Instructions, SURAFELE ASFAW, A01312910, SET C

Read all the instructions carefully before you begin.

Make sure you submit **before** the deadline!

Due date: 13:00 Wednesday Feb 15

During the exam:

- Your phone should be off/silenced and in your bag (not on your desk)
- Make sure you shut down all messaging and communication apps
  - You cannot communicate with anyone other than the exam invigilators during the exam
    - This includes AIs

About Screenshots:

- If you can fit everything into one screenshot, that is ok
- If you need to use one or two additional screenshots, that is also ok

The exam is open book:

- You may review your own notes and class notes

Questions:

P1. 1 point

Create a “midterm” directory in your home directory. Inside the new **midterm** directory, create a new file “**p1-file**”. Change the file permission so that it matches the permission below.

Include screenshots that demonstrate:

- How you made the changes
- That the changes were made successfully

-rwxr--r--

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# pwd
/home
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# mkdir midterm
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# cd midterm
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# touch p1-file
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# ls
total 0
-rw-r--r-- 1 root root 0 Feb 15 19:24 p1-file
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# chmod p1-file 744
chmod: invalid mode: 'p1-file'
Try 'chmod --help' for more information.
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# chmod
chmod: missing operand
Try 'chmod --help' for more information.
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# chmod 744 p1-file
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# ls
total 0
-rwxr--r-- 1 root root 0 Feb 15 19:24 p1-file*
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm#
```

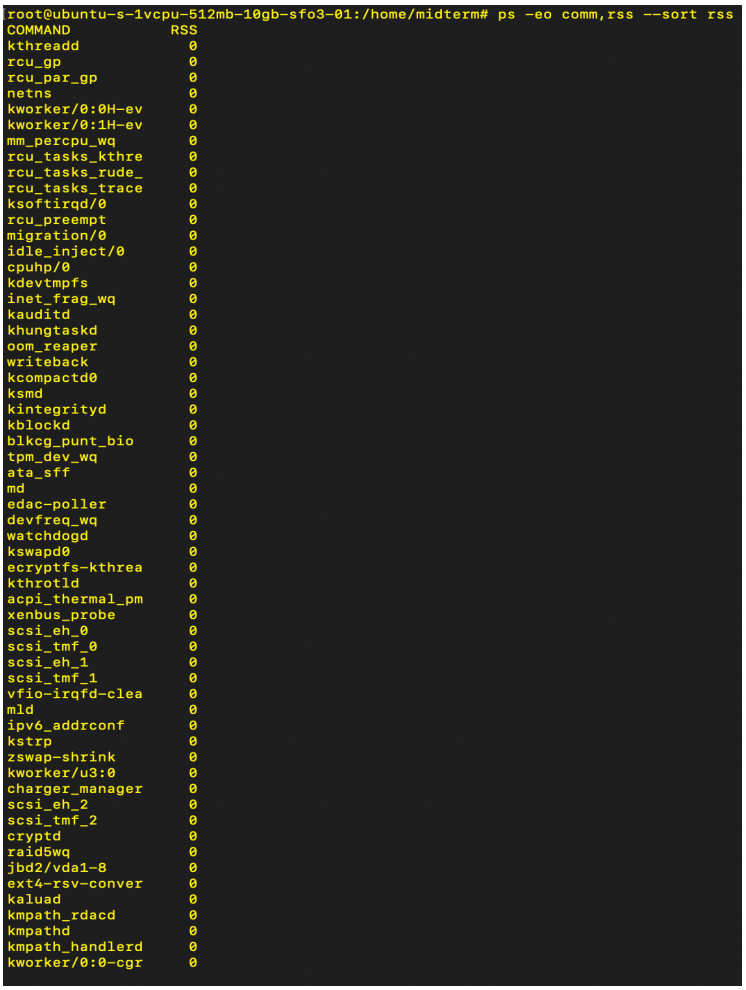
P2. 2 points
Using **only** the `ps` utility, sort all processes by resident set size. Display the command and resident set size.

Your output should look a little like this:

```
COMMAND          RSS
kthreadd           0
rcu_gp             0
rcu_par_gp         0
slub_flushwq       0
netns              0
kworker/0:0H-ev    0
mm_percpu_wq       0
rcu_tasks_kthre    0
```

Include screenshots that demonstrate:

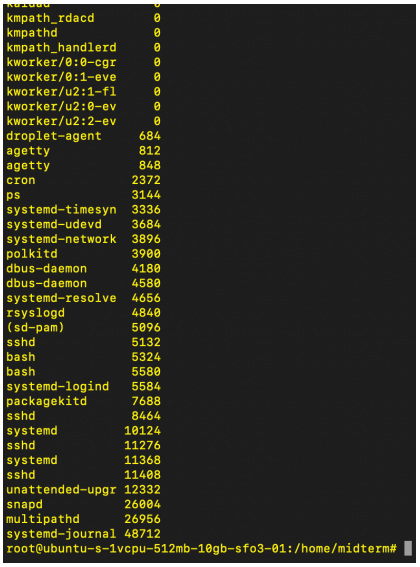
- The command that you used, include some output
- screenshots from the man page for `ps` that illustrate how you displayed the correct fields sorted the output



`ps -eo comm,rss` will show you the command and ram used by a process.

```
       reverse the result of comparisons

  --sort=WORD
       sort according to WORD: general-numeric -g, human-numeric -h, month -M, numeric -n,
       random -R, version -V
```



P3. 4 points

Create a new user. Your new user should have the following:

- a regular home directory in /home
- use bash as their login shell

Give your new user a password, or change their password if you have already created a password for your new user.

Create a new group named “midterm”. Use the man pages to find out how to do this.

Change the group owner of the “midterm” directory created in step 1 to the midterm group created above

Add your new user to the midterm group

Include screenshots that demonstrate:

- the commands that you used

to create your user

set your user's password

create a new group

change the group owner of the midterm directory

add your user to the group

evidence that the above steps were successful

the man page you used to create a group

how you found that man page

```
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# sudo useradd -m -s /bin/bash MidTerm
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# sudo passwd MidTerm
[New password:
[Retype new password:
 passwd: password updated successfully
```

```
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# groupadd midterm
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# ls
 total 4.0K
 -rwxr--r-- 1 root root    0 Feb 15 19:24 p1-file*
 -rw-r--r-- 1 root root    0 Feb 15 19:35 process
 -rw-r--r-- 1 root root 2.0K Feb 15 19:36 sort
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# cd ..
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# ls
 total 28K
 drwxr-x--- 2 /bin/bash /bin/bash 4.0K Feb  1 17:17 CitStudent/
 drwxr-x--- 2 MidTerm   MidTerm   4.0K Feb 15 19:44 MidTerm/
 drwxr-xr-x 3 root      root      4.0K Feb  1 18:03 bin/
 drwxr-xr-x 2 root      root      4.0K Feb 15 19:35 midterm/
```

```
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/MidTerm# sudo chown -R MidTerm:midterm midterm
 chown: cannot access 'midterm': No such file or directory
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/MidTerm# cd ..
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# sudo chown -R MidTerm:midterm midterm
[root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# ls -l midterm/
 total 4.0K
 -rwxr--r-- 1 MidTerm midterm    0 Feb 15 19:24 p1-file*
 -rw-r--r-- 1 MidTerm midterm    0 Feb 15 19:35 process
 -rw-r--r-- 1 MidTerm midterm 2.0K Feb 15 19:36 sort
 root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home#
```

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# sudo usermod -aG midterm MidTerm
```

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# cat /etc/group
```

```
midterm:x:1005:MidTerm
```

```
GROUPADD(8)

NAME
       groupadd - create a new group

SYNOPSIS
       groupadd [options] group
```

P4. 3 points

Write a command that uses `grep` to find and print all the regular users on your system.

Only use grep. Assume that you don't know how many regular users there are.

Output should look a little like this (you will have more users on your system):

```
pond:x:1000:1000:pond:/var/home/pond:/bin/bash
```

> Hint: regular users are always within a range of numbers
> Hint 2: `grep` can search for a "range" using "Bracket Expressions" see man page

Include screenshots that demonstrate:

> Your command
> The output of your command, which should fit comfortably on the screen

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home# grep -E ":[[:digit:]][[:digit:]][[:digit:]][[:digit:]]:" /etc/passwd
surfasfaw:x:1000:1000:Surafele Asfaw:/home/surfasfaw:/bin/bash
surafele:x:1001:1001:Surafele Asfaw,1435,6044454627,:/home/surafele:/bin/bash
/bin/bash:x:1002:1002::/home//bin/bash:/bin/sh
CitStudent:x:1003:1003::/home/CitStudent:/bin/bash
MidTerm:x:1004:1004::/home/MidTerm:/bin/bash
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home#
```

P5. 2 points

Write a command, using `find` , that will find and count all the files in `/etc` . Hide all the error messages, "Permission denied", by sending them to a file that doesn't store any data.

> You can use another utility for the counting.

Include screenshots that demonstrate:

> your command

```
714
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/# find /etc -type f 2> /dev/null | wc -l
714
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/#
```

P6. 1point

Run a command that will display the version of the kernel that your VM is using.

Include screenshots that demonstrate:

your command

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/# uname -r
5.19.0-23-generic
```

P7. 2 points

Copy the code below into a new file `$HOME/midterm/nfntlp`.
Make the file executable and run it as a background process, like this: `./nfntlp &`

Once the script is running, use `ps` and a filtering utility to find the PID of your awesome infinite loop script.

The output of your command should look a little like this:

```
nfntlp                  52119
```

Include screenshots that demonstrate:

Your command

The output

```
#!/bin/bash

while true; do
        x=1
done
```

After completing, You can kill this process in a few ways:

bring to foreground with the `fg` command and kill wit CTRL+c

using the `pkill` utility `pkill -9 nfntlp`

```
root@ubuntu-s-1vcpu-512mb-10gb-sfo3-01:/home/midterm# ps -eo comm,pid | grep nfntlp
nfntlp          615258
```

Total Points: 15

Submission instructions

Make sure you submit **before** the deadline!

Submit: a .pdf using the dropbox on D2L

File name: your_name_midterm_2420.pdf