Dev Environment:
Android
Mobile and Ubiquitous Games
ICS 163
Donald J. Patterson
Out of the box experience
Out of the box experience
Out of the box experience
Out of the box experience
Out of the box experience

- Connect USB on phone to computer/wall to charge it
  - Required to complete set up

- Factory Reset
  - Why? Clear weird software and personal accounts
  - Settings -> Backup & Reset -> Factory Data Reset -> Reset Phone -> Erase Everything
  - 10 minutes later ....

- Welcome
  - Language Selection
  - Skip SIM card (WiFi only)
Out of the box experience

• Welcome
  • Select WiFi (You must be in a wifi location to launch)
    • If you are on campus this could be a problem.
  • Tap & Go
    • NFC based backup and restore
    • Skip it
  • Sign in to a Google Account
    • Required by Google to use location services
    • Does this freak you out? It should.
Out of the box experience

- **Services**
  - Turn off backup
  - Turn on location services
  - Turn on Help improve location services
  - Turn on/off Help improve Android experiences

- **Google Now**
  - Turn off

- **Update all the software**
  - Dial *#*#checkin#*#* to update phone until
  - “checkin succeeded”
Getting a development environment setup
Setting up your environment

Setting up your environment

System Requirements

Windows

- Microsoft® Windows® 8/7/Vista/2003 (32 or 64-bit)
- 2 GB RAM minimum, 4 GB RAM recommended
- 400 MB hard disk space
- At least 1 GB for Android SDK, emulator system images, and caches
- 1280 x 800 minimum screen resolution
- Java Development Kit (JDK) 7
- Optional for accelerated emulator: Intel® processor with support for Intel® VT-x, Intel® EM64T (Intel® 64), and Execute Disable (XD) Bit functionality

Mac OS X

- Mac® OS X® 10.8.5 or higher, up to 10.9 (Mavericks)
- 2 GB RAM minimum, 4 GB RAM recommended
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On Mac OS, run Android Studio with Java Runtime Environment (JRE) 6 for optimized font rendering. You can then configure your project to use Java Development Kit (JDK) 5 or JDK 7.

Linux

- GNOME or KDE desktop
- GNU C Library (glibc) 2.15 or later
Setting up your environment

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Tested on Ubuntu® 14.04, Trusty Tahr (64-bit distribution capable of running 32-bit applications).
Setting up your environment

Welcome back! This setup wizard will validate your current Android SDK and development environment setup. You will have the option to download a new Android SDK or use an existing installation. Once the setup wizard completes, you can import an existing Android app into Android Studio or start a new Android project.
Setting up your environment

Android Studio requires Java Development Kit (JDK) 7.0 or newer.

Java Development Kit (JDK) version 7.0.
Up to date JDK was not detected. Please select JDK location:

/Library/Java/JavaVirtualMachines/jdk1.8.0_05.jdk/Contents/Home

or download and install JDK for your operating system and architecture: Mac OS X x64 and press Detect.
Setting up your environment

Choose the type of setup you want for Android Studio:

- **Standard**
  - Android Studio will be installed with the most common settings and options.
  - Recommended for most users.

- **Custom**
  - You can customize installation settings and components installed.
Setting up your environment

SDK Components Setup

Check the components you want to update/install. Click Next to continue.

- Android SDK - (2.25 GiB)
- Performance (Intel® HAXM) - (2.2 MiB)
- Android Virtual Device - (1 GiB)

The collection of Android platform APIs, tools and utilities that enables you to debug, profile, and compile your apps.

The setup wizard will update your current Android SDK installation (if necessary) or install a new version.

Android SDK Location:
/Users/djp3/Development/Android/adt-bundle-mac-x86_64-current/sdk

Total disk space required: 3.25 GiB
Available disk space: 23.7 GiB
Setting up your environment

We have detected that your system can run the Android emulator in an accelerated performance mode.

Please set the maximum amount of RAM available for the Intel® Hardware Accelerated Execution Manager (HAXM) to use for all x86 emulator instances. You can change these settings at any time by running the Intel® HAXM installer.

Please refer to the Intel® HAXM Documentation for more information.

RAM allocation: 2,048 MiB

Use recommended size
Setting up your environment

License Agreement
Read and agree to the licenses for the components which will be installed

Licenses
- android-sdk-license
  - Google APIs, Android 21
  - Android SDK Platform-Tools 24.1.2
  - Android SDK Tools 24.1.2
  - Google Repository, rev 16
  - Android Support Repository, rev 16
  - Google Inc. x86 System Image
  - Android SDK Platform 21, rev 1
  - Android SDK Build-Tools 21.1.0
  - Sources for Android 21
- *intel-android-extra-license
  - *Intel x86 Emulator Accelerator

To get started with the Android SDK, you must agree to the following terms and conditions.

This is the Android SDK License Agreement (the "License Agreement").

1. Introduction

1.1 The Android SDK (referred to in the License Agreement as the "SDK" and specifically including the Android system files, packaged APIs, and SDK library files and tools, if and when they are made available) is licensed to you subject to the terms of the License Agreement. The License Agreement forms a legally binding contract between you and Google in relation to your use of the SDK.

1.2 "Android" means the Android software stack for devices, as made available under the Android Open Source Project, which is located at the following URL: http://source.android.com/, as updated from time to time.

1.3 "Google" means Google Inc., a Delaware corporation with principal place of business at 1600 Amphitheatre Parkway, Mountain View, CA 94043, United States.

2. Accepting the License Agreement

2.1 In order to use the SDK, you must first agree to the License Agreement. You...
Setting up your environment

Android Studio Setup Wizard

Downloading Components

Downloading Android SDK Build-tools, revision 21.1.2

Show Details

Cancel  Previous  Next  Finish
Setting up your environment

Installing Google Repository, revision 16
   Installed Google Repository, revision 16
Installing Intel x86 Emulator Accelerator (HAXM installer), revision 5.3
Unzipping Intel x86 Emulator Accelerator (HAXM installer), revision 5.3 (53%)
Unzipping Intel x86 Emulator Accelerator (HAXM installer), revision 5.3 (96%)
Unzipping Intel x86 Emulator Accelerator (HAXM installer), revision 5.3 (97%)
Unzipping Intel x86 Emulator Accelerator (HAXM installer), revision 5.3 (99%)
   Installed Intel x86 Emulator Accelerator (HAXM installer), revision 5.3
Installing Android SDK Tools, revision 24.1.2
   Installed Android SDK Tools, revision 24.1.2
Installing Google APIs, Android API 21, revision 1
   Installed Google APIs, Android API 21, revision 1
Installing Google APIs Intel x86 Atom System Image, Google Inc. API 21, revision 4
   Installed Google APIs Intel x86 Atom System Image, Google Inc. API 21, revision 4
Updated ADB to support the USB devices declared in the SDK add-ons.
   Stopping ADB server succeeded.
   Starting ADB server succeeded.
Done. 10 packages installed.
Android SDK is up to date.
Running Intel® HAXM installer
Silent installation Pass!
Creating Android virtual device
Android virtual device Nexus_5_API_21_x86 was successfully created
Setting up your environment

Configure your new project

Application name: GPSDrawApp
Company Domain: edu.uci.ics.luci.ics163
Package name: ics163.luci.ics.uci.edu.gpsdrawapp
Project location: /Users/djp3/Documents/ClassResources/2015_03ICS163/codeWorkspace/GPSDrawApp
Setting up your environment

Select the form factors your app will run on

Different platforms require separate SDKs

- **Phone and Tablet**
  - Minimum SDK: API 21: Android 5.0 (Lollipop)
  - Lower API levels target more devices, but have fewer features available. By targeting API 21 and later, your app will run on < 1% of the devices that are active on the Google Play Store.
  - Help me choose.

- **TV**
  - Minimum SDK: API 21: Android 5.0 (Lollipop)

- **Wear**
  - Minimum SDK: API 21: Android 5.0 (Lollipop)

- **Glass (Not Installed)**
Setting up your environment

Add an activity to Mobile

Add No Activity

Blank Activity

Blank Activity with Fragment
Setting up your environment

Create a new blank activity with an action bar.

Activity Name: MainActivity
Layout Name: activity_main
Title: MainActivity
Menu Resource Name: menu_main

The name of the activity class to create
Setting up your environment
Setting up your environment
Setting up your environment
Virtual devices allow you to test your application without having to own the physical devices.

To prioritize which devices to test your application on, visit the Android Dashboards, where you can get up-to-date information on which devices are active in the Android and Google Play ecosystem.
### Setting up your environment

#### Select Hardware

**Choose a device definition**

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Size</th>
<th>Resolution</th>
<th>Density</th>
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<tr>
<td>Phone</td>
<td>Nexus 5</td>
<td>4.0&quot;</td>
<td>480x800</td>
<td>hdpi</td>
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<tr>
<td></td>
<td>Nexus One</td>
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<td>hdpi</td>
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<tr>
<td></td>
<td>Nexus 6</td>
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<td>1440x2560</td>
<td>560dpi</td>
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<tr>
<td></td>
<td>Nexus 5</td>
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<td>1080x1920</td>
<td>xxhdpi</td>
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<tr>
<td></td>
<td>Nexus 4</td>
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<td>768x1280</td>
<td>xhdpi</td>
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<tr>
<td></td>
<td>Galaxy Nexus</td>
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<td>720x1280</td>
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<td></td>
<td>5.4&quot; FWVGA</td>
<td>5.4&quot;</td>
<td>480x854</td>
<td>mdpi</td>
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<td>4.65&quot;</td>
<td>720x1280</td>
<td>xhdpi</td>
</tr>
</tbody>
</table>

![Nexus 5 Diagram](image)

- Size: normal
- Ratio: notlong
- Density: xxhdpi

[New Hardware Profile] [Import Hardware Profiles] [Clone Device...] [Cancel] [Previous] [Next] [Finish]
Setting up your environment

Virtual Device Configuration

<table>
<thead>
<tr>
<th>Release Name</th>
<th>API Level</th>
<th>ABI</th>
<th>Target</th>
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<td>21</td>
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<td>Android SDK Platform 4.3</td>
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</table>

API Level: 21

Android 5.0.1

Google Inc.

System Image x86

? - See documentation for Android 5 APIs
Setting up your environment

Installing Requested Components


Loading SDK information...
Refresh Sources:
  Fetched Add-ons List successfully
  Refresh Sources

Installing Archives:
  Preparing to install archives
  Installing SDK Platform Android 5.1.1, API 22, revision 2
  Installed SDK Platform Android 5.1.1, API 22, revision 2
  Installing Google APIs, Android API 22, revision 1
  Installed Google APIs, Android API 22, revision 1
  Installing Google APIs Intel x86 Atom_64 System Image, Google Inc. API 22, revision 1

98%, 11423 KiB/s, 0 seconds left
## Setting up your environment

### Virtual Device Configuration

**System Image**

**Select a system image**

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*Show downloadable system images*

[? - See documentation for Android 5 APIs](#)
Setting up your environment

Android Virtual Device (AVD)

AVD Name: Nexus 5 API 22

Enable Snapshot

Helps improve emulator re-start performance. Start the AVD from the AVD manager and check Launch from snapshot and Save to snapshot. This way, when you close the emulator, a snapshot of the AVD state is saved and used to quickly re-launch the AVD next time. Note this will make the emulator slow to close.

Startup size and orientation

Scale: Auto

Orientation: Portrait

Emulated Performance

☑ Use Host GPU

You can either use Host GPU or Snapshots
Setting up your environment

Android Virtual Device (AVD)

Camera
- Front: Webcam0
- Back: Emulated

Network
- Speed: Full
- Latency: None

Emulated Performance
- Use Host GPU
- Store a snapshot for faster startup

Memory and Storage
- RAM: 1536 MB
- VM heap: 64 MB
- Internal Storage: 200 MB
- SD card: Studio-managed 100 MB

Network Latency
Sets the initial state of the simulated network transfer latency used by AVD. Latency is the delay in processing data across the network. The latency speed can also be adjusted in the emulator.
Setting up your environment
Setting up your environment

Restart Everything
### Setting up your environment

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Resolution</th>
<th>API</th>
<th>Target</th>
<th>CPU/ABI</th>
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<td>1080 x 1920...</td>
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<td>Google APIs</td>
<td>x86...</td>
<td>650 MB</td>
<td></td>
</tr>
</tbody>
</table>
Setting up your environment
Setting up your environment

Choose Device

- Choose a running device
- Launch emulator
  - Android virtual device: Nexus 5 API 22
- Use same device for future launches

[Options: Cancel, OK]
Setting up your environment
Setting up your environment
Setting up your environment

Running on a real phone

Enable USB debugging in Developer settings
Setting up your environment

- Running on a real phone
- Enable USB debugging in Developer settings
Setting up your environment

Allow USB debugging?

The computer’s RSA key fingerprint is:
51:9C:C2:F2:71:70:6C:BE:4D:
85:41:2D:1D:B4:57:94

☐ Always allow from this computer

CANCEL  OK
Allow USB debugging?

The computer’s RSA key fingerprint is:
51.9C:C2:F2:71:70:6C:BE:4D:
85:41:2D:1D:B4:57:94

☐ Always allow from this computer

CANCEL OK
Setting up your environment

Now the real phone and emulator are both options
Setting up your environment
Setting up your environment
Setting up your environment

• Now the real phone and emulator are both options

http://developer.android.com/tools/device.html#setting-up