

Project 2A Specification

Kernel Module Programming

Kernel Compilation, Kernel Modules, and Scheduling

Due: 3/9 at end of the day (11:59:59pm)

Language Restrictions: C only

Purpose

This project introduces you to the nuts and bolts of kernel compilation, kernel programming, and concurrency and synchronization in the kernel. This project is divided into two halves and is worth a total of 15% of your class grade. This is the first half, and it is worth 20% of the total project points.

Part 1: Compile a Kernel

Compile the 4.4.2 kernel found in `/usr/src` in your Linux virtual machine. Install this kernel and boot into it. An additional 5% of your grade will be based on how well you can weed out 10 unnecessary drivers and/or modules from the kernel. To get full points, be sure to describe each component you took out in the README file (see the bottom of the specification for details).

Part 2: remember Kernel Module

In Unix-like operating systems, the `/proc` interface is often used to set or read kernel information. For example, take a look at `/proc/cpuinfo` and `/proc/meminfo` using the following commands:

```
$> cat /proc/cpuinfo
```

```
$> cat /proc/meminfo
```

Even though these `proc` files look like ordinary files, they are actually virtual kernel drivers! These modules perform actions based on whether a user reads or writes to them.

You will write your own `proc` module called `remember` that

1. allows the user to write a string (max length 80)
2. allows the user to read back the string that was just added

For example:

```
$> echo "Hello there" > /proc/remember
```

```
$> cat /proc/remember
```

```
Hello there
```

```
$>
```

Please use the example `proc` module and Makefile provided to you as a starting point.

Project 2A Submission Procedure

By the Project 2A due date, you should have parts 1 and 2 finished. (Worth 20%)

You will need to zip up the following files for submission:

- A folder called Part1 containing:
 - The new kernel's .config file (found in /usr/src/linux-4.4.2)
- A folder called Part 2 containing:
 - The remember.c file (**not the .ko file**)
 - The Makefile for remember
- The README text file, which should contain:
 - The names of all the members in your group
 - A listing of all files/directories in your submission and a brief description of each
 - A listing of the 10 items you took out of the kernel compilation process and a description of what each item was.
 - Instructions for compiling your programs (NOTE: use the Makefile provided for you)
 - Instructions for running your programs/scripts
 - Any challenges you encountered along the way
 - Any sources you used to help you write your programs/scripts

Full Project Submission Procedure

By the final submission date, part 3 should be finished. (Worth 40%)

. You will need to zip up the following files for submission:

- A folder called Part 3 containing:
 - The kitchen.c file (**not the .ko file**)
 - The Makefile for kitchen
- The README text file, which should contain:
 - The names of all the members in your group
 - A listing of all files/directories in your submission and a brief description of each
 - Instructions for compiling your programs (NOTE: use the Makefile provided for you)
 - Instructions for running your programs/scripts
 - Any challenges you encountered along the way
 - Any sources you used to help you write your programs/scripts