

Operating Systems

Assignment 1.B

Due: Next Section.

(10 Points) Review Questions : (Individual task, you can submit by email to your section instructor)

Chapter 1 review questions (Starting at page 49):

No. 1, 3, 5, 6, 7, 8, 9, 10, 12, 15, 16, 18, 19, 20, 22, 24, 25, 27, 29, 30.

(10 Points) Programming Task: (Group task “max 3 students”, The instructor should review within the lab)

Linux uses the `/proc` file system to collect information from kernel data structures. The `/proc` implementation provided with Linux can read many different kernel data structures. If you `cd` to `/proc` on a Linux machine, you will see a number of files and directories at that location. Each file in this directory corresponds to some kernel data structure. The subdirectories with numeric names contain virtual files with information about the process whose process ID is the same as the directory name. Files in `/proc` can be read like ordinary ASCII files. You can open each file and read it using library routines such as `fgets()` or `fscanf()`. The `proc (5)` manual page explains the virtual files and their content available through the `/proc` file system.

You are asked to write a program to report the behavior of the Linux kernel. Your program should have two options.

The first option should print the following values on stdout:

1. Processor type
2. Kernel version
3. The amount of memory configured into this computer
4. Amount of time since the system was last booted

A second option of the program should run continuously each 5 seconds and print lists of the following dynamic values: (This option doesn't need to terminate)

1. The percentage of time the processor(s) spend in user mode, system mode, and the percentage of time the processor(s) are idle
2. The amount and percentage of available (or free) memory
3. The rate (number of sectors per second) of disk read/write in the system
4. The rate (number per second) of context switches in the kernel
5. The rate (number per second) of process creations in the system

For clarity, you can find a sample Linux executable file for the task here:

http://www.weebly.com/uploads/6/9/3/5/6935631/task_1

Note: download the file and run within your Linux shell.