TASK5.3

Part1

1. How many states could has a process in Linux?

A process can have the following states: created, ready, waiting, running, completed

2. Examine the pstree command. Make output (highlight) the chain (ancestors) of the current process.

```
student@CsnKhai:~$ pstree -s
init─┬─cron
     ├─dbus-daemon
     ├─dhclient
     ├─5*[getty]
     ├─login───bash───pstree
     ├─rsyslogd───3*[{rsyslogd}]
     ├─sshd
     ├─systemd-logind
     ├─systemd-udevd
     ├─upstart-file-br
     ├─upstart-socket-
     └─upstart-udev-br
student@CsnKhai:~$
```

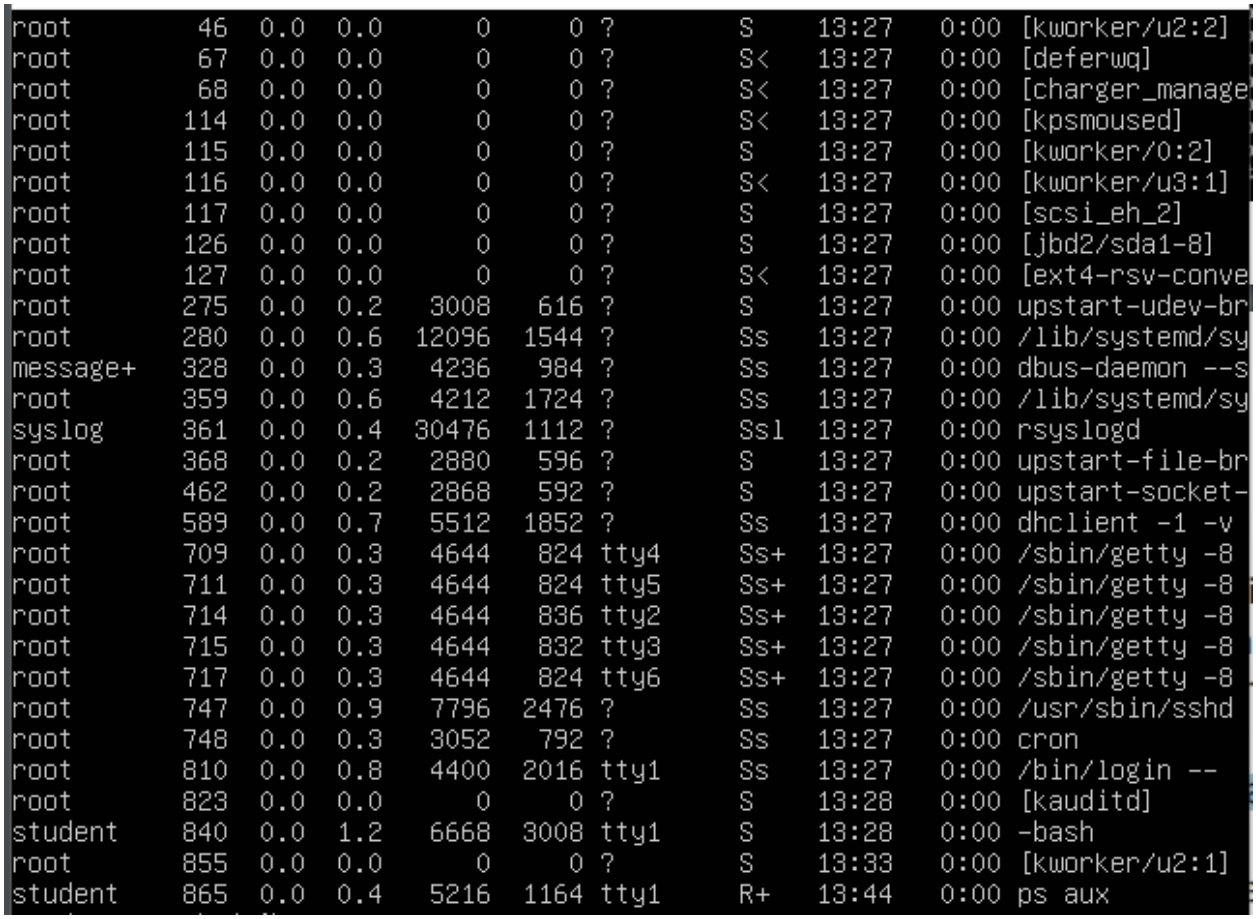
3. What is a proc file system?

**The proc file system** - is as an interface to internal data structures in the kernel. It can be used to obtain information about the system and to change certain kernel parameters at runtime.

4. Print information about the processor (its type, supported technologies, etc.).

```
student@CsnKhai:~$ lscpu
Architecture:          i686
CPU op-mode(s):        32-bit
Byte Order:            Little Endian
CPU(s):                1
On-line CPU(s) list:   0
Thread(s) per core:    1
Core(s) per socket:    1
Socket(s):             1
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 141
Stepping:              1
CPU MHz:               2688.027
BogoMIPS:              5376.05
L1d cache:             48K
L1i cache:             32K
L2 cache:              1280K
L3 cache:              12288K
```

5. Use the ps command to get information about the process. The information should be as follows: the owner of the process, the arguments with which the process was launched for execution, the group owner of this process, etc.



```
root         46  0.0  0.0      0     0 ?        S    13:27   0:00 [kworker/u2:2]
root         67  0.0  0.0      0     0 ?        S<   13:27   0:00 [deferwq]
root         68  0.0  0.0      0     0 ?        S<   13:27   0:00 [charger_manage
root        114  0.0  0.0      0     0 ?        S<   13:27   0:00 [kpsmoused]
root        115  0.0  0.0      0     0 ?        S    13:27   0:00 [kworker/0:2]
root        116  0.0  0.0      0     0 ?        S<   13:27   0:00 [kworker/u3:1]
root        117  0.0  0.0      0     0 ?        S    13:27   0:00 [scsi_eh_2]
root        126  0.0  0.0      0     0 ?        S    13:27   0:00 [jbd2/sda1-8]
root        127  0.0  0.0      0     0 ?        S<   13:27   0:00 [ext4-rsv-conve
root        275  0.0  0.2   3008   616 ?        S    13:27   0:00 upstart-udev-br
root        280  0.0  0.6  12096  1544 ?        Ss   13:27   0:00 /lib/systemd/sy
message+    328  0.0  0.3   4236   984 ?        Ss   13:27   0:00 dbus-daemon --s
root        359  0.0  0.6   4212  1724 ?        Ss   13:27   0:00 /lib/systemd/sy
syslog      361  0.0  0.4  30476  1112 ?        Ssl  13:27   0:00 rsyslogd
root        368  0.0  0.2   2880   596 ?        S    13:27   0:00 upstart-file-br
root        462  0.0  0.2   2868   592 ?        S    13:27   0:00 upstart-socket-
root        589  0.0  0.7   5512  1852 ?        Ss   13:27   0:00 dhclient -1 -v
root        709  0.0  0.3   4644   824 tty4     Ss+  13:27   0:00 /sbin/getty -8
root        711  0.0  0.3   4644   824 tty5     Ss+  13:27   0:00 /sbin/getty -8
root        714  0.0  0.3   4644   836 tty2     Ss+  13:27   0:00 /sbin/getty -8
root        715  0.0  0.3   4644   832 tty3     Ss+  13:27   0:00 /sbin/getty -8
root        717  0.0  0.3   4644   824 tty6     Ss+  13:27   0:00 /sbin/getty -8
root        747  0.0  0.9   7796  2476 ?        Ss   13:27   0:00 /usr/sbin/sshd
root        748  0.0  0.3   3052   792 ?        Ss   13:27   0:00 cron
root        810  0.0  0.8   4400  2016 tty1     Ss   13:27   0:00 /bin/login --
root        823  0.0  0.0      0     0 ?        S    13:28   0:00 [kauditd]
student     840  0.0  1.2   6668  3008 tty1     S    13:28   0:00 -bash
root        855  0.0  0.0      0     0 ?        S    13:33   0:00 [kworker/u2:1]
student     865  0.0  0.4   5216  1164 tty1     R+   13:44   0:00 ps aux
```

ps aux

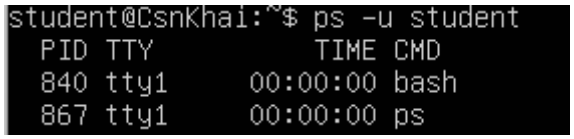
6. How to define kernel processes and user processes?

I f the process name in [], it means that it is a kernel process, otherwise it is a user process

7. Print the list of processes to the terminal. Briefly describe the statuses of the processes. What condition are they in, or can they be arriving in?

R – runnin, s – sleeping, z – zombie, s – stopped, d – uninterruptable sleep

8. Display only the processes of a specific user.

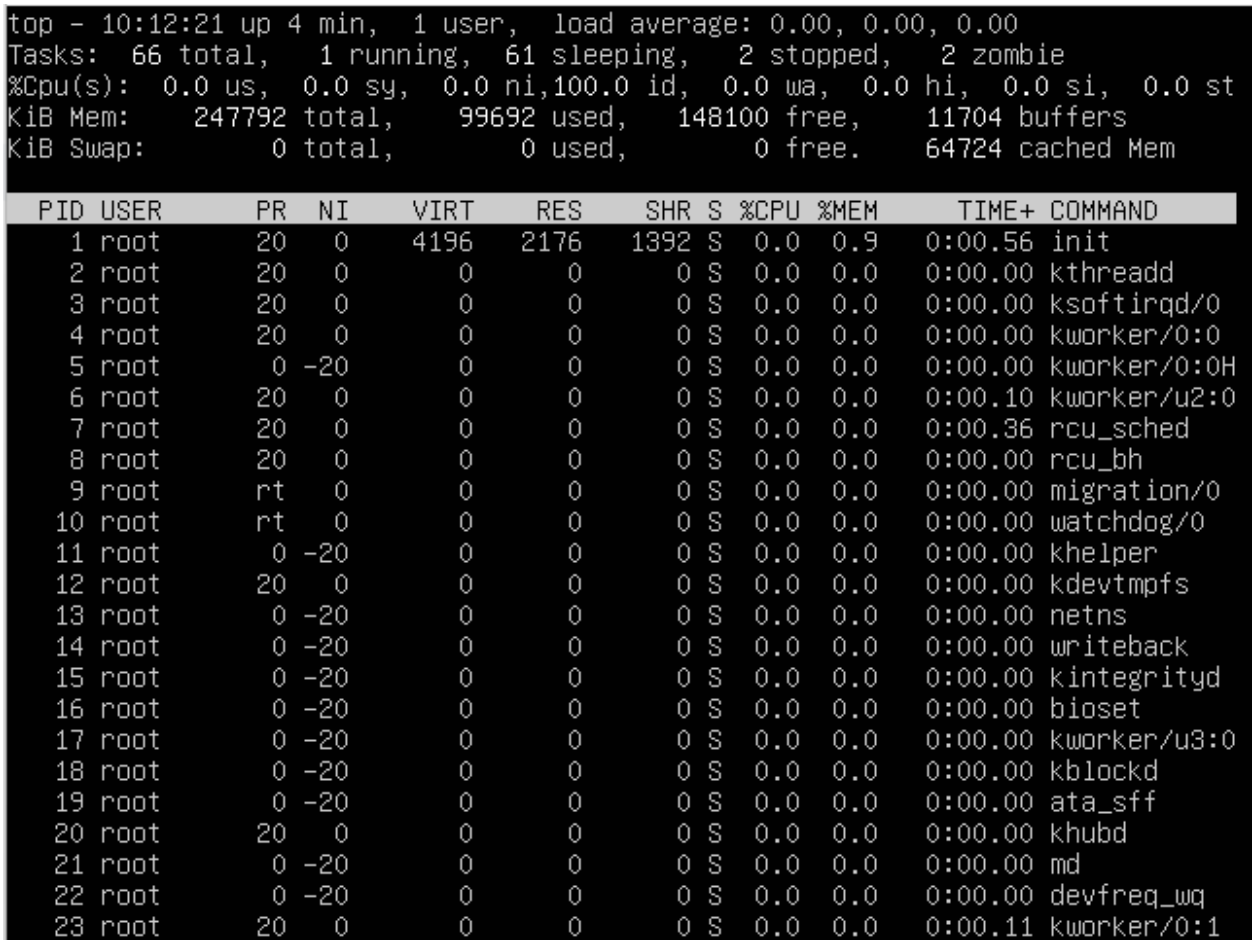


```
student@CsnKhai:~$ ps -u student
  PID TTY          TIME CMD
  840 tty1     00:00:00 bash
  867 tty1     00:00:00 ps
```

9. What utilities can be used to analyze existing running tasks (by analyzing the help for the ps command)?

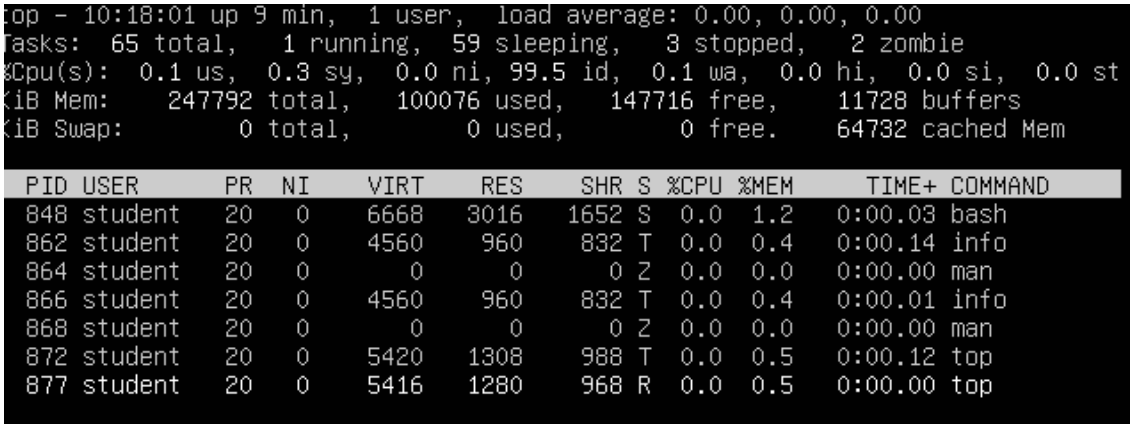
**Pc, top, proc**

10. What information does top command display?




It displays PID, User, Load Averages, CPU and memory usage, commands…

11. Display the processes of the specific user using the top command.



12. What interactive commands can be used to control the top command? Give a couple of examples.

**q** – quit

**k** – kill process

**r** – renice

**o** – add filter

13. Sort the contents of the processes window using various parameters (for example, the amount of processor time taken up, etc.)

**Shift + m** – CPU

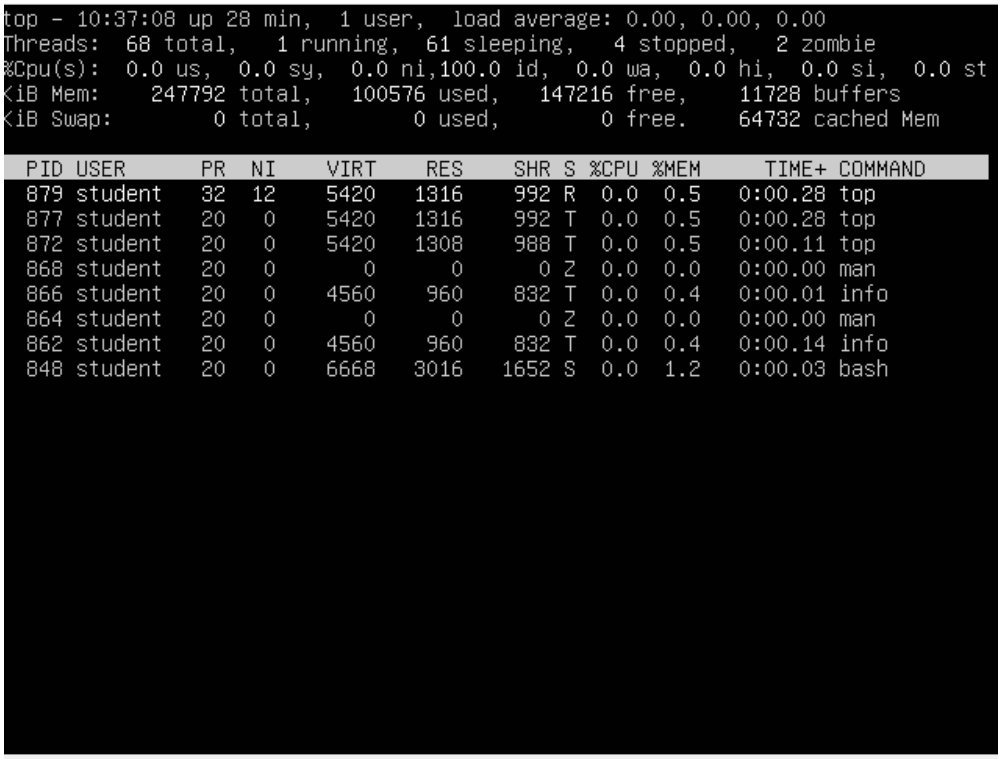
**Shift + t** – time

**Shift + n** – PID

14. Concept of priority, what commands are used to set priority?

**nice -n value command**

15. Can I change the priority of a process using the top command? If so, how?




By using the key **r**

16. Examine the kill command. How to send with the kill command

process control signal? Give an example of commonly used signals.

**kill [options] <pid>**

**SIGTERM (15) –** is used to ask a process to stop

**SIGKILL (9) -** is used to force a process to stop

**SIGHUP (1) -** is used to hang up a process

17. Commands jobs, fg, bg, nohup. What are they for? Use the sleep, yes command to demonstrate the process control mechanism with fg, bg.

**jobs** — display status of jobs in the current session

**fg** — run jobs in the foreground

**bg** — run jobs in the background

**nohup** - run a command immune to hangups, with output to a non-tty

Part2

1. Check the implementability of the most frequently used OPENSSH commands in the MS Windows operating system. (Description of the expected result of the commands + screenshots: command – result should be presented)

2. Implement basic SSH settings to increase the security of the client-server connection (at least

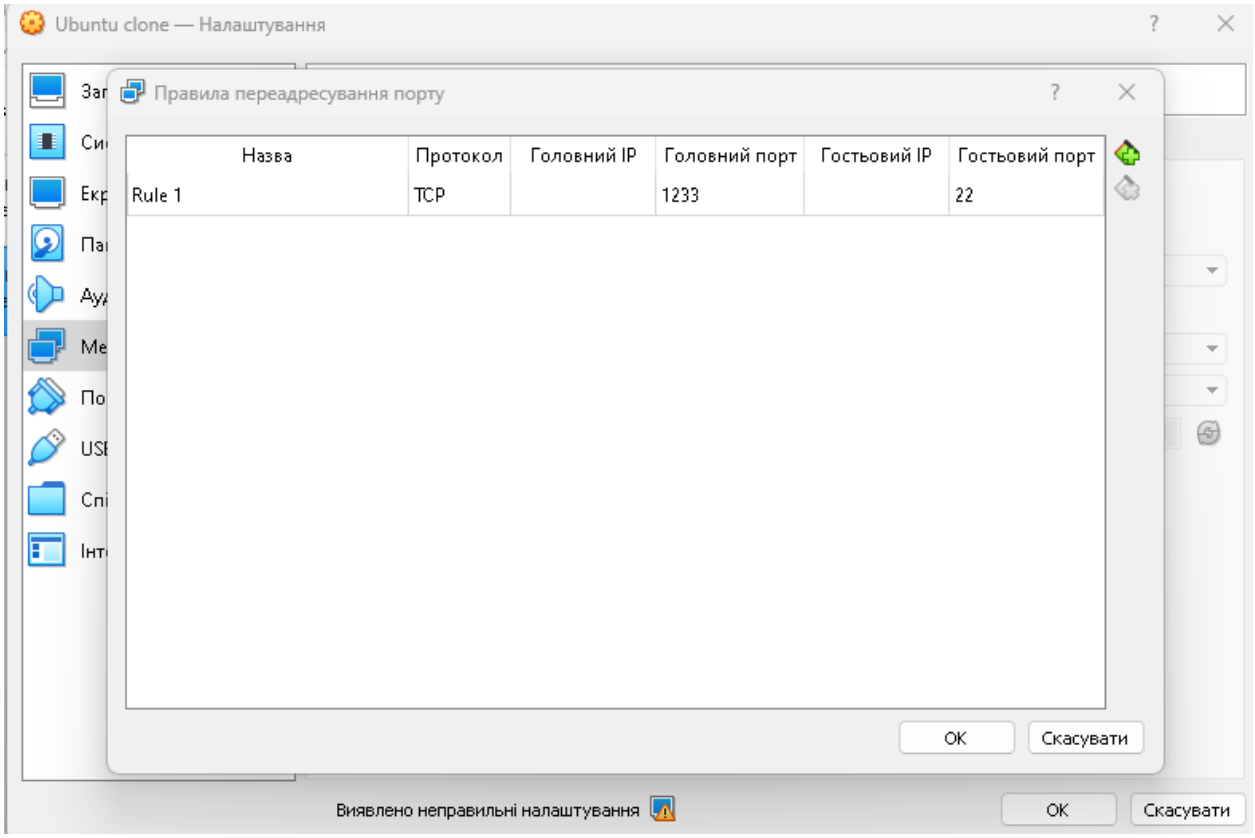
```
PermitRootLogin no
```

```
PasswordAuthentication no
```

3. List the options for choosing keys for encryption in SSH. Implement 3 of them.

```
# HostKeys for protocol version 2
HostKey /etc/ssh/ssh_host_rsa_key
HostKey /etc/ssh/ssh_host_dsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key
```

4. Implement port forwarding for the SSH client from the host machine to the guest Linux virtual machine behind NAT.




5*. Intercept (capture) traffic (tcpdump, wireshark) while authorizing the remote client on the server using ssh, telnet, rlogin. Analyze the result.