

UNX511 Lab 1: Monitoring Process Memory Usage

Due: Sunday, May 18, 2025 (11:59pm)

Information on all processes running on a Linux system is contained within the **/proc** directory. All directories under **/proc** which are digits represent a process. If you issue the command **ps aux** you will see all processes that are running. You can also see the processes ordered by cpu usage by issuing the command **top**.

In this lab, you will write a C/CPP program to scan all processes running on the system and report on those which have used more than 10Mbytes of resident memory. You can do this by going through each process directory in **/proc** and looking at the file **status**. For instance, let's say you want to look at the status information for process 10167:

```
$ cd /proc/10167
```

```
$ vim status
```

Inside the file **status** are variables such as **Name:** (the process name) and **Pid:** (the process pid). Virtual Memory is represented by **VmSize:** and Resident memory is represented by **VmRSS:**

1. Write and execute a C/CPP program that will scan every directory in **/proc** that represents a process (each directory that begin with a number represents a process). Open the file **status**. If **VmRSS:** is greater than 10000 kB, then print out the process name, the process id and the memory used. See the code at the following link as an example on how to get all files in a directory:
<https://www.unix.com/programming/33263-unix-c-get-files-folder.html>.

2. Open a second command line and execute the command **top** which orders processes by cpu usage.

```
$ top
```

Compare the processes reported in **top** with those reported by your program. You can cancel the execution of **top** with **ctrl-c**.

See the following link for an explanation of top:

<https://linux.die.net/man/1/top>.

3. Explain the difference between virtual memory and resident memory. What is virtual memory? What is resident memory?
4. Research and report on any of the three of the processes returned by your program. Simply explain what these processes do.

The following web-page contains detailed information about each of the files under **/proc**:
proc - process information pseudo-filesystem: <https://linux.die.net/sag/proc-fs.html>.

Sample source code that retrieves system information such as model name, cpu speed, memory usage, processes running/blocked, up time and idle time can be seen at [MemMonitor.cpp](#).

Assignment Submission:

- Complete all steps, Add all output-screenshot and explanations (if required) to a MS-Word file.
- Add the following declaration at the top of MSWORD file


```

/*****
***
* UNX511-Lab1
* I declare that this lab is my own work in accordance with Seneca Academic Policy.
* No part of this assignment has been copied manually or electronically from any other source
* (including web sites) or distributed to other students.
*
* Name: _____ Student ID: _____ Date: _____
*
*
*****/
      
```
- Please submit the Source code (zip all .c, .h, and makeFiles)

Important Note:

- **LATE SUBMISSIONS for labs.** There is a deduction of 10% for Late assignment submissions per day, and after three days it will grade of zero (0).
- This labs should be submitted along with a video-recording which contains a detailed walkthrough of your solution + demo. Without recording, the assignment can get a maximum of 1/3 of the total.
 - Note: In case you are running out of time to record the video, you can submit the assignment (source code + screenshots) by the deadline and submit the video within 24 hours after the deadline.