# Overall strategies

## Technical considerations

Phone:

Ensure that devices being used are not “set up” for developers. Ensure that the student goes through the process of enabling developer mode on a device, turns on USB debugging, and connects his or her device to their development machine. This is important as from time to time, and for varying reasons, a student may be required to undergo this step again. They do not benefit by being handing a target device already set up and ready to go.

For example, to enable developer mode on our developer devices, LG Optimus Zone 3, follow these steps:

Enable developer mode:

1. Go to the phone settings
2. click on ***About Phone***
3. Tap on **Build Number** 7 times

Turn on USB debugging:

1. Go to the phone settings
2. Click on **Developer Options**
3. Scroll to the **USB Debugging** option, and make sure that the switch is enabled
   1. Note: If you are not able to turn on USB debugging, disable and then re-enable developer mode by switching the toggle at the top of the Developer Mode option screen off and then on again.
   2. Many times, your device may enter USB MTP mode. If that happens, switch it to PTP mode by clicking on the notification (bring down the notification shade by sliding your finger down from the top of the screen) and switching from MTP to PTP.

You can find more information here: <https://developer.android.com/studio/run/device.html>

Computer:

While it may not be practical (or indeed possible) for a student to be taken through the installation process of all the necessary software due to time constraints or user privileges (having permission to install software on a computer), students should at least be walked through the process demonstratively. They should be given details on all the tools required, how to obtain them, and simple instructions on how they should be installed and executed.

Due to certain “buggy” behavior of some Android SDK tools, ensure that during the Android Studio installation process, the “SDK” directory in placed in a location without a *space* in the name.

E.g. Do not install in a location such as:

“C:\Users\Kevin Jones\sdk”

Instead, specify a location such as:

“C:\Android\sdk”

## Pedagogy strategies

### Make mistakes

It’s not only important that new programmers see that it’s OK when it doesn’t work the first time (or second, or third…), but seeing the debugging process in action can greatly improve a student’s own debugging capabilities.

Encourage use of the JavaDoc

Don’t be afraid to answer questions with “I don’t know” or “Let’s see” followed be a search for documentation or guides on the official Java Documentation page, or other tutorials.

When doing Java GUI applications, you may run into problems that do not present as logical errors. You can find solutions to some common Swing problems here: <https://docs.oracle.com/javase/tutorial/uiswing/components/problems.html>

# App building

In Android Studio, be sure to cover the major areas of the IDE, but not necessarily all at once. Introduce the Project Explorer, and demonstrate how various files are displayed when they are being edited (Activites, layout files [in both Design and Text mode], etc.)

Common errors to look out for:

Null Pointer Exceptions causing crashing:

Be sure to bind your activities variables to your layout file’s views using findViewById()

Unable to load or access external resources:

Have you requested the necessary permissions in the Android Manifest?

* Writing information to, or read information from storage
  + <uses-permission android:name="android.permission.WRITE\_EXTERNAL\_STORAGE" />
* Accessing the internet
  + <uses-permission android:name="android.permission.INTERNET" />
* Accessing location services (GPS)
  + <uses-permission android:name="android.permission.ACCESS\_FINE\_LOCATION" />
  + <uses-permission android:name="android.permission.ACCESS\_COURSE\_LOCATION" />