

# SETTING UP THE DEVELOPMENT ENVIRONMENT FOR PROJECT 1 (UNGRADED LAB SESSION)

Please follow the following steps to setup the development environment for Project 2.

## 1. SETTING UP THE KERNEL SOURCE

1. Copy the linux-2.6.23.1.tar.bz file to your local space under /u/OSLab/username  
`cp /u/OSLab/original/linux-2.6.23.1.tar.bz2 .`
2. Extract  
`tar xvj linux-2.6.23.1.tar.bz2`
3. Change into linux-2.6.23.1/ directory  
`cd linux-2.6.23.1`
4. Copy the .config file  
`cp /u/OSLab/original/.config .`
5. Build  
`make ARCH=i386 bzImage`

You should only need to do this once, however redoing step 2 will undo any changes you've made and give you a fresh copy of the kernel should things go horribly awry.

## 2. REBUILDING THE KERNEL

To build any changes you made, from the linux-2.6.23.1/ directory, simply:

```
make ARCH=i386 bzImage
```

### 3. QEMU VERSION

We will be using a different version of Linux and QEMU (x86-based instead of ARM) for this project. The disk image and a copy of QEMU for windows are available on CourseWeb (qemu.zip). For Mac users, you can download an older but GUI-based application (Q.app) available on CourseWeb as well. Point it at the tty.qcow2 disk image in the above zip.

For Linux users and Mac users wanting to use the homebrew version, you can find on CourseWeb a test version of the disk image and a start.sh script to run it (qemu-test.zip). It should be identical to the above version in terms of functionality, but actually boot with a recent version of QEMU. IF THE ORIGINAL WORKS FOR YOU, DON'T BOTHER WITH THIS ONE.

The username and password are both the word **root**.

### 4. COPYING THE FILES TO QEMU

From QEMU, you will need to download two files from the new kernel that you just built. The kernel itself is a file named bzImage that lives in the directory linux-2.6.23.1/arch/i386/boot/. There is also a supporting file called System.map in the linux-2.6.23.1/ directory that tells the system how to find the system calls.

Use scp to download the kernel to a home directory (/root/ if root):

```
scp USERNAME@thoth.cs.pitt.edu:/u/OSLab/USERNAME/linux-2.6.23.1/arch/i386/boot/bzImage .
```

```
scp USERNAME@thoth.cs.pitt.edu:/u/OSLab/USERNAME/linux-2.6.23.1/System.map .
```

### 5. INSTALLING THE REBUILT KERNEL IN QEMU

As root (either by logging in or via su):

```
cp bzImage /boot/bzImage-devel
```

```
cp System.map /boot/System.map-devel
```

and respond 'y' to the prompts to overwrite. Please note that we are replacing the -devel files, the others are the original unmodified kernel so that if your kernel fails to boot for some reason, you will always have a clean version to boot QEMU.

You need to update the bootloader when the kernel changes. To do this (do it every time you install a new kernel if you like) as root type:

```
lilo
```

lilo stands for LInux Loader, and is responsible for the menu that allows you to choose which version of the kernel to boot into.

## 6. BOOTING INTO THE MODIFIED KERNEL

As root, you simply can use the `reboot` command to cause the system to restart. When LILO starts (the red menu) make sure to use the arrow keys to select the `linux(devel)` option and hit enter.