THE FUNDAMENTALS OF LINUX OPERATIONS

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OBECTIVES:

- Introduction
- Linux Filesystem Hierarchy
- Linux Shell Scripts
- User and Group Management
- Network Configuration
- Career / Softskills
- Conclusion

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INTRODUCTION

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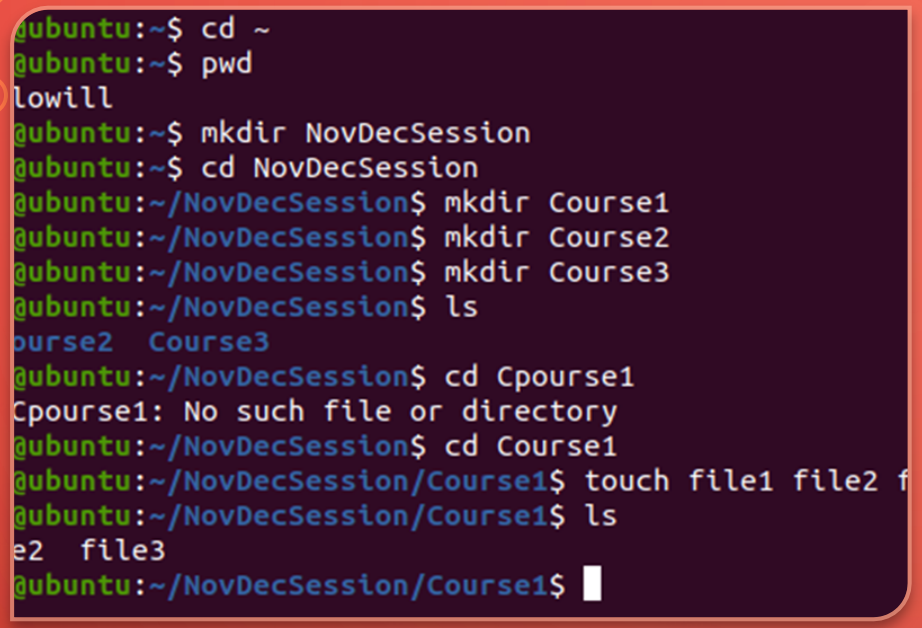
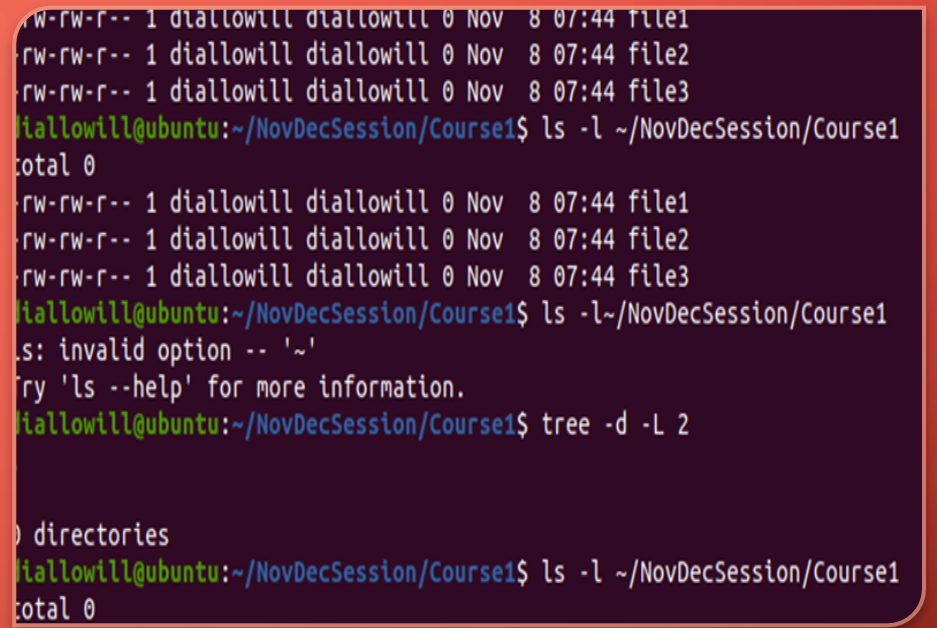
- LINUX IS AN OPERATING SYSTEM (OS) USED TO RUN A VARIETY OF APPLICATIONS ON A VARIETY OF DIFFERENT HARDWARE COMPONENTS.
- LINUX BEGAN IN 1991 AS A PERSONAL PROJECT BY FINNISH STUDENT LINUS TORVALDS: TO CREATE A NEW FREE OPERATING SYSTEM KERNEL.
- LINUX IS AN **OPEN SOURCE SOFTWARE (OSS)** THAT IS FREELY DEVELOPED AND CONTINUOUSLY IMPROVED BY A LARGE COMMUNITY OF SOFTWARE DEVELOPERS.





CREATE DIRECTORIES AND FILES

COPY AND REMOVE DIRECTORIES AND FILES

```
diallowill@ubuntu:~/Desktop$ cd ~
diallowill@ubuntu:~$ pwd
/home/diallowill
diallowill@ubuntu:~$ cp -r NovDecSession JanFebSession
diallowill@ubuntu:~$ tree NovDecSession JanFebSession
NovDecSession
├── Course1
│   ├── file1
│   ├── file2
│   └── file3
├── Course2
└── Course3
JanFebSession
├── Course1
│   ├── file1
│   ├── file2
│   └── file3
├── Course2
└── Course3

6 directories, 6 files
diallowill@ubuntu:~$ rmdir JanFebSession/Course3
diallowill@ubuntu:~$ ls JanFebSession
Course1  Course2
diallowill@ubuntu:~$ rm JanFebSession/Course1/file3
diallowill@ubuntu:~$ tree NovDecSession JanFebSession
```

```
├── Course1
│   ├── file1
│   ├── file2
│   └── file3
├── Course2
└── Course3

6 directories, 6 files
diallowill@ubuntu:~$ rmdir JanFebSession/Course3
diallowill@ubuntu:~$ ls JanFebSession
Course1  Course2
diallowill@ubuntu:~$ rm JanFebSession/Course1/file3
diallowill@ubuntu:~$ tree NovDecSession JanFebSession
NovDecSession
├── Course1
│   ├── file1
│   ├── file2
│   └── file3
├── Course2
└── Course3
JanFebSession
├── Course1
│   ├── file1
│   └── file2
└── Course2

5 directories, 5 files
diallowill@ubuntu:~$
```

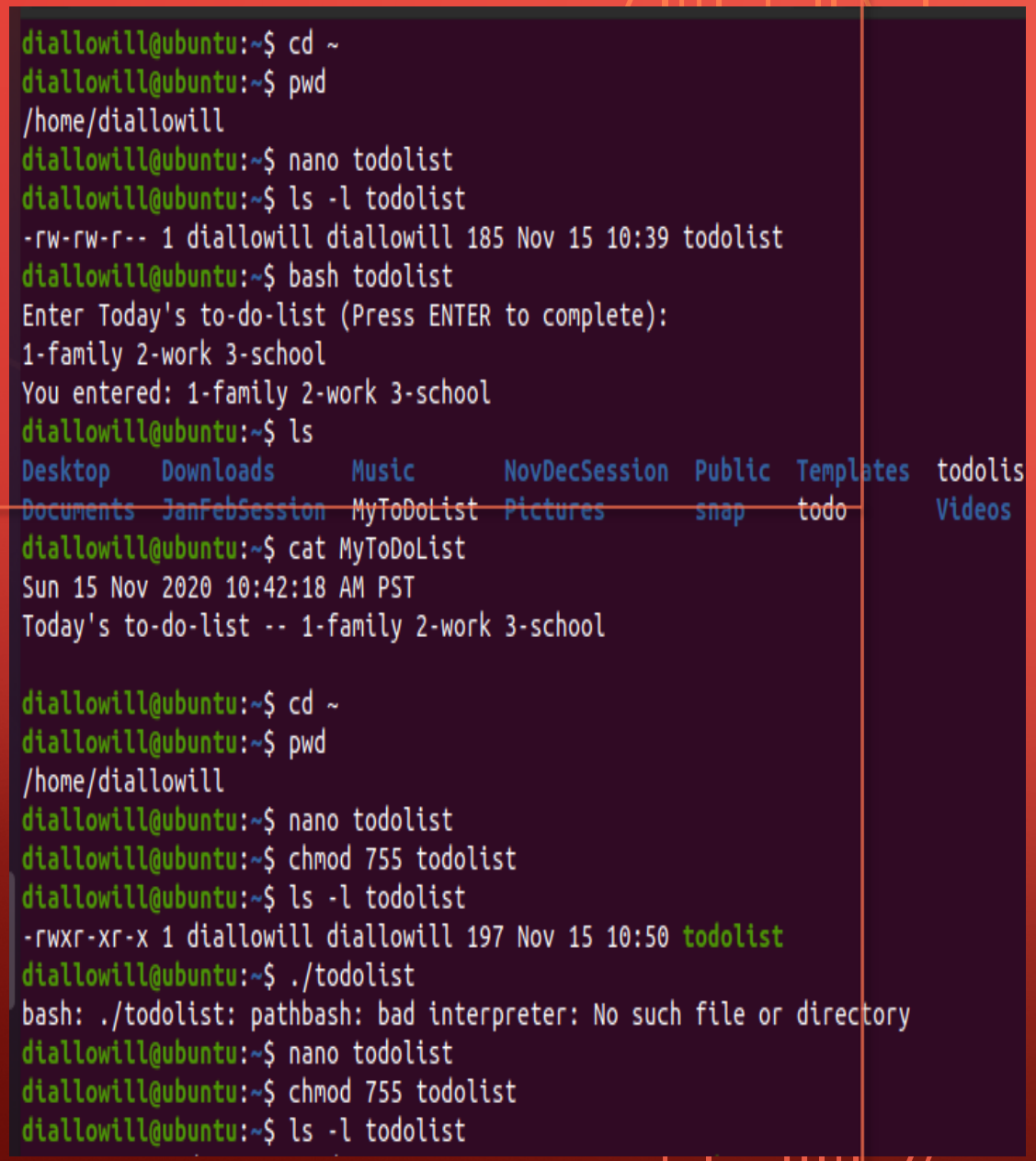
LOCATE DIRECTORIES AND FILES

```
diallowill@ubuntu:~/Desktop$ cd ~
diallowill@ubuntu:~$ pwd
/home/diallowill
diallowill@ubuntu:~$ find ~ -iname course* type d
find: paths must precede expression: `type'
diallowill@ubuntu:~$ find ~ -iname course* -type d
/home/diallowill/NovDecSession/Course3
/home/diallowill/NovDecSession/Course2
/home/diallowill/NovDecSession/Course1
/home/diallowill/JanFebSession/Course2
/home/diallowill/JanFebSession/Course1
diallowill@ubuntu:~$ find ~ -iname file1
/home/diallowill/NovDecSession/Course1/file1
/home/diallowill/JanFebSession/Course1/file1
diallowill@ubuntu:~$ find ~ -iname file*
/home/diallowill/NovDecSession/Course1/file3
/home/diallowill/NovDecSession/Course1/file2
/home/diallowill/NovDecSession/Course1/file1
/home/diallowill/JanFebSession/Course1/file2
/home/diallowill/JanFebSession/Course1/file1
diallowill@ubuntu:~$ find ~ -iname file[1,2,3]
/home/diallowill/NovDecSession/Course1/file3
/home/diallowill/NovDecSession/Course1/file2
/home/diallowill/NovDecSession/Course1/file1
```

```
ome/diallowill/NovDecSession/Course1/file1
me/diallowill/JanFebSession/Course1/file2
e/diallowill/JanFebSession/Course1/file1
lowill@ubuntu:~$ find ~ -iname file[1,2,3]
/diallowill/NovDecSession/Course1/file3
diallowill/NovDecSession/Course1/file2
iallowill/NovDecSession/Course1/file1
iallowill/JanFebSession/Course1/file2
allowill/JanFebSession/Course1/file1
l@ubuntu:~$ sudo apt install locate
ssword for diallowill:
ackage lists... Done
ependency tree
ate information... Done
ng NEW packages will be installed:

1 newly installed, 0 to remove and 238 not upgrad
85.3 kB of archives.
peration, 265 kB of additional disk space will be
/us.archive.ubuntu.com/ubuntu focal/universe amd6
85.3 kB]
kB in 0s (223 kB/s)
eviously unselected package locate.
```

```
will@ubuntu:~$ sudo updatedb
in/find: '/run/user/1000/doc': Permission denied
in/find: '/run/user/1000/gvfs': Permission denied
will@ubuntu:~$ locate -S
se /var/cache/locate/locatedb is in the GNU LOCATE02 format.
ase was last modified at 2020:11:08 09:15:48.756684529 -0800
e database size: 3786246 bytes
ilenames: 312581
names have a cumulative length of 20127081 bytes.
hose file names,

    75 contain whitespace,
    0 contain newline characters,
    and 4 contain characters with the high bit set.
ompression ratio 81.19% (higher is better)
```

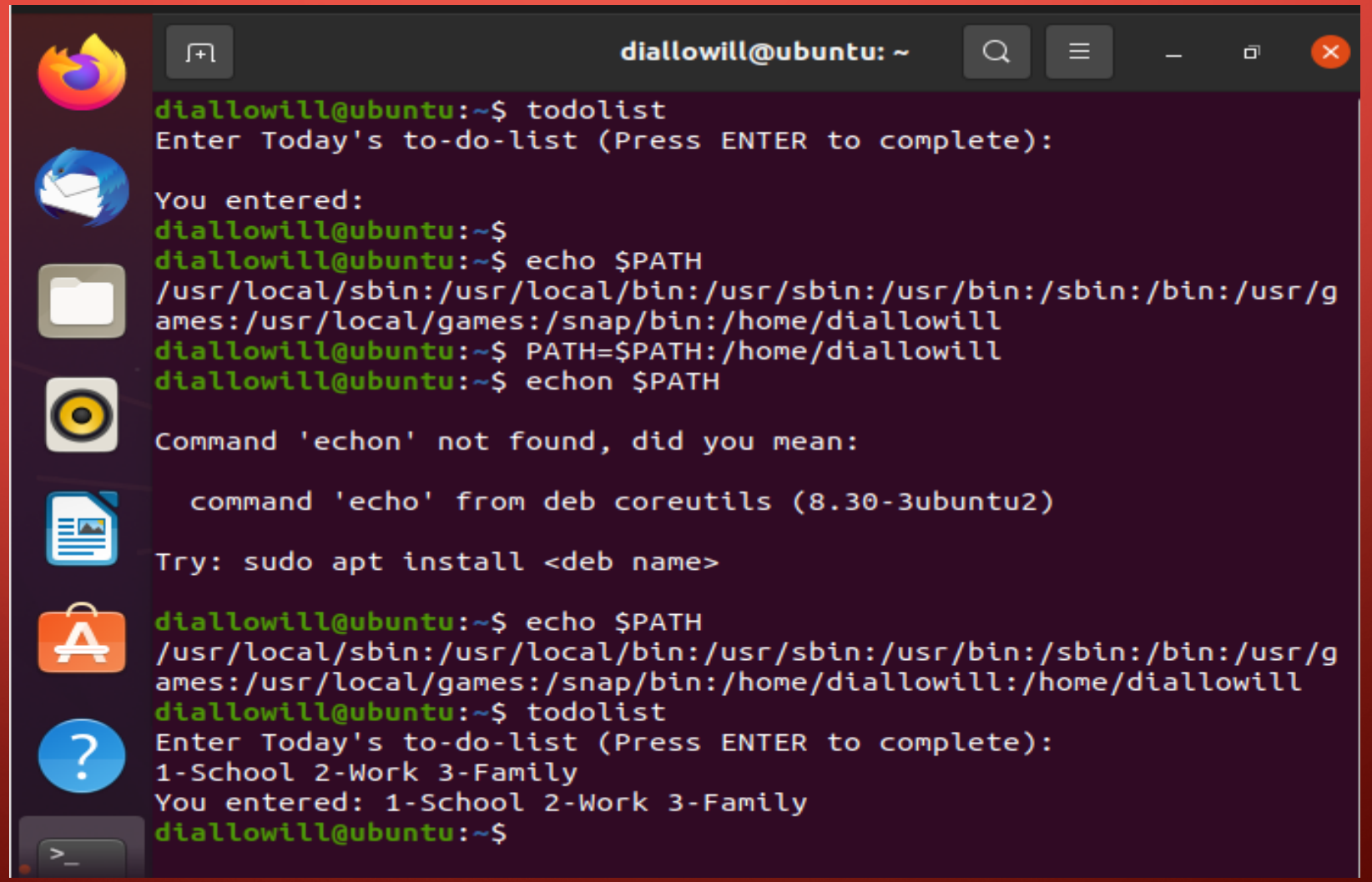
CHANGE SCRIPT FILE PERMISSION

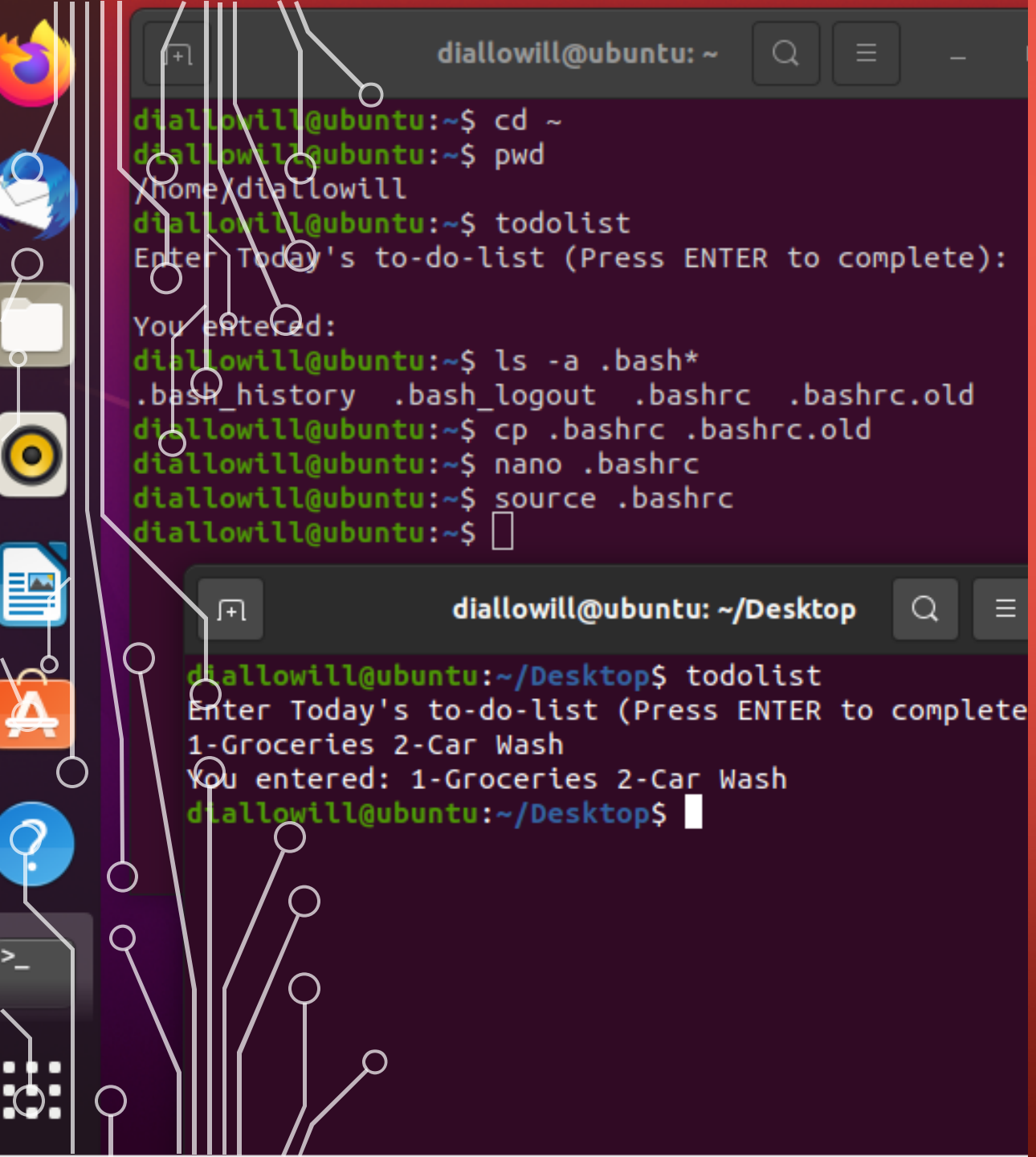


CHANGE SCRIPT FILE PERMISSION CONTINUED..

```
diallowill@ubuntu:~$ bash todolist
Enter Today's to-do-list (Press ENTER to complete):
1-family 2-work 3-school
You entered: 1-family 2-work 3-school
diallowill@ubuntu:~$ ls
Desktop    Downloads      Music       NovDecSession  Public  Templates  todolist
Documents  JanFebSession  MyToDoList  Pictures       snap    todo       Videos
diallowill@ubuntu:~$ cat MyToDoList
Sun 15 Nov 2020 10:42:18 AM PST
Today's to-do-list -- 1-family 2-work 3-school

diallowill@ubuntu:~$ cd ~
diallowill@ubuntu:~$ pwd
/home/diallowill
diallowill@ubuntu:~$ nano todolist
diallowill@ubuntu:~$ chmod 755 todolist
diallowill@ubuntu:~$ ls -l todolist
-rwxr-xr-x 1 diallowill diallowill 197 Nov 15 10:50 todolist
diallowill@ubuntu:~$ ./todolist
bash: ./todolist: pathbash: bad interpreter: No such file or directory
diallowill@ubuntu:~$ nano todolist
diallowill@ubuntu:~$ chmod 755 todolist
diallowill@ubuntu:~$ ls -l todolist
-rwxr-xr-x 1 diallowill diallowill 198 Nov 15 11:06 todolist
diallowill@ubuntu:~$ ./todolist
Enter Today's to-do-list (Press ENTER to complete):
1-Work 2-Family 3-School
You entered: 1-Work 2-Family 3-School
diallowill@ubuntu:~$
```

SET PATH VARIABLE





MAKE PATH VARIABLE PERMANENT

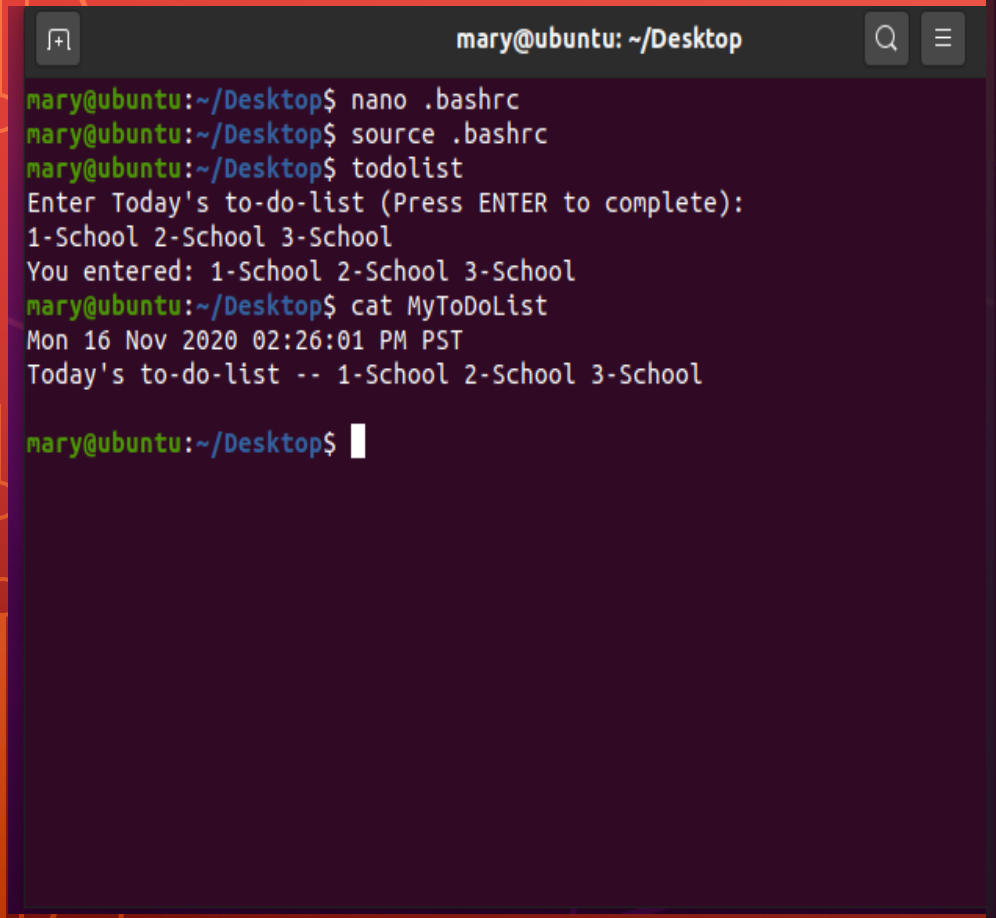
ADD USERS AND GROUPS USING THE COMMAND LINE INTERFACE (C.L.I.)

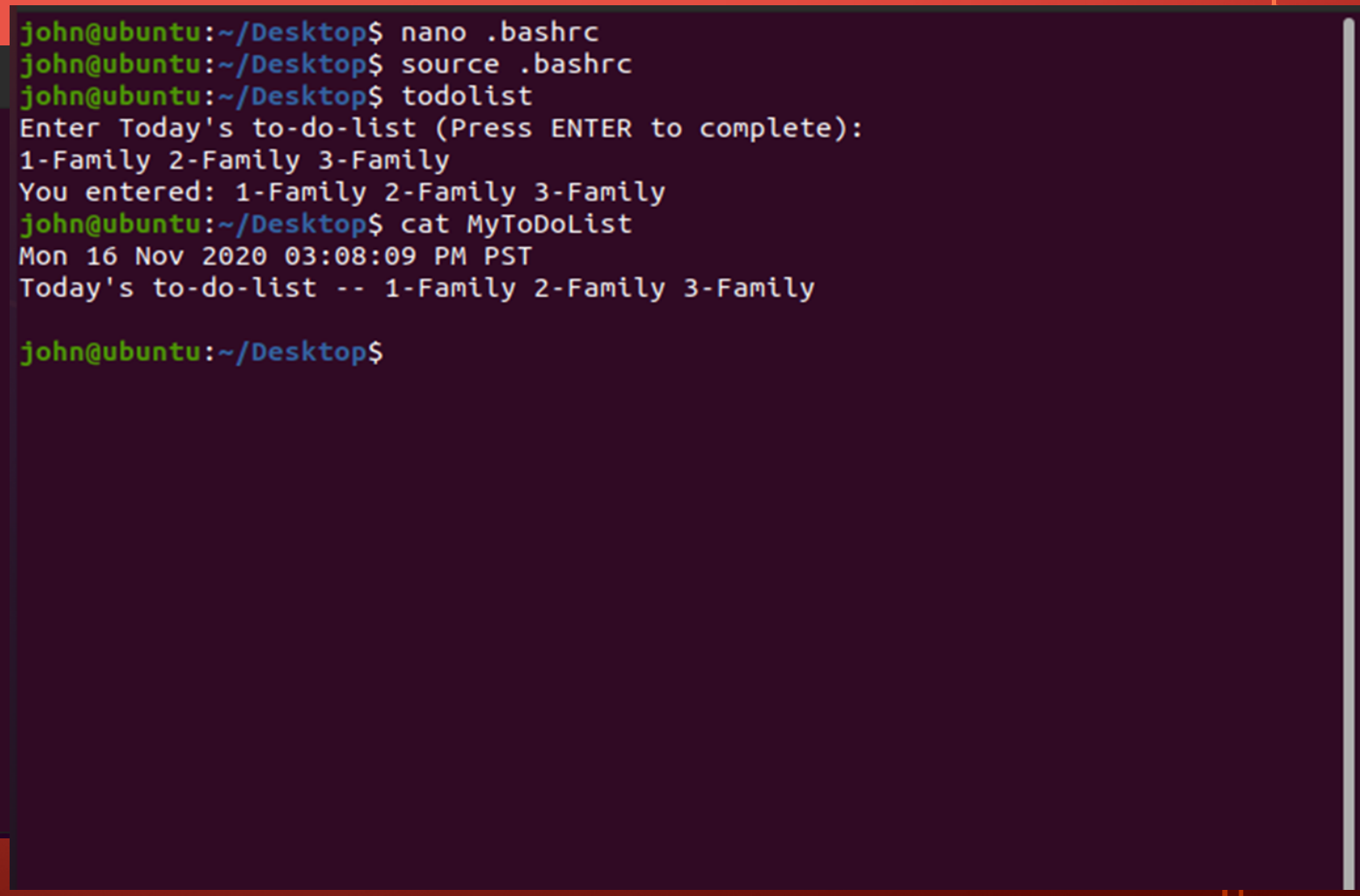
- 1. What does the –m option in the useradd command do?
- Answer here:The –m option creates a home folder

- 2. What does the -3 option in the tail command do?
- Answer here: the -3 option in the tail command is Three lines

- 3. Which line of the /etc/group file lists members of the “students” group? Copy it here.
- Answer here: Line 3 sudo tail -3 /etc/group
- systemd-coredump:x:999:
- mary:x:1001:
- students:x:1002:diallowill,mary

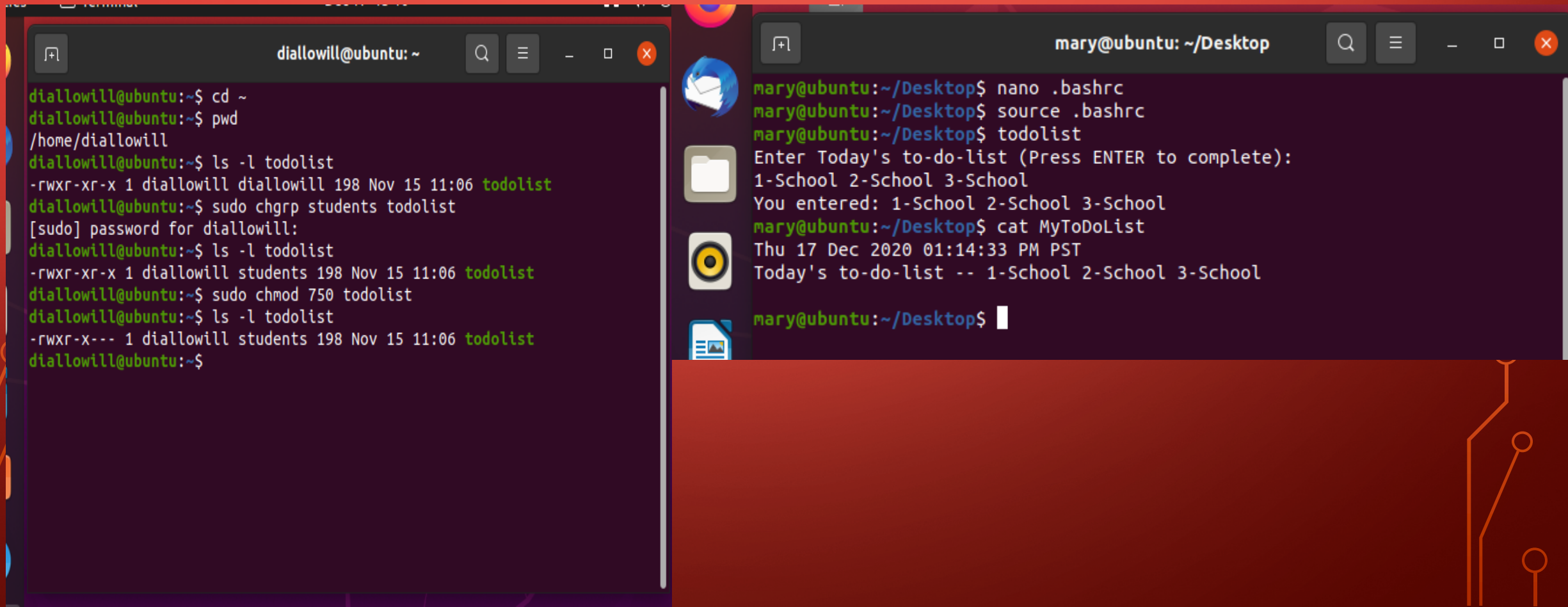
TEST USER & GROUP SETTINGS





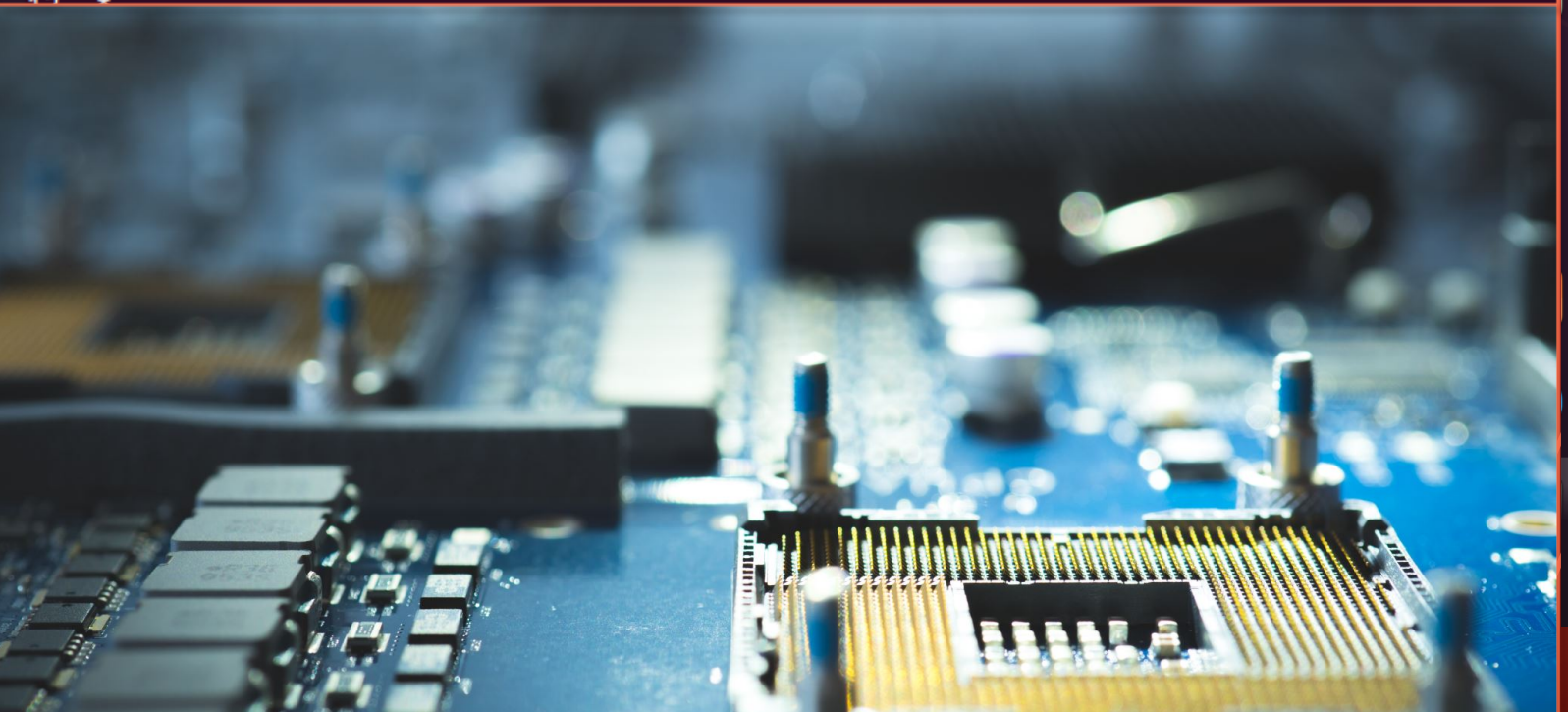
ADD USERS IN GUI

REMOVE USERS & GROUPS



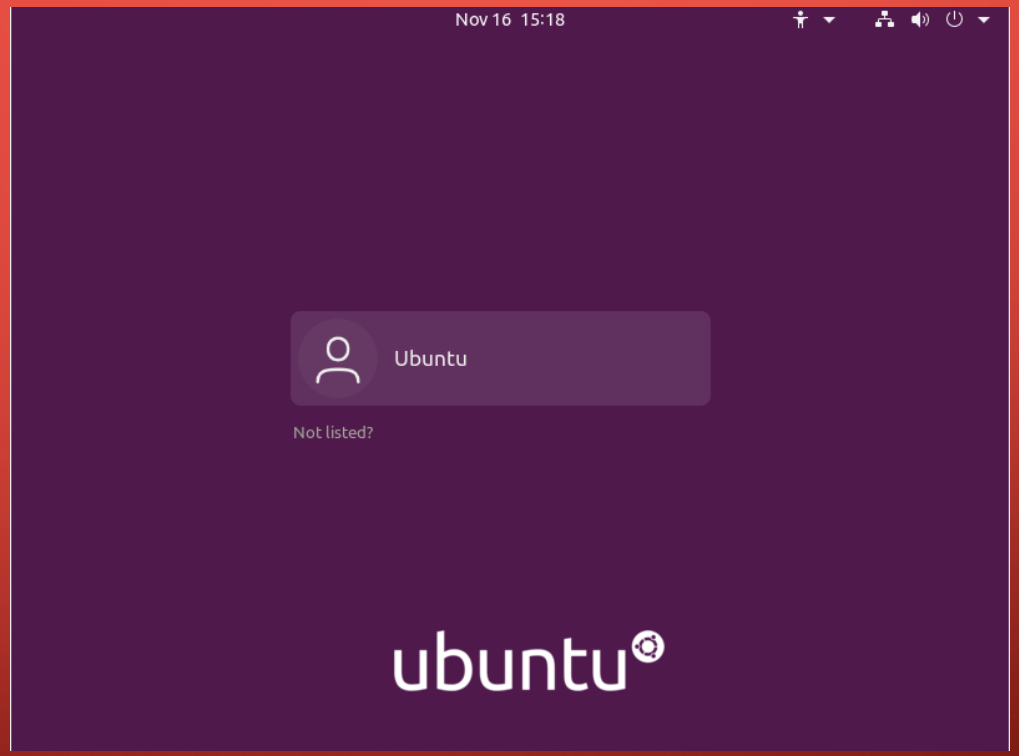
USE NETWORK UTILITIES

```
diallowill@ubuntu: ~
update-alternatives: using /usr/bin/traceproto.db to provide
 /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: using /usr/sbin/tcptraceroute.db to pro
vide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.9.1-1) ...
diallowill@ubuntu:~$ traceroute -n -q 1 www.devry.edu
traceroute to www.devry.edu (104.123.65.184), 30 hops max, 60 byte packets
 1  192.168.30.2  3.727 ms
 2  *
 3  *
 4  *
 5  *
 6  *
 7  *
 8  *
 9  *
10  *
11  *
```

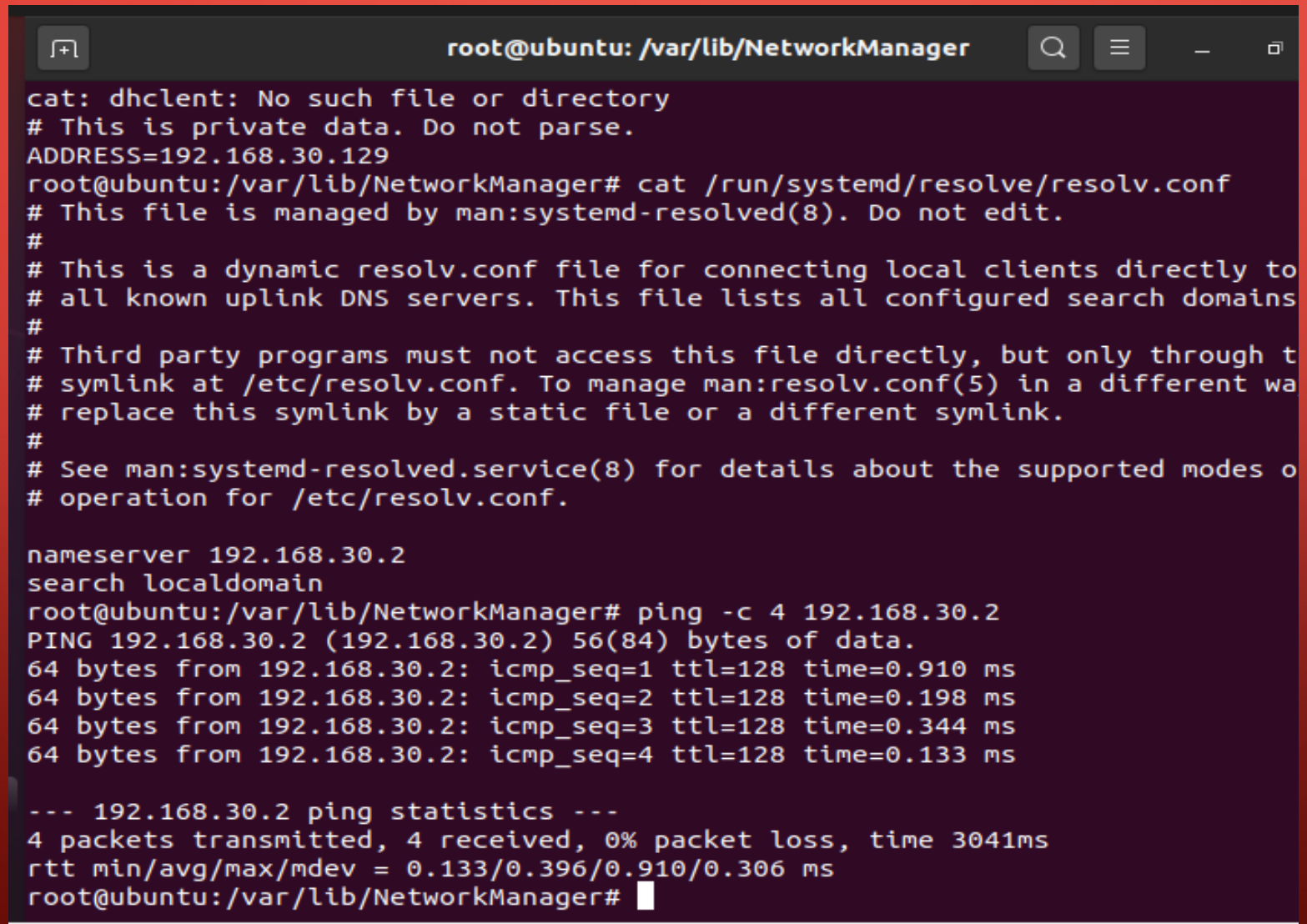


```
diallowill@ubuntu: ~
 8  *
 9  *
10  *
11  *
12  *
13  *
14  *
15  *
16  *
17  *
18  *
19  *
20  *
21  *
22  *
23  *
24  *
25  *
26  *
27  *
28  *
29  *
30  *
diallowill@ubuntu:~$ nslookup www.devry.edu.8.8.8.8
Server:         127.0.0.53
Address:        127.0.0.53#53

** server can't find www.devry.edu.8.8.8.8: NXDOMAIN

diallowill@ubuntu:~$
```

REMOVE USERS AND GROUPS CONTINUED…



DISCOVER HOST IP CONFIGURATIONS



1. What is the IP address of your Ubuntu machine?
Answer here:
192.168.30.129

2. What is the IP address of its default gateway?
Answer here:192.168.30.2

3. What is the IP address of its DHCP server?
Answer here:

4. What is the IP address of its DNS server?
Answer here192.168.30.2:

MANAGE NETWORK INTERFACES

1. Which DHCP message is shown in the output of the **sudo dhclient –v –r ens33** command?
Answer here DHCPRELEASE of 192.168.30.130 on ens33 to 192.168.30.254 port 67 (xid=0x11bfeaf9)
:

2. Which four DHCP messages are shown in the output of the **sudo dhclient –v ens33** command?
Answer here:DHCPDISCOVER on ens33 to 255.255.255.255 port 67 interval 3 (xid=0xdd97b25d)
DHCPOFFER of 192.168.30.130 from 192.168.30.254
DHCPREQUEST for 192.168.30.130 on ens33 to 255.255.255.255 port 67 (xid=0x5db297dd)
DHCPACK of 192.168.30.130 from 192.168.30.254 (xid=0xdd97b25d)
cmp: EOF on /tmp/tmp.pAvntsud0u which is empty
bound to 192.168.30.130 -- renewal in 748 seconds.

DHCPDISCOVER on ens33 to 255.255.255.255 port 67 interval 6 (xid=0x55b9480e)
DHCPOFFER of 192.168.30.130 from 192.168.30.254
DHCPREQUEST for 192.168.30.130 on ens33 to 255.255.255.255 port 67 (xid=0xe48b955)
DHCPACK of 192.168.30.130 from 192.168.30.254 (xid=0x55b9480e)

MONITOR LINUX PROCESSES

- 1. What is the default action of the **15 SIGTERM** kill signal?
- Answer here: Closes the application.

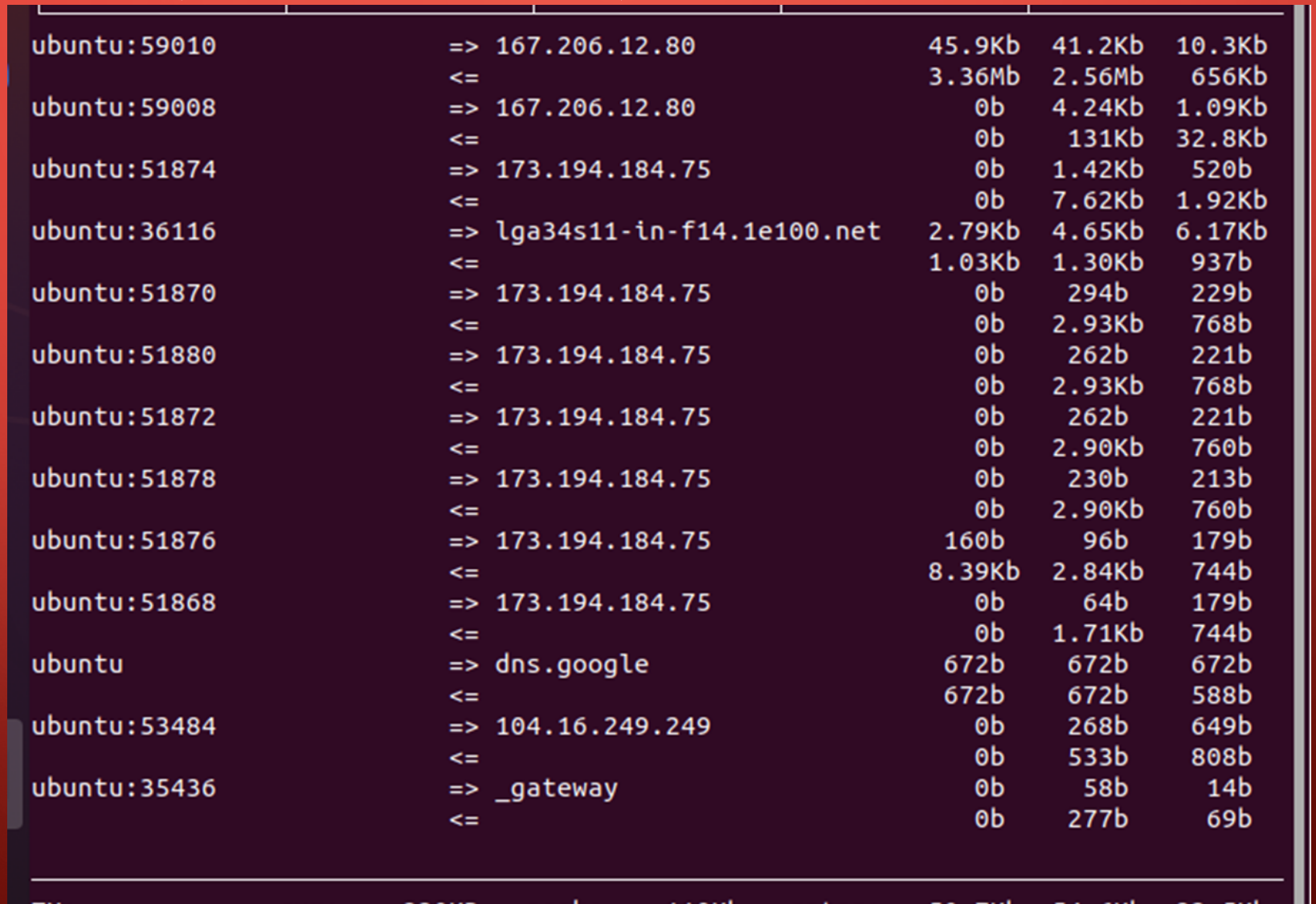
- 2. In the System Monitor window, click on % **CPU** to sort the processes by CPU load. Which process shows the highest percentage of CPU usage?
- Answer here:Gnome Shell/ Gnome-system-Monitor

MONITOR USER ACTIVITIES

- Issue the **sudo accton on** command to turn on GNC accounting. Enter **lastcomm apt** to check if the apt command was executed before. Remember to turn off GNC accounting (**sudo accton off**) after answering the questions.
- 1. What flag value is displayed in the output?
- Answer here:S for the Suoer user, pts0 for the terminal name and the number of seconds each process ran.

- 2. Why is the name of the user who ran the processes shown as root, not your username?
- Answer here: Root ,by default, has access to all commands and files on **a** Linux

MONITOR NETWORK BANDWIDTH USAGE



ubuntu:59010	=>	167.206.12.80	45.9Kb	41.2Kb	10.3Kb
	<=		3.36Mb	2.56Mb	656Kb
ubuntu:59008	=>	167.206.12.80	0b	4.24Kb	1.09Kb
	<=		0b	131Kb	32.8Kb
ubuntu:51874	=>	173.194.184.75	0b	1.42Kb	520b
	<=		0b	7.62Kb	1.92Kb
ubuntu:36116	=>	lga34s11-in-f14.1e100.net	2.79Kb	4.65Kb	6.17Kb
	<=		1.03Kb	1.30Kb	937b
ubuntu:51870	=>	173.194.184.75	0b	294b	229b
	<=		0b	2.93Kb	768b
ubuntu:51880	=>	173.194.184.75	0b	262b	221b
	<=		0b	2.93Kb	768b
ubuntu:51872	=>	173.194.184.75	0b	262b	221b
	<=		0b	2.90Kb	760b
ubuntu:51878	=>	173.194.184.75	0b	230b	213b
	<=		0b	2.90Kb	760b
ubuntu:51876	=>	173.194.184.75	160b	96b	179b
	<=		8.39Kb	2.84Kb	744b
ubuntu:51868	=>	173.194.184.75	0b	64b	179b
	<=		0b	1.71Kb	744b
ubuntu	=>	dns.google	672b	672b	672b
	<=		672b	672b	588b
ubuntu:53484	=>	104.16.249.249	0b	268b	649b
	<=		0b	533b	808b
ubuntu:35436	=>	_gateway	0b	58b	14b
	<=		0b	277b	69b

CAREER/SOFTSKILLS

- Communication - Having strong communication skills is the most important soft skill you can have.
- Teamwork - knowing how to be a team player is a key skillset
- Problem Solver – A person who is quick on their feet and can work well under pressure and are adaptable.
- Ability to follow instructions
- Strong Drive to Learn

CONCLUSION

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