

OpenGL ES: iPhone and Android

CSCI 4239/5239

**Advanced Computer Graphics
Spring 2015**

Apple iOS Devices

- Supports OpenGL ES 1.1 or 2.0
 - Newer devices support 1.1 AND 2.0
- User interface is Objective C
 - Links to C and C++ code
- Develop with Xcode on Mac only
- Emulator for all devices
 - Slower than native devices
 - Almost perfect emulation

Getting iOS Tools

- Download Xcode from Apple
 - 4GB download
- Provides compiler, frameworks, etc
- Create project in Xcode
- Select target iPhone/iPad
- Emulator launched on run

Android Devices

- Supports OpenGL ES 1.1 or 2.0
 - Newer devices support 1.1 AND 2.0
- User interface is Java
 - Link to C/C++ code with JNI
- Develop with NDK
- Emulator for phones and tablets
 - Slower than native devices
 - Only recent emulator supports OpenGL ES 2.0

Android Tools

- Install Ubuntu tools and 32 bit packages
 - apt-get install ant lib32z1 lib32stdc++6
- Download Android SDK and NDK
 - android-sdk_r24.0.2-linux.tgz
 - android-ndk-r10d-linux-x86_64.bin
- Add Android tools to PATH
 -/android-sdk-linux/tools
 -/android-sdk-linux/platform-tools
 -/android-ndk-r10d
- Get updates and install AVDs
 - android
 - Start emulator (Tools > Manage AVDs)

Execution on Android

- Create project
android update project -p .
 - makes build.xml from AndroidManifest.xml
- Build JNI library
ndk-build -B
- Build APK
ant debug
- Upload to emulator or device
adb install -r bin/xxxx.apk
- Makefile implements all steps

Android Alternatives

- Eclipse
 - Provides an IDE similar to Xcode
 - Get ADT plugin, SDK and NDK
- Install to hardware
 - Edit */etc/udev/rules.d/51-android.rules*
 - View with *adb devices*
 - Install with *adb install -r xxxxx.apk*

Portable OpenGL ES Code

- Write the bulk of the code in C++
 - OpenGL ES 1.1 will run on all devices
 - OpenGL ES 2.0 will run on newer devices
- Write minimal code in interface language
 - Objective C – link to C/C++
 - Java – call C/C++ using JNI
- Currently no system agnostic libraries like SDL and GLUT for all devices

Assignment 6

- Create an application that displays a scene in 3D on the iPhone/iPad or Android
 - Build objects yourself
 - Explore advanced features such as lighting, textures, ...
- Groups are permitted
 - Pair up with somebody ahead of the curve
 - Presentations are still individual
 - Volunteer if this is your thing