

This module for the Linux kernel allows users to view a list of active processes as well as a running process count. This is how it goes:

- It initialises a counter for active processes as well as a task list pointer.
- The system iterates through each procedure.
- It examines if each process is in the "TASK_RUNNING" state, which denotes that it is active at the moment.
- If a process is active, it prints details including the name, process ID (PID), and state of the process.
- It increases the number of processes for each one that is active.
- It then displays the total number of active processes after processing each task.

Load the module into the kernel to use it. The module will show information about active processes in the kernel log after it has loaded. Use the correct kernel module management commands to unload the module. Refer to the picture for the same

Commands used:

- 1) Compile module: run make. This step generates a .ko file which is the kernel module file.
- 2) Loading module: run insmod (command used to manually insert a kernel module into the running kernel, extending its functionality.) command to run the module.
- 3) Verifying the module is loaded or not: run lsmod | grep lkm_hello1.
- 4) Displaying kernel log messages: dmesg | tail (messages to be printed at the time of module initialisation).
- 5) Removing the module: run rmmod command.
- 6) Verifying module is loaded or not: run lsmod | grep lkm_hello1.

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krishna@krish:~/Downloads/Question3$ sudo rmmod lkm_hello1
[sudo] password for krishna:
krishna@krish:~/Downloads/Question3$ make
make -C /lib/modules/6.2.0-33-generic/build M=/home/krishna/Downloads/Question3 modules
make[1]: Entering directory '/usr/src/linux-headers-6.2.0-33-generic'
warning: the compiler differs from the one used to build the kernel
The kernel was built by: x86_64-linux-gnu-gcc-12 (Ubuntu 12.3.0-1ubuntu1-23.04) 12.3.0
You are using:          gcc-12 (Ubuntu 12.3.0-1ubuntu1-23.04) 12.3.0
make[1]: Leaving directory '/usr/src/linux-headers-6.2.0-33-generic'
krishna@krish:~/Downloads/Question3$ sudo insmod lkm_hello1.ko
krishna@krish:~/Downloads/Question3$ lsmod | grep lkm_hello1
lkm_hello1                16384  0
krishna@krish:~/Downloads/Question3$ sudo dmesg | tail
[40627.547707] wlp2s0: associated
[40974.916225] test_tasks_exit: In exit
[41023.215790] test_tasks_init: In init
[41023.215904] Process: systemd-journal PID:[287]          State:TASK_RUNNING
[41023.215994] Process: insmod PID:[42515]          State:TASK_RUNNING
[41023.215996] Number of running processes: 2
[41242.673227] test_tasks_exit: In exit
[41264.287248] test_tasks_init: In init
[41264.287408] Process: insmod PID:[42925]          State:TASK_RUNNING
[41264.287413] Number of running processes: 1
krishna@krish:~/Downloads/Question3$ sudo rmmod lkm_hello1
krishna@krish:~/Downloads/Question3$ lsmod | grep lkm_hello1
krishna@krish:~/Downloads/Question3$ lsmod
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