

2017 FTC Kick-Off

Build the Developer Workstation

Frog Tech University, FRC Team 503
September 1, 2017

Course 101

Today's Goal.....



The goal of today's session is to set up your laptop to make software changes to the robot

Developer Workstation Set-up

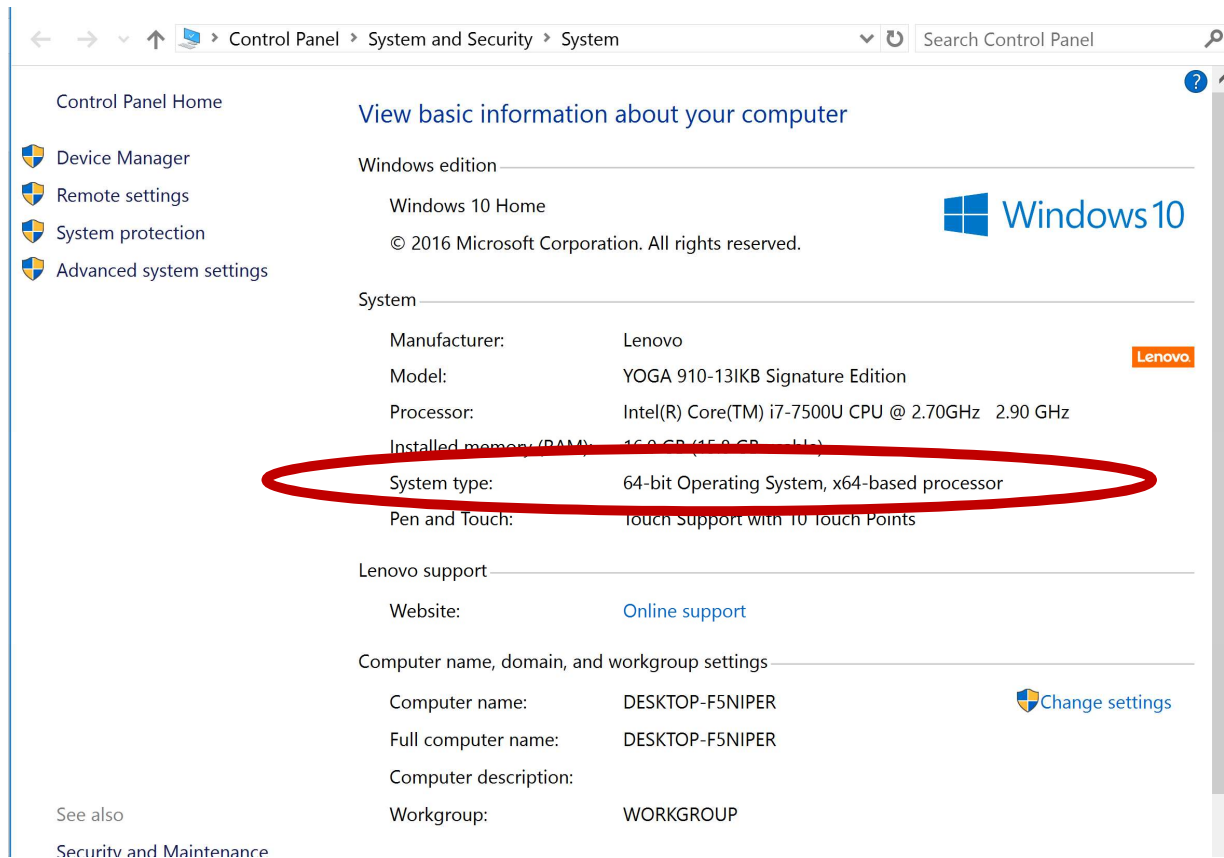
5 Easy Steps !!!!



1. Verify System Requirements
2. Install FTC Software Development Kit (SDK)
3. Install Java Developers Kit (JDK)
4. Install Android Studio Integrated Development Environment (IDE)
5. Build the FTC Master App

Step 1 – Verify System Requirements

We need to find the System Type

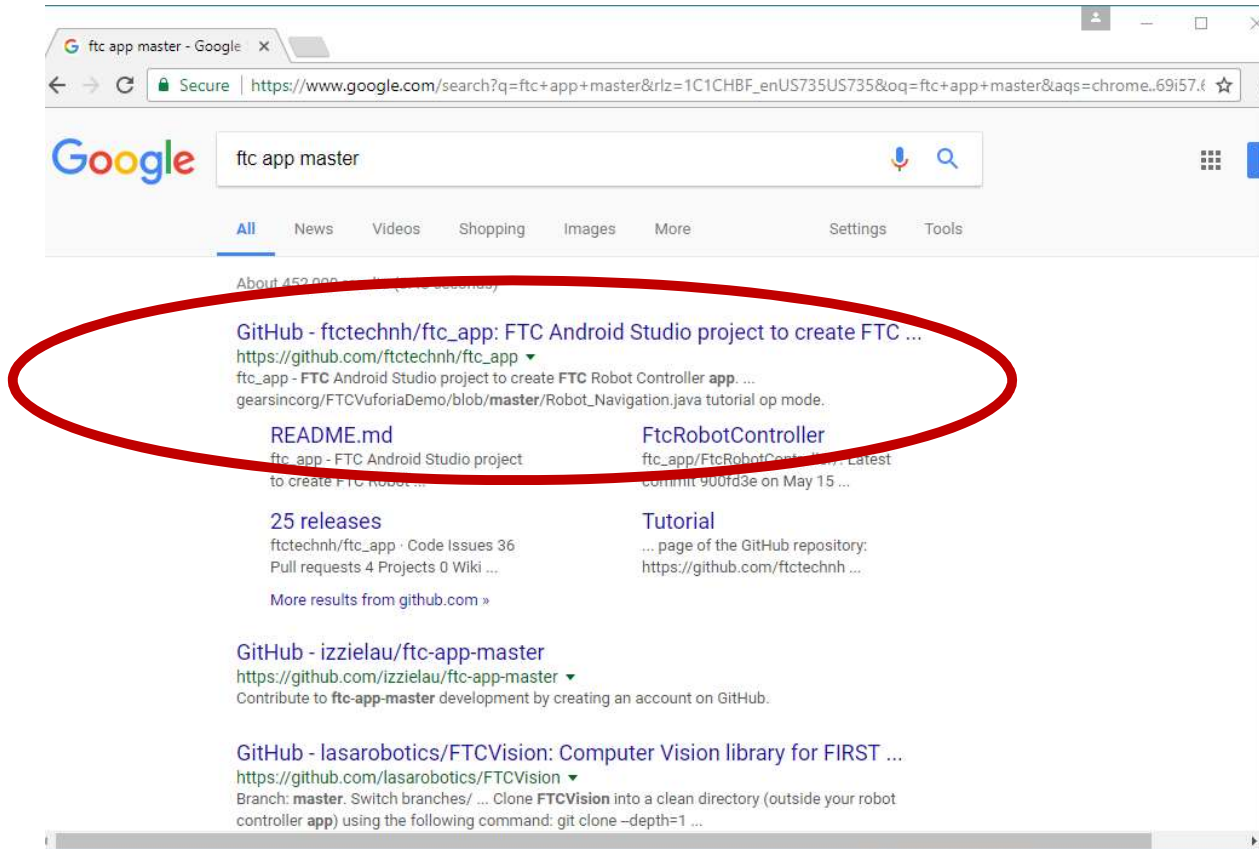


Guide

- Enter “Windows System” in the search box
- Find the System Type
 - 32-Bit or 64-Bit (see red oval)
- Make note of the system type for later
- System Requirements
 - Windows 10/8/7
 - 32 or 64-bit
 - 2 GB RAM, 8GB Recommended
 - 1.5 GB Disk Space
 - JDK 8

Step 2 – Install FTC Software Development Kit (SDK)

1 – Using your browser go to Google and look up FTC_app-Master

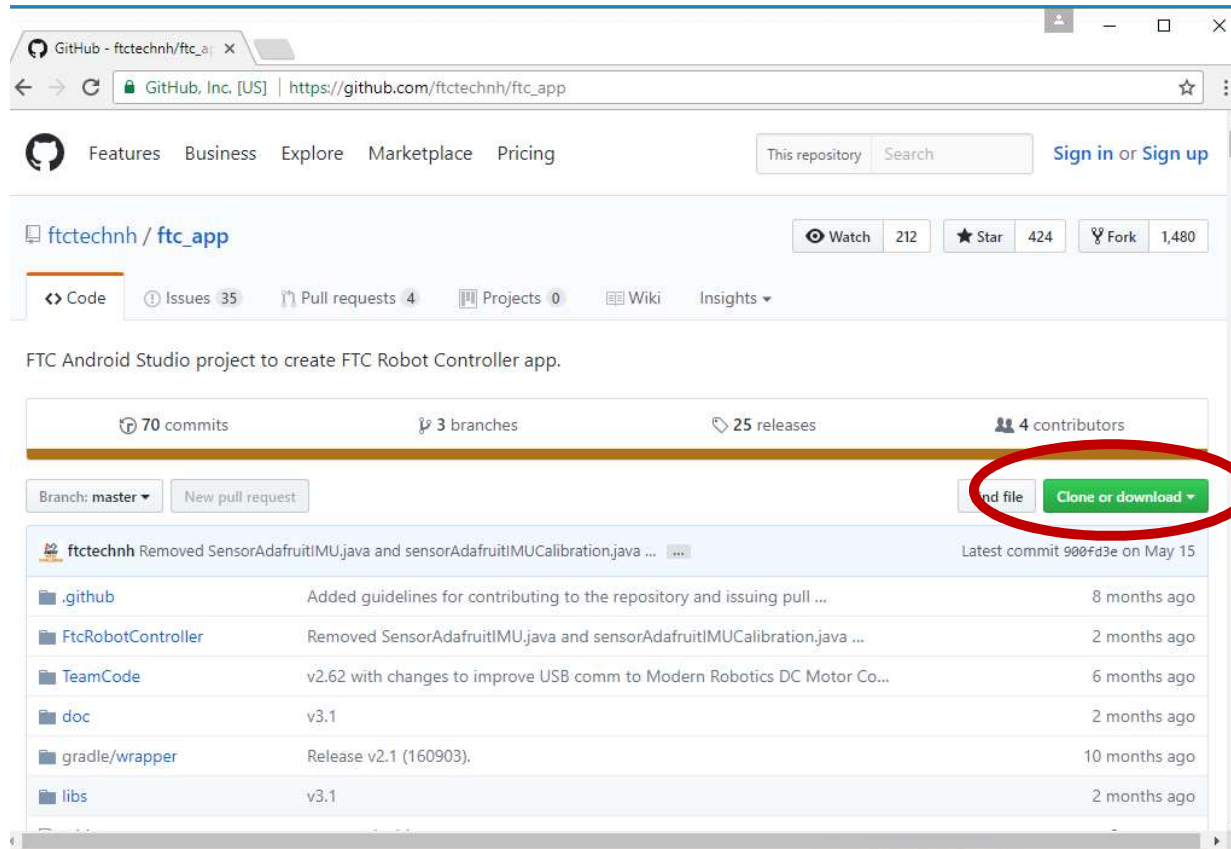


Guide

- Open the internet browser installed on your machine (i.e. Internet Explorer, Chrome, Edge, etc)
- Enter WWW.GOOGLE.COM
- Hit Enter
- In the Google Search box, enter "FTC App MASTER"
- As you type Google will begin to search and will find the GitHub location for the FTC Master Application (see red oval)
- Click on the link to GitHub – ftctechnh/ftc_app:

Step 2 – Install FTC Software Development Kit (SDK)

2 – At the GitHub Repository click “Clone or Download”

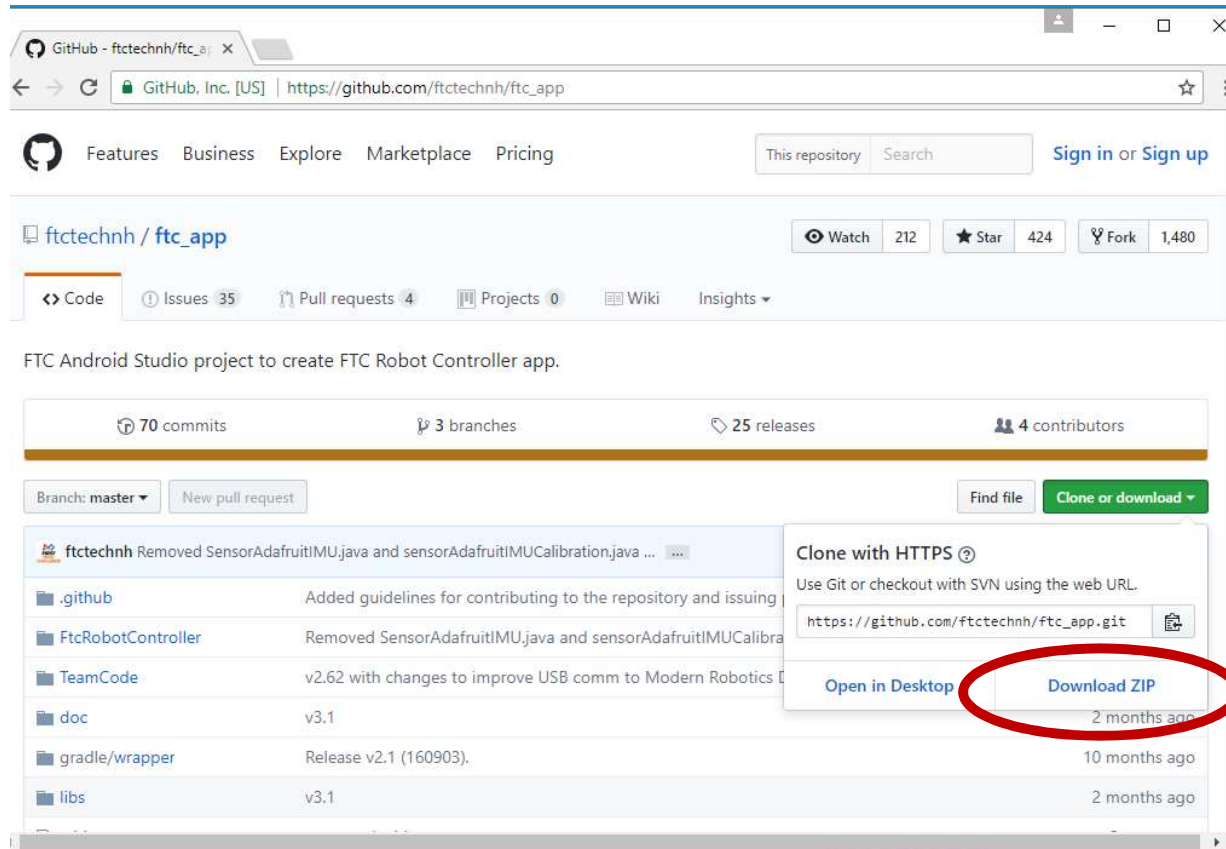


Guide

- The browser will open the GitHub repository for the FTC App master similar to the page shown on the left.
- Find the green “Clone or download” button (see red oval)
- Click the “Clone or download” button

Step 2 – Install FTC Software Development Kit (SDK)

3 – Select Download ZIP

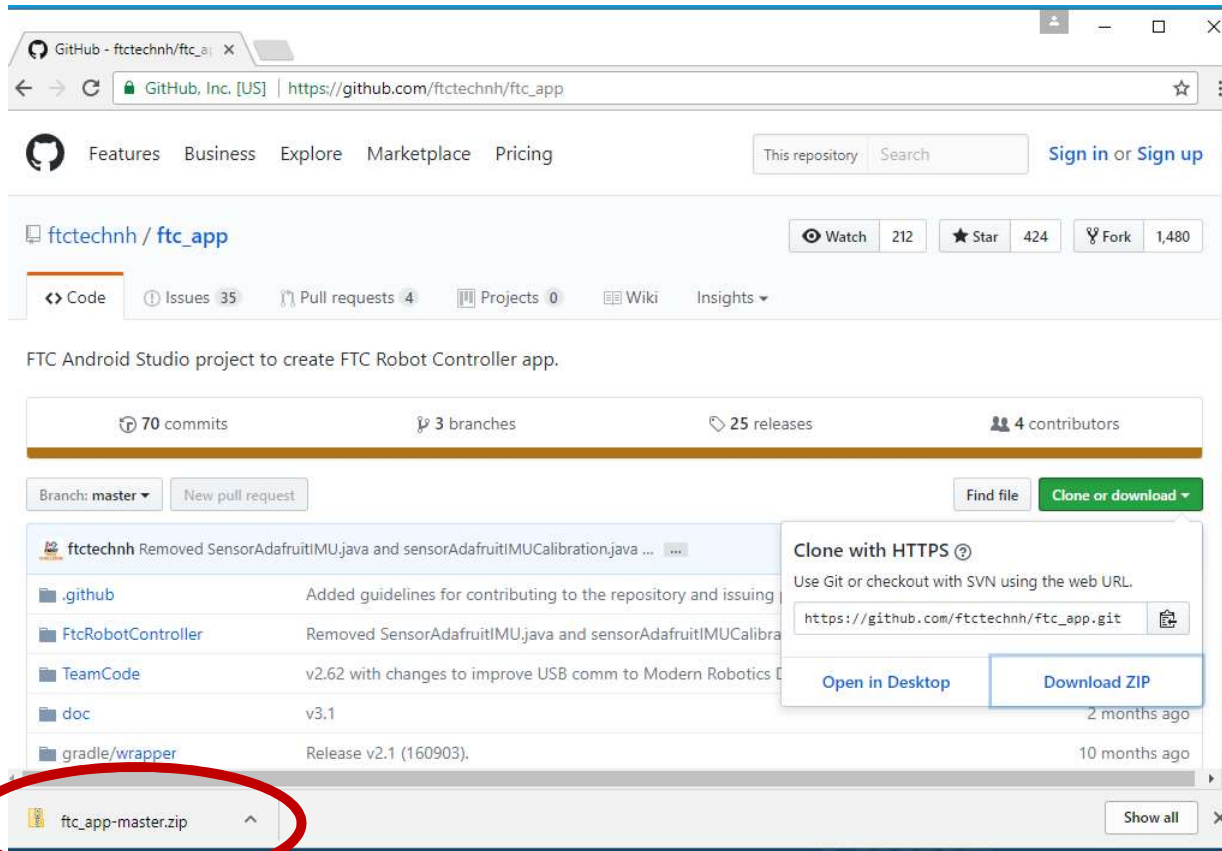


Guide

- GitHub will display a page similar to the one on the left.
- GitHub is offering two different download options:
 - Open in Desktop
 - Download ZIP
- Click Download ZIP button (see red oval)

Step 2 – Install FTC Software Development Kit (SDK)

4 – ZIP file is downloading

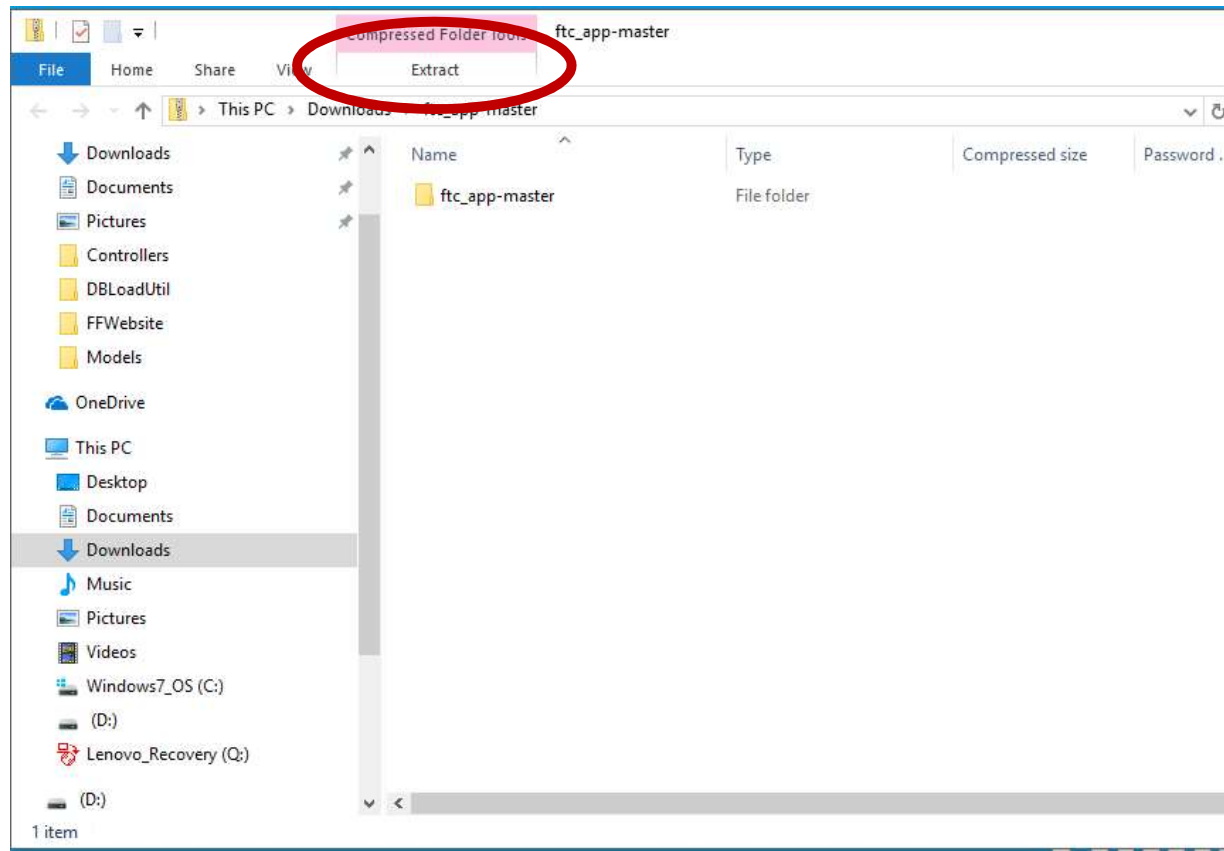


Guide

- The browser will begin downloading the master application. (see red oval)
- Depending on which browser you use for the download, the screen might look different.

Step 2 – Install FTC Software Development Kit (SDK)

5 – Download is complete!

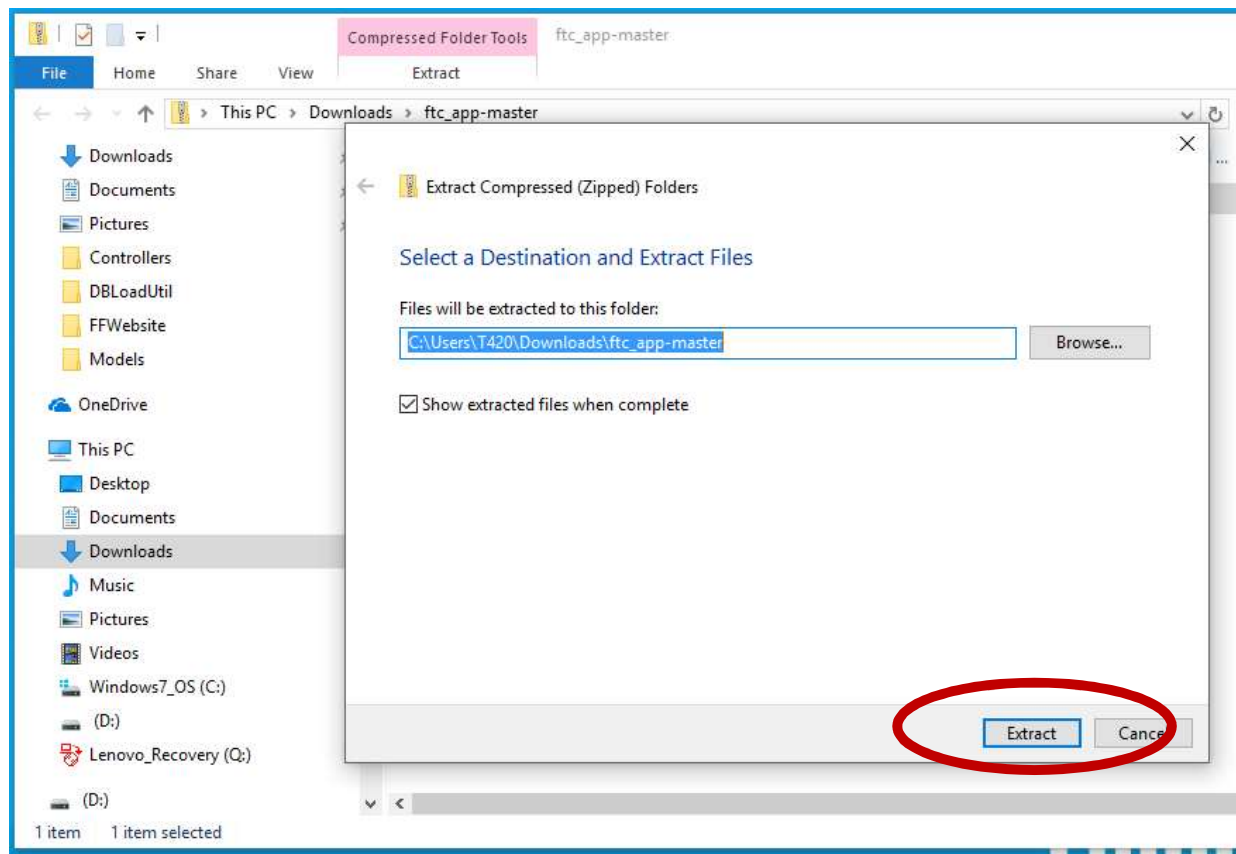


Guide

- Once the download has completed, File Explorer will open a window similar to the one on the left.
- The ZIP file is a compressed format. For us to use it we must un-compress it by extracting the data.
- Click on the “Extract” menu bar item (see red oval)

Step 2 – Install FTC Software Development Kit (SDK)

6 – Enter File Location

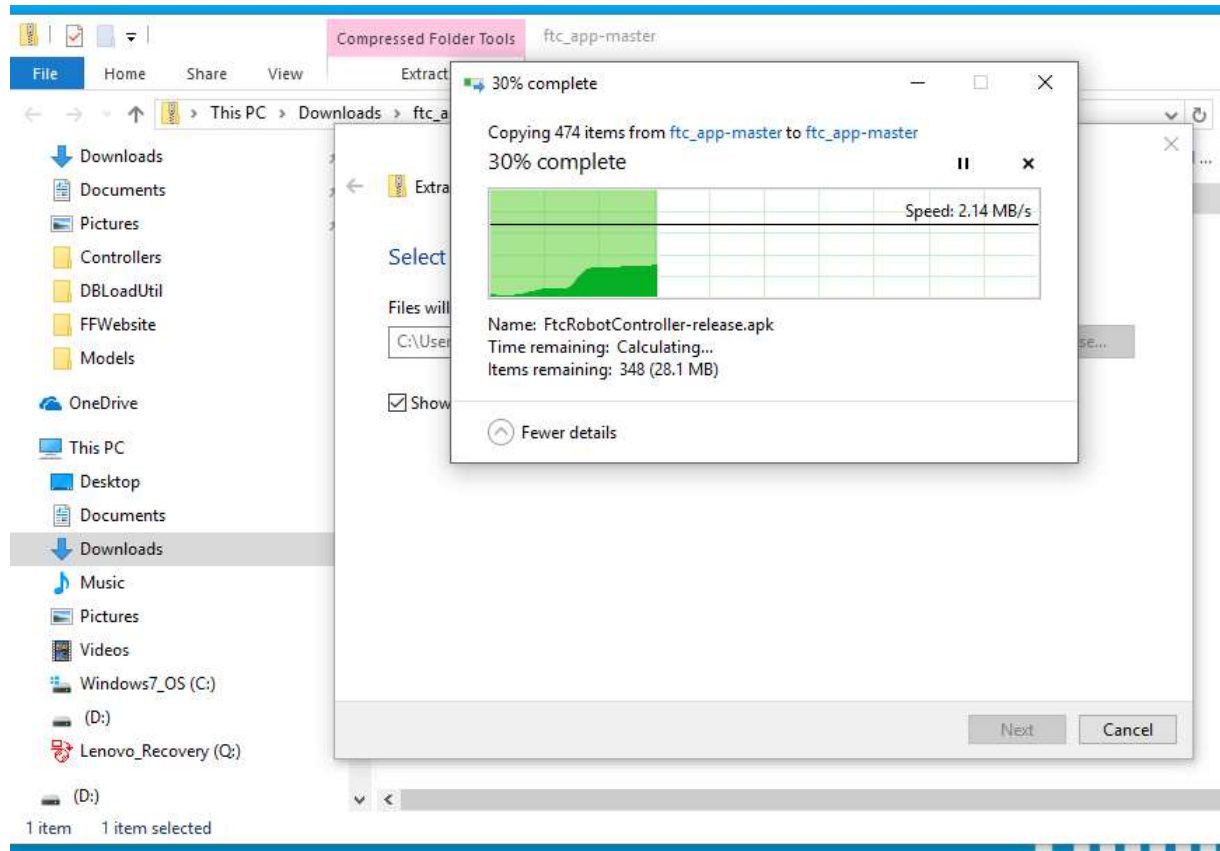


Guide

- File Explorer will open a window similar to the one on the left.
- File Explorer is asking for a location to place the extracted files.
- **Make sure you remember this location you will need it to tell Android Studio where to import from.**
- **In this case we are putting it in the Downloads directory right next to the compressed file.**
- Hit the “Extract” button (see red oval)

Step 2 – Install FTC Software Development Kit (SDK)

7 – Enter File Location

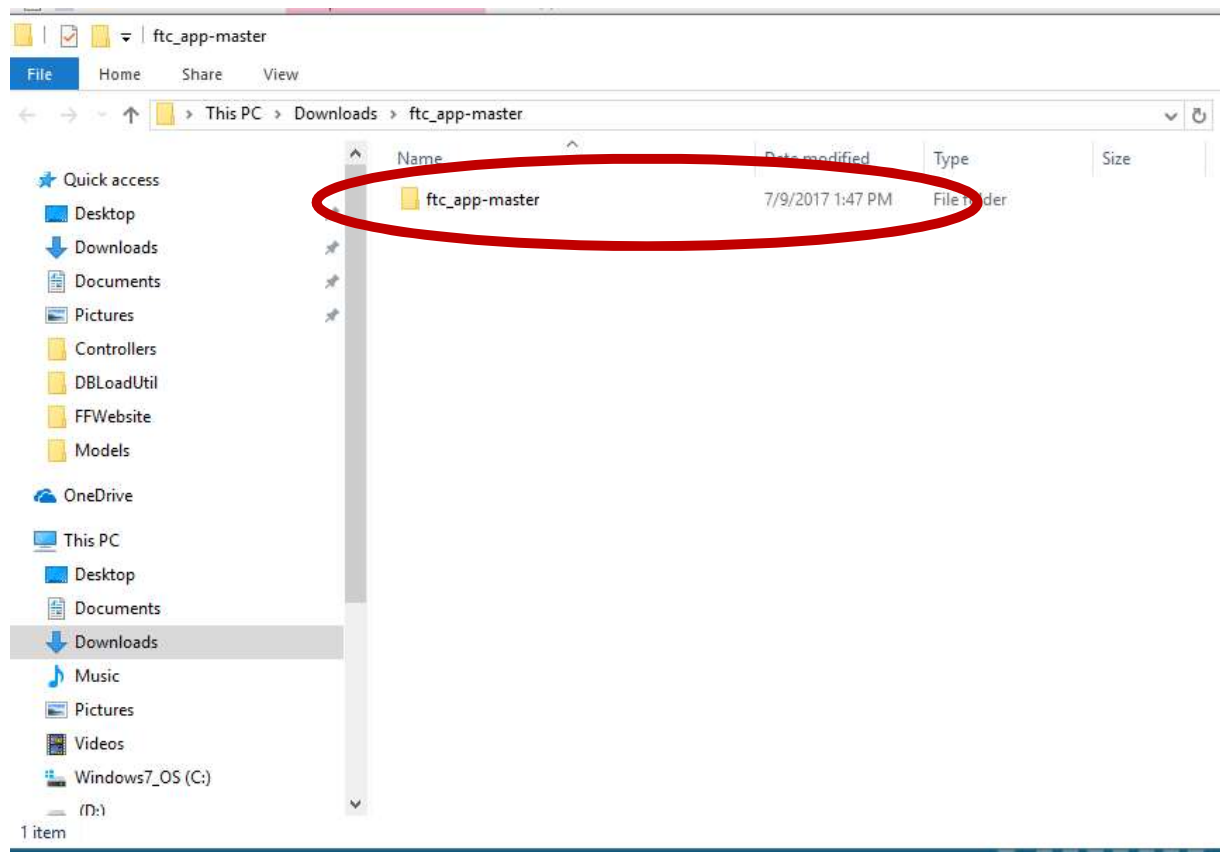


Guide

- File Explorer will open a window similar to the one on the left.
- This indicates how many files are left to extract.

Step 2 – Install FTC Software Development Kit (SDK)

8 – File Extract Completed

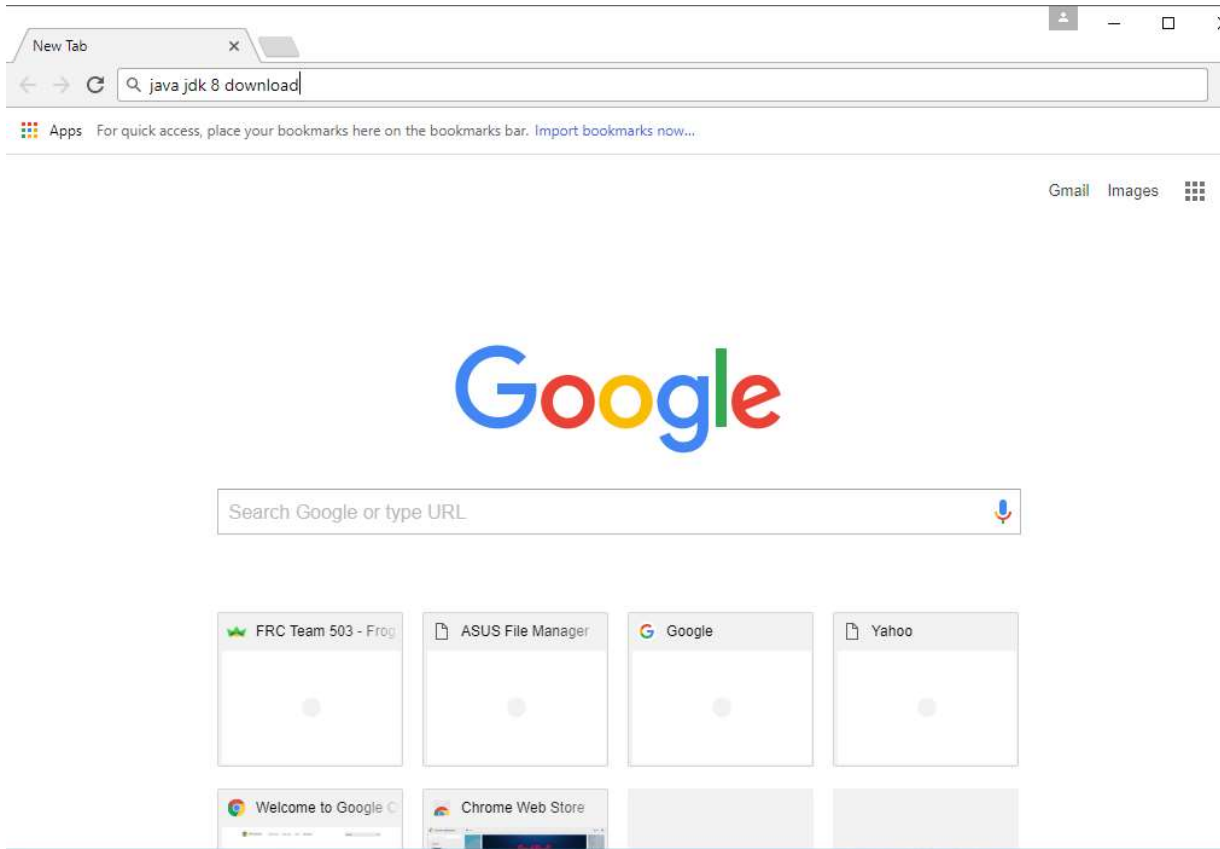


Guide

- Once the extraction process has completed, File Explorer will open a window similar to the one on the left.
- This indicates That the file has been extracted and is now a normal directory ready for use. (See red oval)

Step 3 – Install Java Development Kit (JDK)

1 – Using your browser go to Google and look up java jdk 8 download

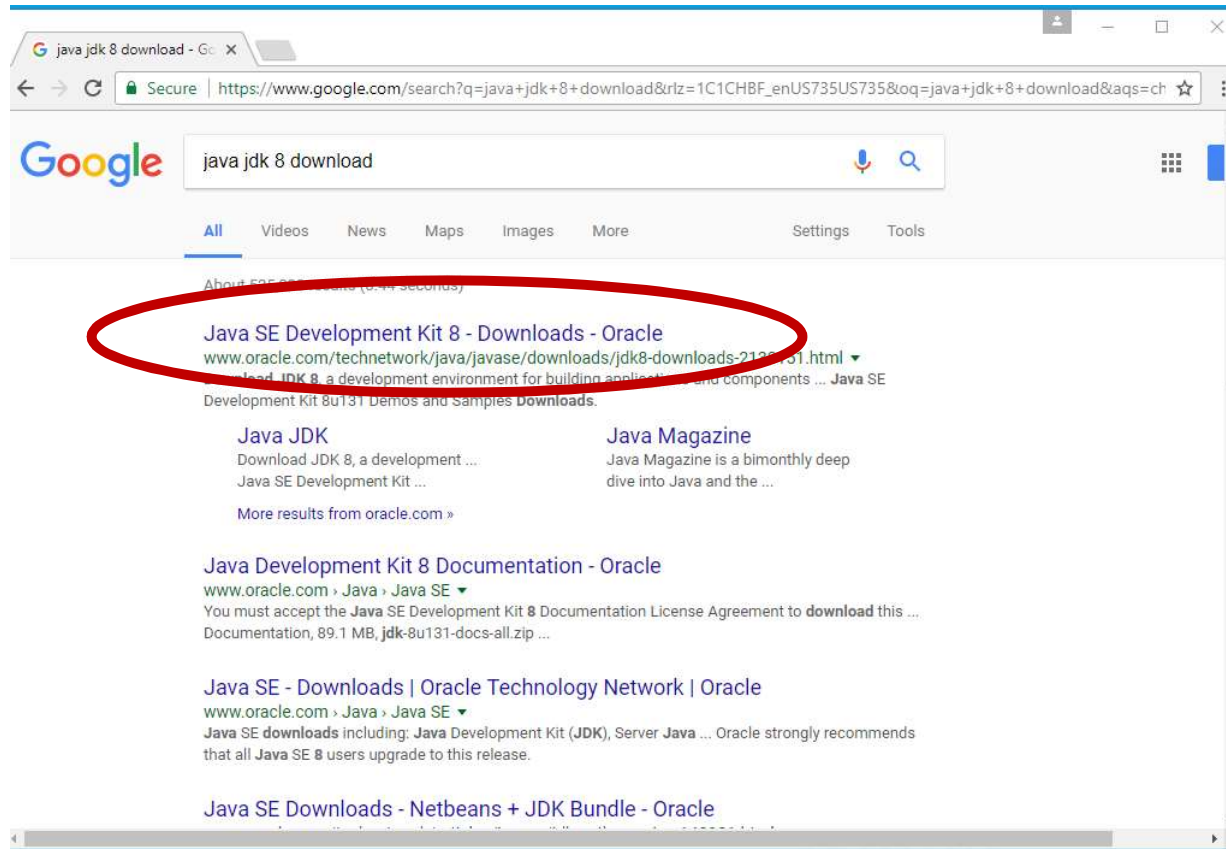


Guide

- Open the internet browser installed on your machine (i.e. Internet Explorer, Chrome, Edge, etc)
- Enter “java jdk 8 download” in the search box
- Hit Enter

Step 3 – Install Java Development Kit (JDK)

2 – Select the Java SE SDK link

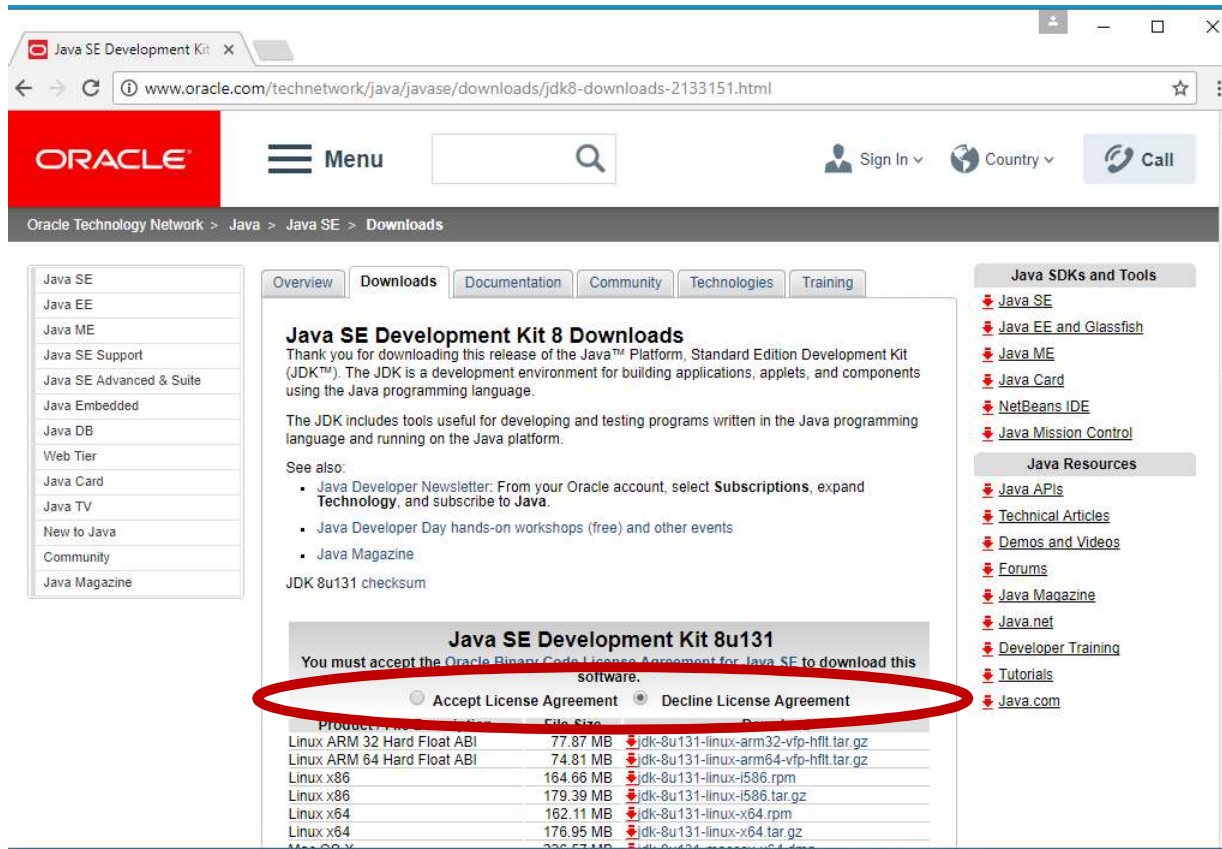


Guide

- Google will display the search results similar to the page on the left.
- Find the “Java SE Development Kit 8 – Downloads – Oracle” link. (see red oval)
- Click the link.

Step 3 – Install Java Development Kit (JDK)

3 – Click the Accept License Agreements radio button

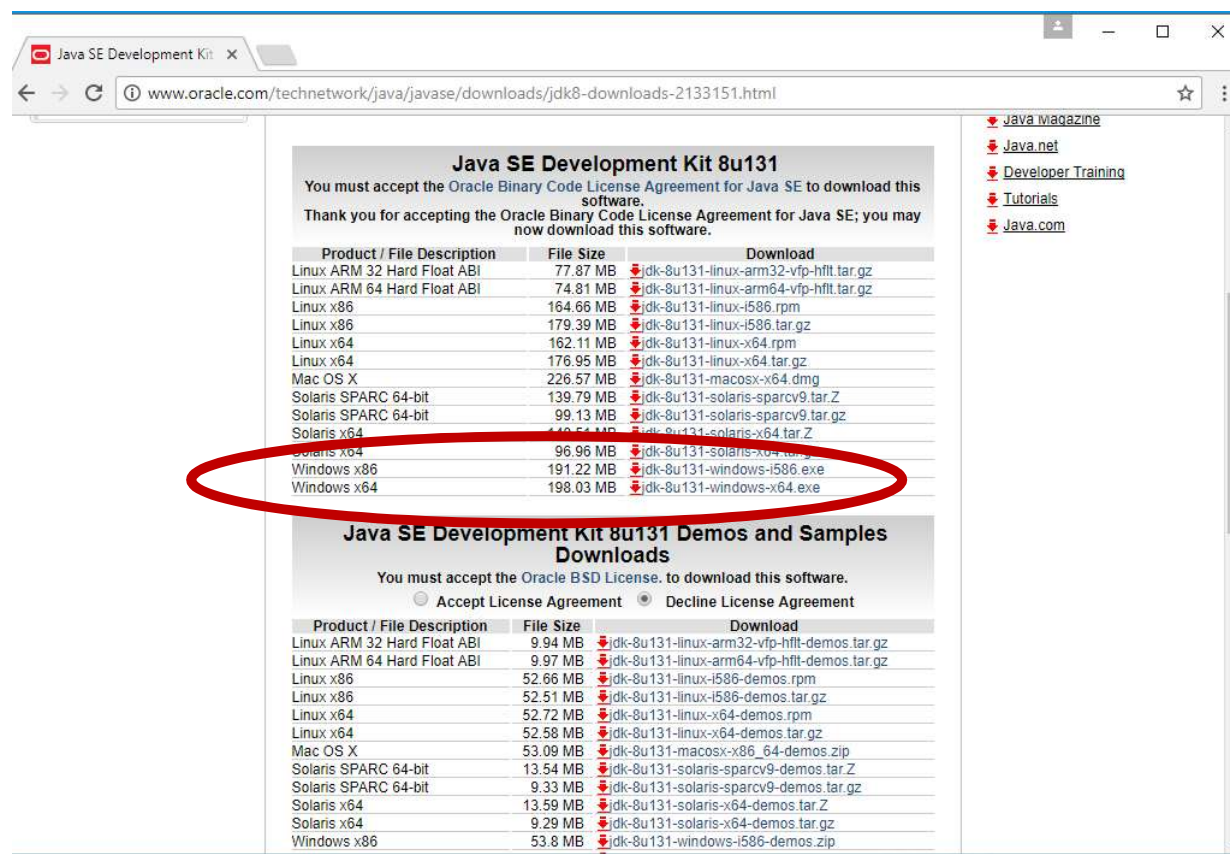


Guide

- The browser will connect to the Oracle Java JDK downloads site and display a page similar to the one on the left.
- Click on the radio button to accept the Oracle License Agreement

Step 3 – Install Java Development Kit (JDK)

4 – Select the JDK that matches your Windows System Type (i.e. 32 or 64-bit)



Java SE Development Kit 8u131
You must accept the Oracle Binary Code License Agreement for Java SE to download this software.
Thank you for accepting the Oracle Binary Code License Agreement for Java SE; you may now download this software.

Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	77.87 MB	jdk-8u131-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	74.81 MB	jdk-8u131-linux-arm64-vfp-hflt.tar.gz
Linux x86	164.66 MB	jdk-8u131-linux-i586.rpm
Linux x86	179.39 MB	jdk-8u131-linux-i586.tar.gz
Linux x64	162.11 MB	jdk-8u131-linux-x64.rpm
Linux x64	176.95 MB	jdk-8u131-linux-x64.tar.gz
Mac OS X	226.57 MB	jdk-8u131-macosx-x64.dmg
Solaris SPARC 64-bit	139.79 MB	jdk-8u131-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	99.13 MB	jdk-8u131-solaris-sparcv9.tar.gz
Solaris x64	119.54 MB	jdk-8u131-solaris-x64.tar.Z
Solaris x64	96.96 MB	jdk-8u131-solaris-x64.tar.gz
Windows x86	191.22 MB	jdk-8u131-windows-i586.exe
Windows x64	198.03 MB	jdk-8u131-windows-x64.exe

Java SE Development Kit 8u131 Demos and Samples Downloads
You must accept the Oracle BSD License, to download this software.
☐ Accept License Agreement ☒ Decline License Agreement

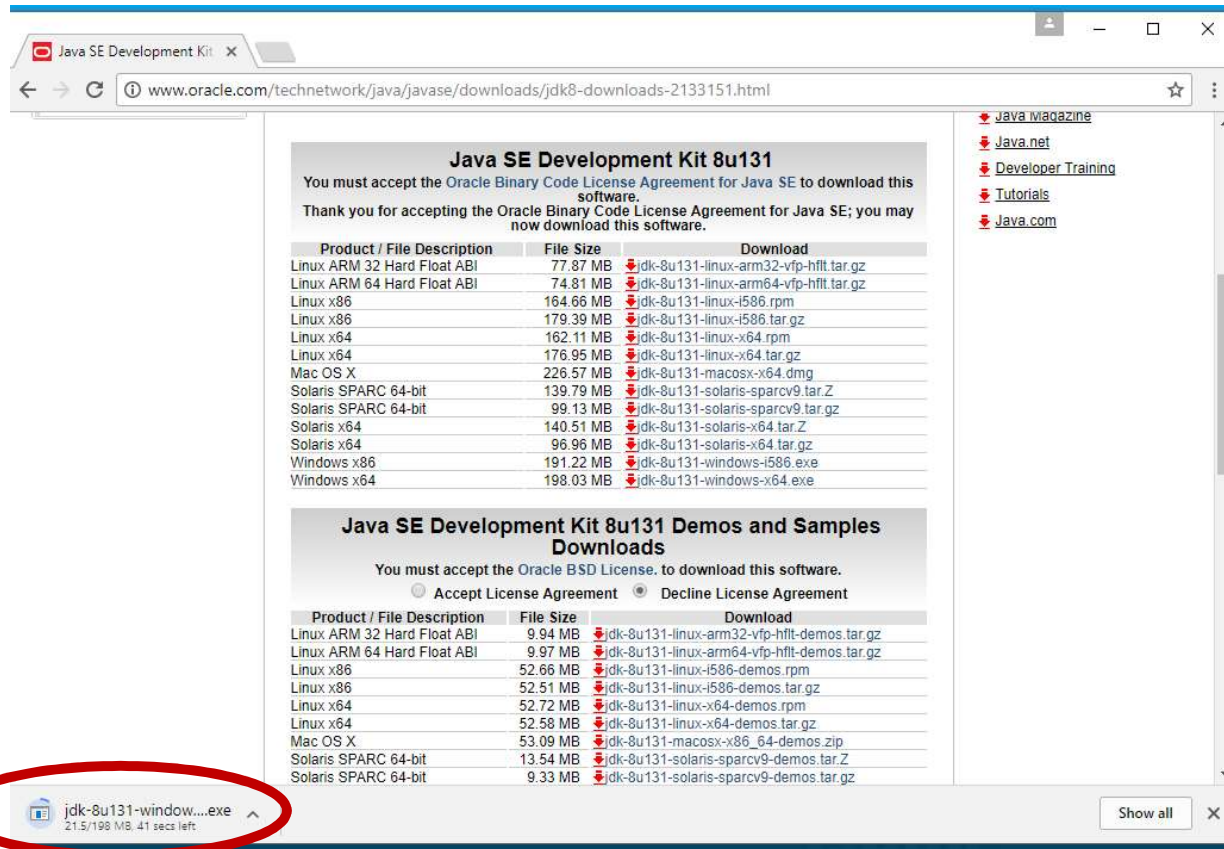
Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	9.94 MB	jdk-8u131-linux-arm32-vfp-hflt-demos.tar.gz
Linux ARM 64 Hard Float ABI	9.97 MB	jdk-8u131-linux-arm64-vfp-hflt-demos.tar.gz
Linux x86	52.66 MB	jdk-8u131-linux-i586-demos.rpm
Linux x86	52.51 MB	jdk-8u131-linux-i586-demos.tar.gz
Linux x64	52.72 MB	jdk-8u131-linux-x64-demos.rpm
Linux x64	52.58 MB	jdk-8u131-linux-x64-demos.tar.gz
Mac OS X	53.09 MB	jdk-8u131-macosx-x86_64-demos.zip
Solaris SPARC 64-bit	13.54 MB	jdk-8u131-solaris-sparcv9-demos.tar.Z
Solaris SPARC 64-bit	9.33 MB	jdk-8u131-solaris-sparcv9-demos.tar.gz
Solaris x64	13.59 MB	jdk-8u131-solaris-x64-demos.tar.Z
Solaris x64	9.29 MB	jdk-8u131-solaris-x64-demos.tar.gz
Windows x86	53.8 MB	jdk-8u131-windows-i586-demos.zip

Guide

- Once you click accept, the download site will change similar to the page on the left with a message that says “Thank you for accepting...”.
 - Note - you may need to scroll down the page!
- Using the System Type you identified in Step one for your particular workstation. (i.e. is it a X86 machine-32-bit- or an x64 machine-64-bit) then double click on the correct JDK file:
 - X86 – jdk-8u131-windows-i586.exe
 - X64 – jdk-8u131-windows-x64.exe
- If your machine asks to allow the Java SE Development Kit 8 Update 131 to make changes to your computer click ‘Yes’

Step 3 – Install Java Development Kit (JDK)

5 – File Download Progress

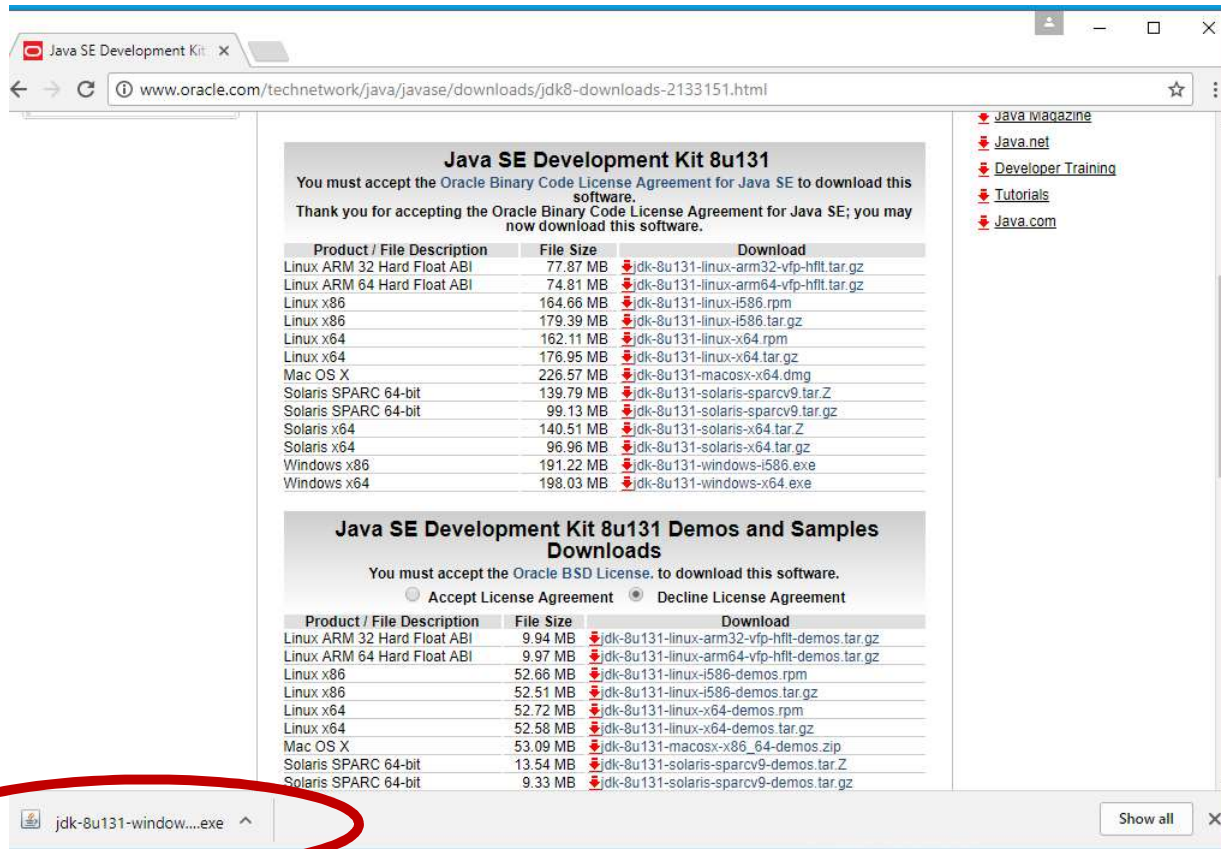


Guide

- Once you click on the link, the browser will display a download progress indicator in the lower left corner of the screen. (See red oval)
 - Note depending on which browser you used for the download you may not see a progress indicator.
- This indicates how much is left to download.

Step 3 – Install Java Development Kit (JDK)

6 – File Download Completed

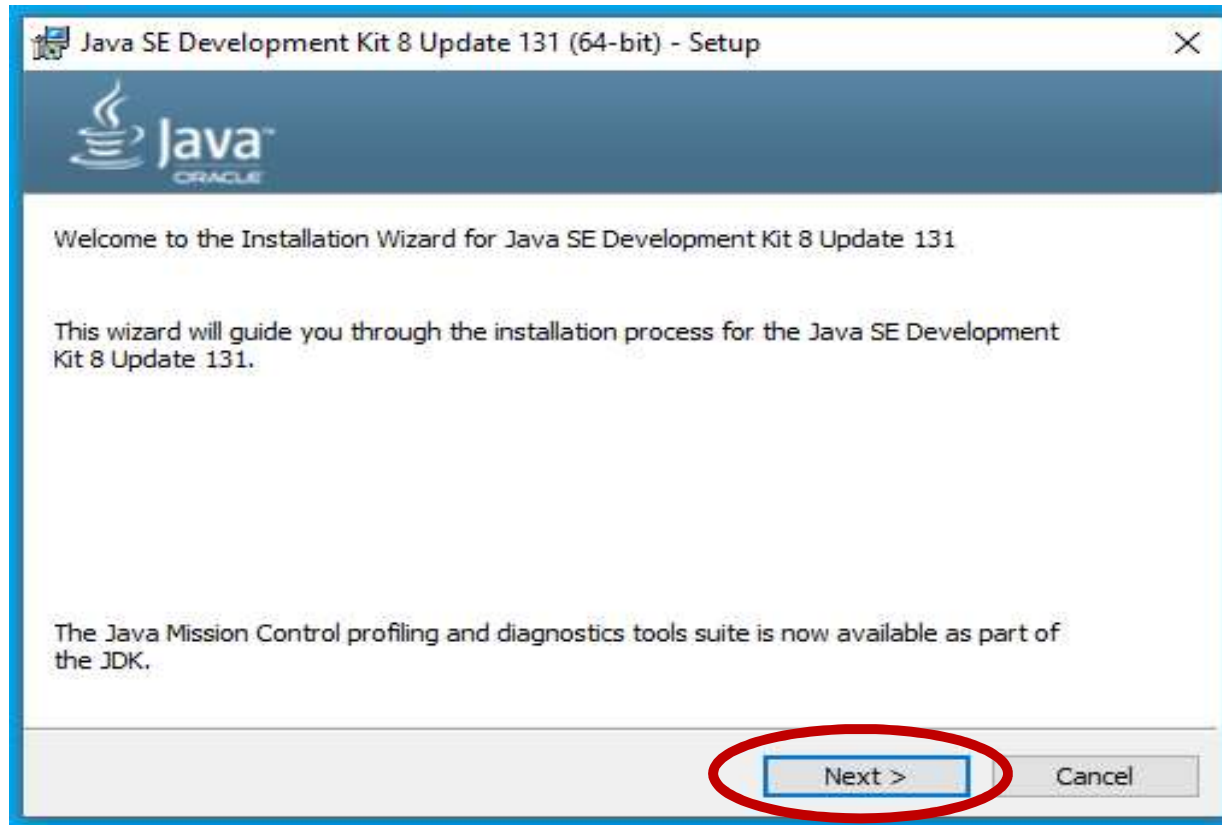


Guide

- Once the download has completed, the progress indicator will go away and you will see just "jdk-8u131-windows...exe" (See red oval)
- Click on the downloaded exe button. (see red oval)

Step 3 – Install Java Development Kit (JDK)

7 – Java JDK Installation Wizard Setup Page

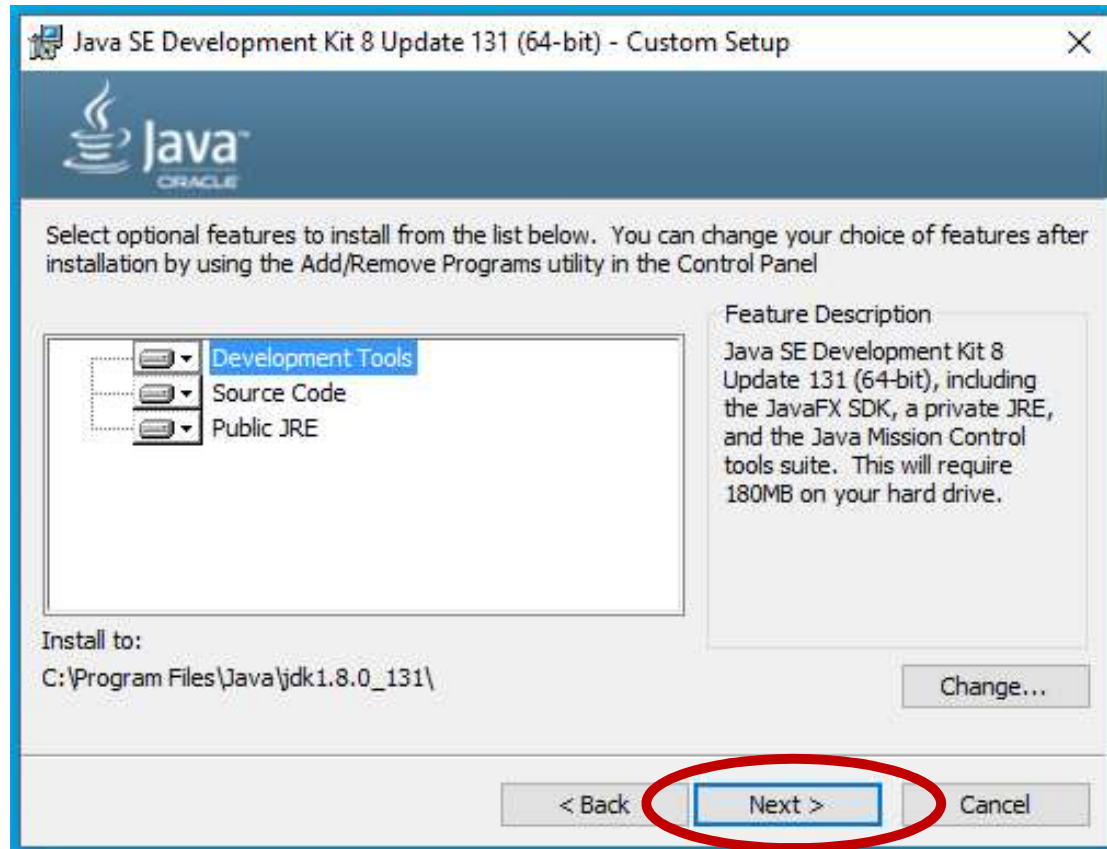


Guide

- Once the installation begins, you will see a pop-up windows similar to the one on the left.
- Click “Next” (See red oval)

Step 3 – Install Java Development Kit (JDK)

8 – Confirm which tools to install – take all the defaults

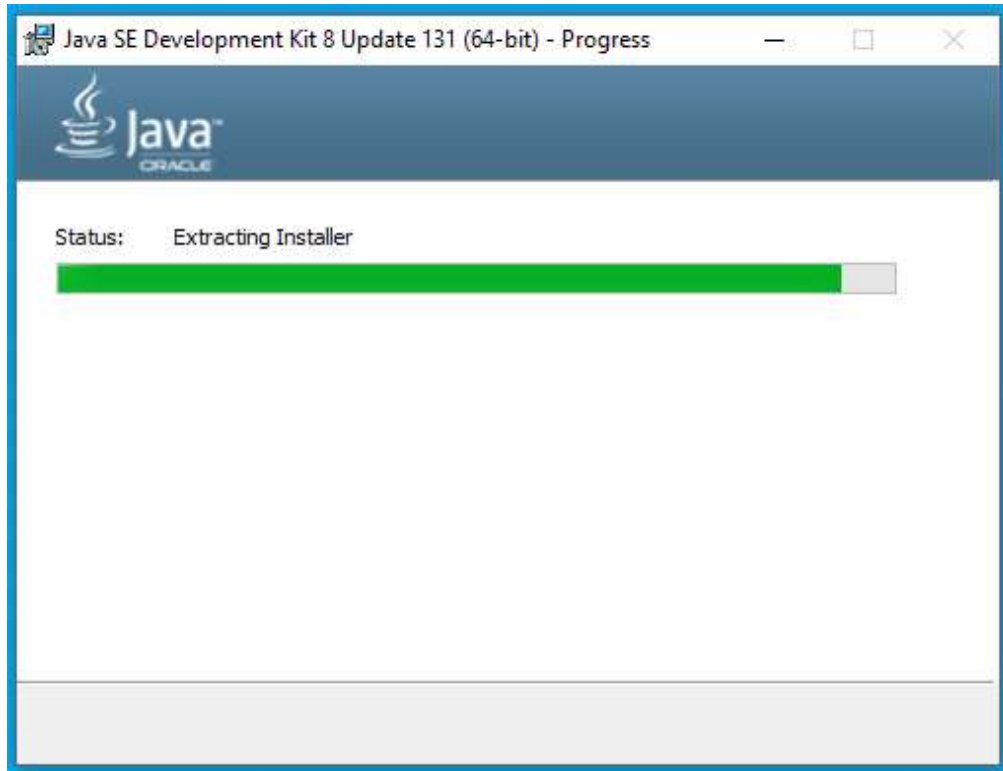


Guide

- The Setup Wizard will display a pop-up windows similar to the one on the left.
- Click “Next” (See red oval)

Step 3 – Install Java Development Kit (JDK)

9 – The Setup Wizard will extract the installation utility and show a progress indicator

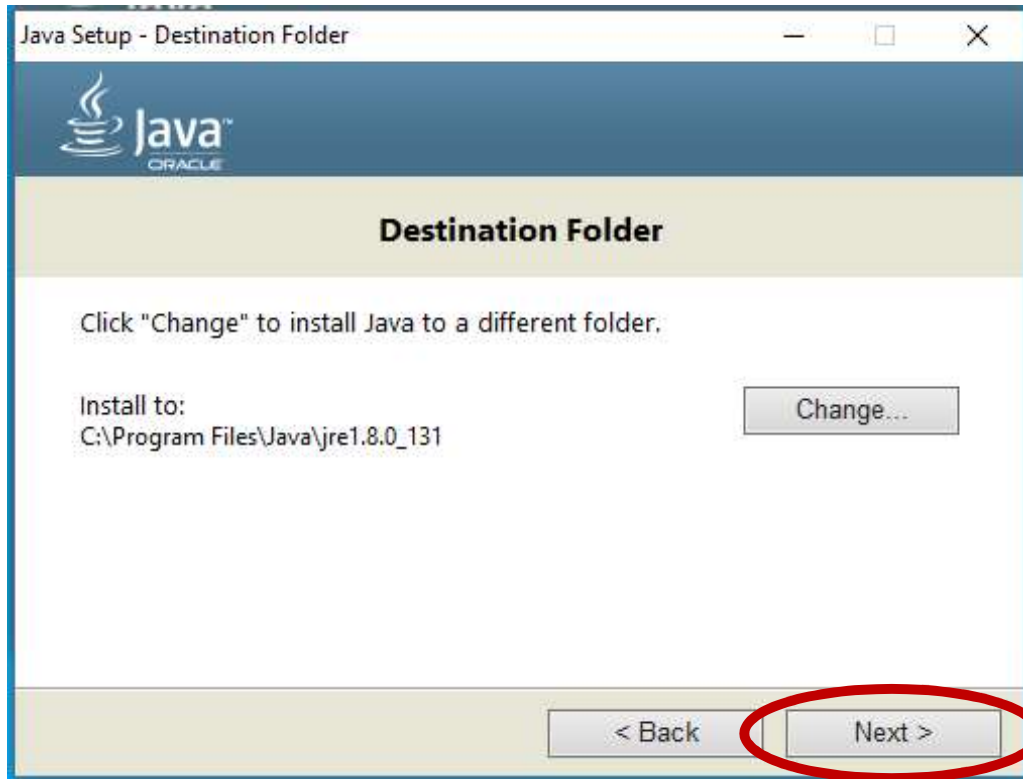


Guide

- The Setup Wizard will display a progress indicator similar to the one on the left.

Step 3 – Install Java Development Kit (JDK)

10 – Confirm which folder to install the JDK too



Guide

- The Setup Wizard will display a destination folder window similar to the one on the left.
- Accept the default location
- Click “Next” (See red oval)

Step 3 – Install Java Development Kit (JDK)

11 – Installation Progress

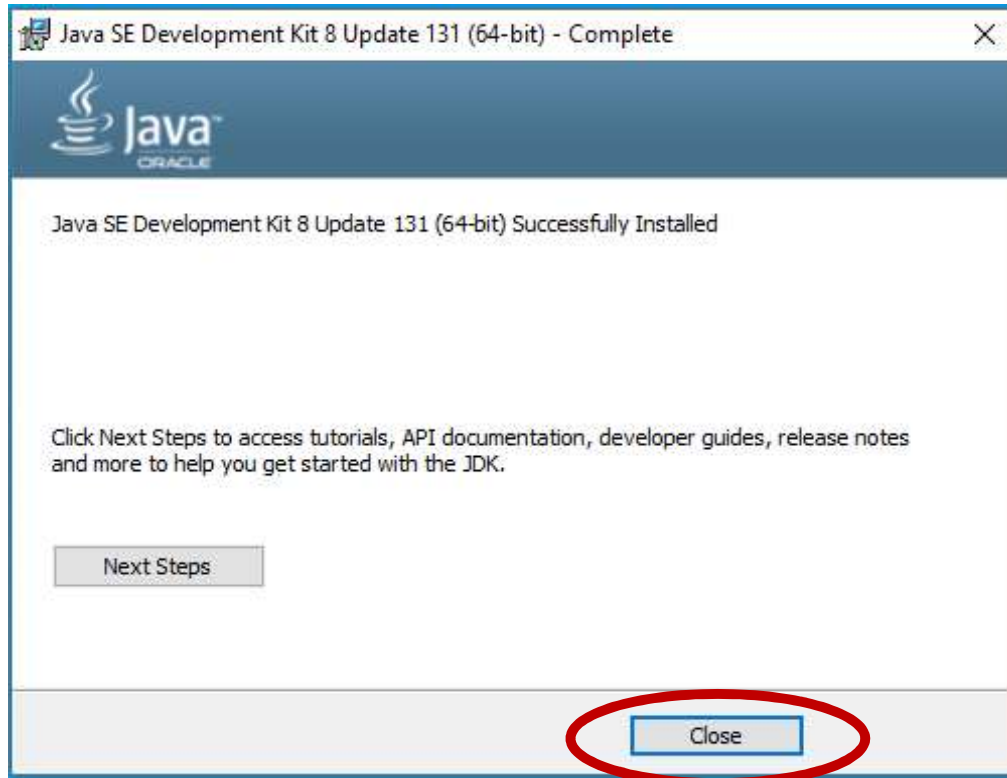


Guide

- The Setup Wizard will begin the installation and display a pop-up window similar to the one on the left.

Step 3 – Install Java Development Kit (JDK)

12 – Installation Completed



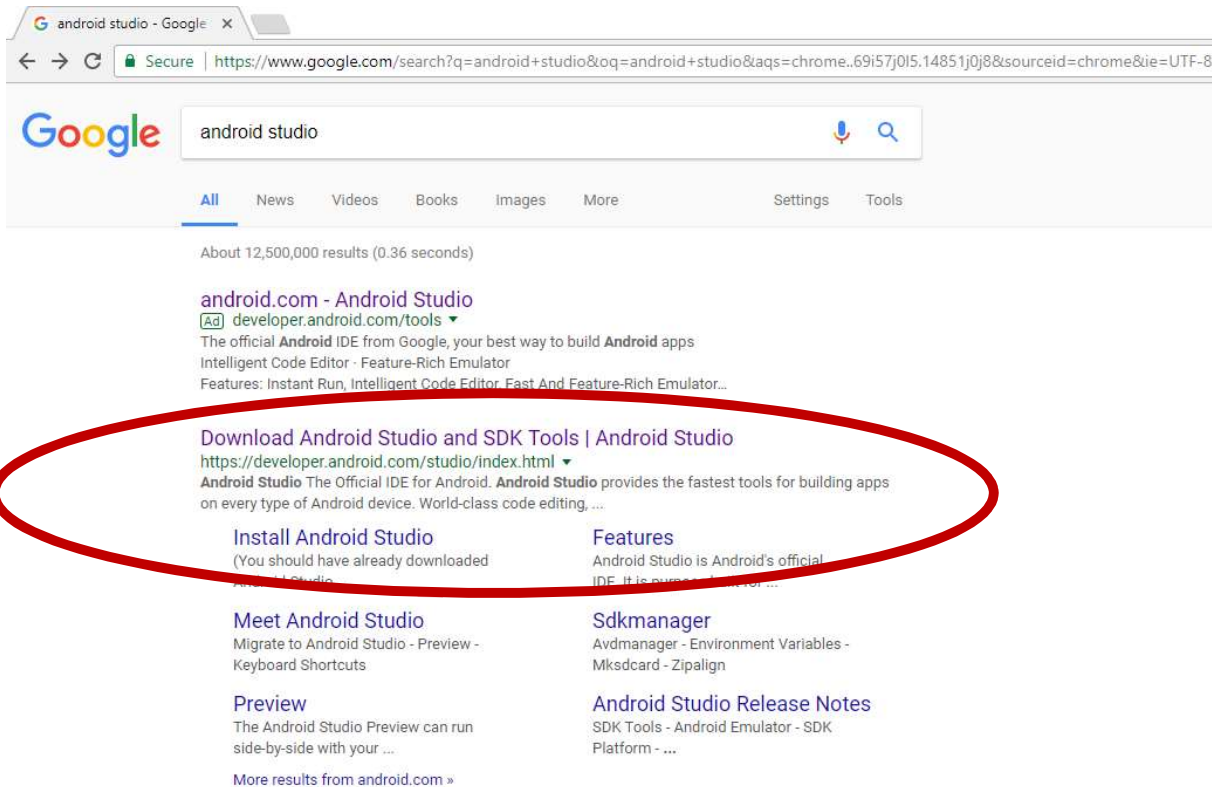
Guide

- Once the installation has completed, a the Setup Wizard will display a pop-up window similar to the one on the left.
- Click "Close". (See red oval)

Congratulations you have completed the Java JDK installation !!!

Step 4 – Install Android Studio Integrated Development Environment (IDE)

1 – Using your browser go to Google and look up Android Studio

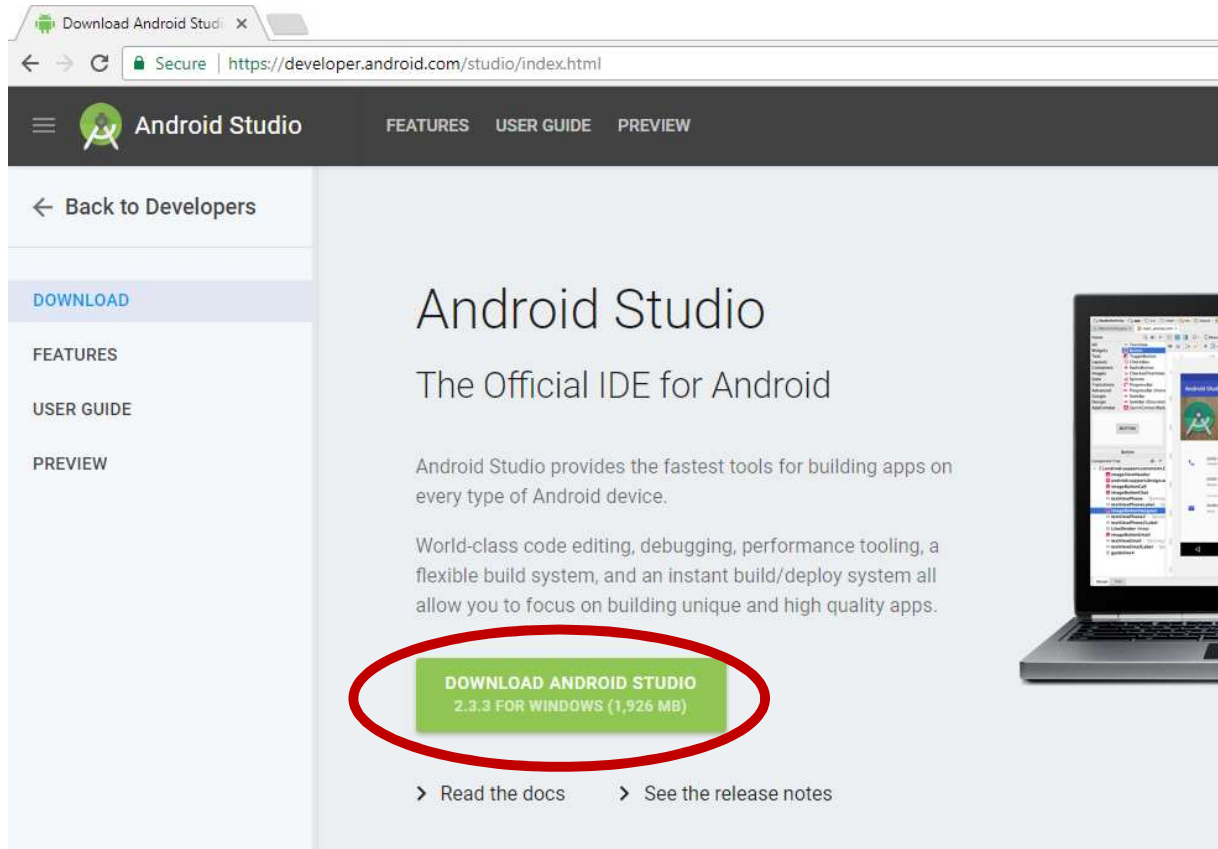


Guide

- Open the internet browser installed on your machine (i.e. Internet Explorer, Chrome, Edge, etc)
- Enter WWW.GOOGLE.COM
- Hit Enter
- In the Google Search box, enter [Android Studio](#)
- Hit Enter
- As you type Google will begin to search and will find the Android Studio Website (see red oval)
- Click on the link that says: “Download Android Studio and SDK Tools” (see red oval)

Step 4 – Install Android Studio Integrated Development Environment (IDE)

2 – Download Android Studio

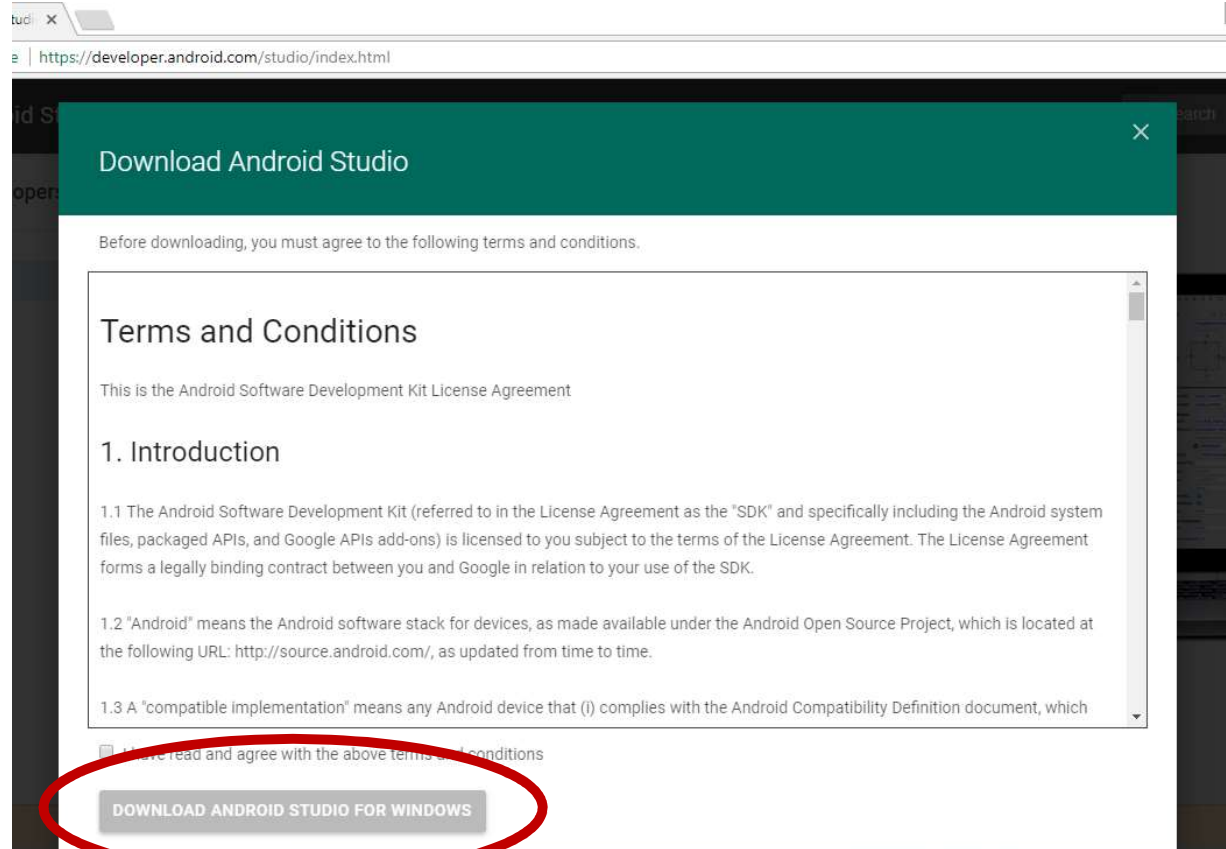


Guide

- The browser will bring up the Android Studio Website with a page similar to the one on the left.
- Click the green “DOWNLOAD ANDROID STUDIO” button (see red oval)

Step 4 – Install Android Studio Integrated Development Environment (IDE)

3 – Accept the Terms and Conditions



Guide

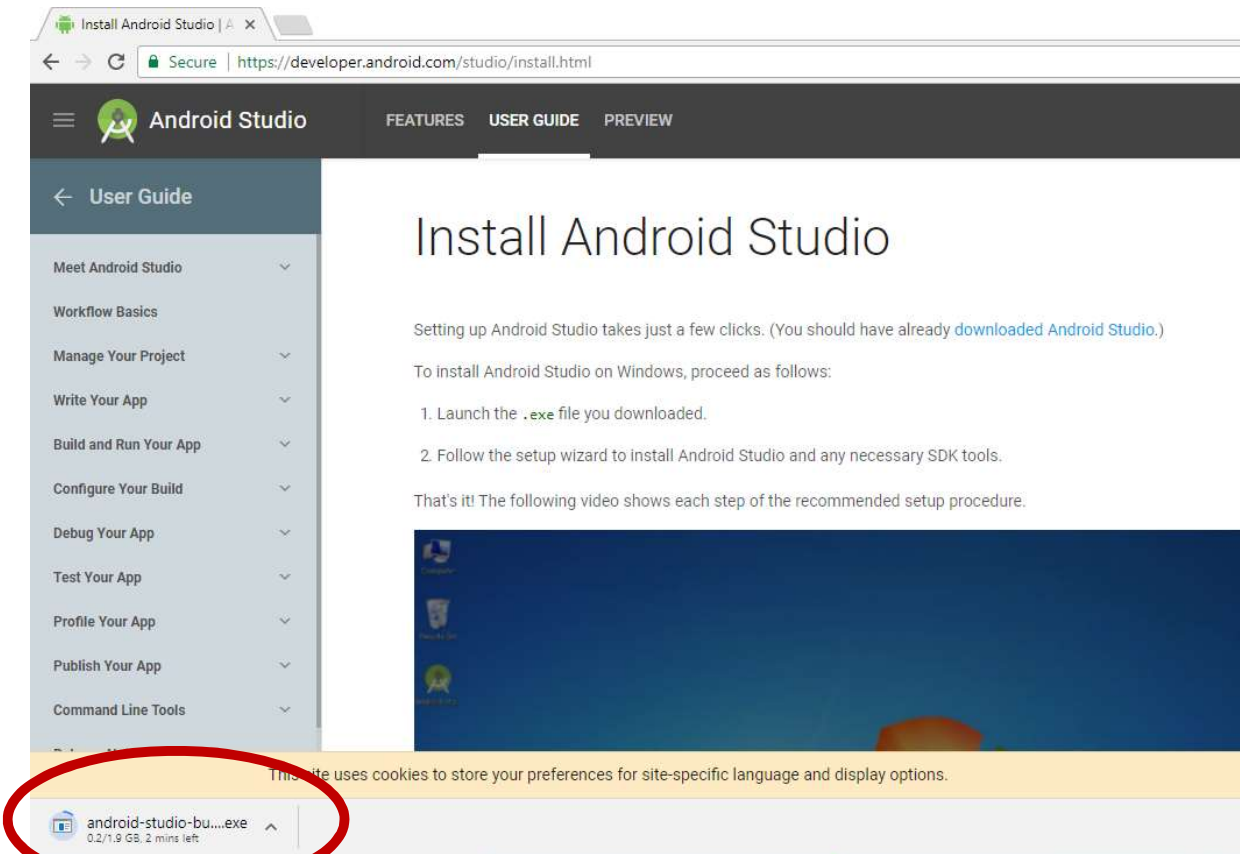
- The browser will bring up the Android Studio Terms and Conditions page similar to the one on the left.
- This will list all the license terms for the Android Studio software. It can make for very exciting reading!!!
- Click the check box that says "I have read and agree with the above terms and conditions" (See red oval)
- Once you click the check box, the "DOWNLOAD ANDROID STUDIO FOR WINDOWS" button will enable and change from gray to blue.
- Click the "DOWNLOAD ANDROID STUDIO" button (See red oval)

Step 4 – Install Android Studio Integrated Development Environment (IDE)

4 – The browser will download Android Studio to your machine

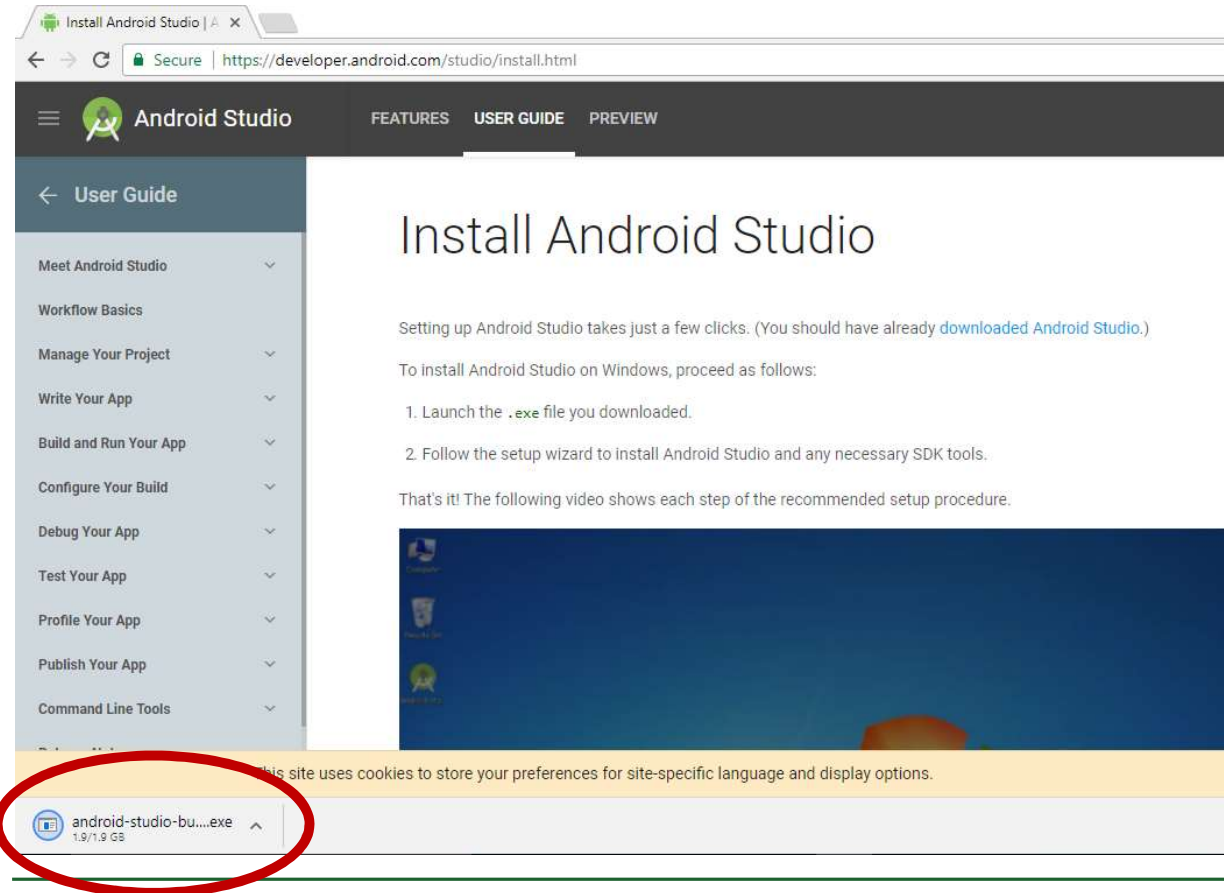
Guide

- The browser will bring up the Android Studio Installation page similar to the one on the left.
- It will also show that a download has started and how long is remaining to complete the download
- Note the “2 mins left” message that indicates a download is in progress (see red oval)



Step 4 – Install Android Studio Integrated Development Environment (IDE)

5 – Download Complete start the install



Guide

- Once the “time Left” disappears the download process has completed. (see red oval)
- Click on the “android-studio-bu...exe” to begin the installation process (see red oval)
- Note - You may see a security screen that asks you to allow “android-studio-bundle-xxx.yyyyyy.exe” to make changes to your machine. You must click the “YES” button to continue

Step 4 – Install Android Studio Integrated Development Environment (IDE)

6 – Confirm that you want to install Android Studio

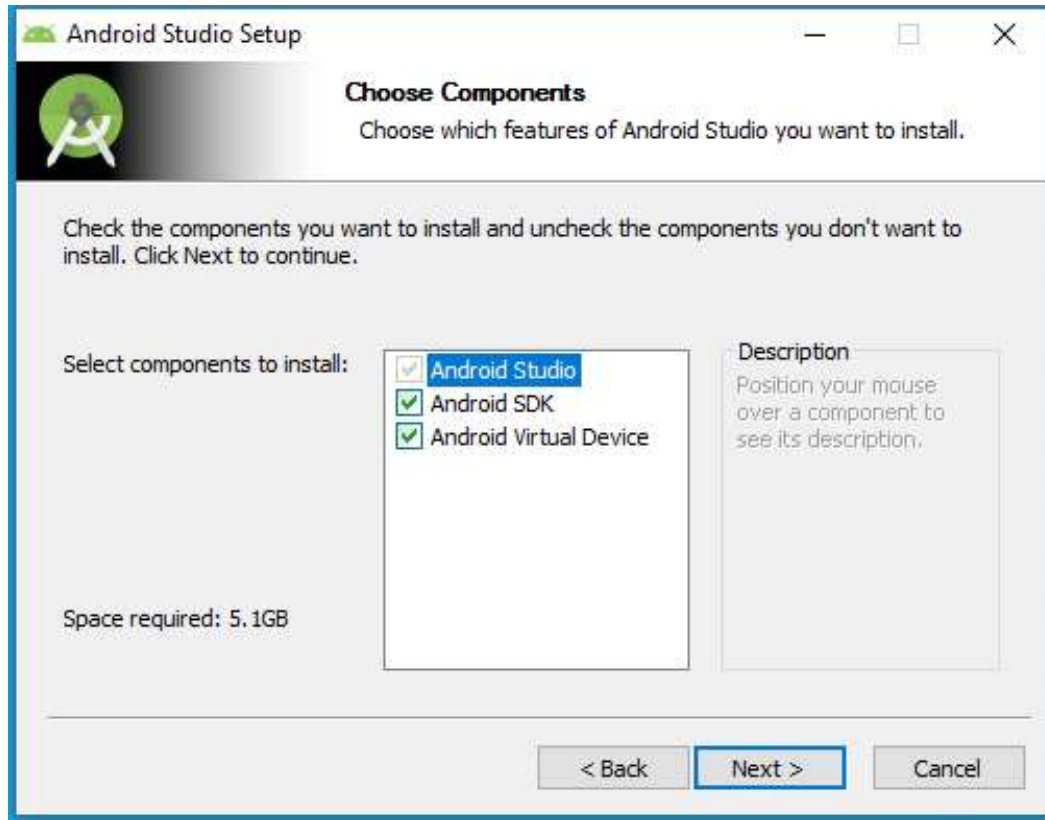


Guide

- Once the setup program loads you will see the confirmation page at the left
- Click Next to continue the install

Step 4 – Install Android Studio Integrated Development Environment (IDE)

7 – Choose what components you want to install

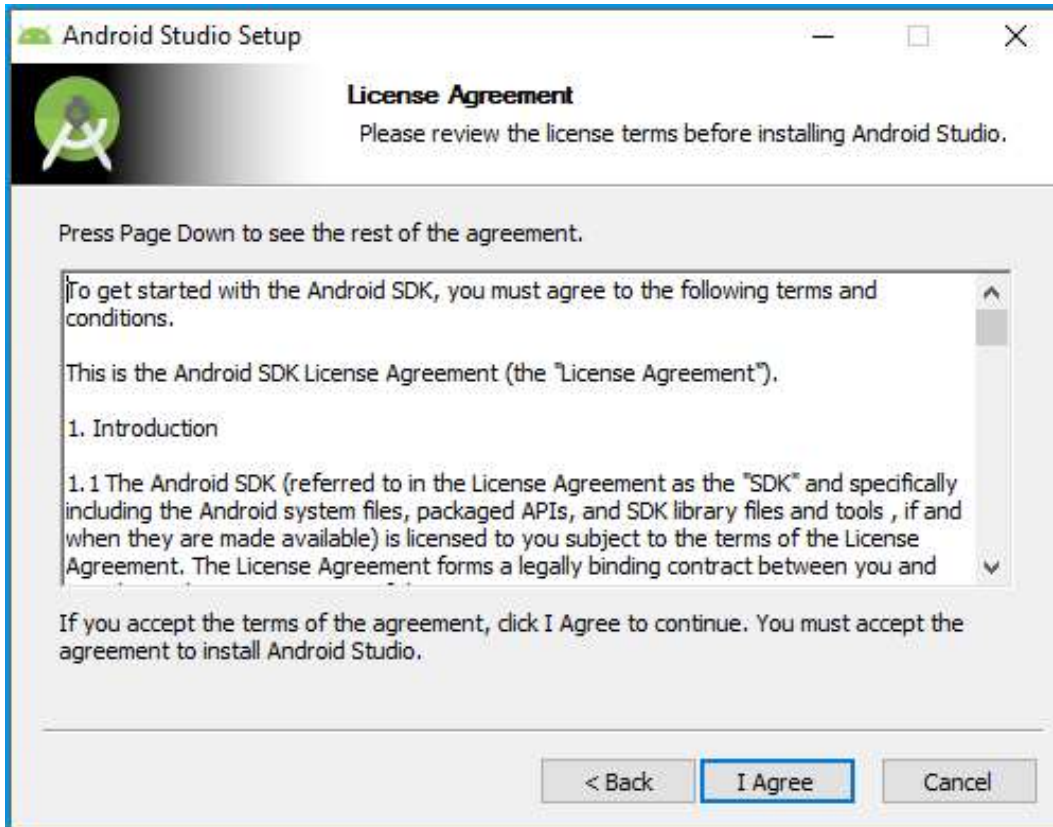


Guide

- You will see the 'Choose Components' page at the left
- Accept the default selections
- Click Next to continue the install

Step 4 – Install Android Studio Integrated Development Environment (IDE)

8 – Accept the license Agreement

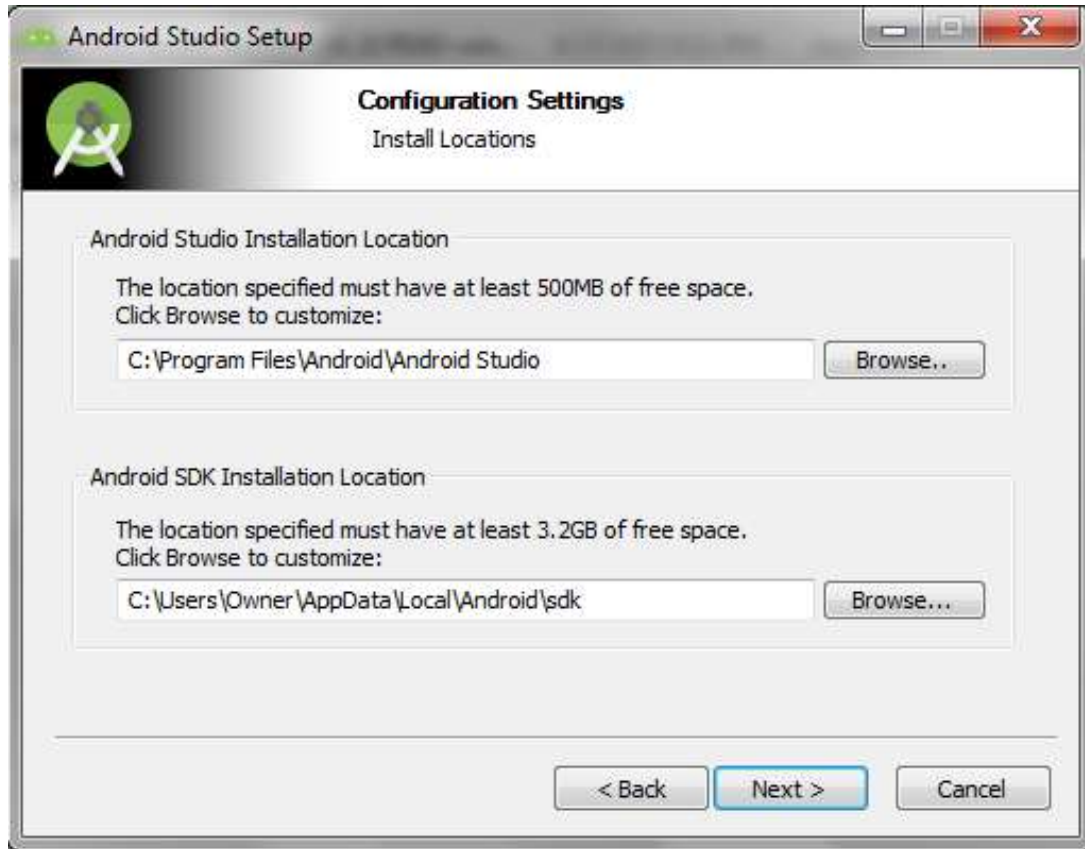


Guide

- You will see the 'License Agreement' page at the left
- After thoroughly reading the agreement...
- Click I Agree to continue the install

Step 4 – Install Android Studio Integrated Development Environment (IDE)

9 – Set the Install Locations

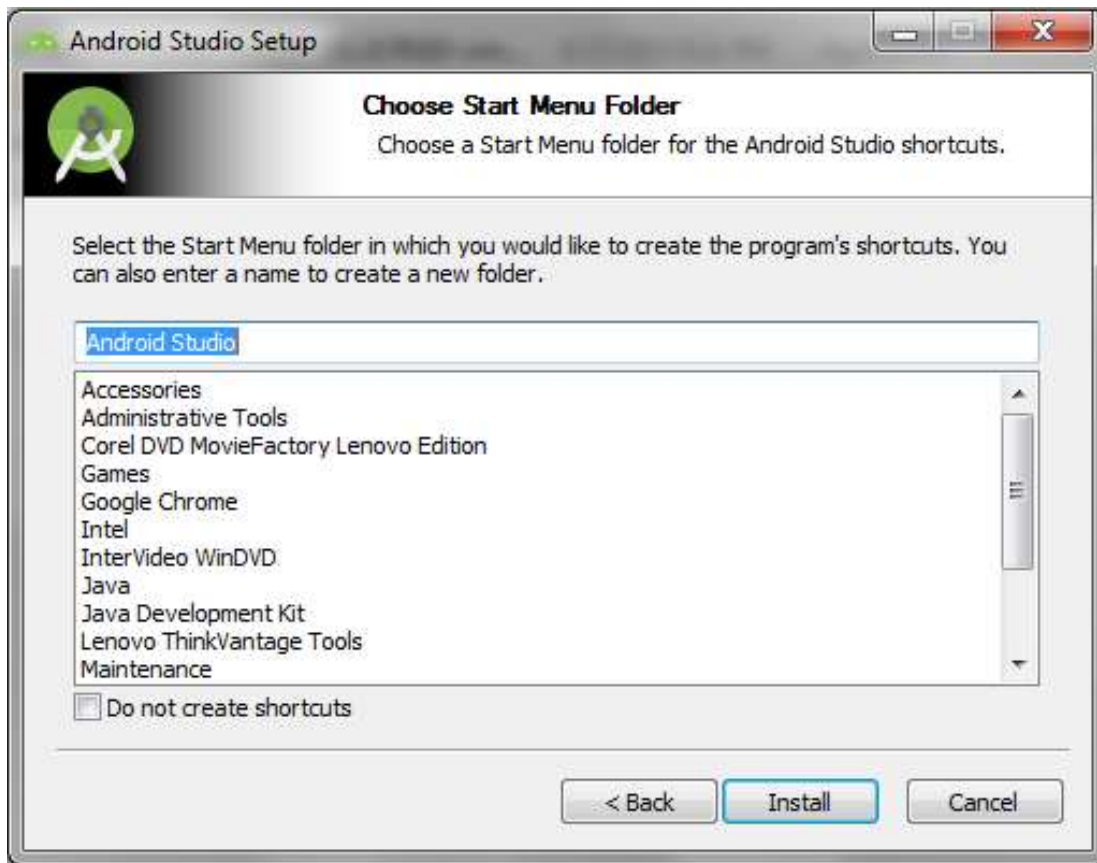


Guide

- You will see the 'Configuration Settings' page at the left
- Accept the default locations for the Android files
- Click Next to continue the install

Step 4 – Install Android Studio Integrated Development Environment (IDE)

10 – Set the Folder name on the Start Menu

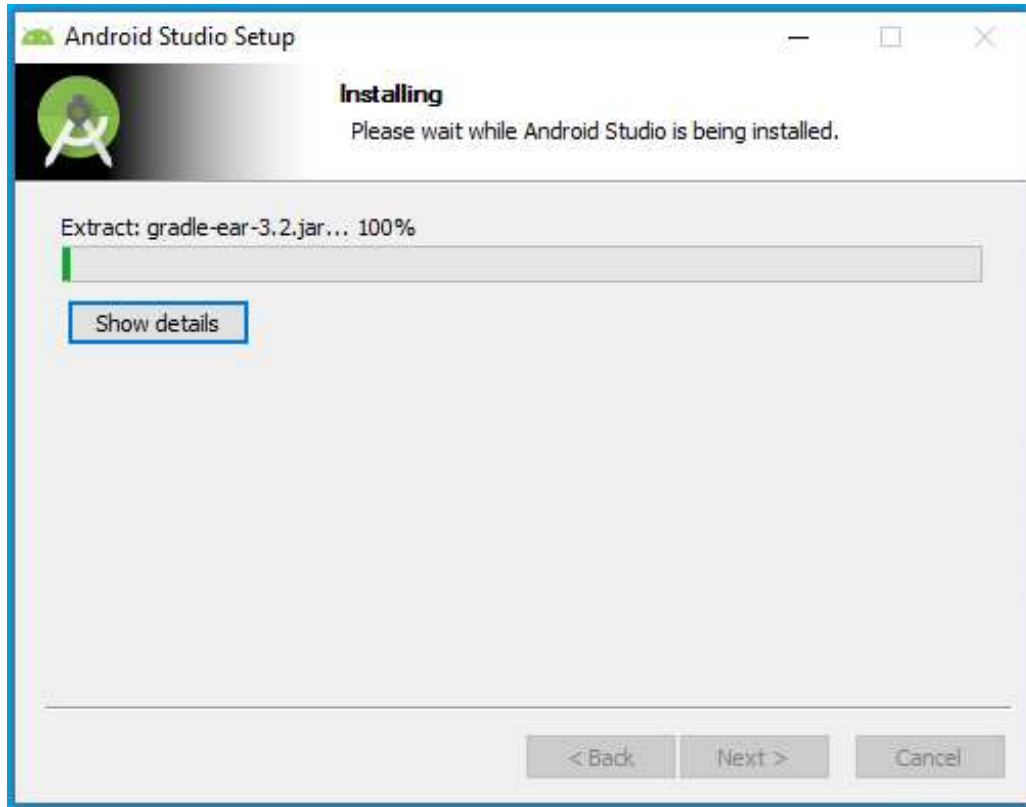


Guide

- You will see the 'Choose Start Menu Folder' page at the left
- Accept the default folder name
- Click Install to start the process

Step 4 – Install Android Studio Integrated Development Environment (IDE)

11 – Android Studio Installation Progress Bar

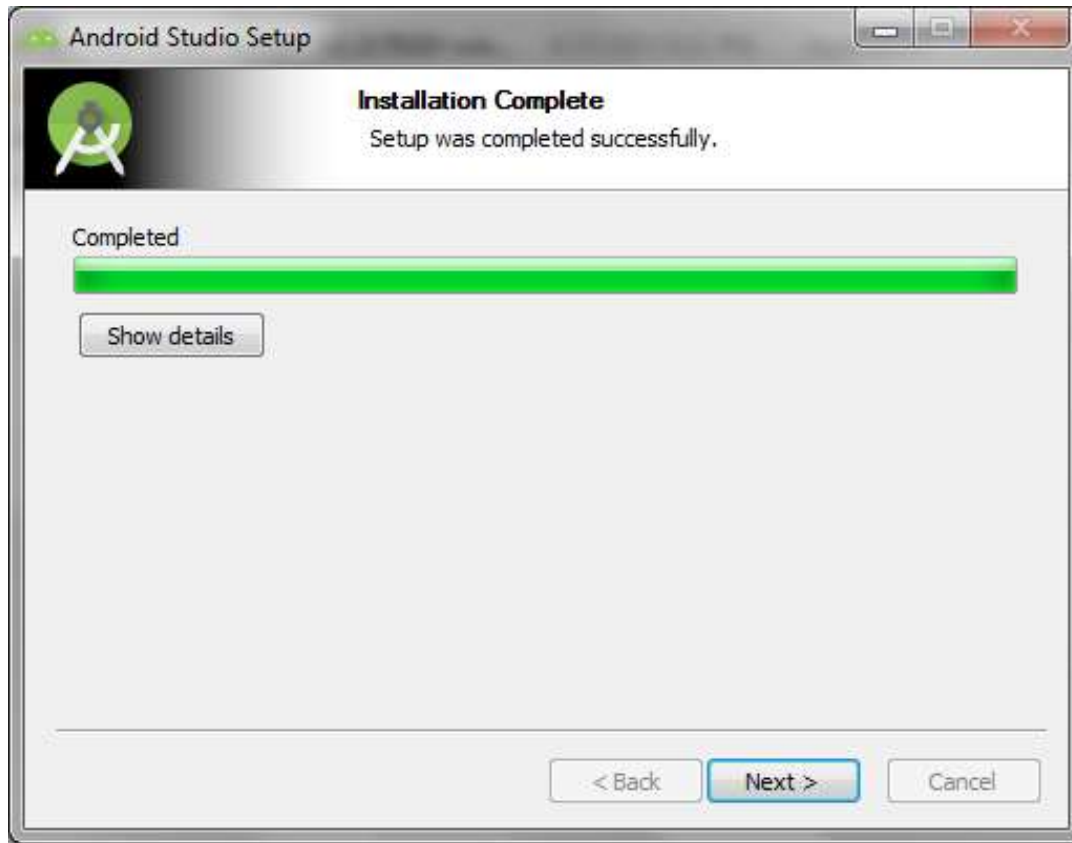


Guide

- Once the installation process starts you will see a progress bar showing how the installation is going.
- Be patient this does take a while.

Step 4 – Install Android Studio Integrated Development Environment (IDE)

12 – Installation Completed



Guide

- Once the installation finishes, you should see the 'Installation Complete' page at the left
- Click Next to complete the install

Step 4 – Install Android Studio Integrated Development Environment (IDE)

13 – Setup has completed



Guide

- You should see the 'Android Studio Setup' page at the left
- Check the Start Android Studio box
- Click Finish to complete the install

Congratulations you have installed Android Studio!!!

Step 5 – Build the FTC Master App

1 - Start Android Studio

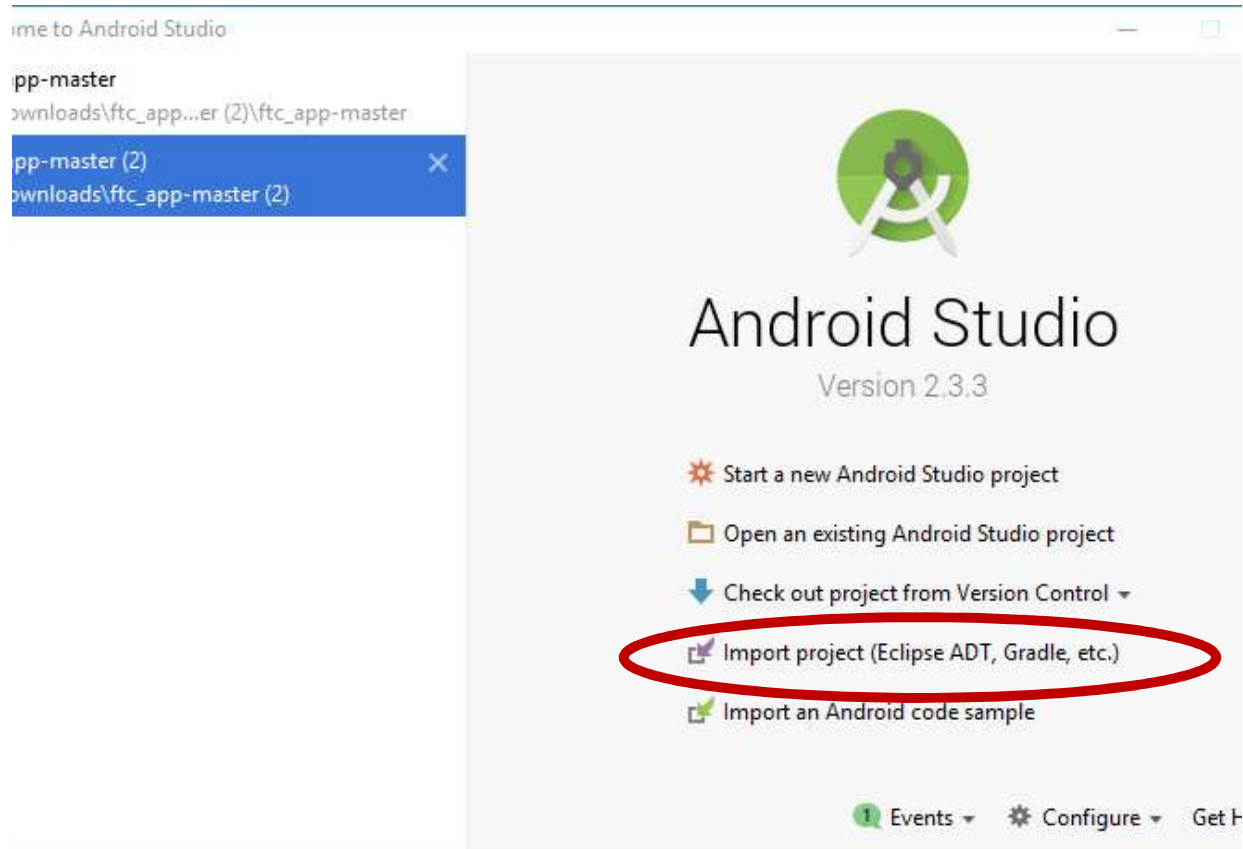


Guide

- If you checked the “Start Android Studio” box in the previous section you should see page similar to the one on the left.
- If You need to start Android Studio manually:
 - Go to the Windows Start Menu
 - Click on “All Programs”
 - Locate the Android Studio folder, click to open folder
 - Select Android Studio application by clicking on it
 - You should see the start up screen on the left

Step 5 – Build the FTC Master App

2. Import project (ftc_App-Master)

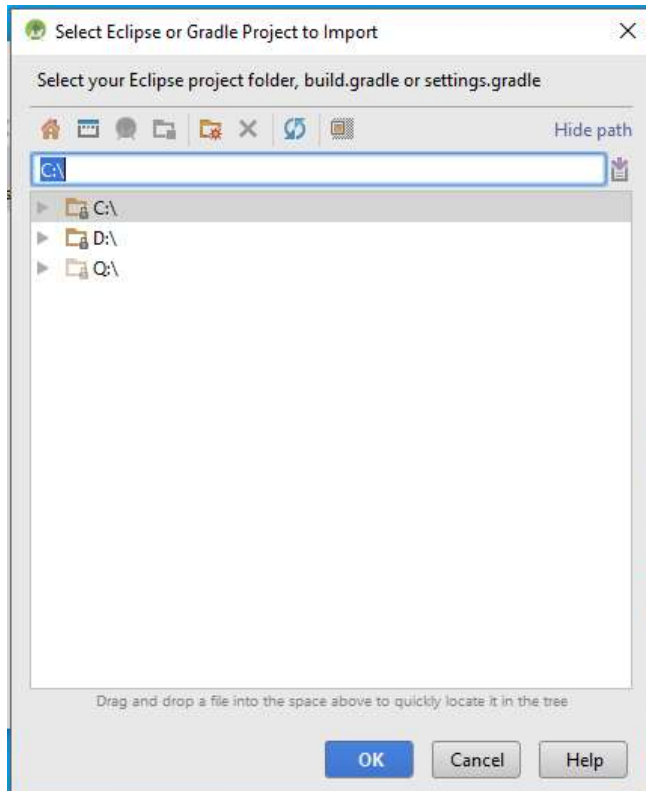


Guide

- Once Android Studio has finished loading the Splash page will be replaced with a page similar to the one on the left.
- The next step is to import the FTC_App-Master project into your Android Studio.
- Click on the “Import Project” link (See red oval)

Step 5 – Build the FTC Master App

3. Select File location

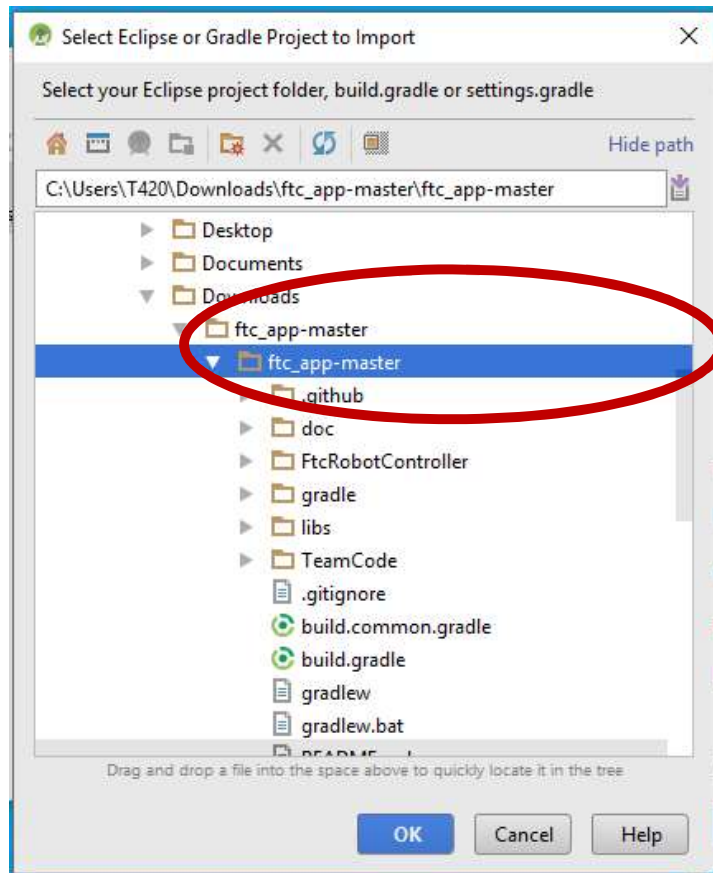


Guide

- Android Studio will display the file selection page similar to the one on the left.
- Find the directory that you installed the FTC_App-MASTER too.
- Note this is the directory where you extracted your files too in Step 2.6 (Slide 13)

Step 5 – Build the FTC Master App

4. Import project (FTC_App-Master)

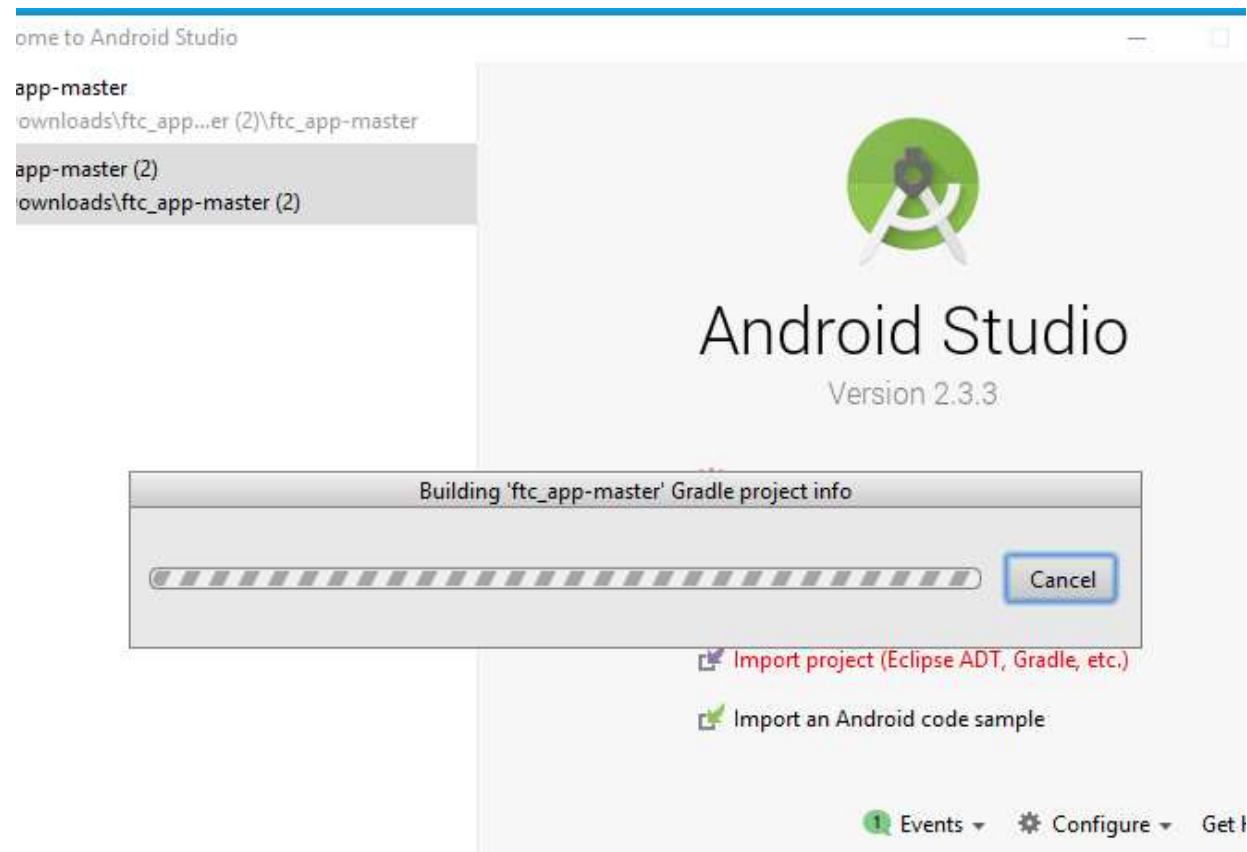


Guide

- In this example we installed the extracted FTC_App-Master to the C:\Users\T420\Downloads\ftc_app-master directory.
- Note: That we selected the ftc_App_Master directory INSIDE the FTC_App-Master folder. (Yes there are two directories named the same thing!!!!!!) Make sure you select the second one. (See red oval)
- Once you have selected the correct directory Click the “OK” button

Step 5 – Build the FTC Master App

5. Gradle Build (compile) of the FTC_App-Master

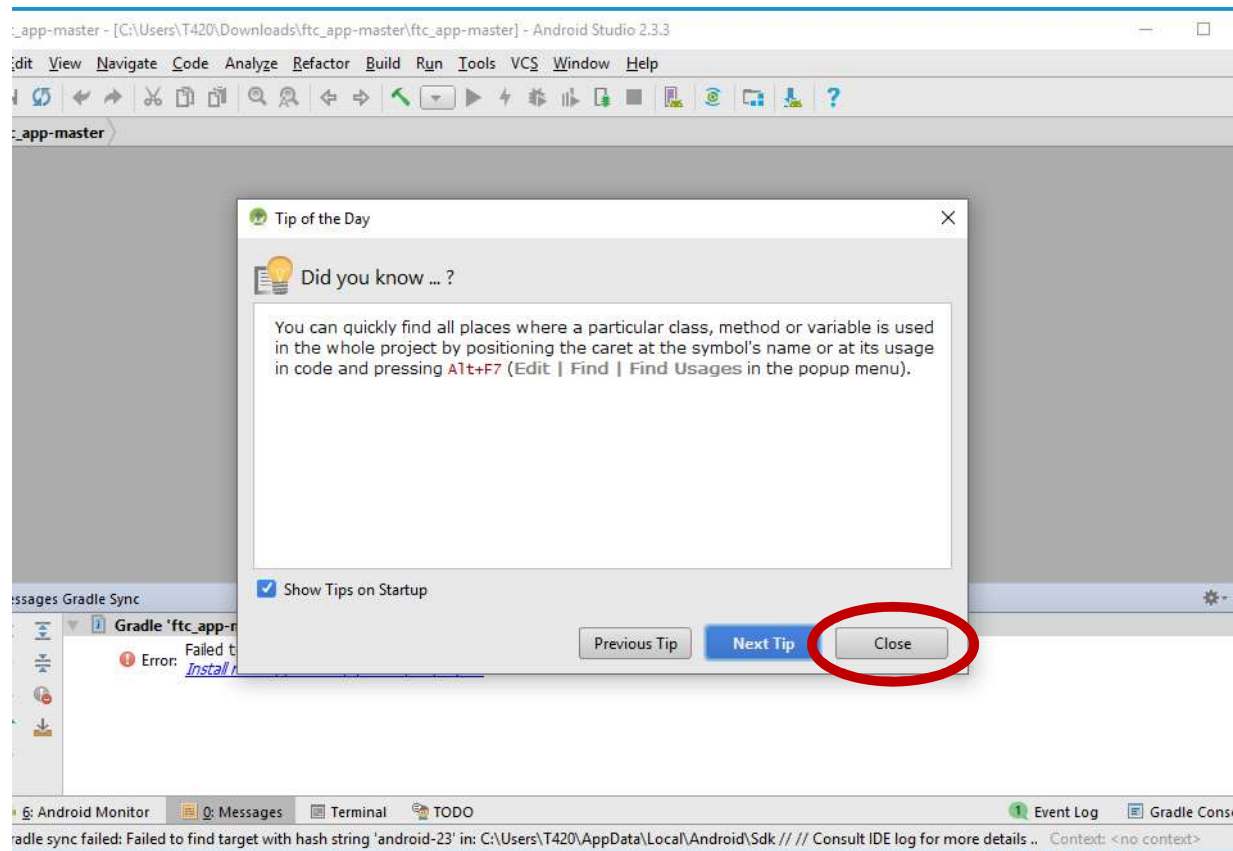


Guide

- Once you click the “OK” button on the previous step, Android Studio will recompile the ftc_app-master application.
- You should see a progress bar similar to the screen on the left.
- This is very important. If you do not see a “Building Gradle” progress bar it is most likely caused by not selecting the second ftc_app-master on the previous step.
- If you do not see this screen go back to the previous step and select a different directory for import.

Step 5 – Build the FTC Master App

6. Close Tip of the Day

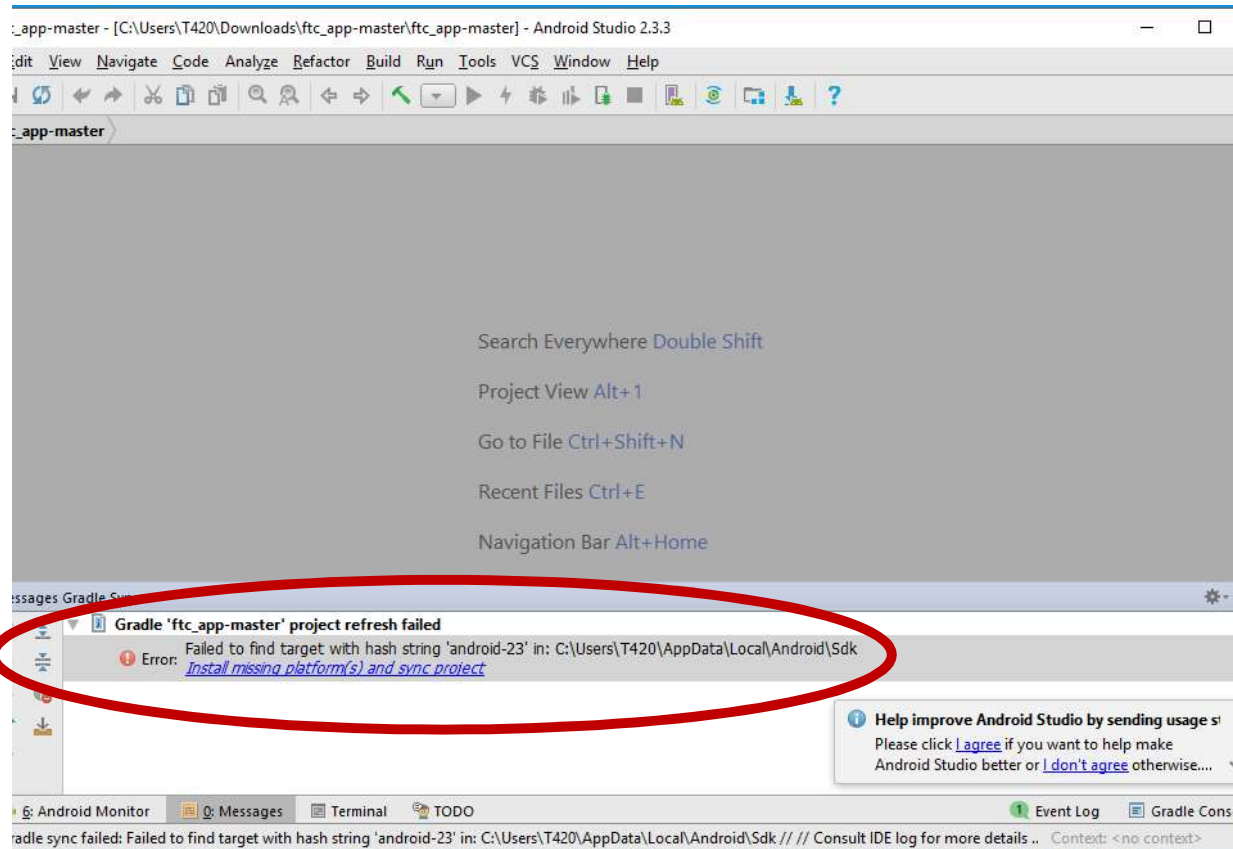


Guide

- Once the Gradle build finishes, you will see the normal Android Studio development screen with a random “Tip of the Day” message box. Your screen should look similar to the one on the left.
- Click the “Close” button on the tip of the day. (See red oval)

Step 5 – Build the FTC Master App

7. Gradle Build Fails

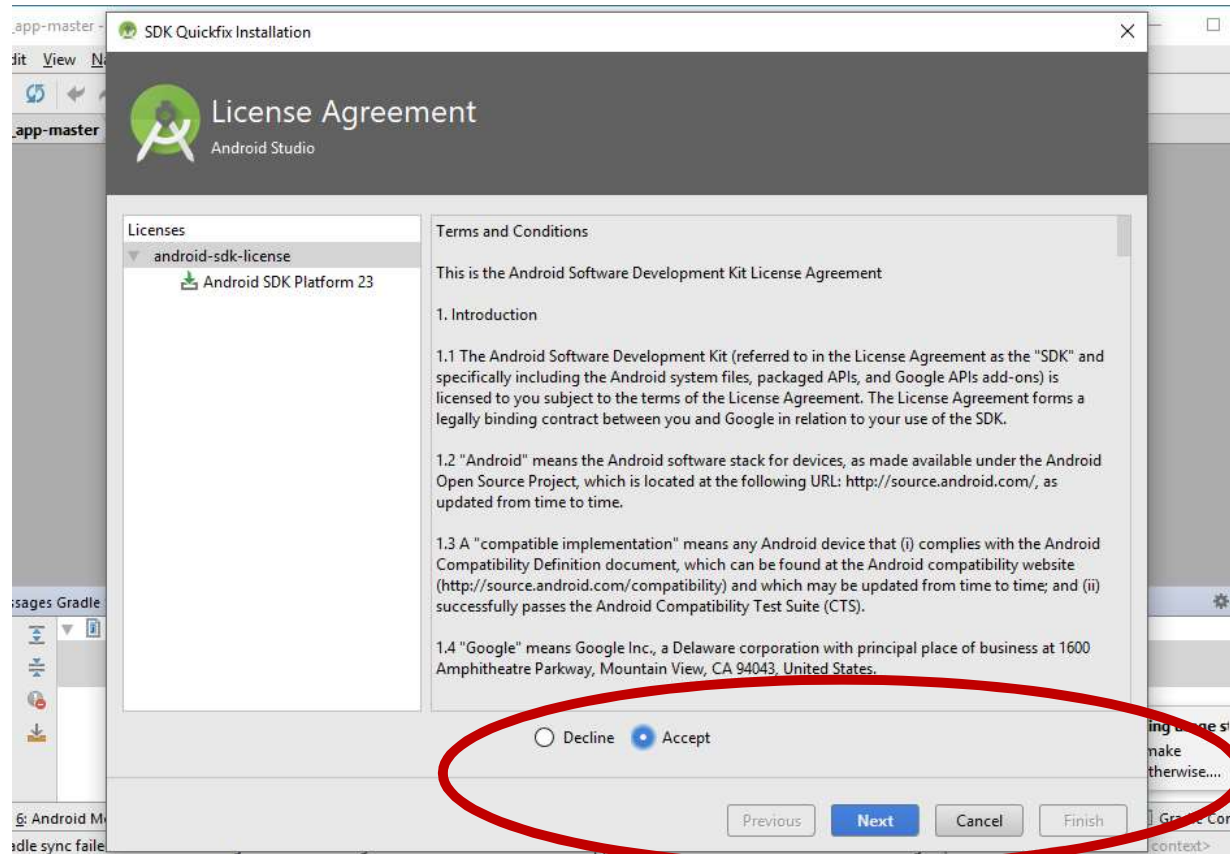


Guide

- Once you close the “Tip of the Day” you will notice that the Gradle build of the ftc_app-master failed. (See red oval)
- Click the link “Install missing platform(s) and sync project” (See red oval)

Step 5 – Build the FTC Master App

8. Accept License Terms

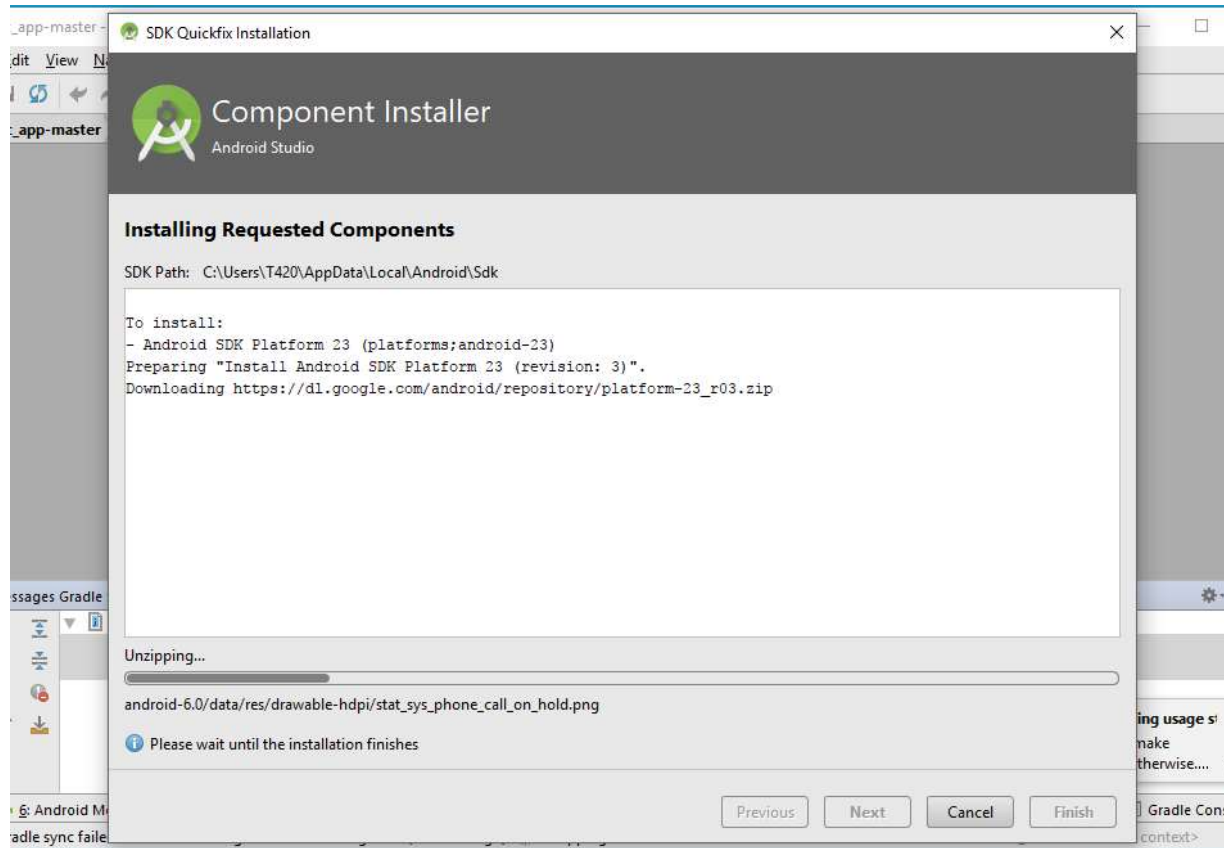


Guide

- The license Agreement terms and conditions page will display similar to the one on the left. They make for exciting reading !!
- You must click the “Accept” radio button for the “Next” button to enable. (see red oval)
- Click the “Next” button to begin the download and install. (see red oval)

Step 5 – Build the FTC Master App

9. Component Installer Status

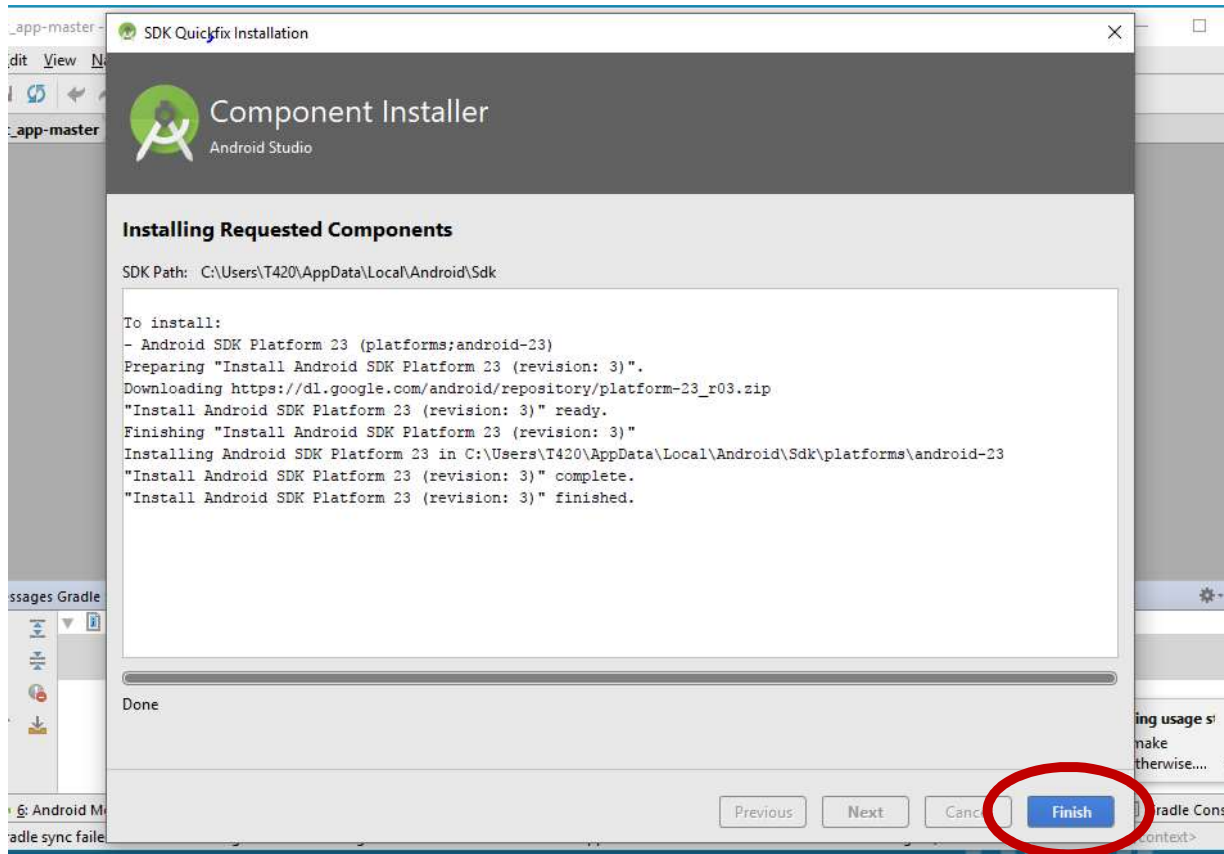


Guide

- Android Studio will display an installation status screen similar to the one on the left.
- This indicates that the install is working.
- The performance bar at the bottom will indicate how much of the install is left to complete.

Step 5 – Build the FTC Master App

10. Component Installer Completion

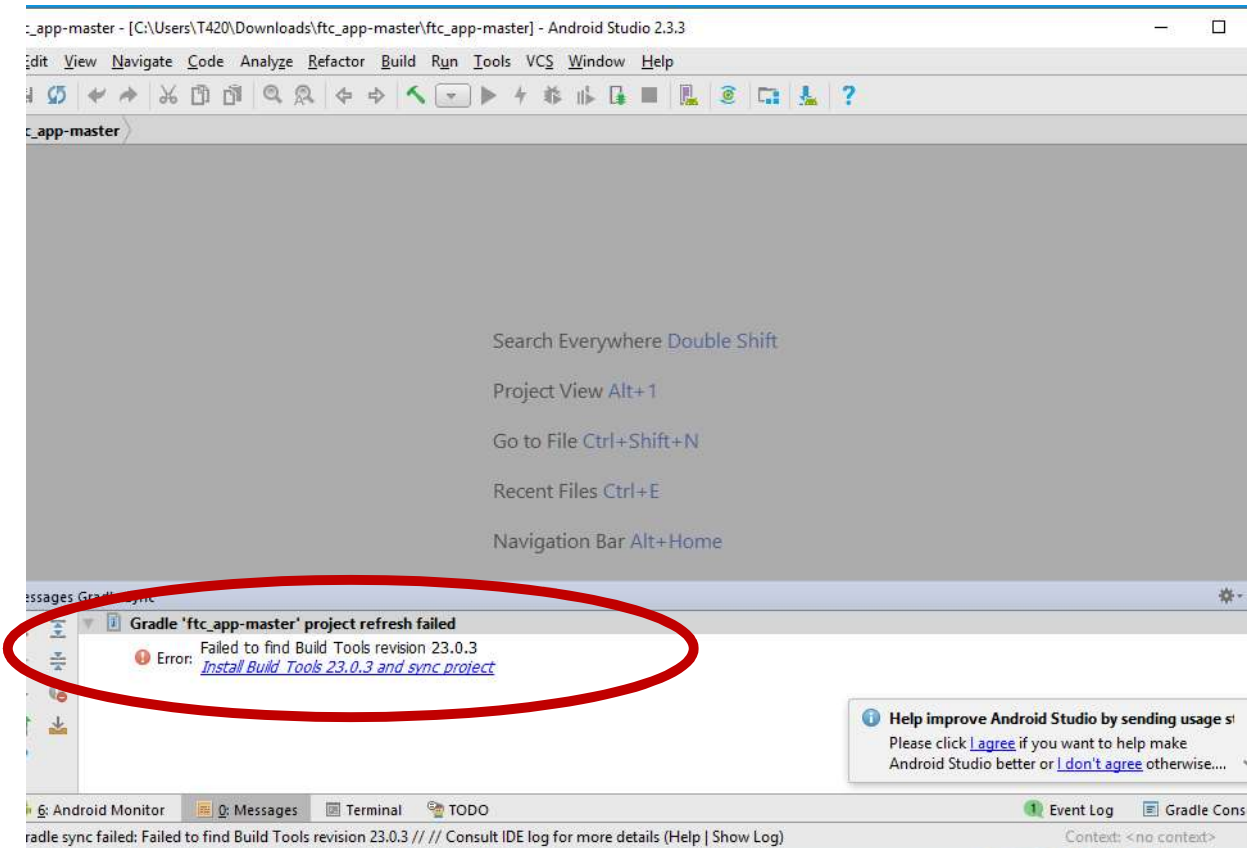


Guide

- Once the installation completes, the Finish button will enable. (See red oval)
- Click "Finish" button. See red oval)

Step 5 – Build the FTC Master App

11. Gradle Build Fails Again

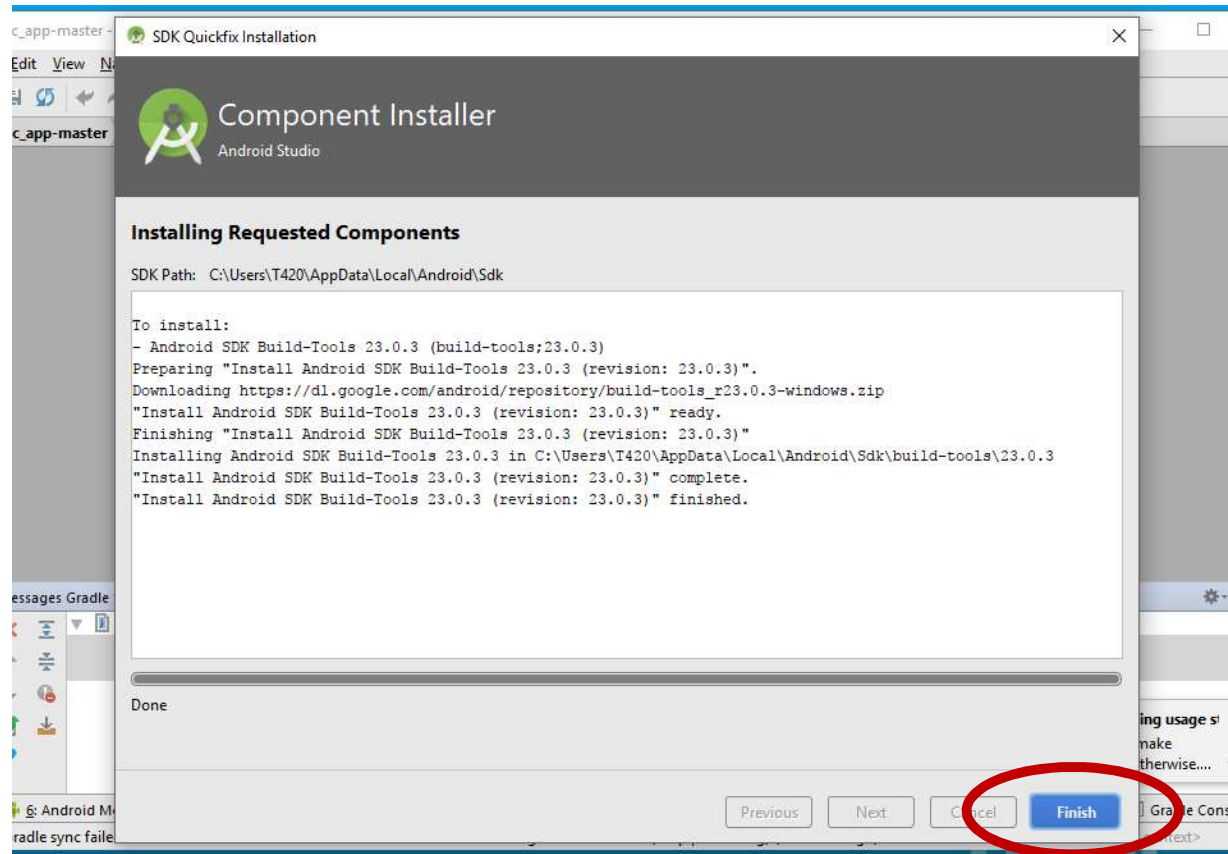


Guide

- The Gradle will automatically start to compile again.
- You will notice that the compile failed again. (See red oval)
- This is due to another missing tool.
- Click the “Install Build Tools 23.0 and sync project. (See red oval)

Step 5 – Build the FTC Master App

12. Component Installer Completion

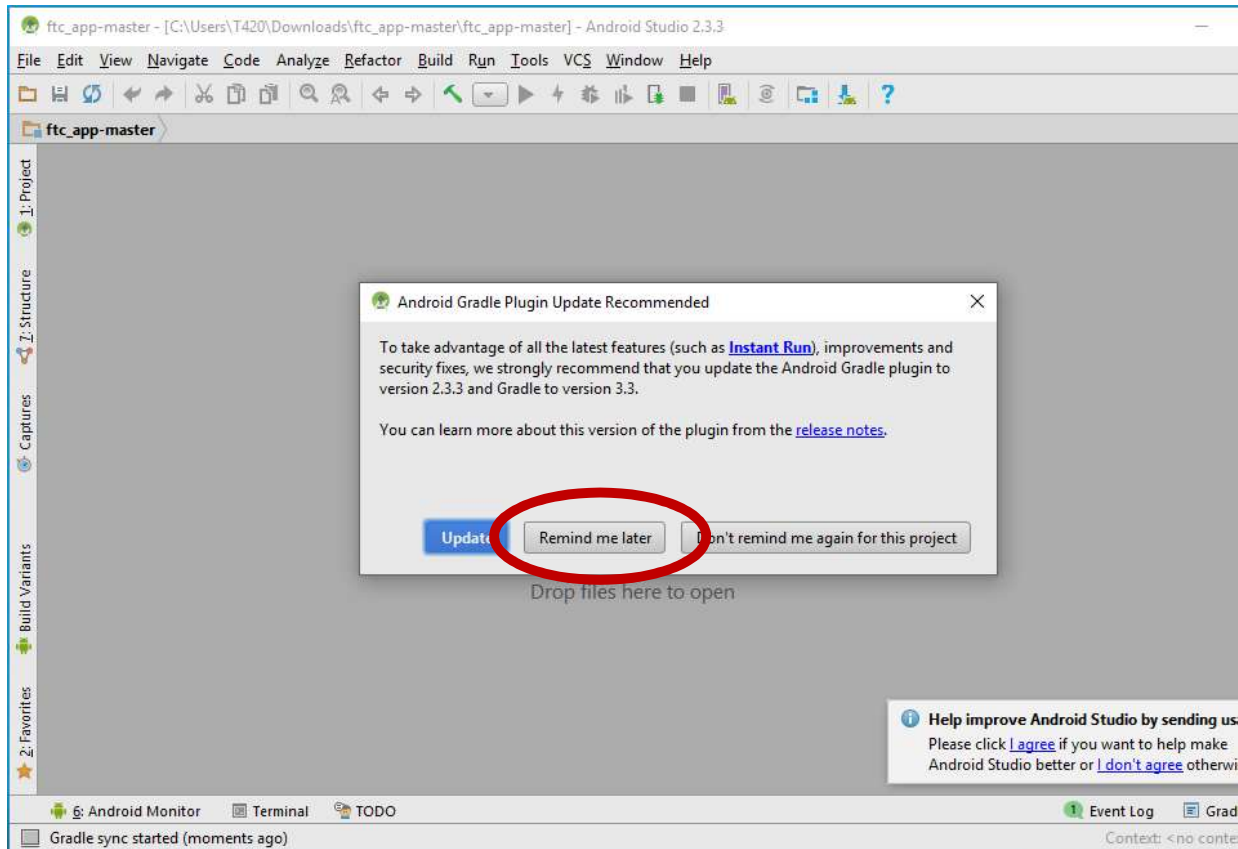


Guide

- This time there are no license terms to accept and the install will start automatically.
- Your screen should look similar to the one on the left.
- Once the installation has completed the "Finish" button will enable.
- Click the "Finish" button (see red oval)

Step 5 – Build the FTC Master App

13. Ignore Gradle Plugin Update Recommendation

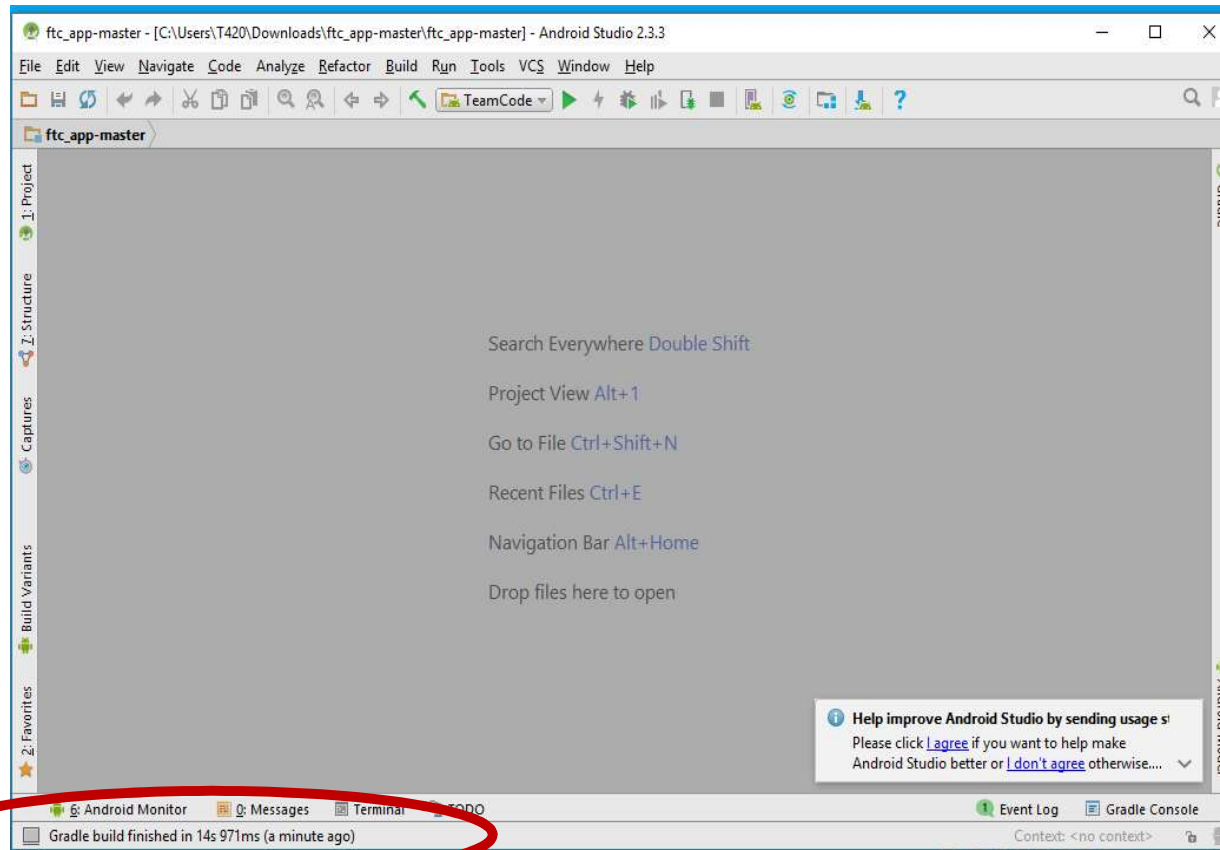


Guide

- The Gradle build will start automatically.
- You may see a pop-up window similar to the one on the left that recommends a Gradle Plugin Update.
- For now do not install this upgrade!
- Click the “Remind me later” button. (See red oval)

Step 5 – Build the FTC Master App

14. Gradle Build Finishes – But we are not yet done!

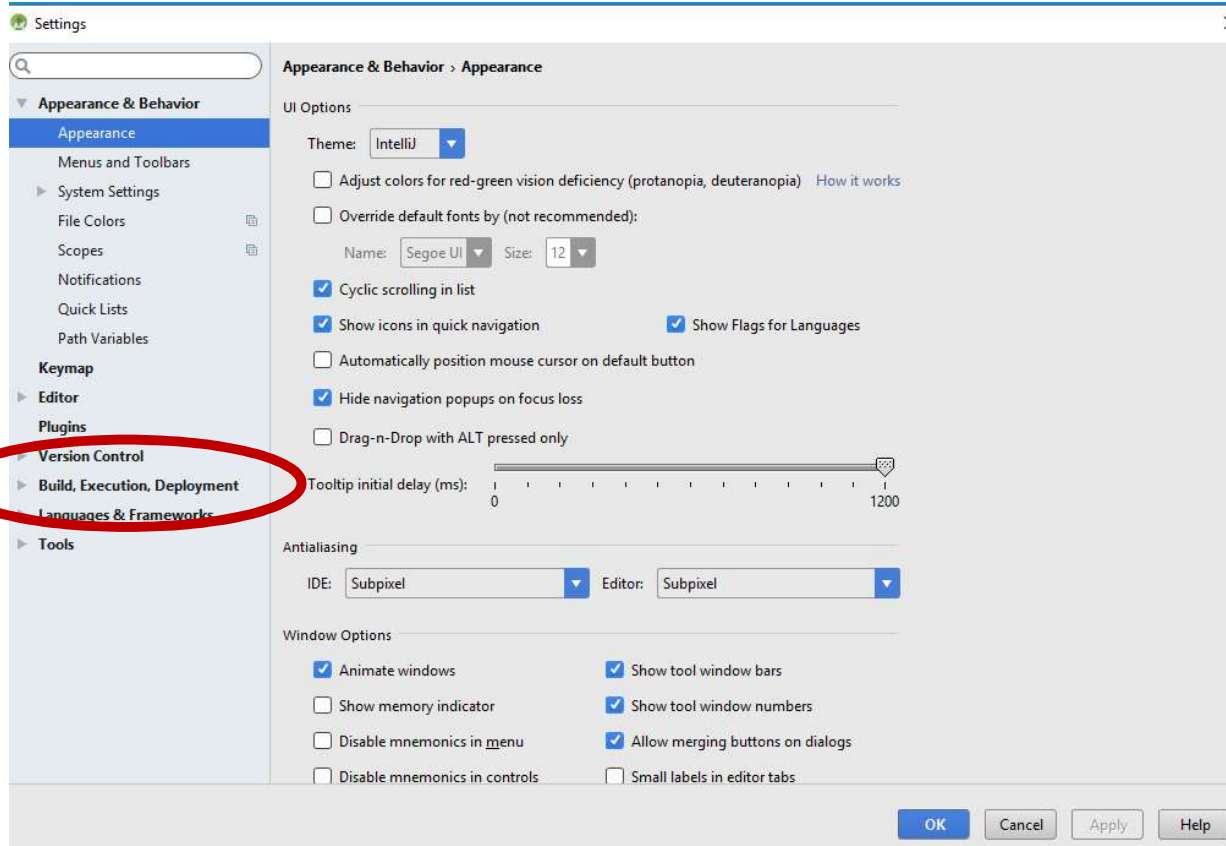


Guide

- The Gradle build will start automatically.
- Please be patient this will take a little bit to complete.
- Finally, you will see the Gradle Build finished” message on the lower left hand corner of the screen. (See red oval)
- You might think that this is the time that your team should be doing the Happy dance, however; there is one more step that you must complete, otherwise your compiled program will not find any motor controllers on your Robot!!!

Step 5 – Build the FTC Master App

15. Find Build and Execution Settings

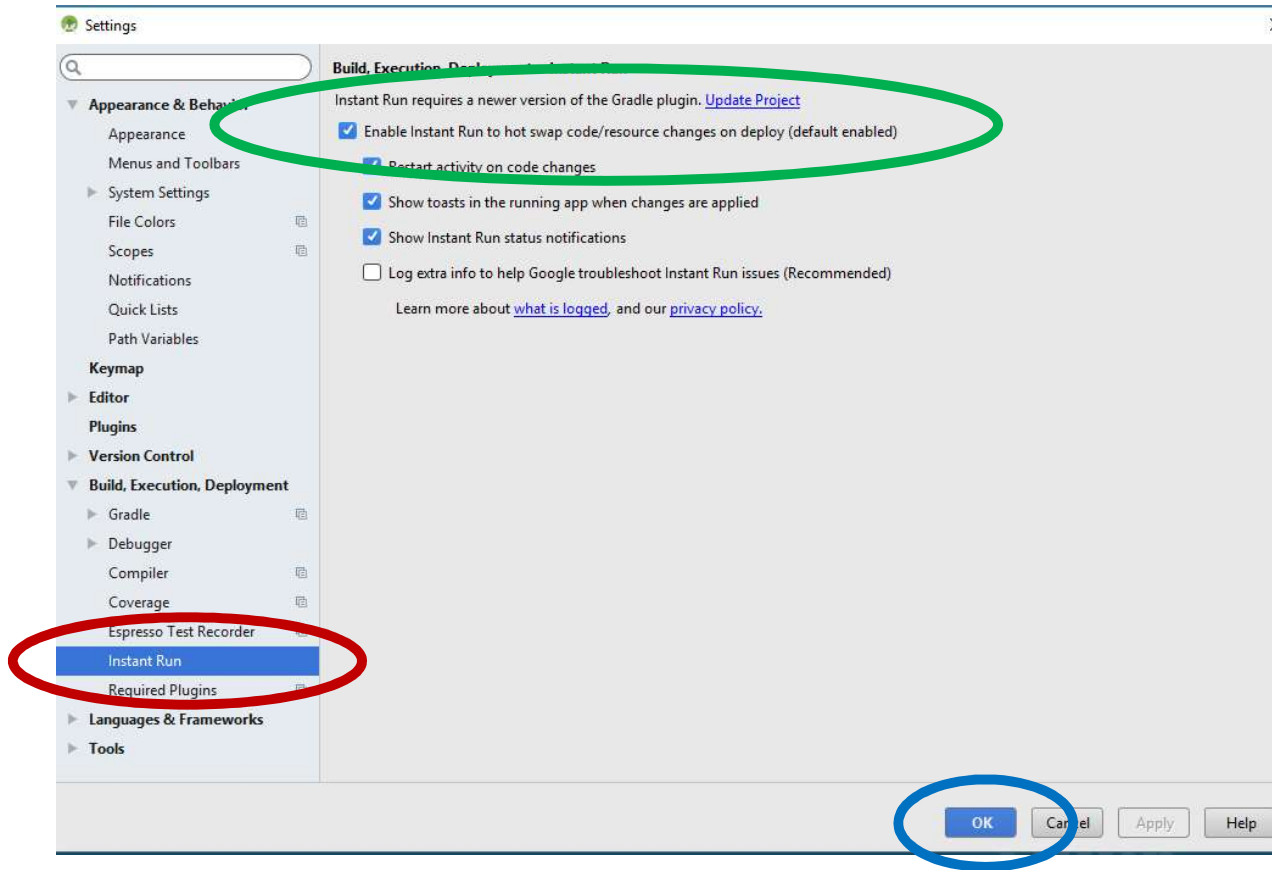


Guide

- On the top menu bar select “File”
- The select “Settings”
- You will see a screen similar to the one on the left.
- Select “Build, Execution, Deployment” on the menu. (see red oval)

Step 5 – Build the FTC Master App

16. Disable Instant Run

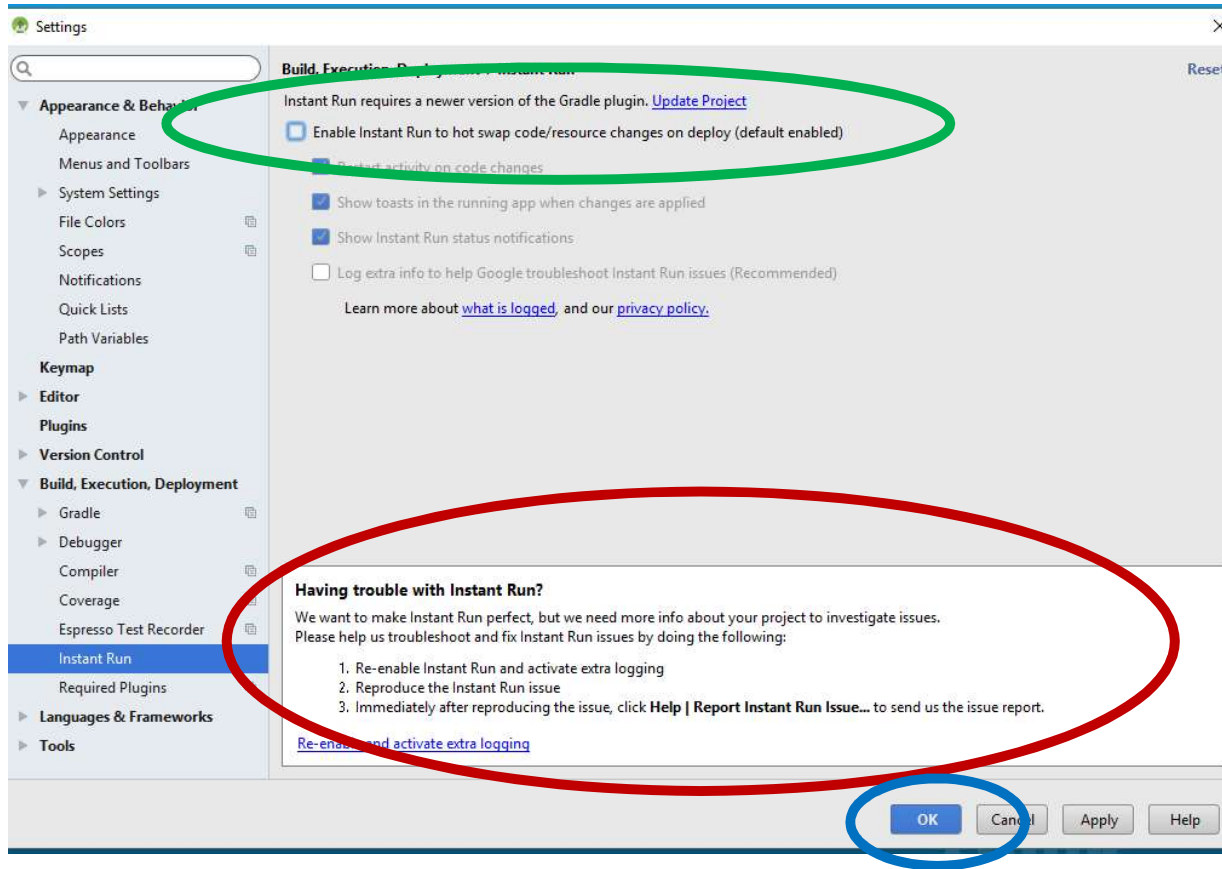


Guide

- On sub-menu select “Instant Run” (see red oval)
- You will then see a page similar to the one on the left.
- Notice that the “Enable Instant Run to hot swap code...” checkbox is selected.
- Instant Run causes a number of problems with the FTC code, so we need to uncheck this box.
- Click on the “Enable Instant Run to hot swap code...” to unselect it. (See green oval)
- Click the “OK” button (see blue oval)

Step 5 – Build the FTC Master App

17. Really Disable Instant Run

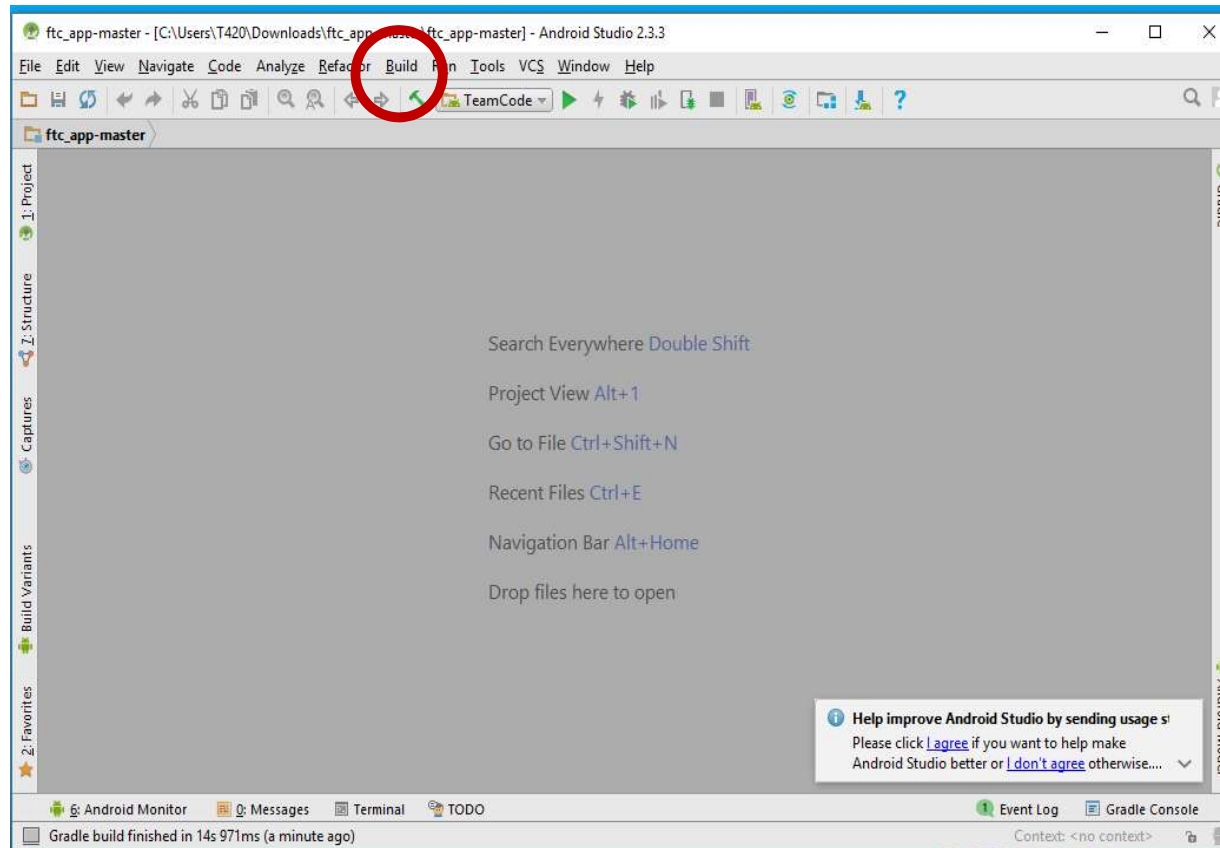


Guide

- A popup message box will display asking you to keep Instant Run enabled. (See red oval)
- Click the “OK” button again (see blue oval)

Step 5 – Build the FTC Master App

18. Clean and Rebuild the App one more time!

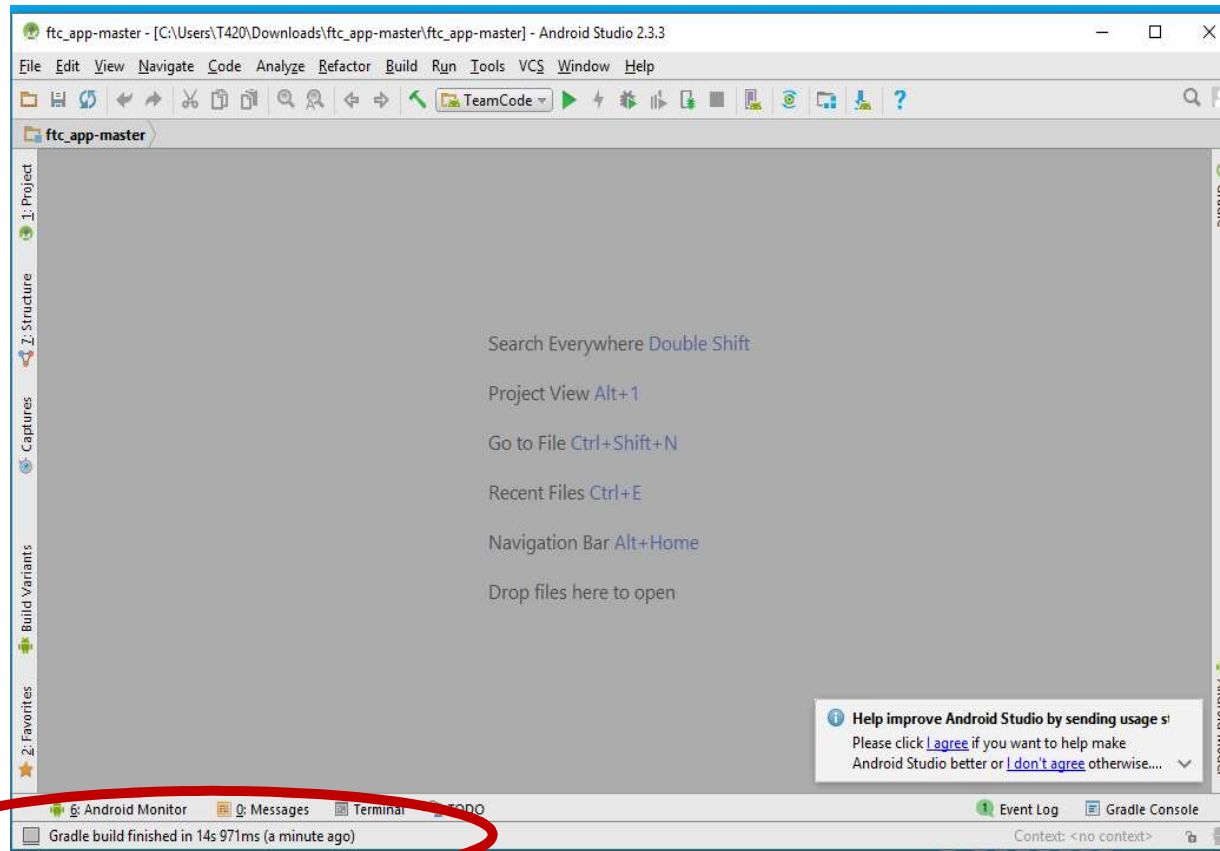


Guide

- Now that you have disabled the Instant Run feature, you must clean and rebuild the ftc_app-master one more time.
- Click “Build” on the menu-bar. (See red oval)
- This will open a drop down menu.
- Select “Clean Project”
- This will start a build of the ftc_app-master

Step 5 – Build the FTC Master App

19. Gradle Build Finishes (for real this time)



Guide

- Finally, you will see the Gradle Build finished” message on the lower left hand corner of the screen. (See red oval)
- Now you truly are done !!!!

Congratulations you have completed building the FTC_App-Master!!!



Congratulations you have a working development environment!!!!!!



Questions?



What we are doing today will transform tomorrow's culture.