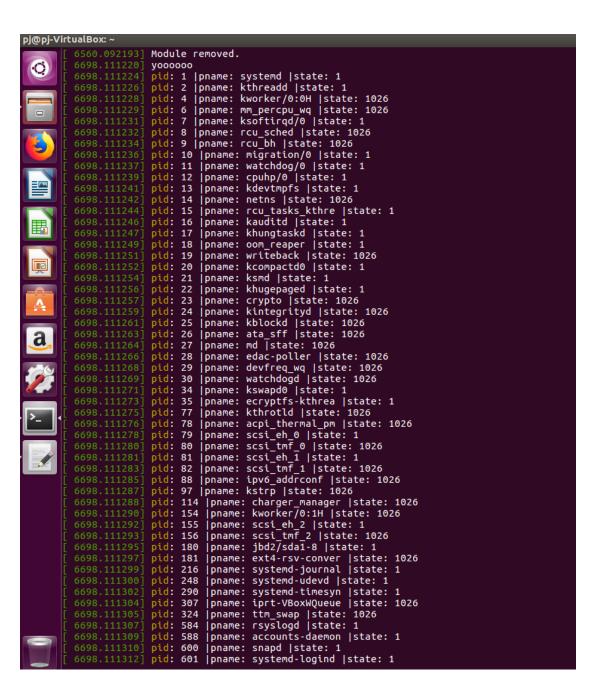
Linux Kernel Module for Listing Tasks

• In this project, you will write a kernel module that **lists all current** tasks in a Linux system.

Part I—Iterating over Tasks Linearly

- Design a kernel module that iterates through all tasks in the system using the **for_each_process()** macro(in < linux/sched/signal.h>).
- In particular, output the process id, task name (known as executable name), and state of each task.
- You will probably have to read through the task_struct structure in linux/sched.h> to obtain the names of these fields.

• Write this code in the module entry point so that its contents will appear in the **kernel log buffer**, which can be viewed using the **dmesg** command.



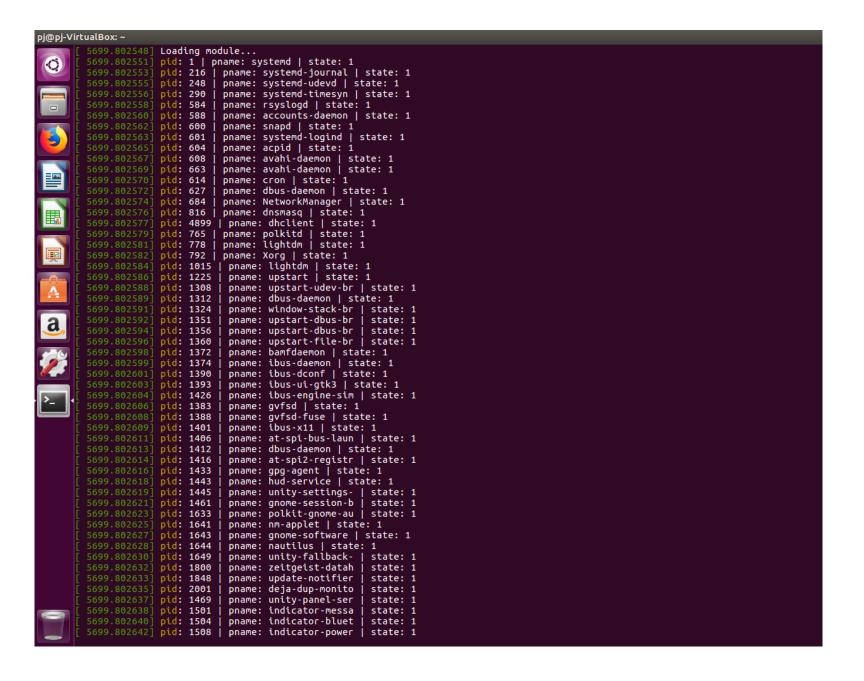
• To verify that your code is working correctly, compare the contents of the kernel log buffer with the output of the following command, which lists all tasks in the system: **ps -el**

 The two values should be very similar. Because tasks are dynamic, however, it is possible that a few tasks may appear in one listing but not the other.

Part II—Iterating over Tasks with a Depth-First Search Tree

• The second portion of this project involves iterating over all tasks in the system using a **depth-first search** (DFS) tree.

- Examining the task struct in linux/sched.h>, we see two struct list head objects: **children** and **sibling**.
- These objects are pointers to a list of the task's children, as well as its siblings.
- Beginning from the init_task, design a kernel module that iterates over all tasks in the system using a DFS tree.
- Just as in the first part of this project, output the pid, name, and state of each task.
- Perform this iteration in the kernel entry module so that its output appears in the kernel log buffer.



• To check the output of the DFS tree, use the command *ps -eLf*

- Hw2 {studentID}.rar:
- hw2_linear.c (40%)
- hw2_dfs.c (40%)
- hw2_report(20%)
- Tell us how you implement your homework in detail and show us your results.
- O will be given to cheaters, so don't copy & paste your friend's code directly.
- Deadline:4/14(Sun.) 23:59