Machine Problem 1: Getting Started

Introduction

The objective of this machine problem is to test out your development environment. You are provided a simple "kernel", which essentially prints a welcome text and goes into an infinite loop. You are to modify the text on the welcome message to print out your name.

The "kernel" source code at this point consists of a small collection of source files:

kernel.C: This file contains the main entry point for the kernel. For this MP, this is where you need to apply the modifications in order to have the kernel print out your name after the welcome message.

start.asm: This assembler file contains the multiboot header, some initial setup, and the call to the main entry point in the kernel.

utils.H/C: A selection of utility functions, such as memory copy, simple string operations, port I/O operations, and program termination.

console.H/C: Access to the console video output.

makefile: Used to easily compile everything to generate the `kernel.bin` file.

After modifying the kernel file, compile it, and copy the resulting `kernel.bin` binary file onto the provided floppy image file. Remember that an easy way to copy a file onto a disk image is to mount the image as a disk (by using a utility like `filedisk`, `WinImage`, or PowerISO), copy the file onto the mounted disk, and then unmount the disk image. Now you can start Bochs with the floppy image file.

Your Bochs Environment

The ZIP archive that comes with MP1 also contains a set of files that define the Bochs emulation environment:

dev_kernel_grub.img: This file contains the image of the boot "floppy disk". It contains the GRUB bootloader and a dummy kernel.

BIOS-bochs-latest: This file contains the BIOS.

VGABIOS-lpgl-latest: This file contains a basic VGA BIOS.

bochsrc.bxrc: This text file contains the configuration of the emulated machine. If bochs is correctly installed, double-clicking on this file should start the emulator.

Note: You are not required to use Bochs. If you use a different emulator or a virtual machine monitor (such as VirtualBox), the virtual machine will be set up differently, and you will not be using the files described above, except for the floppy image file.

The Assignment

You are to modify the given "kernel" to print out your name on the welcome screen. For this, you modify the provided file `kernel.C`. You then compile the source to generate the kernel executable `kernel.bin`. Preferably you do this by invoking the `make` command. You then copy the kernel onto the provided `.img` file. After testing your code with the Bochs emulator, you rename your `.img` file to `mp1.img` and compress it into a ZIP file called `mp1.zip`. You are to turn in the ZIP file.

What to Hand In

- You are to hand in one file, with name `mp1.zip`, which contains a single file, named `mp1.img`. The latter is the floppy image file that you obtain by copying (replacing) the file `kernel.bin` on the provided `.img` file.
- Grading of these MPs is a very tedious chore. These handin instructions are meant to mitigate the difficulty of grading, and to ensure that the grader does not overlook any of your efforts.
- **Failure to follow the handing instructions will result in lost points.**