Emerging Technologies: Mobile Development for Android Devices

Getting Started

Android:Motivation

- Most popular mobile platform at the current time.
- 86.8% Market share according to www.idc.com 2018.
- Powerful development tools (Android Studio).
- Android Studio may be downloaded freely.
- Development is supported on Windows, Mac and Linux.

Android Studio Development IDE

- At the current time, Android Studio is the only practical choice.
- Google support for Android developer tools in Eclipse ended in favour of Android Studio in 2016.
- Android Studio is based on IntelliJ
- Android Studio may be downloaded from:

  https://developer.android.com/studio/
- Development is supported on Windows, Linux and OSX.
- With Android Studio, user interfaces may be created graphically or by manually writing/editing XML syntax.
- In order to have fine-grained control of user interface construction, the approach taken here will be to edit/write the XML files directly.

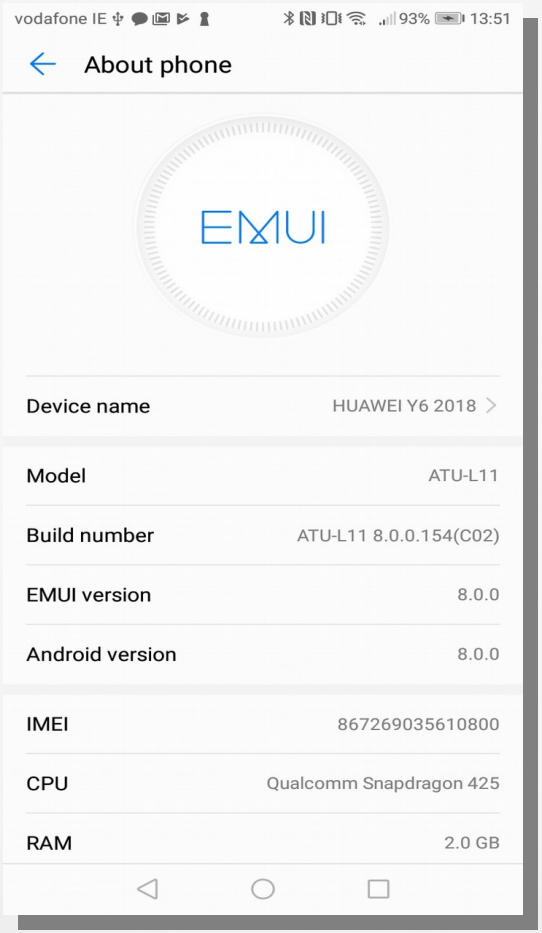
Development & Testing

- Use a minimum API level of 15 (Android Studio default)
- Applications may be tested and run using one of three options:
- A connected Android device is the preferred option.
- However, you may also GenyMotion which is a virtual device that runs beside Android Studio.
- A third option is to use use the software emulator but this is resource intensive and not very responsive (slow).
- Students are encouraged to use a connected device. Further notes and tutorials will assume that you are taking this approach.

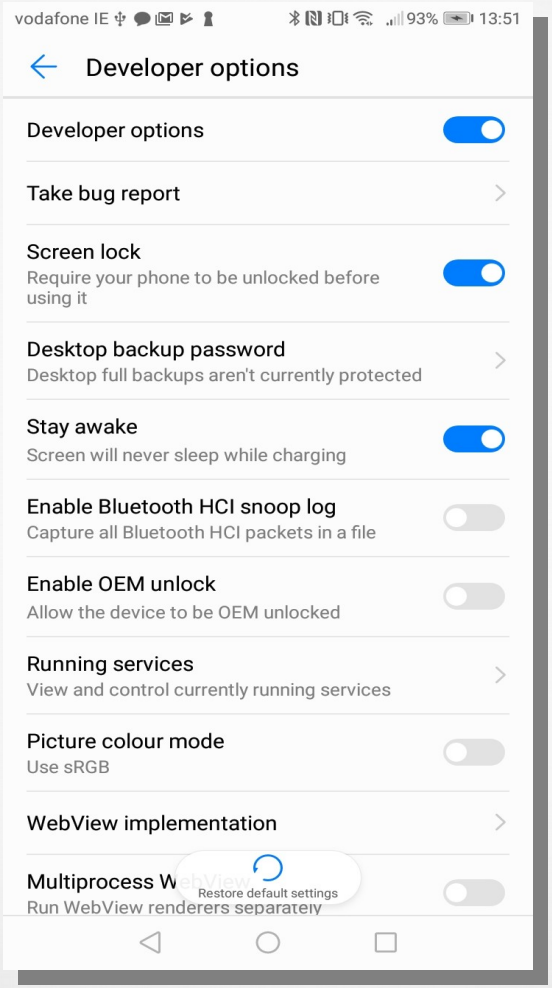
Connecting to your Android Device

- To connect your Android device, tap System -> About Phone.
- Find the Build Number and tap it seven times. The device than indicates that you have entered developer mode.
- In Developer Options, enable USB Debugging.
- For convenience, tap the Stay Awake option to keep the screen awake during charging/development. Remember to deselect this option when finished developing.

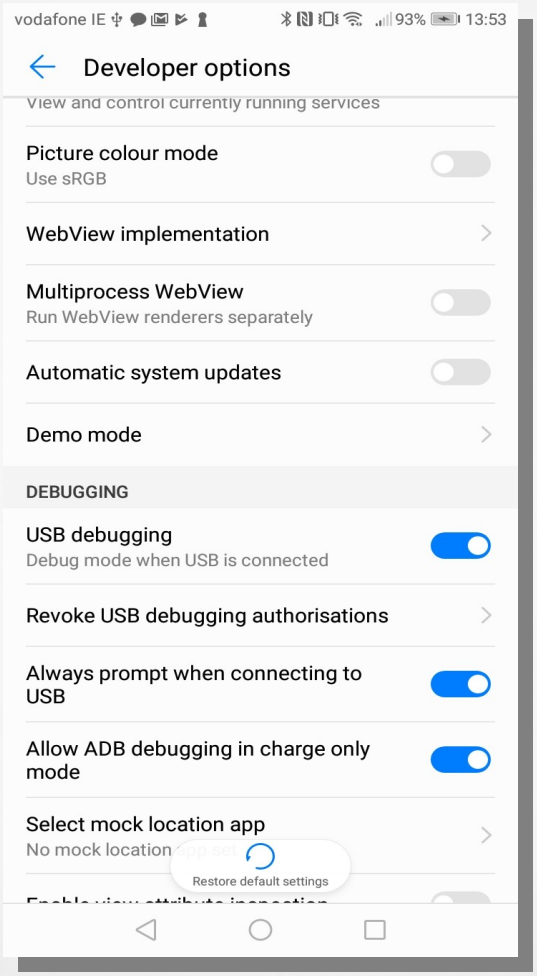
Entering Developer Mode



Selecting Developer Options



Enable USB Debugging



Running the App on the Device

- Connect to a USB port using a suitable cable.
- Be aware that not all cables support data transfer. Some cables are simply ‘dumb’ cables that can be used for charging only.
- Start Android Studio. On linux, use the shell script studio.sh from the bin directory to do this. This can take a few seconds, so wait for the shell script to execute.
- When Android Studio starts, start a new project using a blank activity template.
- Before making any changes, build the project using Build→ Make Project.
- When the project has finished building, click on Run→ Run App
- The app should now appear on the device screen.
- Having verified that the app is running correctly, now modify as required.

Debugging the Device Connection on linux

- If on running your applicaton, you can not find your device. Use the connection wizard from within Android Studio. If this doesn't help, you can also use a terminal with root permissions to check the connection on linux.
- Find your way to the android/sdk/platform-tools directory: This command lists attached devices. There is a problem connecting so there are none.

```
linux-4m7e:/raid1/android/sdk/platform-tools # ./adb devices
List of devices attached
```

Debugging the Device Connection on linux

#Navigate to the android/sdk/platform-tools directory. Kill #the adb server and restart it:

```
linux-4m7e:/raid1/android/sdk/platform-tools # ./adb kill-server
linux-4m7e:/raid1/android/sdk/platform-tools # ./adb start-server
```

#Try listing the adb attached devices again:

```
linux-4m7e:/raid1/android/sdk/platform-tools # ./adb devices
List of devices attached
F6N9X18927C04883        device
```

Debugging the Device Connection on linux

- List all attached USB devices:

```
linux-4m7e:/raid1/android/sdk/platform-tools # lsusb
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 005: ID 04f3:0103 Elan Microelectronics Corp. ActiveJet K- 2024 Multimedia Keyboard
Bus 001 Device 004: ID 093a:2510 Pixart Imaging, Inc. Optical Mouse
Bus 001 Device 003: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 001 Device 002: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 001 Device 009: ID 12d1:107d Huawei Technologies Co., Ltd.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
linux-4m7e:/raid1/android/sdk/platform-tools #
```