

Lab 1: Introduction to Android Studio and Git

(Due: Mon, Feb 3, 2020 @ 3.25pm)



Introduction:

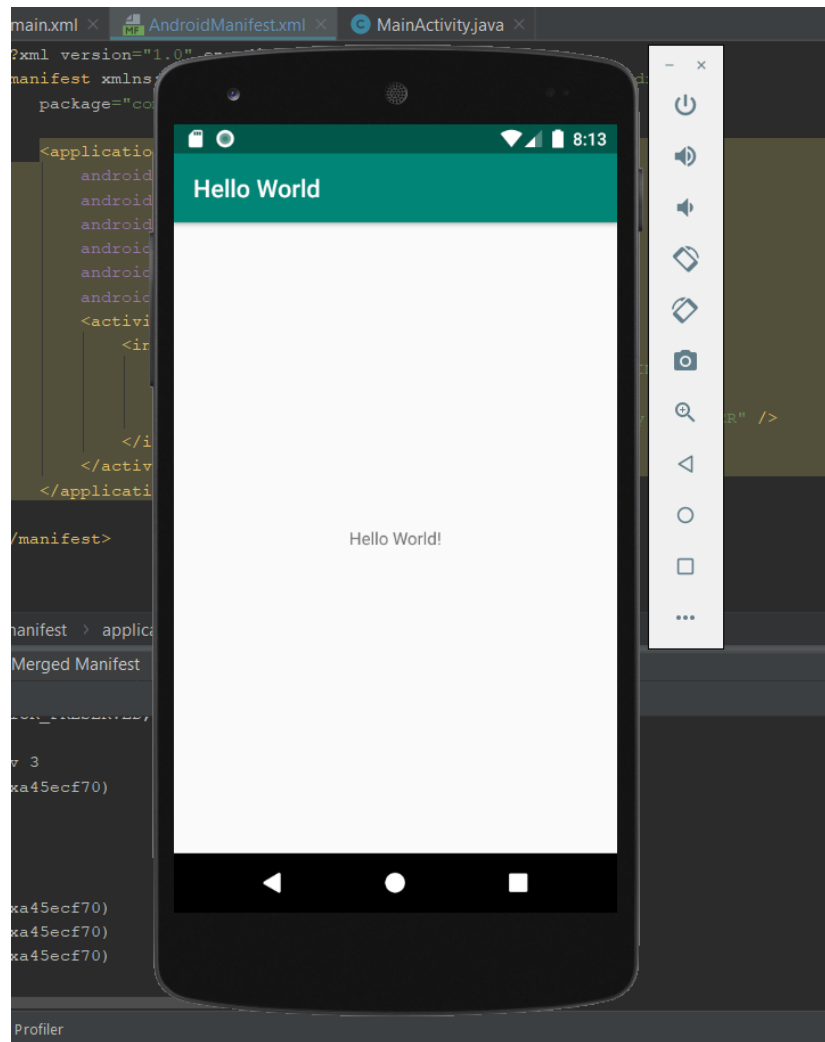
This lab is to help you set up your Android development environment. We will be using Android Studio which is the official integrated development environment for Google's Android operating system. There are two main goals for this lab. The first one is to successfully install Android Studio on your personal computer and run a basic "Hello World" application. The second one is to make a clone of our class GitHub repository and make a few changes that will be described in more detail below. The successful completion of this lab will help you get more comfortable with Android Studio and version control with Git. This lab will help you complete more complex Android projects in the future.

Directions:

Milestone 1 - Successfully compile and run "Hello World" app on an Android Virtual Device (AVD) in Android Studio.

1. First step is to download Android Studio from the following link provided by Google: <https://developer.android.com/studio>. Then follow these steps:
 - a. Navigate to the Android developers site and follow the instructions to download and install Android Studio.
 - b. Accept the default configurations for all steps.
 - c. Make sure that all components are selected for installation.
 - d. After finishing the install, the Setup Wizard will download and install some additional components.
 - e. When the download completes, Android Studio will start, and you are ready to create your "Hello World" project.
2. Create the "Hello World" app:
 - a. Launch Android Studio if it is not already opened.
 - b. In the main Welcome to Android Studio window, click "Start a new Android Studio project".
 - c. Customize the Activity window under the Phone and Tablet section. Every app needs at least one activity. An activity represents a single screen with a user interface and Android Studio provides templates to help you get started. For the Hello World project, choose the **Empty Activity** template.

- d. In the New Project window, give your application an Application Name, such as "Hello World".
 - e. Verify the Project location, or choose a different directory for storing your project.
 - f. Make sure that you select the language as **Java**.
 - g. Verify that the default Project location is where you want to store your Hello World app and other Android Studio projects, or **change it to your preferred directory**. Click Next.
 - h. On the Target Android Devices screen, "Phone and Tablet" should be selected. And you should ensure that **API 15: Android 4.0.3 IceCreamSandwich is set as the Minimum SDK**. Click Next.
 - i. If your project requires additional components for your chosen target SDK, **Android Studio will install them automatically**. Click Next.
 - j. Last step is to verify all the details that you have provided and click **Finish**.
3. Now that you have started an Android project, you will need a virtual device to run the app. To create an Android Virtual Device follow these steps:
 - a. In Android Studio, select Tools > AVD Manager, or click the AVD Manager icon  in the toolbar.
 - b. Click the **+Create Virtual Device....** (If you have created a virtual device before, the window shows all of your existing devices and the button is at the bottom.)
 - c. The **Select Hardware** screen appears showing a list of preconfigured hardware devices. For each device, the table shows its diagonal display size (Size), screen resolution in pixels (Resolution), and pixel density (Density).
 - d. Choose the Nexus 5 hardware device and click **Next**.
 - e. On the **System Image** screen, from the **Recommended** tab, choose which version of the Android system to run on the virtual device. You can select the latest system image.
 - f. If a **Download** link is visible next to a system image version, it is not installed yet, and you need to download it. If necessary, click the link to start the download, and click **Finish** when it's done.
 - g. On the **Verify Configuration** screen, you can select a name for your AVD (all the other settings are default) and click **Finish**.
4. Now that you have setup an Android Virtual Device and a "Hello World" project all that remaining to do is **run** this application on the AVD.
 - a. In Android Studio, select **Run > Run app** or click the **Run icon**  in the toolbar.
 - b. In the **Select Deployment Target** window, under **Available Emulators**, select your **AVD name** (Nexus 5 API 23 by default) and click **OK**.
5. If you complete all these steps successfully you should see the emulator showing something like this:



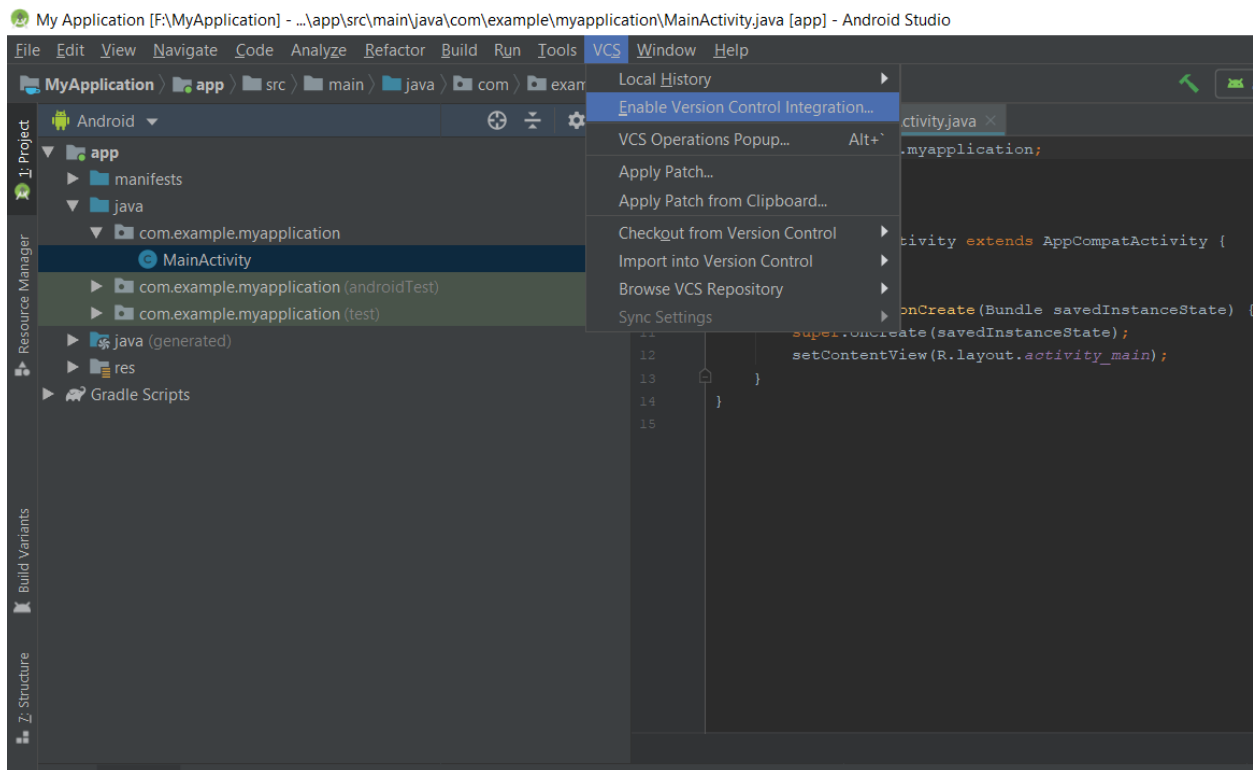
Once you have completed the following steps show your work to an instructor so that you can receive credit for the work that you have done so far.

Version Control Setup - Now you will be learning how to use and integrate a Version Control System (VCS) with Android development. We will be using Git as our version control software to

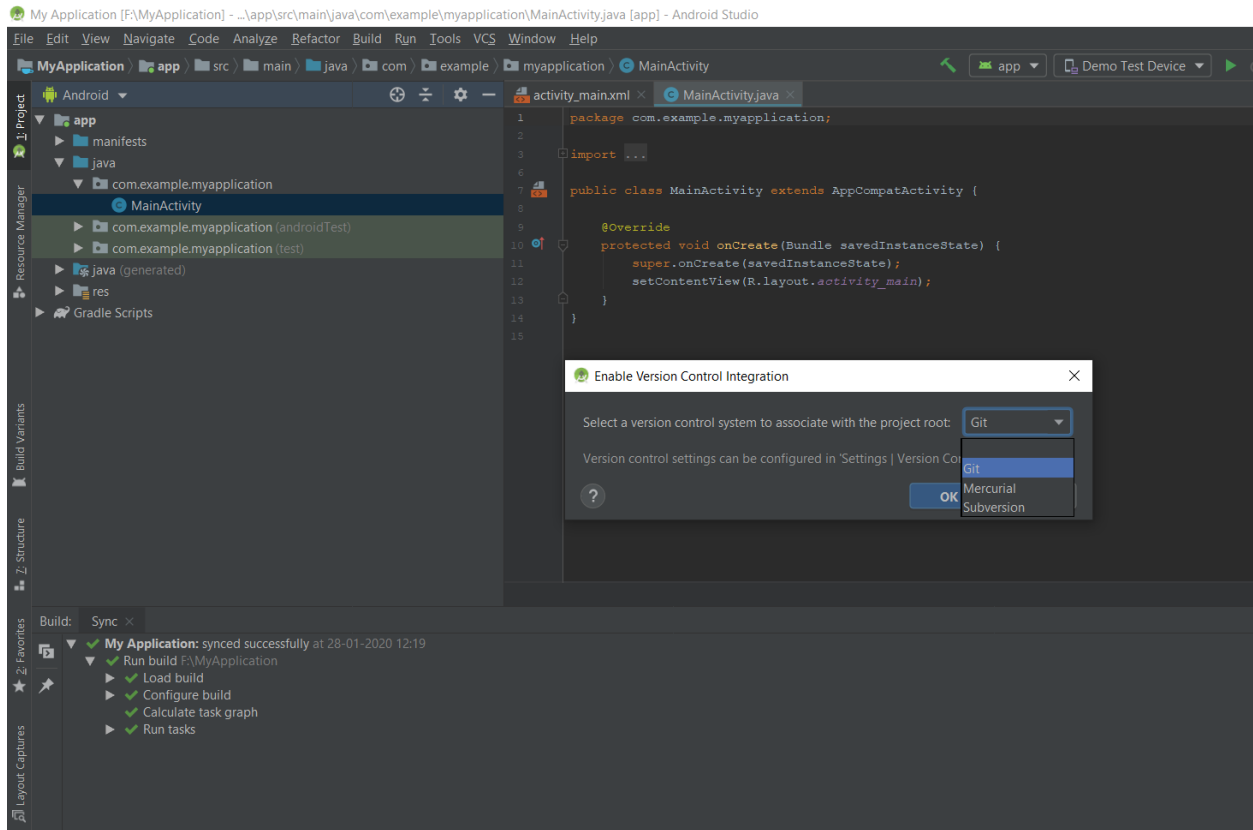
track your progress. In this milestone you will connect your GitHub account to your Android Studio project. If you do not already have a GitHub account then you can sign up at this link: <https://github.com/>

We will be using GitHub classroom in this course to monitor your progress. Here is an easy tutorial to set up your first GitHub repository on Android Studio:

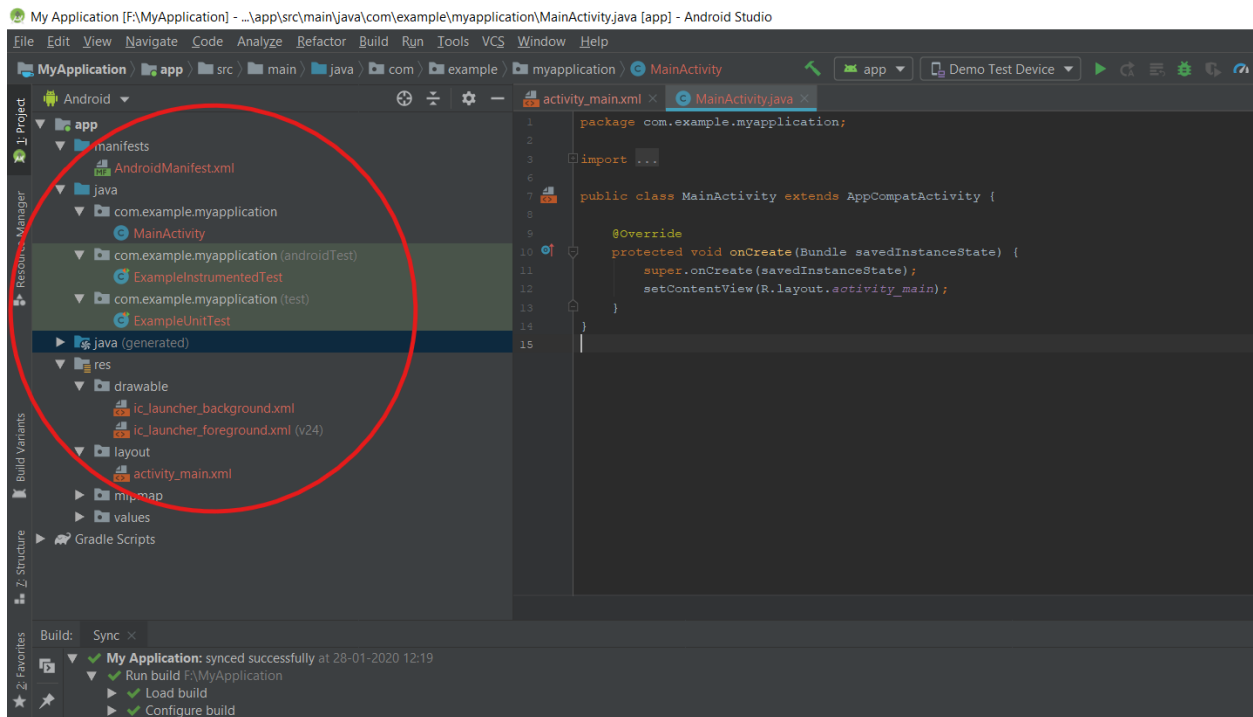
1. Install Git on your computer: Visit this [official site](#) to download git on your computer. Once you do that, you can start using it with android studio.
2. Enable Version Control Integration on android studio: Go to Menu>VCS>Enable Version Control Integration



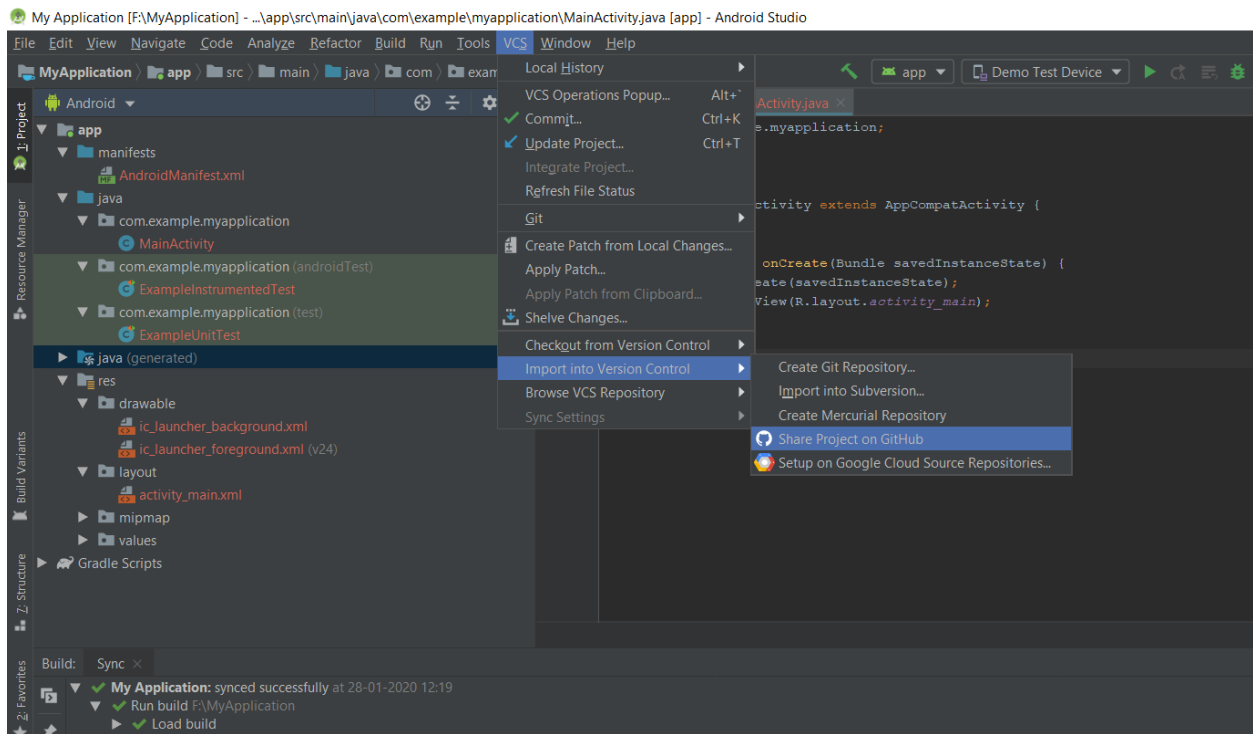
After that,select Git as your version control system



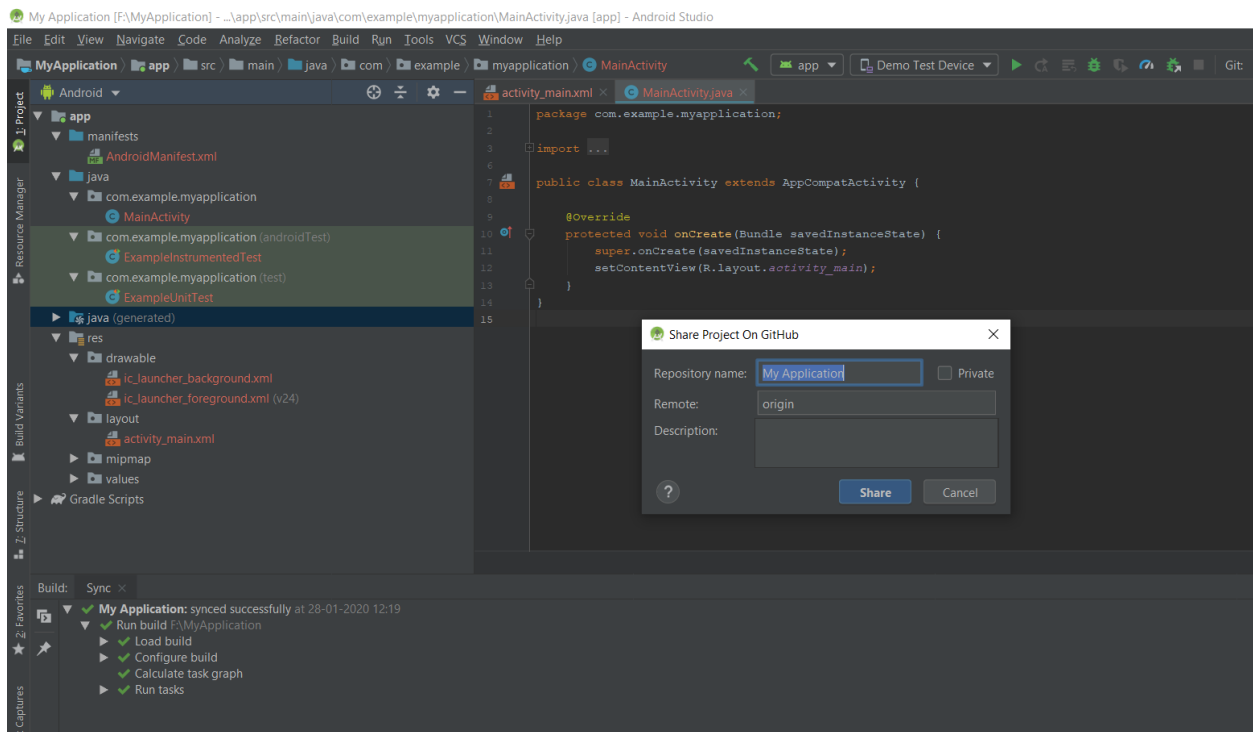
On doing this, you will notice that all your files will turn red.



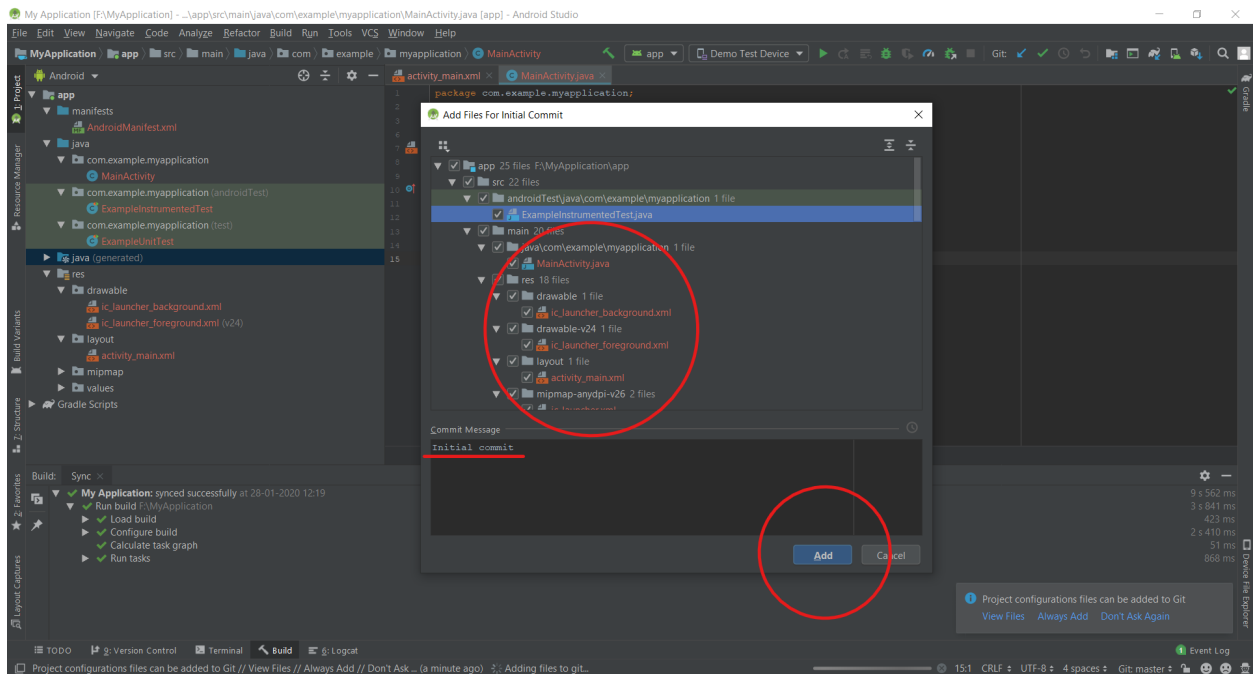
3. Share on Github: Now, go to VCS>Import into Version Control>Share project on Github.



Now give a name to your repository and write a description if you want.

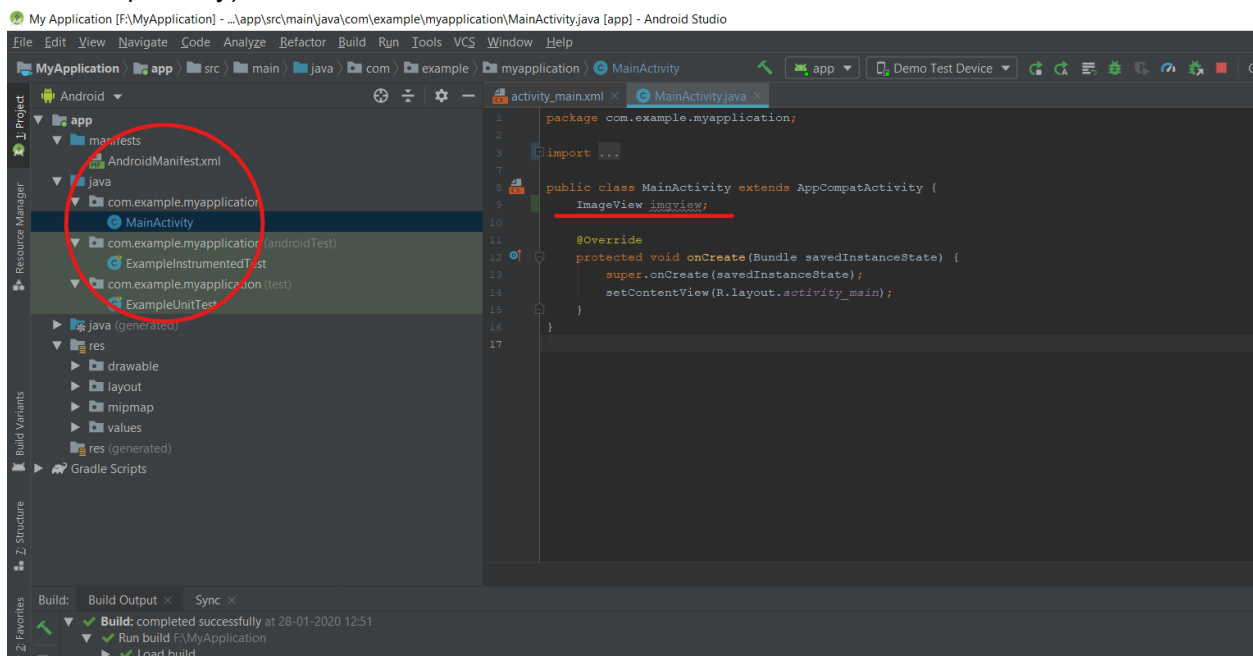


4. Push your project files on Github: Now select the files you want to share and press Ok. You can also write a specific commit message and after you do so, all your files will turn white.



5. Make changes

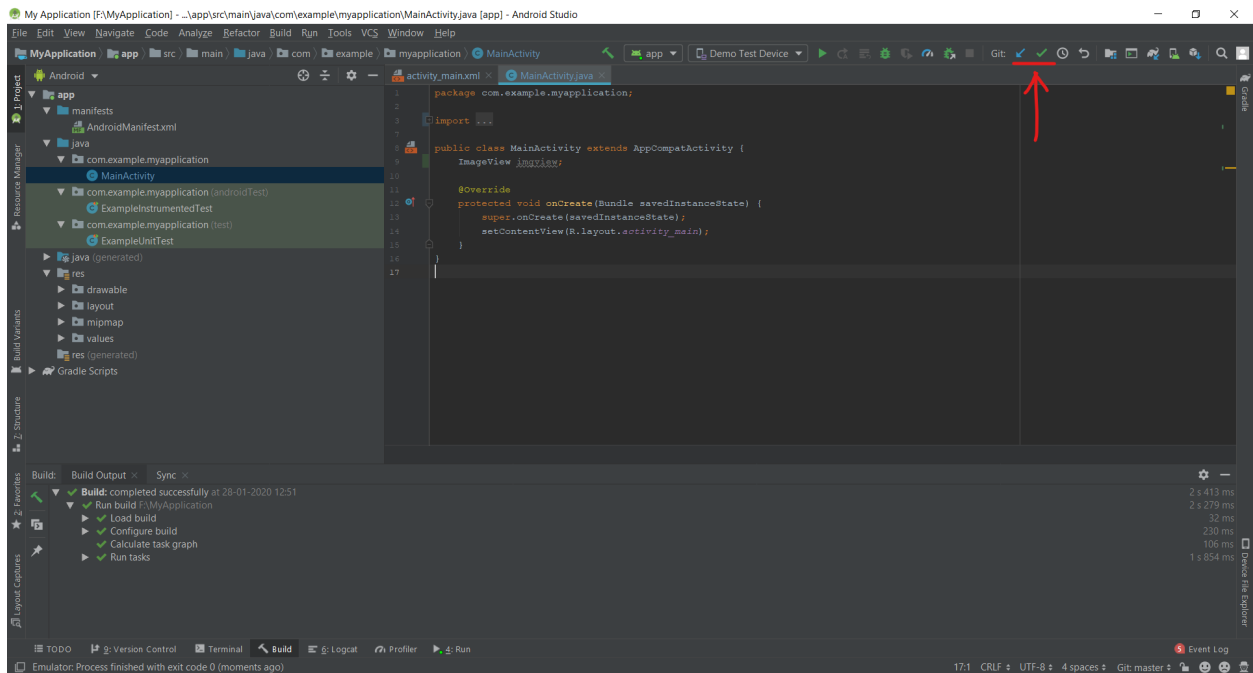
Your project is now under version control and shared on Github, you can start making changes to commit and push. You can see I added a new `ImageView` reference (code underlined in red) to the `MainActivity.java`. Notice that after I made the change, the `MainActivity.java` file turned blue. That means the file now has uncommitted changes (and it doesn't match the file in the Github repository).



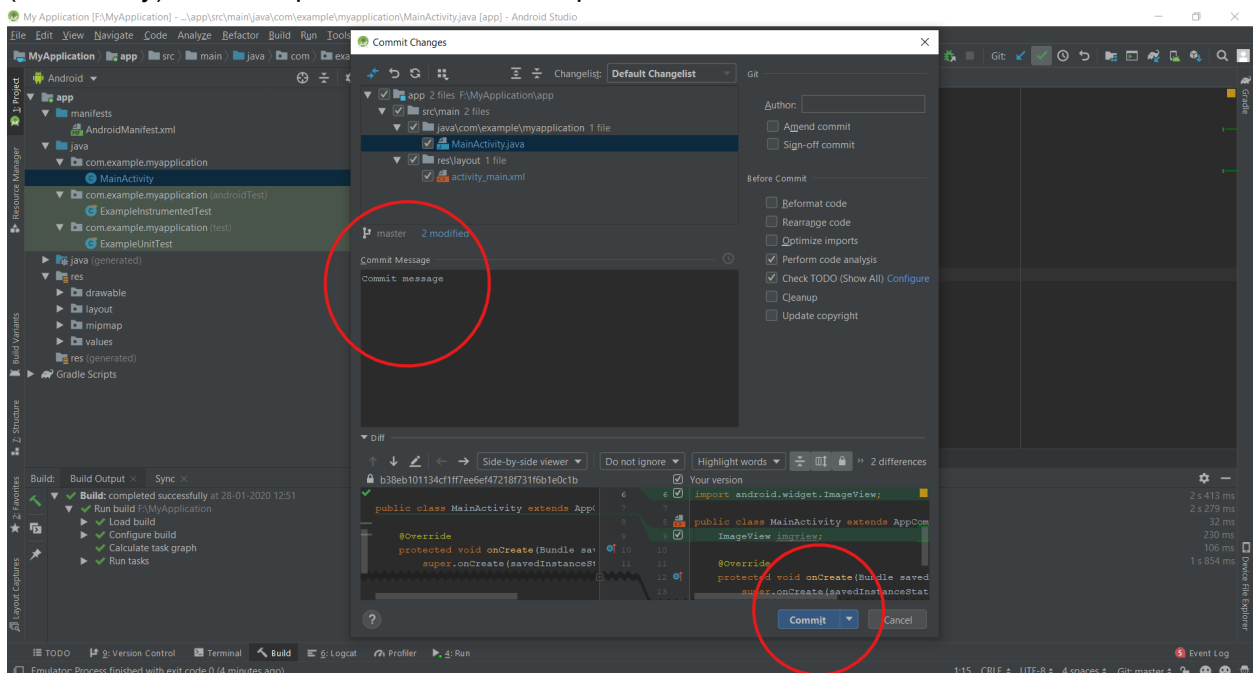
6. Commit and Push

Its upto you now when you want to commit and push. You can do it after every new change or after a lot of changes.

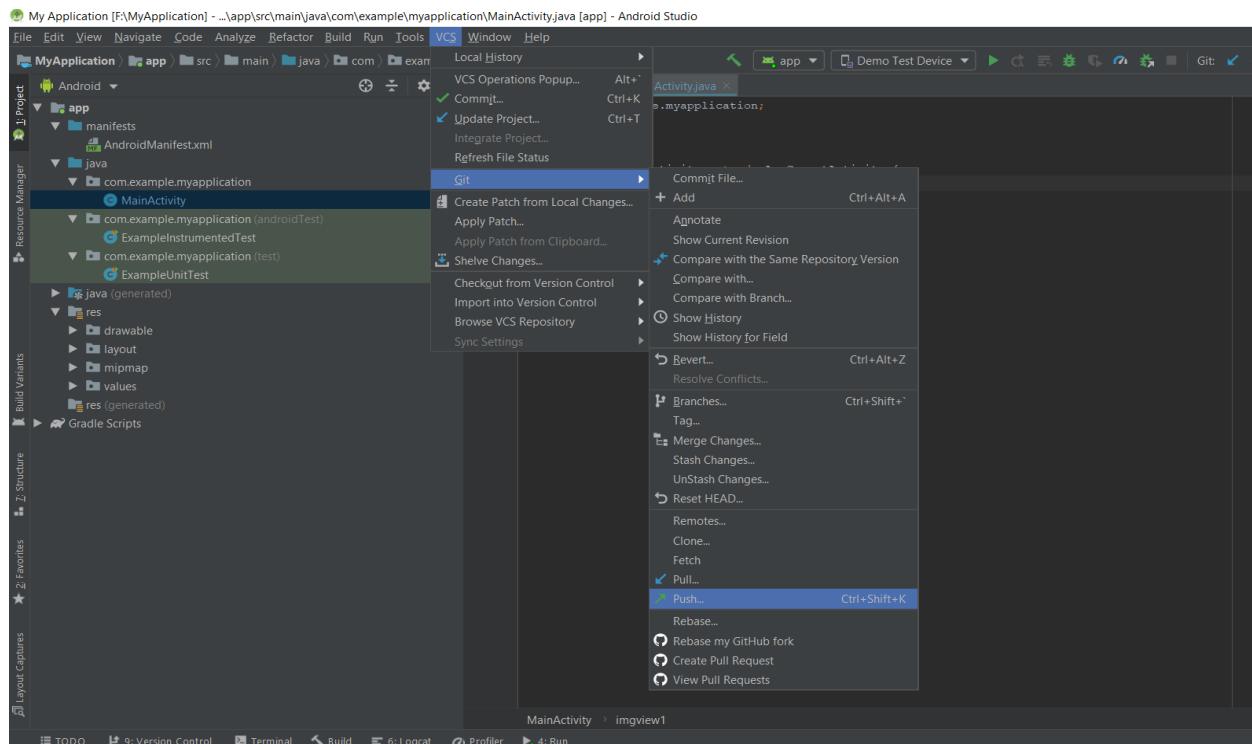
To commit and push, go to Menu>VCS (with green tick)



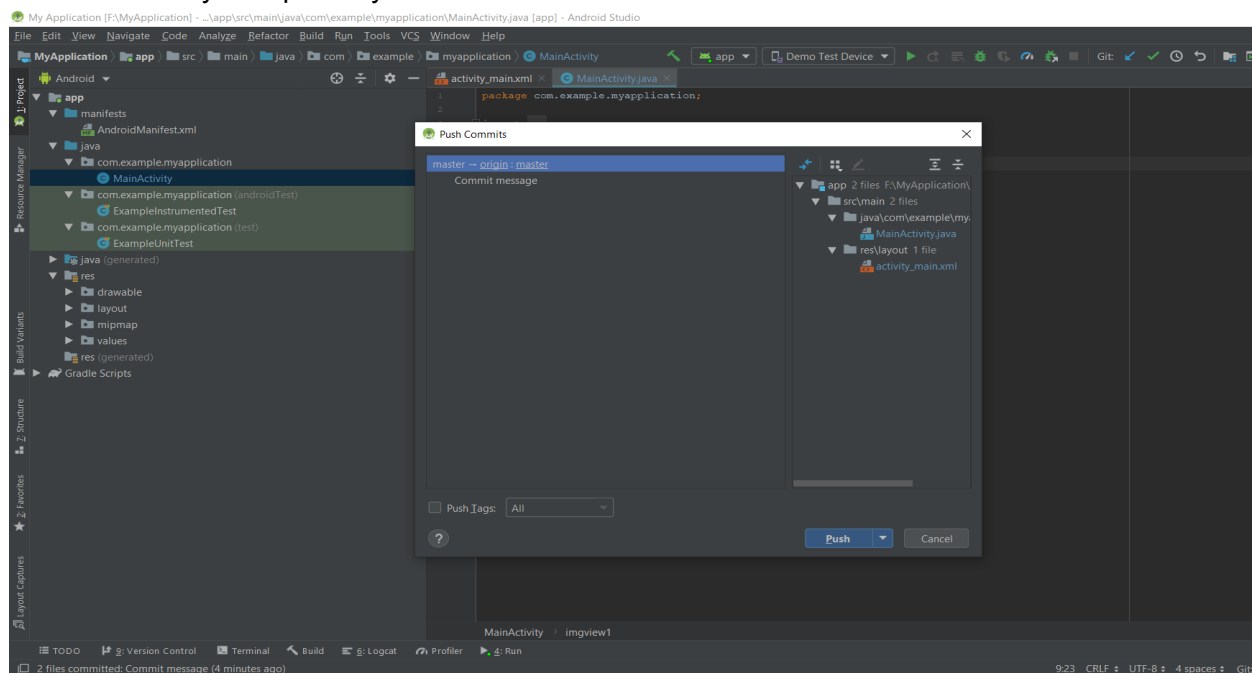
After that,you will see a commit changes window and you have to write a commit message (mandatory) and then press on commit and push.



After this step you will now push your changes to the GitHub repository. You will do this by navigating to VCS > Git > Push.



Finally, you will see another push window. Just press on push button and all your changes will be reflected in your repository.



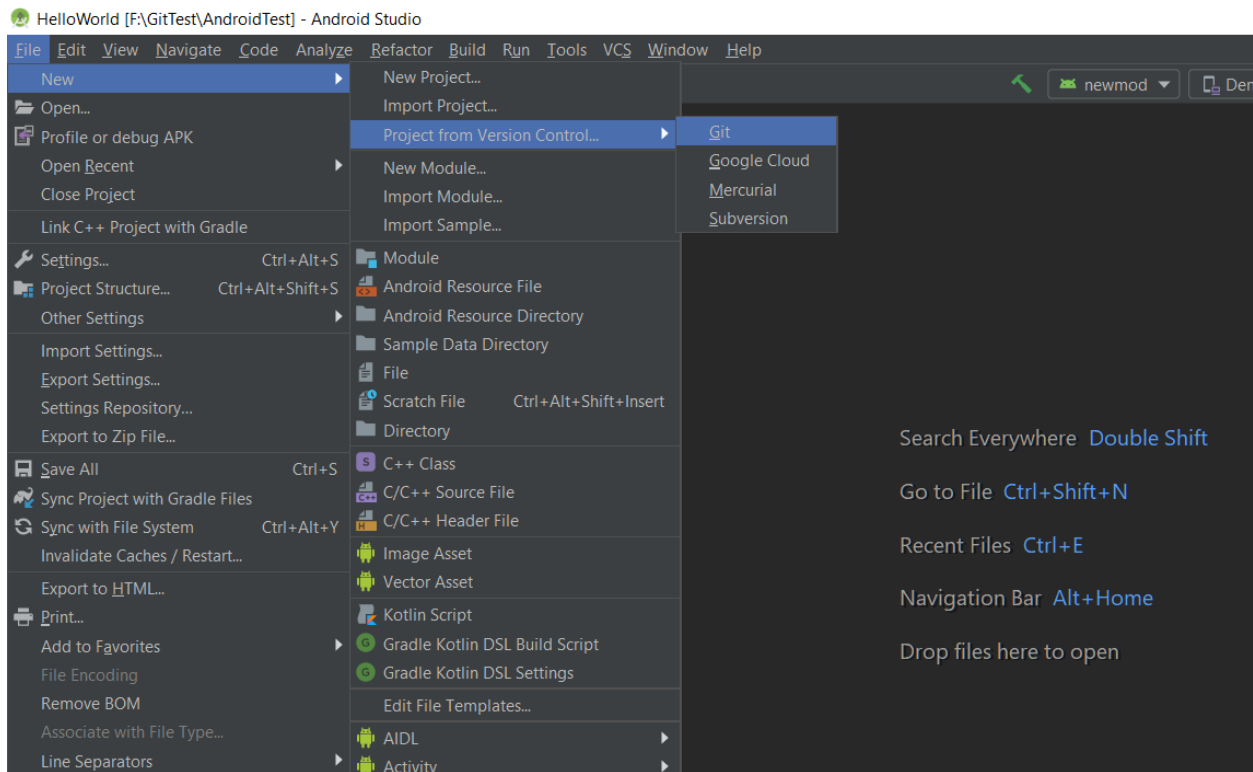
Congratulations on setting up your first project with version.

Milestone 2 - In this milestone you will have to successfully make a local clone of the repository that we have set up. Then you will have to make a git pull to get the most updated

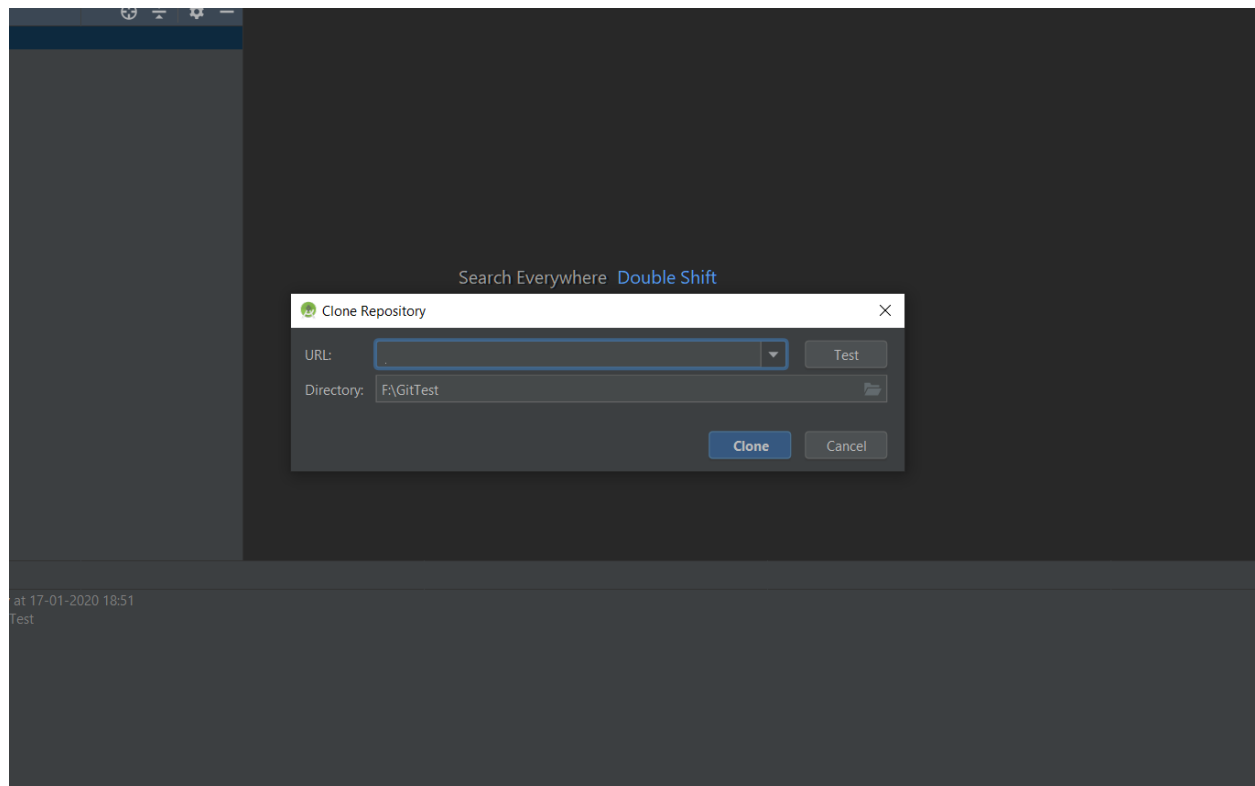
code. Once you have the most updated copy of the code you will have to make a few changes to the code which will be described below.

Now that you have Git setup on your computer and have connected your own private GitHub repositories to Android Studio, we can try using it to clone our classroom repository. To clone a repository follow these steps.

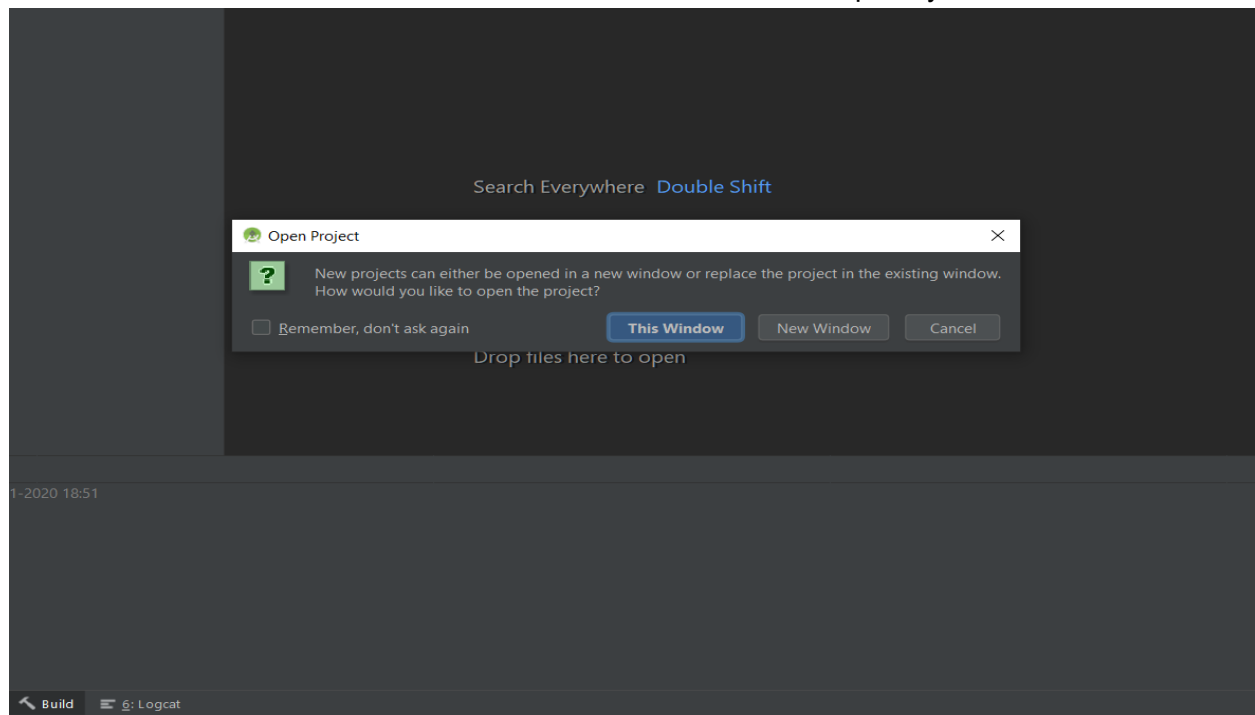
1. Clone a repository by selecting File > New > Project from Version Control > Git



2. Then click the following link: <https://classroom.github.com/a/9dKNMDHB> to accept the invitation for this assignment. Once you click authorize you will receive a link (it will be something like <https://github.com/CS-407-Spring2020/helloworld-yourgithubnamehere>) which you can paste in the URL text field as shown in the picture below and hit **Clone**.

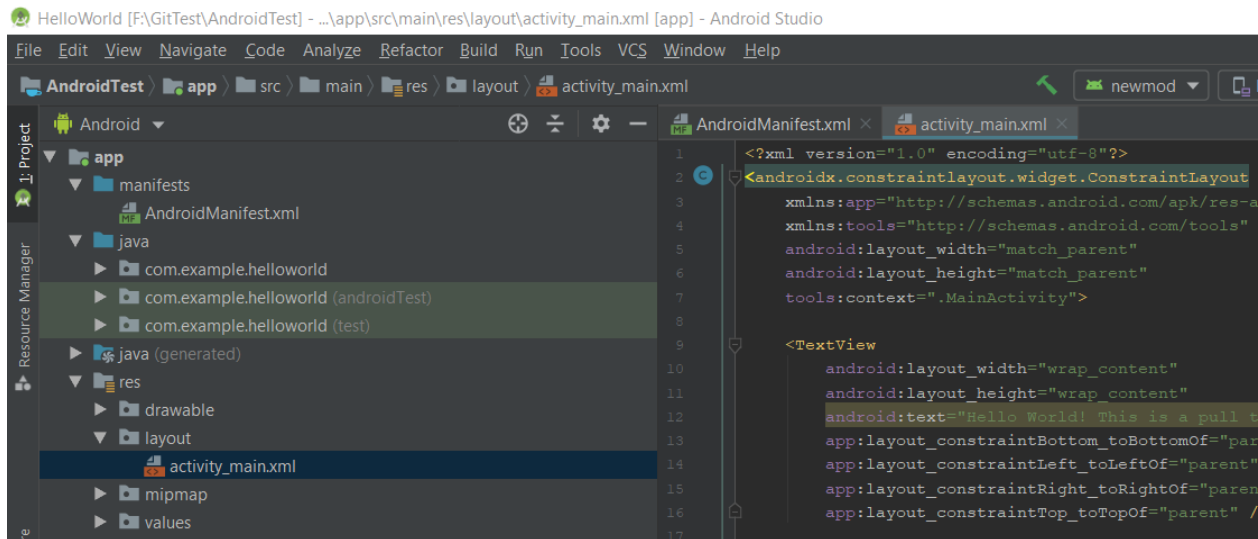


3. Then you will get this prompt which will ask you whether you want to open this project in the current window or in a new window. You can choose whichever option you are comfortable with.

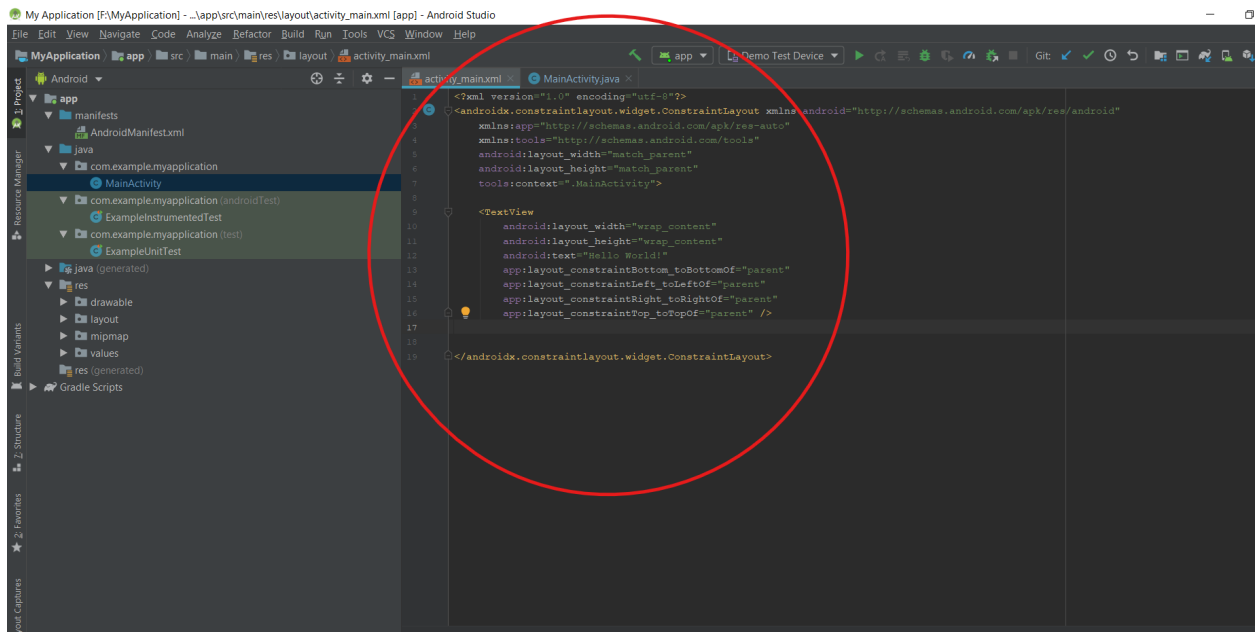


Once you have completed this step you will be left with a local clone of our GitHub classroom repository. Now you have the most updated copy of the code you will have to make the following changes to the code given to you:

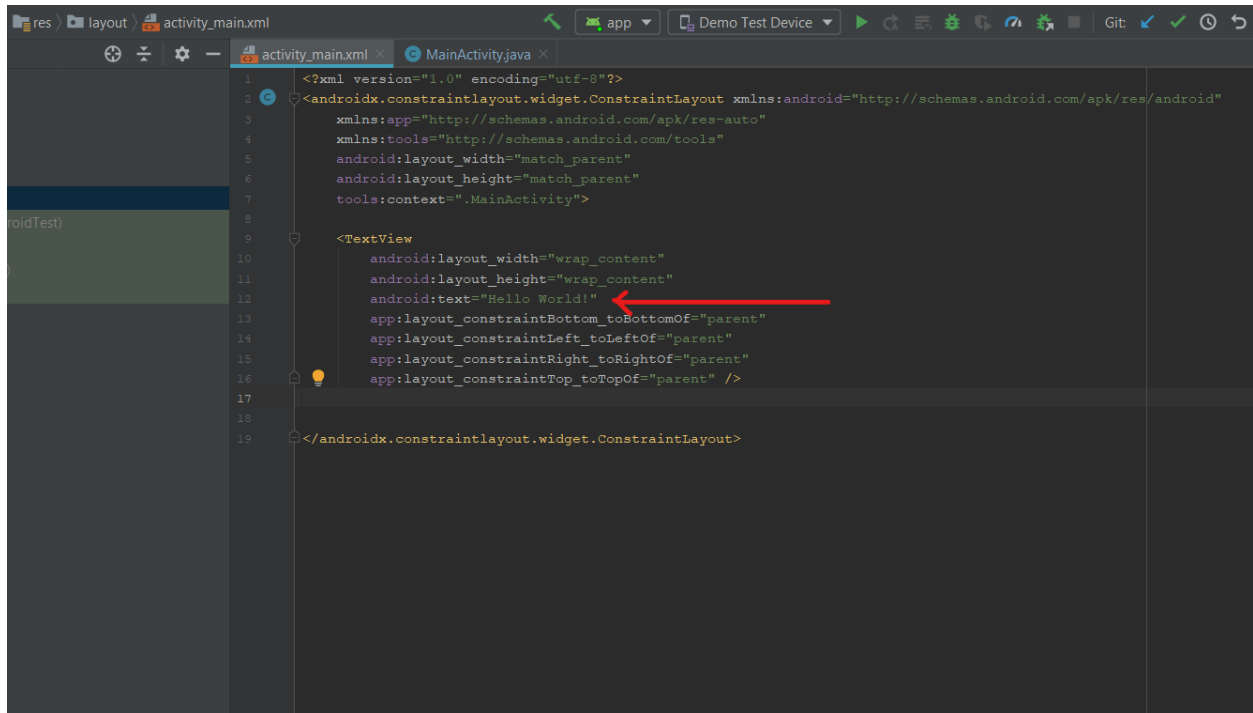
In the activity_main.xml file (found in the files on the left hand side : app > res > layout):



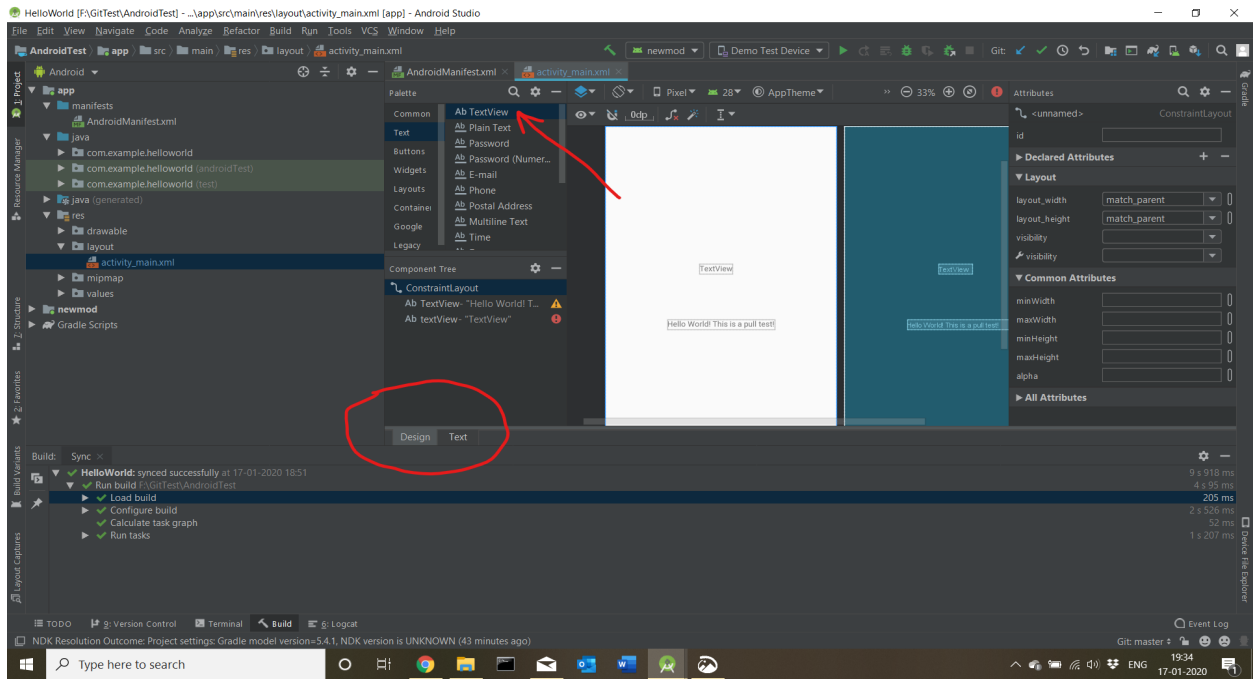
Once you open this file from the file explorer you should be looking at some code like the one in the screenshot below.



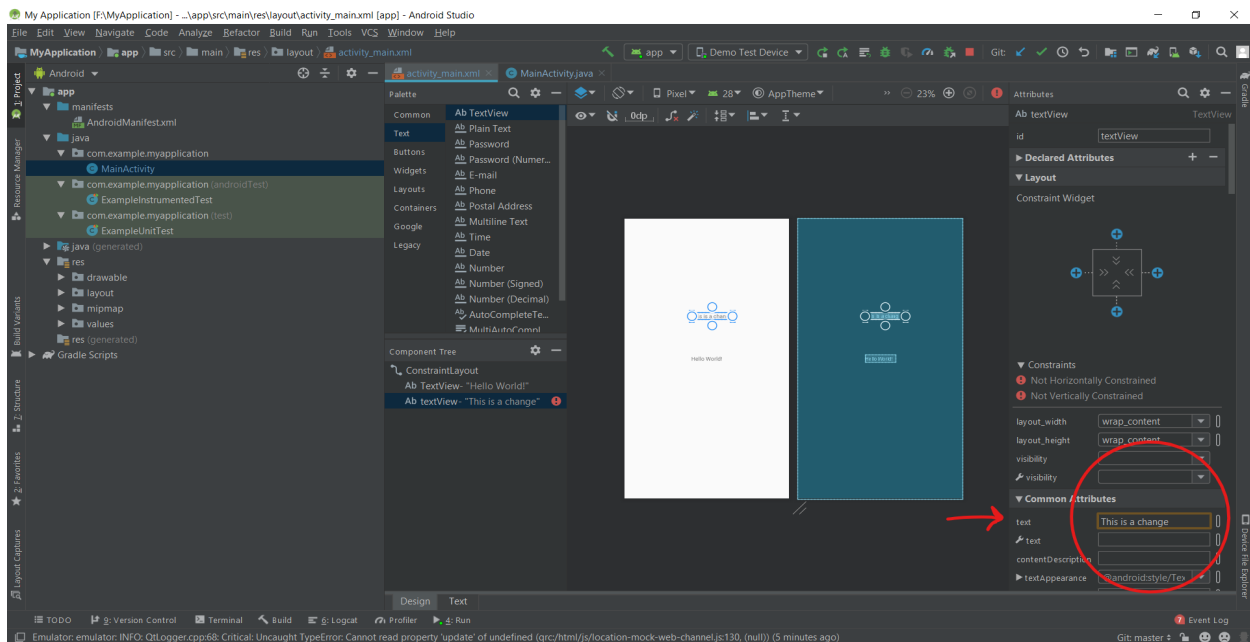
Your first task is to change message from “Hello World” to “This is my first change!” You will need to make this change in the following location.



Your second task is to add another TextView by using the **design** tab. You can use this design tab to drag and drop various components onto your app. For this task you should select Text > TextView and drag and drop it onto the app. You will now be able to see it on the app preview. You can move it around and place it wherever you'd like as shown in the screenshot below.



You can change the text that the TextView displays by going back to the **text** tab and changing it or you can change it in the design tab by editing the common attributes (common attributes > text) as shown below.



As the semester progresses, you will get more and more comfortable with the various resources that Android Studio provides.

Now that you have made these changes to the manifest file, commit these changes to your local version control repo as you have learned from the git tutorial above.

Milestone 3 - After you have made these changes to your android project, the last milestone is to Git push all these changes to your remote GitHub classroom repository. We will be checking the time and date of the last push to your individual repositories and grading you accordingly.

Conclusion:

You have done a great job to get this far. Generally the setup is the most boring part of any software development. Now that you have successfully completed this you are ready to take on more complex challenges that are waiting for you in the next many weeks of this semester.

References:

- Google has great documentation for Android and this a good link to help get you started with this project. https://google-developer-training.github.io/android-developer-fundamentals-course-practicals/en/Unit%201/11_p_hello_world.html
- Github set up tutorial. <https://medium.com/code-yoga/how-to-link-android-studio-with-github-312037a13b99>