SYSTEMS II — PROJECT 2 A multiprogrammed kernel

1 Overview

Given the kernel that you developed in Project 1, which is capable of running a number of processes in sequence, we transition now to a kernel that loads multiple processes at once, and then interleaves execution between them. In short, we make our kernel support *multiprogrammed* execution.

2 Getting started

Do the following to prepare yourself to work on this project:

- 1. Login to the CS workstations or one of our servers (vega.cs/remus/romulus).
- 2. Create and change into a directory for this project, such as project-2.
- 3. Copy your existing Project 1 kernel into this directory. It may look something like this:

\$ cp ../project-1/kernel.asm .

4. Edit your copied kernel.asm file with the editor of your choice, fulfilling the requirements in the next section, 3.

3 Your assignment

Augment your kernel to give it the following characteristics:

- Each ROM that holds a user-level program (that is, ROM number 3 and beyond) is used to start a *process*—a single, executing instance of a user program.
- Each process is given a *fixed-sized memory allocation* (e.g., $64 \frac{KB}{mocess}$).
- When running, each process is in *virtual addressing mode*, using single-segment, base/limit address translation and enforcement in the MMU.
- Each process is scheduled for a quanta whose length can easily be changed (e.g., by changing a static's value). The quanta should expire with a clock interrupt.
- The kernel's *CPU scheduler* should be invoked at the end of a quanta, choosing the next process to run for its quanta.

4 How to submit your work

Use the CS submission systems to submit your work. Specifically, you will need to submit your kernel.asm file. You may use either of two ways, from the servers and/or workstations, to use the submission system:

1. Web-based: Open a browser point it at:

https://www.cs.amherst.edu/submit

- 2. Command-line based: From a shell running on any of the servers (remus/romulus/vega.cs), or on any of the workstations in Seeley Mudd 007, use the following command:
 - \$ ~lamcgeoch/submit kernel.asm

This assignment is due at 11:59 pm on Sunday, March 28^{th} .