Operating Systems with C/C++ The University of Birmingham
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Exercise 4: Boot Sector Programming

Deadline: **Monday week 1 of term 2, midnight**

For this exercise, you are to read through the initial chapters of a draft document which introduces the main concepts of writing a simple operating system from scratch. The document can be found with Nick's lecture resources and is called `os-dev.pdf`. Though incomplete (*i.e.* the later sections), this document is a self-contained introduction to how a typical computer boots and how an operating system can bootstrap itself from a small bootsector program written in assembly.

The document contains four questions — all of equal weighting towards the final mark — relating to the initial sections that will require you to write some assembly bootsector code and understand the main low-level functioning of the computer.

Note that students registered on the *extended* module are expected additionally to answer Question 5, and that in this case the five questions will have equal weight towards the final mark.

The tools required to complete the work, which are installed on the lab machines, are:

- `nasm`: an assembler
- `QEmu`: a computer emulator, that allows for easy development and testing of low-level code, without you having to continuously reboot your real machine. You could also use a virtual machine for this, though a simple command-line emulator such as QEmu is much better suited to this kind of work.

Marking of this work, as ever, will aim to check your understanding, so copying a piece of assembly code from the web will not gain you any marks: you must explain your solution clearly, with comments for code or with brief paragraphs/diagrams otherwise.

Although the document is self-contained, some useful and interesting references for this exercise are listed here:

- Good assembly guide: `http://drpaulcarter.com/pcasm/pcasm-book-pdf.zip`

- Great source of info on OS development: `http://wiki.osdev.org/Main_Page`
- Excellent advanced OS development tutorials: `http://www.jamesmolloy.co.uk/tutorial_html/index.html`