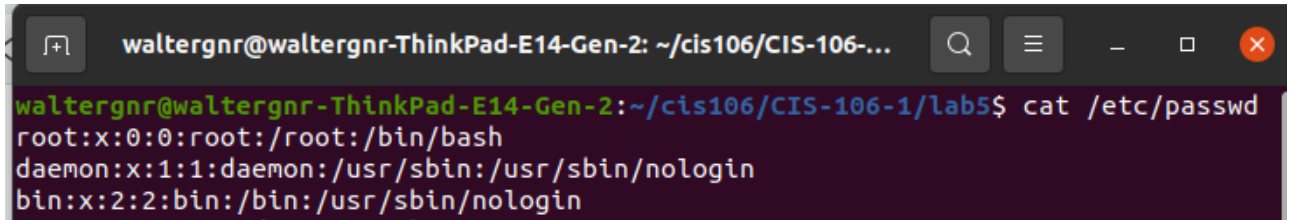


Lab 5 | Handling Text Files

Question 1

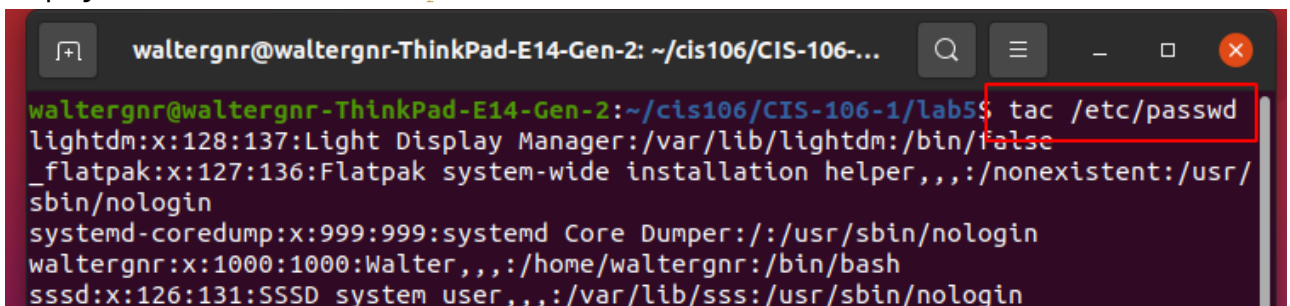
Cat, head and tail commands are used for displaying the content of a file.

1. Display the content of the `/etc/passwd` file.



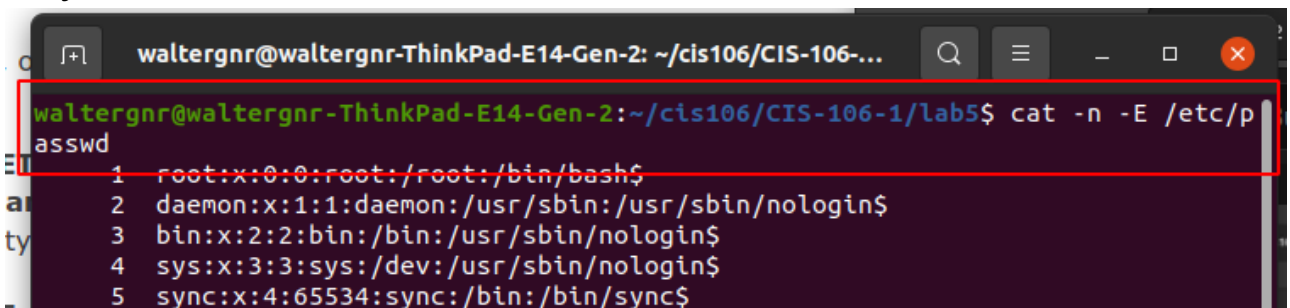
```
waltergnr@waltergnr-ThinkPad-E14-Gen-2: ~/cis106/CIS-106-...  
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ cat /etc/passwd  
root:x:0:0:root:/root:/bin/bash  
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin  
bin:x:2:2:bin:/bin:/usr/sbin/nologin
```

2. Display the content of the `/etc/passwd` file in reverse order.



```
waltergnr@waltergnr-ThinkPad-E14-Gen-2: ~/cis106/CIS-106-...  
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ tac /etc/passwd  
lightdm:x:128:137:Light Display Manager:/var/lib/lightdm:/bin/false  
_flatpak:x:127:136:Flatpak system-wide installation helper,,,:/nonexistent:/usr/  
sbin/nologin  
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin  
waltergnr:x:1000:1000:Walter,,,:/home/waltergnr:/bin/bash  
sssd:x:126:131:SSSD system user,,,:/var/lib/sss:/usr/sbin/nologin
```

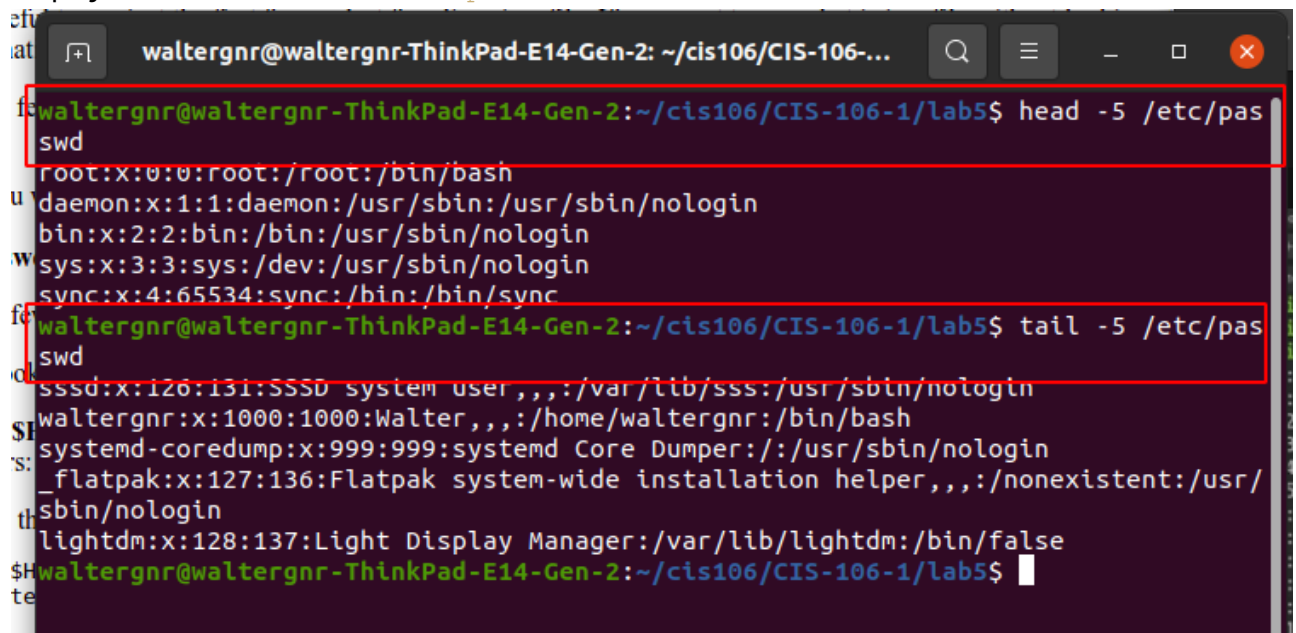
3. Display the content of the `/etc/passwd` file with line numbers and the \$ to indicate the end of every line.



```
waltergnr@waltergnr-ThinkPad-E14-Gen-2: ~/cis106/CIS-106-...  
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ cat -n -E /etc/passwd  
1 root:x:0:0:root:/root:/bin/bash$  
2 daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin$  
3 bin:x:2:2:bin:/bin:/usr/sbin/nologin$  
4 sys:x:3:3:sys:/dev:/usr/sbin/nologin$  
5 sync:x:4:65534:sync:/bin:/bin/sync$
```

4. Display the first 5 lines of a the `/etc/passwd` file.

5. Display the last 5 lines of the `/etc/passwd` file.

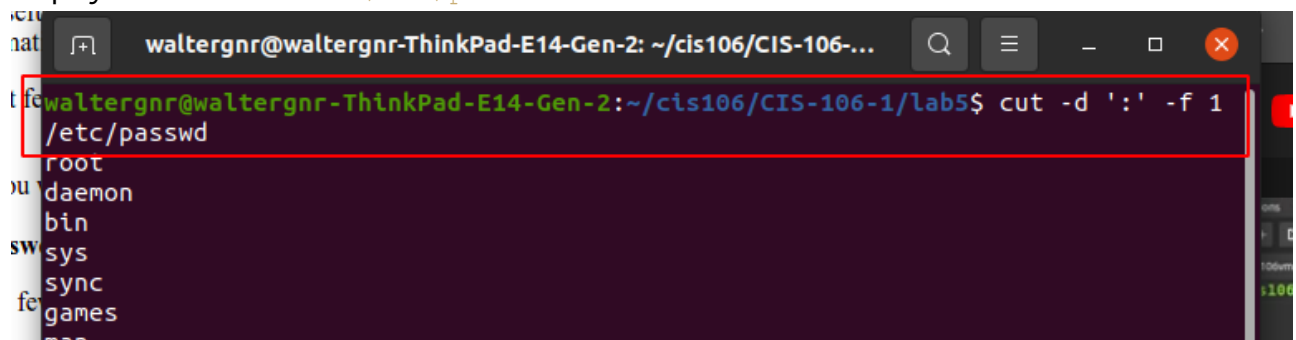


```
waltergnr@waltergnr-ThinkPad-E14-Gen-2: ~/cis106/CIS-106-...
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ head -5 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ tail -5 /etc/passwd
sssd:x:126:131:SSSD system user,,,:/var/lib/sss:/usr/sbin/nologin
waltergnr:x:1000:1000:Walter,,,:/home/waltergnr:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
flatpak:x:127:136:Flatpak system-wide installation helper,,,:/nonexistent:/usr/sbin/nologin
lightdm:x:128:137:Light Display Manager:/var/lib/lightdm:/bin/false
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$
```

Question 2

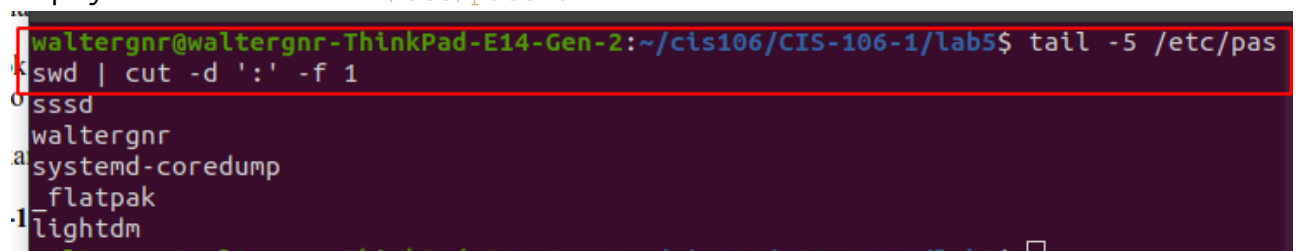
The `cut` command is very useful when working with files that are already formatted using a field separator. The `cut` command can show specific information about each line of text in a given file.

1. Display the first field of the `/etc/passwd` file.



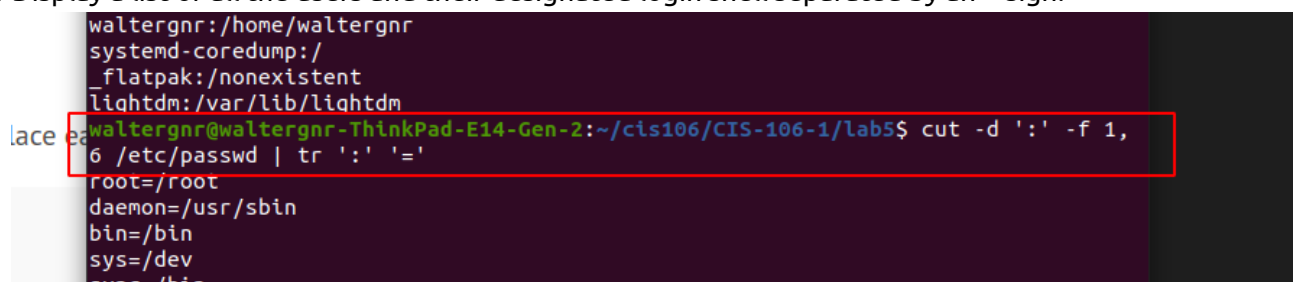
```
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ cut -d ':' -f 1 /etc/passwd
root
daemon
bin
sys
sync
games
man
```

2. Display the last 5 users in the `/etc/passwd` file.



```
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ tail -5 /etc/passwd | cut -d ':' -f 1
sssd
waltergnr
systemd-coredump
flatpak
lightdm
```

3. Display a list of all the users and their designated login shell separated by an `=` sign.



```
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ cut -d ':' -f 1,6 /etc/passwd | tr ':' '='
root=/root
daemon=/usr/sbin
bin=/bin
sys=/dev
sync=/bin
```

4. The `sort` command is another amazing tool in any linux user's tool box. `Sort` allows you to display data in a given order. Cut the first and 3rd field of the `/etc/passwd` field and sort the output.

```
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ cut -d ':' -f 1,3 /etc/passwd | sort
apt:105
avahi:115
avahi-autoipd:109
backup:34
lightdm:128
```

5. Repeat the previous command but this time only show the last 5 entries.

```
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ tail -5 /etc/passwd | cut -d ':' -f 1,3 | sort
flatpak:127
lightdm:128
```

Question 3

The `wc` command is used to count the number of lines, characters and words in a file.

1. How many lines does the `/etc/passwd` file have?
2. How many words does the `/etc/passwd` file have?

```
waltergnr@waltergnr-ThinkPad-E14-Gen-2: ~/cis106/CIS-106-1/lab5$ man wc
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ wc -l /etc/passwd
49 /etc/passwd
waltergnr@waltergnr-ThinkPad-E14-Gen-2:~/cis106/CIS-106-1/lab5$ wc -w /etc/passwd
91 /etc/passwd
```

3. How many users can login with the `/bin/bash` shell?
4. How many users have the `/sbin/nologin` shell assigned?

```
student@student-VirtualBox:~$ grep /bin/bash /etc/passwd
root:x:0:0:root:/root:/bin/bash
student:x:1000:1000:cis106vm,,,:/home/student:/bin/bash
student@student-VirtualBox:~$ grep /sbin/nologin /etc/passwd
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
```

5. Display your user's information in `/etc/passwd` file

```
student@student-VirtualBox:~$ grep $USER /etc/passwd
student:x:1000:1000:cis106vm,,,:/home/student:/bin/bash
student@student-VirtualBox:~$
```

Question 4

1. Run the `ip ad` command and display all the lines that match the string `inet`. How many lines did you get?

```

student@student-VirtualBox:~$ ip ad | grep 'inet'
inet 127.0.0.1/8 scope host lo
inet6 ::1/128 scope host
inet 192.168.1.213/24 brd 192.168.1.255 scope global dynamic noprefixroute e
np0s3
inet6 fe80::48cd:9391:7776:3f05/64 scope link noprefixroute
student@student-VirtualBox:~$ ip ad | grep 'inet' | wc -l
4
student@student-VirtualBox:~$

```

2. Run the `ip ad` command and display all the lines that match the string `inet6`. Display the output in reverse order.

```

student@student-VirtualBox:~$ ip ad | grep 'inet6'
inet6 ::1/128 scope host
inet6 fe80::48cd:9391:7776:3f05/64 scope link noprefixroute
student@student-VirtualBox:~$ ip ad | grep 'inet6' | tac
inet6 fe80::48cd:9391:7776:3f05/64 scope link noprefixroute
inet6 ::1/128 scope host
student@student-VirtualBox:~$

```

3. Run the `ip ad` command and display all the lines that match the string `inet` or `inet6` sort the output and save it to a file.
4. Run the `ip ad` command and display only the 3rd line that matches the string `inet`.
5. Run the `ip ad` command and display all the ipv4 addresses sorted.

```

student@student-VirtualBox:~$ ip ad | grep -E 'inet|inet6' | sort > ~/Downloads/
ipaddress.txt
student@student-VirtualBox:~$ ip ad | grep 'inet' | head -3 | tail -1
inet 192.168.1.213/24 brd 192.168.1.255 scope global dynamic noprefixroute e
np0s3
student@student-VirtualBox:~$ ip ad | grep -E '([0-9]{1,3}[\.]){3}[0-9]{1,3}'
inet 127.0.0.1/8 scope host lo
inet 192.168.1.213/24 brd 192.168.1.255 scope global dynamic noprefixroute e
np0s3
student@student-VirtualBox:~$

```

Question 5

1. Run the following command and save the output to a markdown file: `echo "# Information about my pc"`. You can use any naming convention you want for the file as long as it is a markdown file.
2. Run the following command and append the output to the markdown file you created earlier: `echo "## CPU Information"`
3. The `lscpu` command displays a lot of information about the CPU the computer has. Use the `lscpu`, `grep`, and the pipe (`|`) to extract, and append to the file you created earlier, the following information from the output of the `lscpu` command:
 - Architecture
 - Threads
 - Cores
 - Model name
 - CPU Frequency

- Virtualization technology supported
4. Run the following command and append the output to the markdown file you created earlier: `echo "## RAM Information"`
 5. The command `lshw -c memory` displays information about the RAM installed in your system. Extract and append to the file the following information:
 - Memory size:
 6. Display the content of the file you created earlier showing all the data that has been appended so far.

```
student@student-VirtualBox: ~  
student@student-VirtualBox:~$ echo "# Information about my pc" > ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ echo "## CPU Information" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "Architecture" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "Thread(s) per core" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "Core(s) per socket" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "Model name" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "CPU MHz" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lscpu | grep -i "Virtualization type" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ echo "## RAM Information" >> ~/CIS-106/lab5/mypc.md  
student@student-VirtualBox:~$ lshw -c memory | grep -i "size:" >> ~/CIS-106/lab5/mypc.md  
WARNING: you should run this program as super-user.  
WARNING: output may be incomplete or inaccurate, you should run this program as super-user.  
student@student-VirtualBox:~$
```

```
Open mypc.md Save  
~/CIS-106/lab5  
1 # Information about my pc  
2 ## CPU Information  
3 Architecture: x86_64  
4 Thread(s) per core: 1  
5 Core(s) per socket: 2  
6 Model name: Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz  
7 CPU MHz: 3600.000  
8 Virtualization type: full  
9 ## RAM Information  
10 size: 2GiB
```