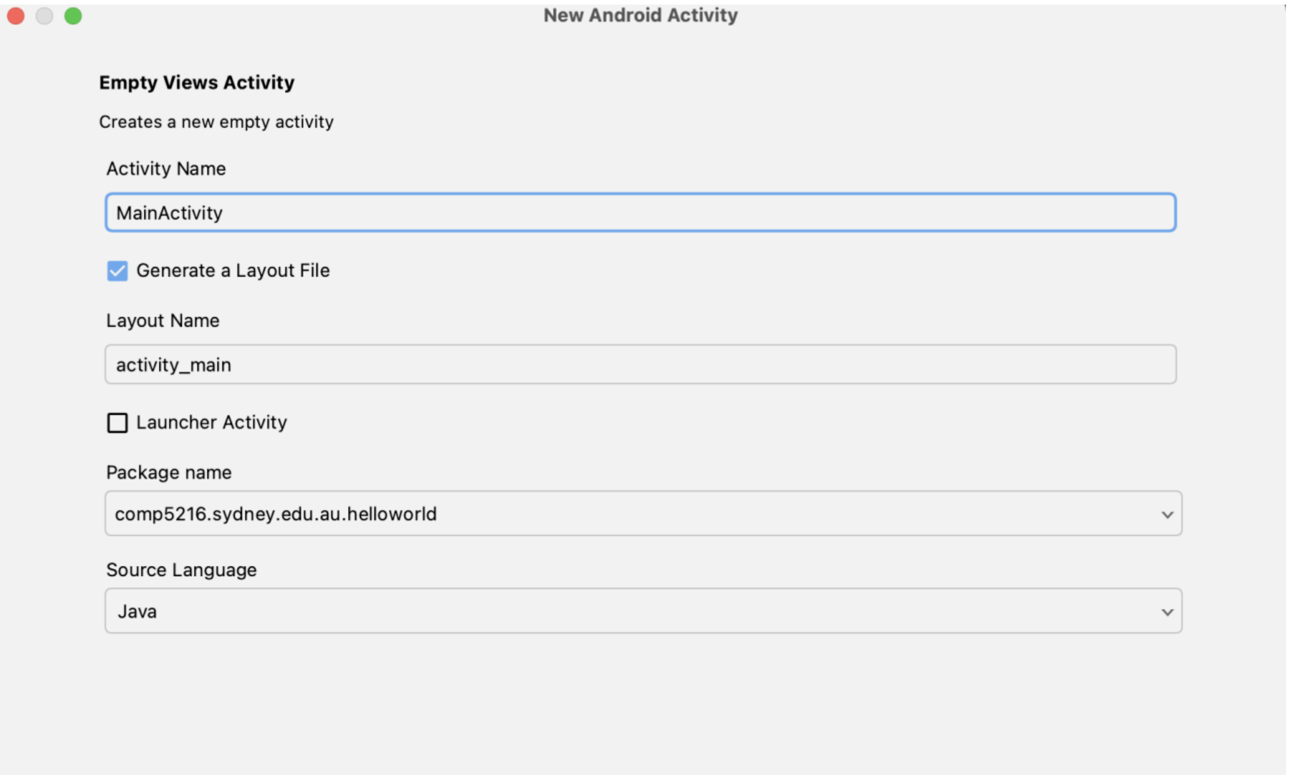
Minimum SDK: API 24 ("Nougat"; Android 7.0)

Your app will run on approximately **95.4%** of devices.
Help me choose

Build configuration language: Groovy DSL (build.gradle)

5. After some processing, Android Studio opens the IDE. Now take a moment to review the most important files. First, be sure the Project window is open (select View > Tool Windows > Project) and the Android view is selected from the drop-down list at the top of that window.

6. Right-click on the **app > java > comp5216.sydney.edu.au.helloworld** and hover over the **New >Activity > Empty Views Activity** and fill in all the fields to generate the files.



New Android Activity

Empty Views Activity

Creates a new empty activity

Activity Name: MainActivity

☑ Generate a Layout File

Layout Name: activity_main

□ Launcher Activity

Package name: comp5216.sydney.edu.au.helloworld

Source Language: Java

7. You can then see the following files:

   - app > java > comp5216.sydney.edu.au.helloworld > MainActivity
   - app > res > layout > activity_main.xml
   - app > manifests > AndroidManifest.xml
   - Gradle Scripts > build.gradle (Project: HelloWorld)
   - Gradle Scripts > build.gradle (Module: HelloWorld.app)

8. Expand the manifest folder and open the **AndroidManifest.xml** file and the following lines in between the activity tags.

```
<activity
    android:name=".MainActivity"
    android:exported="true">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
```

9. Navigate to **app** > **res** > **layout** > **activity_main.xml** and add the code below in between the parent tag of the file.

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello World!"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
```

10.Open the Device Manager by selecting Tools > Device Manager. Click “Create Device…” to create an emulator that allows you to test your application without having to own the physical devices.

11. In the Select Hardware screen, select a phone device e.g. Pixel 3, and then click Next

12. In the System Image screen, select the version with the highest API level e.g. Release Name: “Tiramisu”. If you don't have that version installed, a Download link is shown, so click that and complete the download.

13. Click Next.

14. On the Device Manager screen, leave all the settings alone and click Finish. Close the Device Manager window.

15. We will run the app on the emulator we have just created. In Android Studio, click the app module in the Project window and then select Run > Run ‘app’ (or click Run ▶ in the toolbar, or click ‘Shift + F10’).

16. Android Studio installs the app on the emulator and starts it. You should now see the "Hello World!" text displayed in the app running on the emulator.

Task 3: Create your first Android project for wearables

1. Next, we will create our first wearable app using Android Studio's New Project wizard. Click File > New > New Project.

2. In the '**New Project**' window:

- Under the "Wear OS" tab, create a new blank activity by selecting "No Activity".
- Click Next

3. On the '**No Activity**' screen, enter the following:

- **Name**: HelloWorldWearApp
- **Package name:** comp5216.sydney.edu.au.helloworldwearapp
- **Save location:** (leave as is or change to your preferred location)
- **Language:** Java
- **Minimum SDK:** API 25: Android 7.1.1 (Nougat)
- **Build configuration language:** Groovy DSL (build.gradle)
- Click Finish

4. Right-click on the **app** > **java** > **comp5216.sydney.edu.au.helloworld** and hover over the **New** >**Activity** > **Empty Views Activity** and fill in all the fields to generate the files.

5. Navigate to **app** > **res** > **layout** > **activity_main.xml** and add the code below in between the parent tag of the file.

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello World!"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
```

6. Expand the manifest folder and open the **AndroidManifest.xml** file and update the application tag with the code below.

```
<application
    android:allowBackup="true"
    android:icon="@mipmap/ic_launcher"
    android:label="@string/app_name"
    android:supportsRtl="true"
    android:theme="@android:style/Theme.DeviceDefault">
    <activity
        android:name=".MainActivity"
        android:exported="true" />
</application>
```

7. Open **MainActivity** class and update the inheritance of the class from **AppCombactActivity to Activity** and add the import line at the top.

```
package comp5216.sydney.edu.au.helloworldwearapp;

import android.app.Activity;
import android.os.Bundle;

public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

8. Open the Device Manager by selecting Tools > Device Manager.

9. Click Create Device.

10. In the Category pane, select ‘Wear OS’ and choose a hardware profile e.g. ‘Android Wear Square’. Click Next.

11. In the ‘Select a system image’ screen, select an image with the Release Name of Nougat, the API Level of 25, and the Target of "Android 7.1.1 (Android Wear)". If you don't have that version installed, a Download link is shown, so click that and complete the download.

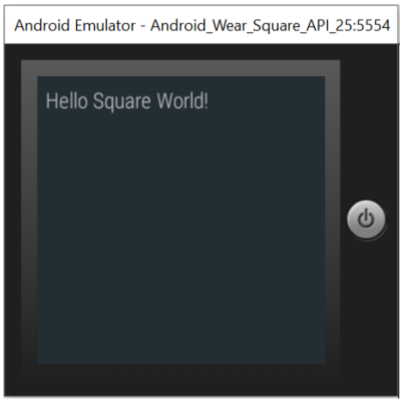
12. Click Next and then click Finish.

13. Close the Device Manager window.

14. In Android Studio, click the Run ‘app’ button (or click ‘Shift + F10’).

15. Select the new device you have just created and click OK.

16. The device starts and, after a few moments, runs your app. A "Hello Square World!" message is displayed.



Android Emulator - Android_Wear_Square_API_25:5554

Hello Square World!

Task 4: Connect your Android studio with GitHub

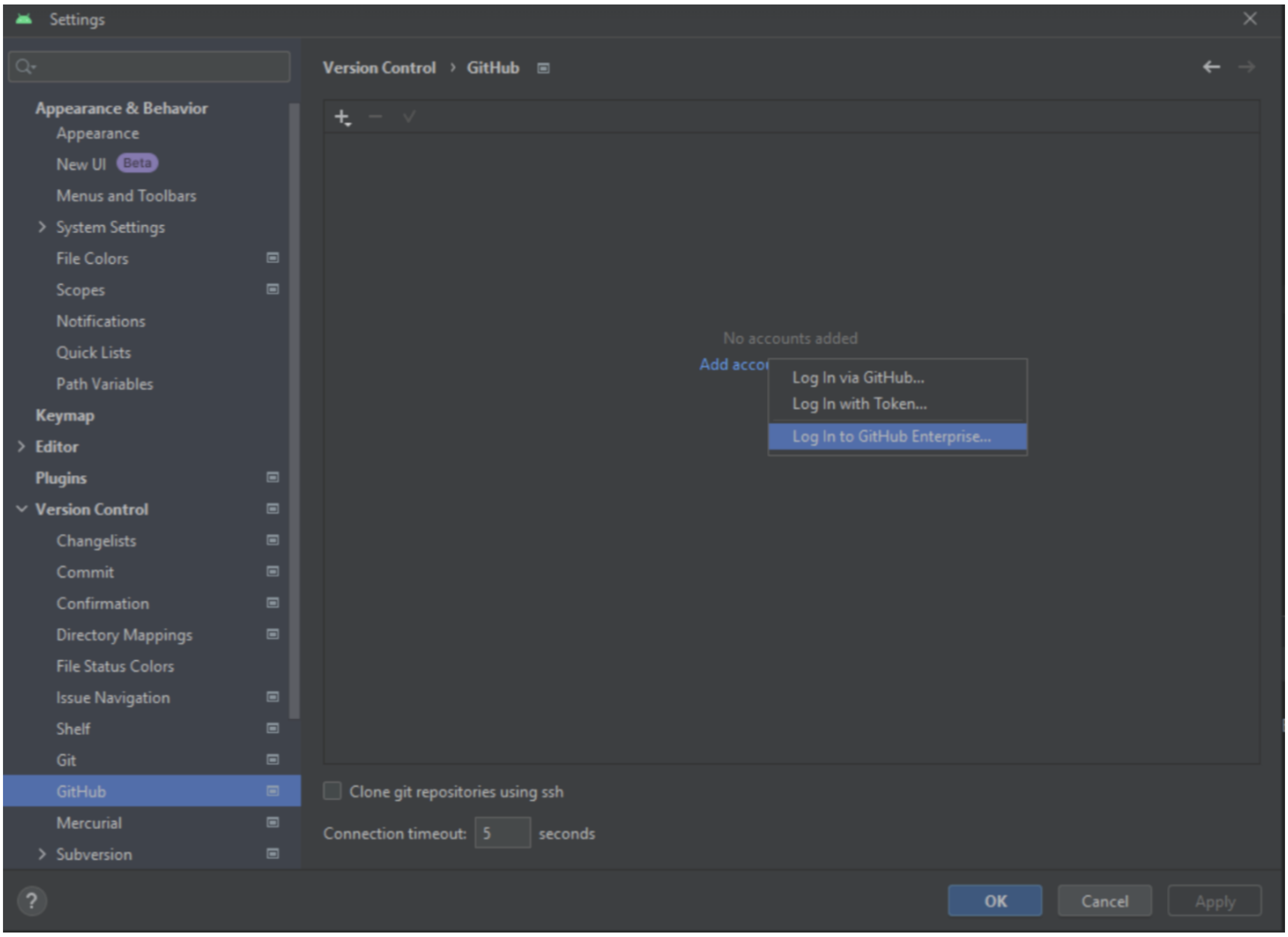
1. Visit https://github.sydney.edu.au/

2. Enter your UniKey and UniKey password to log in.

3. **Window Users:** click on File -> Settings -> Version Control -> GitHub. A GitHub configuration box will appear and click on the green colour "+" icon to add the connection to your individual USYD GitHub account.

4. **Mac Users:** click on Android Studio -> Settings -> Version Control -> GitHub. A GitHub configuration box will appear and click on the green colour "+" icon to add the connection to your individual USYD GitHub account.

5. Select **Login into GitHub Enterprise** option to connect your USYD Enterprise GitHub account.



No accounts added

□ Clone git repositories using ssh

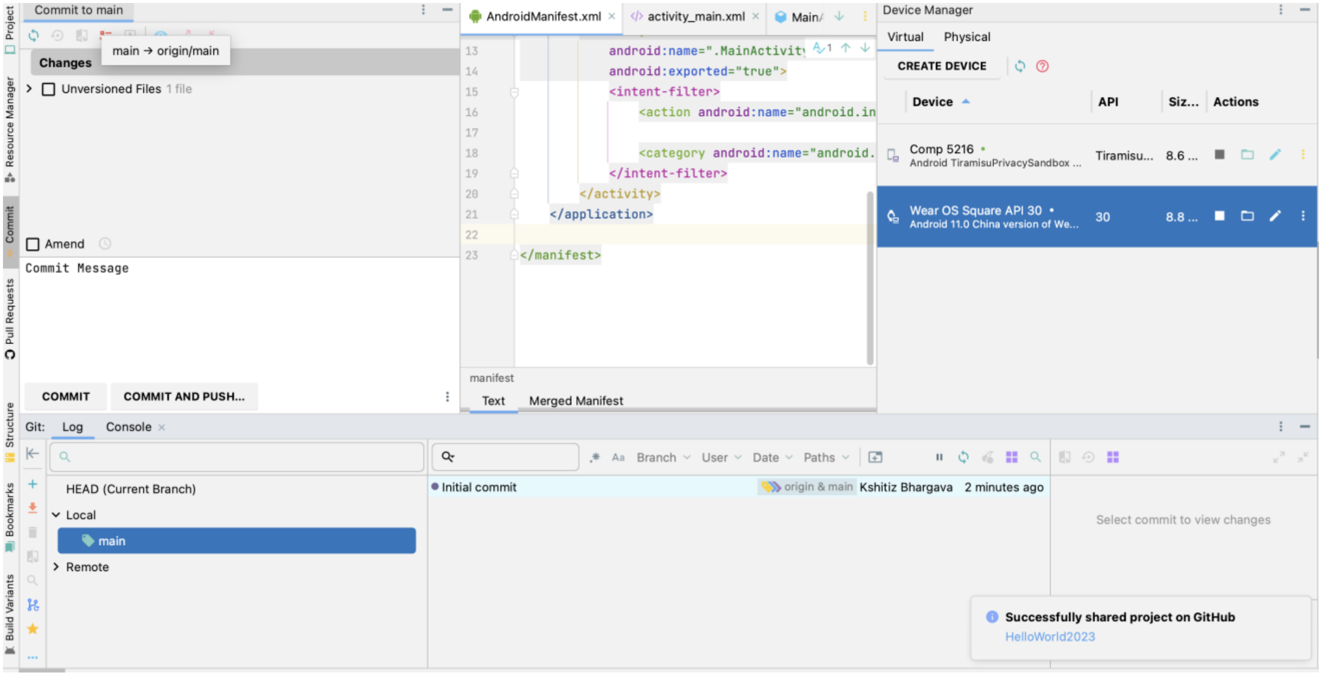
Connection timeout: 5 seconds

6. In the popup, enter the following URL as server https://github.sydney.edu.au/ and click **Generate** button next to the token text box.

7. The GitHub account will open in the browser with default token settings, change the settings as per your requirements and click **Generate Token** green button at the bottom of the page.

8. Copy the generated token and navigate back to Android Studio add GitHub account screen and click **Add Account** button. You will see your account added to Android Studio and click **Apply** button.

9. Click on the VCS option in the menu bar and select Share GitHub to initialise the repository and it will be available for collaboration. You will see a popup in the right bottom corner acknowledging the successful sharing of the project.



```
            android:name=".MainActivity
            android:exported="true">
            <intent-filter>
                <action android:name="android.in

                <category android:name="android.
            </intent-filter>
        </activity>
    </application>

</manifest>
```

Device	API	Siz...	Actions
Comp 5216 • Android TiramisuPrivacySandbox ...	Tiramisu...	8.6 ...	
Wear OS Square API 30 • Android 11.0 China version of We...	30	8.8 ...	

Initial commit origin & main Kshitiz Bhargava 2 minutes ago

Successfully shared project on GitHub
HelloWorld2023

References

The tutorial is partially adopted based on the materials from Android Developer:
https://developer.android.com/training/basics/firstapp
https://developer.android.com/training/basics/firstapp/running-app
https://developer.android.com/training/wearables/get-started/creating

If you wish to set up an Android app development environment, please refer to:
https://developer.android.com/studio/install