Android Emulator Blues – update to Project 3

The official current Samsung version of the Galaxy Tab source which is available in /pub/CIS520/GT-P7510_OpenSource.zip is based on the Linux Version 3.1.10 kernel. Unfortunately, the Android emulator doesn't work well with Linux kernels newer than version 2.6. I tested the new version on an actual device using fastboot, and that works fine, but the emulator hangs when trying to boot the kernel – sorry about that. You can remedy this problem in one of two ways, or use both, your choice. Modifications to the kernel will be almost identical in both cases:

   1. Use fastboot to test the kernel on an actual device (Galaxy Tab).
   2. Use an older version of the kernel which is posted in Kernel.tgz.

Here are the steps to use the emulator with the older version of the kernel which is posted in the public directory as /pub/CIS520/Kernel.tgz:

   1. Copy /pub/CIS520/Kernel.tgz to your own directory and extract files:

      $ cp /pub/CIS520/Kernel.tgz .
      $ tar xvzf Kernel.tgz

      This will create a subdirectory called Kernel with the Android Linux Version 2.6.29 kernel.

   2. There are some additional scripts which I wrote, called build-it and start-emulator, to make building the kernel and starting the emulator easier, respectively. The steps executed are:

$ make ARCH=arm vexpress_defconfig
..
#
configuration written to .config
#

$ make ARCH=arm CROSS_COMPILE=/pub/CIS520/usr/arm/bin/arm-angstrom-linux-gnueabi- -j4
..
  LD   arch/arm/boot/compressed/vmlinux
  OBJCOPY arch/arm/boot/zImage
  Kernel: arch/arm/boot/zImage is ready

$ cd test; make
[Arm-CC] test.c...
[Arm-LD] ptest

$ emulator -avd Simple -kernel arch/arm/boot/zImage -no-window -verbose &

$ adb devices
List of devices attached
emulator-5554   device   ← STILL RUNNING FROM PREVIOUS TESTING
emulator-5556   offline

```
$ ps -uneilsen
  PID TTY          TIME CMD
 5900 pts/16   00:00:00 vi
 6383 pts/18   00:00:15 emulator64-arm
 6516 pts/18   00:00:00 ps
15940 ?        00:27:28 emulator64-arm  ← OLD ONE NOT ASSOCIATED WITH TERMINAL
..
$ kill -9 15940

$ adb devices
List of devices attached
emulator-5556    device

$ adb push test/ptest /data/misc
1168 KB/s (585337 bytes in 0.489s)

$ adb shell
#

# cd /data/misc

# ./ptest
SYSCALL PID = 620
GETPID PID = 620

# exit

$ kill -9 6383
```

NOTES:

1. If you corrupt your Android Virtual Device (e.g., by trying to start up two instances of the same device, etc.), you can use the command:

   $ emulator –avd <AVD NAME> -wipe-data

   to wipe the data and hopefully restore the device.

2. You won't be able to use the call number 245 for __NR_ptree in the old version, a quick look at arch/arm/include/asm/unistd.h shows that the system call reference numbers are relative to a base value called __NR_SYSCALL_BASE, you can use something like #define __NR_ptree (__NR_SYSCALL_BASE+223) – that's about the closest one that is currently not in use. Likewise, for the number used in the test program (e.g., 20 for getpid()), you must choose a value that is not used in arch/arm/kernel/calls.S – note that it is a simple enumerated list. (Hint: I used 7, but the value you select is up to you ;-).