OpenGL ES: iPhone and Andoid

CSCI 4239/5239
Advanced Computer Graphics
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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
- Get command line tools also

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
  - OpenGL ES 2.0 emulator is flaky

Android Tools

- Install Ubuntu tools and 32 bit packages
  - apt-get install ant lib32z1 lib32stdc++6
- Download Android SDK and NDK
  - android-sdk_r24.4.1-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*

Qt Creator

- Xcode lookalike IDE for Qt
- Allows builds for different platforms
  - Desktop
  - iOS
  - Android
- Cross compiles for hardware
- Many examples and tutorials
  - Cube OpenGL ES 2.0

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
- Build code using Qt

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