

```
object to mirror
mirror_mod.mirror_object

operation == "MIRROR_X":
mirror_mod.use_x = True
mirror_mod.use_y = False
mirror_mod.use_z = False
operation == "MIRROR_Y":
mirror_mod.use_x = False
mirror_mod.use_y = True
mirror_mod.use_z = False
operation == "MIRROR_Z":
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True

selection at the end -add
mirror_ob.select= 1
mirror_ob.select=1
context.scene.objects.active
("Selected" + str(modifier
mirror_ob.select = 0
= bpy.context.selected_obj
data.objects[one.name].select
print("please select exactly
-- OPERATOR CLASSES --

types.Operator):
X mirror to the selected
object.mirror_mirror_x"
mirror X"

is not
```

CEIS106 LINUX FINAL PRESENTATION

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DEVRY UNIVERSITY:
FEBRUARY 2022

- Learned about the Linux operating system
- Learned how to create user accounts
- Learned how to set up network adaptors and pick them up and down

INTRODUCTION

- Created directories or folders and files
- Copied and removed directories or folders and files
- Located directory files

LINUX FILE SYSTEM

- 1. What is the `pwd` command an acronym for? What about the `cd` command?
- Print Working Directory
- 2. Explain the differences between a relative path and an absolute/full path in Linux.
- An “Absolute Path” specifies the location from the “Root Directory” whereas a “Relative Path” is related to the current directory; however, using a relative pathway is only feasible when moving around the same directory.
- References:
 1. Lessons in DeVry Modules
 2. <https://www.geeksforgeeks.org>

NAVIGATE THE LINUX FILESYSTEM TREE

```
... object to mirror...
mirror_mod.mirror_object =
operation == "MIRROR_X":
mirror_mod.use_x = True
mirror_mod.use_y = False
mirror_mod.use...
```

631-JAN22 (5) - ml-lab-1b329e3b-bd6f-4d4b-9b05-fc32a0165d67.eastus2.cloudapp.azure.com:65231 - Remote Desktop Conn... Ubuntu on ML-REI VM-47/94B

Activities Terminal

student

Trash

Old Firefox Da

Ubuntu Software

```
student@ubuntuvvm: ~/JanFebSession/Course1
student@ubuntuvvm:~/JanFebSession/Course1$ tree -d -L 2 -
/home/student
├── Desktop
│   └── Old Firefox Data
├── Documents
├── Downloads
├── JanFebSession
│   ├── Course1
│   ├── Course2
│   └── Course3
├── Music
├── Pictures
├── Public
├── Templates
└── Videos

13 directories
student@ubuntuvvm:~/JanFebSession/Course1$ ls -l ~/JanFeb
total 0
-rw-rw-r-- 1 student student 0 Jan 13 12:42 file1
-rw-rw-r-- 1 student student 0 Jan 13 12:42 file2
-rw-rw-r-- 1 student student 0 Jan 13 12:42 file3
student@ubuntuvvm:~/JanFebSession/Course1$
```

```
...types.Operator):
... X mirror to the selected
...ject.mirror_mirror_x"
...ror X"
```



```
Old Firefox Da
student@ubuntuvm:~$ find ~ -iname course* -type d
/home/student/MarAprSession/Course1
/home/student/MarAprSession/Course2
/home/student/JanFebSession/Course1
/home/student/JanFebSession/Course2
/home/student/JanFebSession/Course3
/home/student/MarAprSesssion/Course1
/home/student/MarAprSesssion/Course2
/home/student/MarAprSesssion/Course3
student@ubuntuvm:~$ find ~ -iname file1
/home/student/MarAprSession/Course1/file1
/home/student/JanFebSession/Course1/file1
/home/student/MarAprSesssion/Course1/file1
student@ubuntuvm:~$ locate -S
Database /var/lib/mlocate/mlocate.db:
  38,738 directories
  422,407 files
  29,192,651 bytes in file names
  10,701,322 bytes used to store database
student@ubuntuvm:~$ locate -i course
student@ubuntuvm:~$ locate -r /file1$
student@ubuntuvm:~$
```

```
...or object to mirror...
mirror_mod.mirror_object...
operation == "MIRROR_X":
mirror_mod.use_x = True
mirror_mod.use_y = False
mirror_mod.use_z = False
operation == "MIRROR_Y":
mirror_mod...
```

```
...types.Operator):
... X mirror to the selected
...object.mirror_mirror_x"
...mirror X"
```

- Created a shell script
- Changes script file permissions
- Set the PATH variables
- Made the PATH variable permanent

LINUX SHELL SCRIPTS

1. What are the file permissions of the script?

rw-rw-r

2. What's the name of the user-defined variable in the script? text

3. Which redirection meta-character is used in the script? What does it do? > redirects output and appends it to a file

References:

1. Week 3 Project Video

2. Week 3 Project Instructions

CREATE A SHELL SCRIPT

```
echo "Today's to-do-list -- $TEXT" >> MyToDoLists
echo "" >> MyToDoLists
```

```
student@ubuntuvm:~$ ls -l todolist
-rw-rw-r-- 1 student student 190 Jan 21 13:17 todolist
student@ubuntuvm:~$ 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.
student@ubuntuvm:~$ bash todolist
Enter today's to-do-list (Press ENTER to complete):
1. school. 2. family. 3. work.
You entered: 1. school. 2. family. 3. work.
student@ubuntuvm:~$ cat MyToDoLists
Fri 21 Jan 2022 01:21:36 PM EST
Today's to-do-list -- 1. family. 2. work. 3. school.

Fri 21 Jan 2022 01:23:51 PM EST
```

```
student@ubuntuvms:~$ bash todolist
```

```
Enter today's to-do-list (Press ENTER to complete):
```

```
nano todolist^C
```

```
student@ubuntuvms:~$ nano todolist
```

```
student@ubuntuvms:~$ cat todolist
```

```
#!/bin/bash
```

```
echo "Enter today's to-do-list (Press ENTER to complete):"
```

```
read text
```

```
echo "You entered: $text"
```

```
date >> MyToDoLists
```

```
echo "Today's to-do-list -- $text" >> MyToDoLists
```

```
echo "" >> MyToDoLists
```

```
student@ubuntuvms:~$ chmod 755 todolist
```

```
student@ubuntuvms:~$ ls -l todolist
```

```
-rwxr-xr-x 1 student student 202 Jan 21 13:44 todolist
```

```
student@ubuntuvms:~$ ./todolist
```

MAKE THE PATH VARIABLE PERMANENT

RUNNING THE *TODOLIST* SCRIPT BEFORE AND AFTER MAKING THE PATH VARIABLE PERMANENT
A SCREENSHOT OF THE TERMINAL WINDOW

```
student@ubuntuvm: ~
You entered: 1. work. 2. family. 3. school.
student@ubuntuvm:~$
student@ubuntuvm:~$ cd ~
student@ubuntuvm:~$ pwd
/home/student
student@ubuntuvm:~$ todolist
Command 'todolist' not found, but can be installed with:
sudo snap install todolist

student@ubuntuvm:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
student@ubuntuvm:~$ PATH=$PATH:/home/student
student@ubuntuvm:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/home/student
student@ubuntuvm:~$
student@ubuntuvm:~$ todolist
Enter today's to-do-list (Press ENTER to complete):
1. school. 2. work. 3. family.
You entered: 1. school. 2. work. 3. family.
student@ubuntuvm:~$
```

- Added users and groups in CLI
- Tested users and group settings
- Added users in GUI

LINUX ADMINISTRATIVE TASK

1. What does the `-m` option in the `useradd` command do? Answer here: It creates a user account for Mary. And/or “Creates the home Directory.”

2. What does the `-3` option in the `tail` command do? Answer here: Shows the last three lines. `tail` means “end”, and `-3` means last three lines

It confirms the new account for Mary and that both your account and Mary’s account are members of the “students” group.

3. Which line of the `/etc/group` file lists members of the “students” group? Copy it here. Answer here: The last line:

References:

1. Professor Bird
2. Module 4 Project Guide

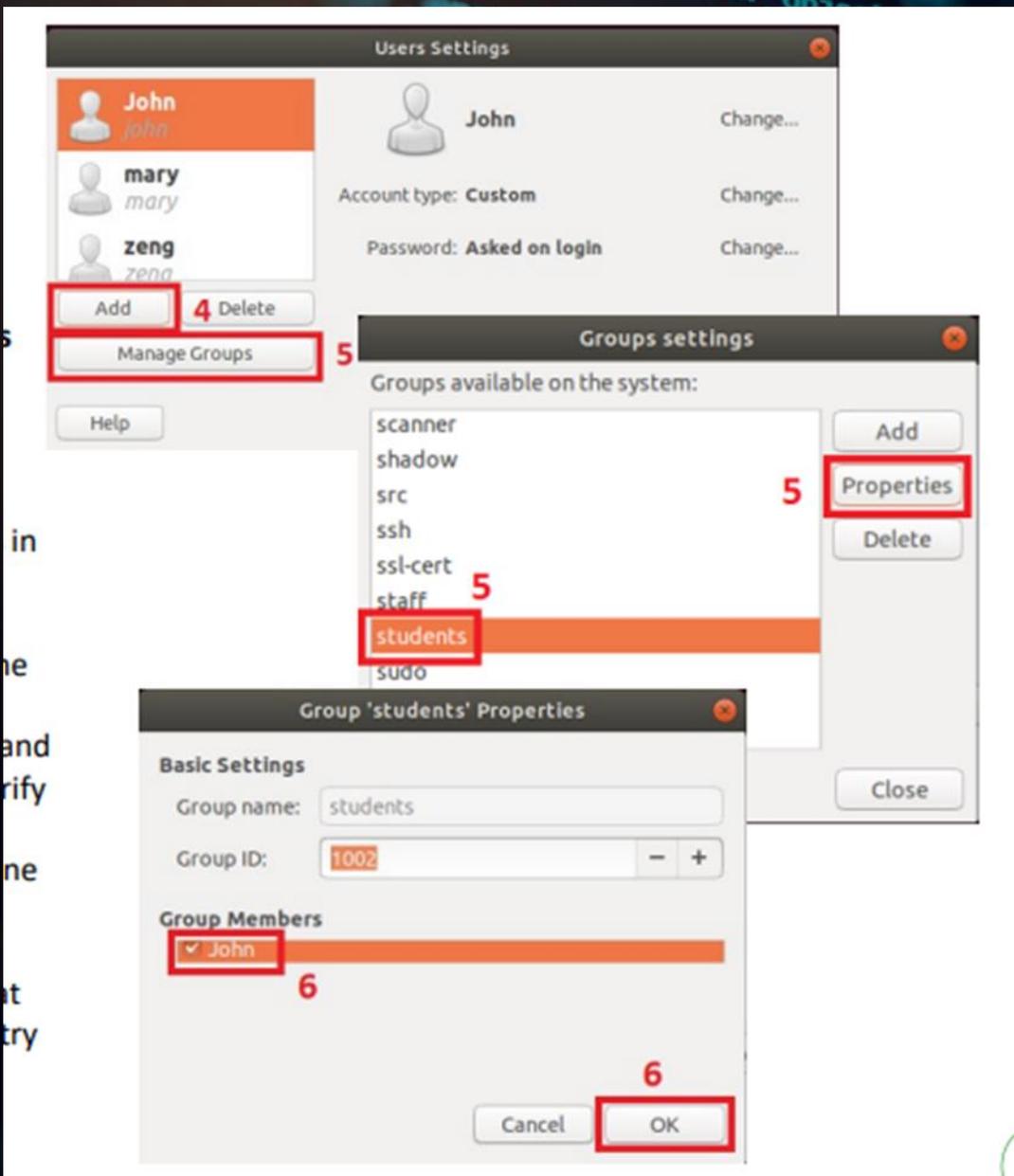
ADD USERS AND GROUPS IN CLI

TEST USER AND GROUP SETTINGS

These are screenshots of the output

```
zeng@ubuntu:~$  
zeng@ubuntu:~$  
zeng@ubuntu:~$ cd ~ 1  
zeng@ubuntu:~$ pwd  
/home/zeng  
zeng@ubuntu:~$ sudo chgrp students todo1ist 2  
zeng@ubuntu:~$ ls -l todo1ist  
-rwxr-xr-x 1 zeng students 201 Jan 26 18:30 todo1ist  
zeng@ubuntu:~$  
zeng@ubuntu:~$ sudo chmod 750 todo1ist 3  
zeng@ubuntu:~$ ls -l todo1ist  
-rwxr-x--- 1 zeng students 201 Jan 26 18:30 todo1ist  
zeng@ubuntu:~$  
zeng@ubuntu:~$
```

```
mary@ubuntu:~$  
mary@ubuntu:~$ nano .bashrc 5  
mary@ubuntu:~$ source .bashrc  
mary@ubuntu:~$  
mary@ubuntu:~$ todo1ist 6  
Enter today's to-do-list (Press ENTER to complete):  
1. school. 2. school. 3. school.  
You entered: 1. school. 2. school. 3. school.  
mary@ubuntu:~$  
mary@ubuntu:~$ cat MyToDoLists 6  
Wed Jan 29 11:23:04 PST 2020  
Today's to-do-list -- 1. school. 2. school. 3. school.  
mary@ubuntu:~$
```



ADD USERS IN GU

A SCREENSHOT OF THE OUTPUT

```
zeng@ubuntu:~$  
zeng@ubuntu:~$ sudo userdel -r mary 3  
userdel: mary mail spool (/var/mail/mary) not found  
zeng@ubuntu:~$  
zeng@ubuntu:~$ sudo userdel -r John 4  
userdel: John mail spool (/var/mail/John) not found  
zeng@ubuntu:~$  
zeng@ubuntu:~$ sudo groupdel students 5  
zeng@ubuntu:~$  
zeng@ubuntu:~$ sudo chgrp zeng todolist 6  
zeng@ubuntu:~$ ls -l todolist  
-rwxr-x--- 1 zeng zeng 201 Jan 26 18:30 todolist  
zeng@ubuntu:~$
```

REMOVE USERS AND GROUPS

A SCREENSHOT OF THE
LOG ON PAGE WITH THREE
USER ACCOUNTS

- Discovered host IP configurations
- Managed network interfaces
- Use of network utilities

NETWORKING

DISCOVER HOST IP CONFIGURATIONS

1. What is the IP address of your Ubuntu machine?

`192.168.1.104/24 brd 192.168.1.255`

2. What is the IP address of its default gateway?

Answer here: `192.168.1.0/24`

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

`dhcp-server-identifier 192.168.1.1;`

4. What is the IP address of its DNS server?

Answer here: `nameserver 192.168.1.1`

A screenshot of the output

```
student@ubuntuvm:/var/lib/dhcp$ ping -c 4 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data:
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=0.695 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=0.641 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=0.574 ms
64 bytes from 192.168.1.1: icmp_seq=4 ttl=64 time=0.717 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3067ms
rtt min/avg/max/mdev = 0.574/0.656/0.717/0.055 ms
student@ubuntuvm:/var/lib/dhcp$
```

MANAGE NETWORK INTERFACES

1. Which DHCP message is shown in the output of the `sudo dhclient -v -r eth0` command? [hint: the message name is in uppercase.]

Answer here:

```
<BROADCAST,MULTICAST>
```

2. Which four DHCP messages are shown in the output of the `sudo dhclient -v eth0` command? [hint: the message names are in uppercase.]

Answer here:

```
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 3 (xid=0x73fb0928)
DHCPOFFER of 192.168.1.105 from 192.168.1.1
DHCPREQUEST for 192.168.1.105 on eth0 to 255.255.255.255 port 67 (xid=0x2809fb73)
DHCPACK of 192.168.1.105 from 192.168.1.1 (xid=0x73fb0928)
```

References:

1. Week 5 Project Manual

2. Week 5 Project Video

USE NETWORK UTILITIES

This is a screenshot of the output in Step 5.

```
student@ubuntuvm:~$ sudo ifconfig eth0 up
student@ubuntuvm:~$ ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.1.104  netmask 255.255.255.0  broadcast 192.168.1.255
    inet6 fe80::dc70:6737:b80c:95a6  prefixlen 64  scopeid 0x20<link>
    ether 00:15:5d:00:04:01  txqueuelen 1000  (Ethernet)
    RX packets 18594  bytes 1210974 (1.2 MB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 20369  bytes 1605570 (1.6 MB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

student@ubuntuvm:~$ █
```

- Monitoring the Linux processes
- Monitoring user activities
- Monitoring network bandwidth usage

SECURITY, TROUBLESHOOTING, PERFORMANCE

1. What is the default action of the *15 SIGTERM* kill signal?

Answer here: Kill the highlighted process

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

References:

1. Completing the project.

MONITOR LINUX PROCESSES

MONITOR USER ACTIVITIES

Issue the `sudo accton on` command to turn on GNC accounting. Run the `sudo updatedb` command. Enter `lastcomm updatedb` to check if the `updatedb` 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 – means the command was executed by the root (superuser)

2. Why is the name of the user who ran the processes shown as root, not student?

Answer here: We put “sudo” in front of the command, which means “superuser do” and caused the root user (superuser) to execute the command for us

Reference:

1. Watched Project Help Video

MONITOR NETWORK BAND-WIDTH USAGE

A SCREENSHOT OF THE OUTPUT

```
student@ubuntuvvm: ~  
student@ub... x student@ub... x student@ub... x  
12.5Kb 25.0Kb 37.5Kb 50.0Kb 62.5Kb  
192.168.1.104 => 192.168.1.1 672b 2.28Kb 2.58Kb  
<= 672b 1.89Kb 2.07Kb  
time=2.12 ms  
time=1.61 ms  
time=0.608 ms  
time=0.613 ms  
time=2.68 ms  
time=0.554 ms  
time=1.86 ms  
time=0.628 ms  
time=1.09 ms  
time=0.627 ms  
time=1.84 ms  
time=0.592 ms  
time=1.77 ms  
time=0.550 ms  
time=1.75 ms  
time=0.600 ms  
time=1.72 ms  
time=0.638 ms  
time=1.76 ms  
time=0.492 ms  
time=1.82 ms  
TX: cum: 144Krates:ak 672b69 2.28Kb 2.58Kb  
RX: 110KB 672b62 1.89Kb 2.07Kb  
TOTAL: 255KB 1.31Kb3 4.17Kb 4.65Kb  
64 bytes from 192.168.1.1: icmp_seq=170 ttl=64 time=0.703 ms  
64 bytes from 192.168.1.1: icmp_seq=171 ttl=64 time=2.10 ms
```

- The network adaptor was not configured correctly
- Low resolution monitor so needed full-screen to see the menu button in Ubuntu
- Laptop needed a full reset because it was operating slowly

CHALLENGES

➤ Several career skills were gained in this project:

- Learned how to use the Linux operating system
- Learned how to work with the networking protocols
- Learned several Linux commands
- Troubleshooting errors as situations were presented
- Analysis – Reviewing screens and screenshots to understand processes

CAREER SKILLS

- Linux is an amazing operating system
- Many corporations use Linux for servers (eg. mail servers, web servers)
- This course provided a hands-on learning opportunity to put into practice the topics covered in the use of Linux

CONCLUSION