Exploring Linux (Ubuntu)

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CEIS106 – Introduction to Operating Systems

My Portfolio Contains:

1. Introduction
2. Modules
3. Questions asked within each module
4. Challenges within each module
5. Conclusion (What was learned)

Introduction

What is an operating system?

An operating system (OS) is a system software that handles computer hardware, software resources, and offers essential services for computer programs.

Module 1: Linux Installation

In this first module, we had to learn to install the Virtual Machine and the Linux OS (Ubuntu).

Access the BIOS settings

1. Research how to access the BIOS settings on your computer. What key or key combination or procedure do you use to access it?

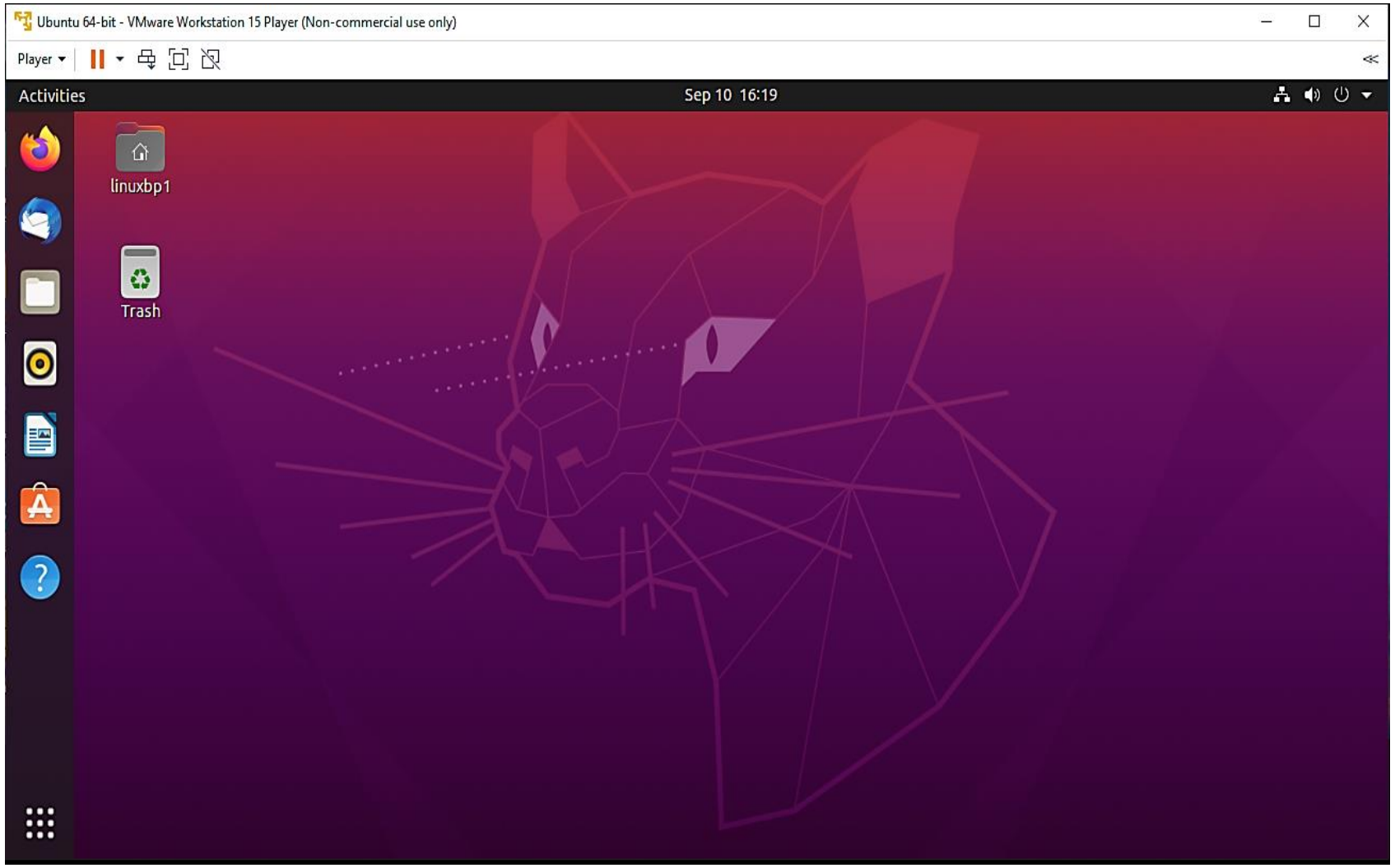
Answer: *On start up press the DEL or even the ESC keys to enter the setup menu. Then, press a designated key (F1, F2, F10, or F12) access the BIOS settings.*

2. Do you have Virtualization or Virtualization Technology enabled in the BIOS settings of your computer?

Answer: *Yes, I had followed the procedure as directed in the project guide to ensure that the virtualization was enabled.*

Install Ubuntu

A screen capture of the Ubuntu Desktop.



Challenges in the module:

- *Understanding the Linux (Ubuntu) OS and how it functions.*
- *Figuring out the software within the OS.*

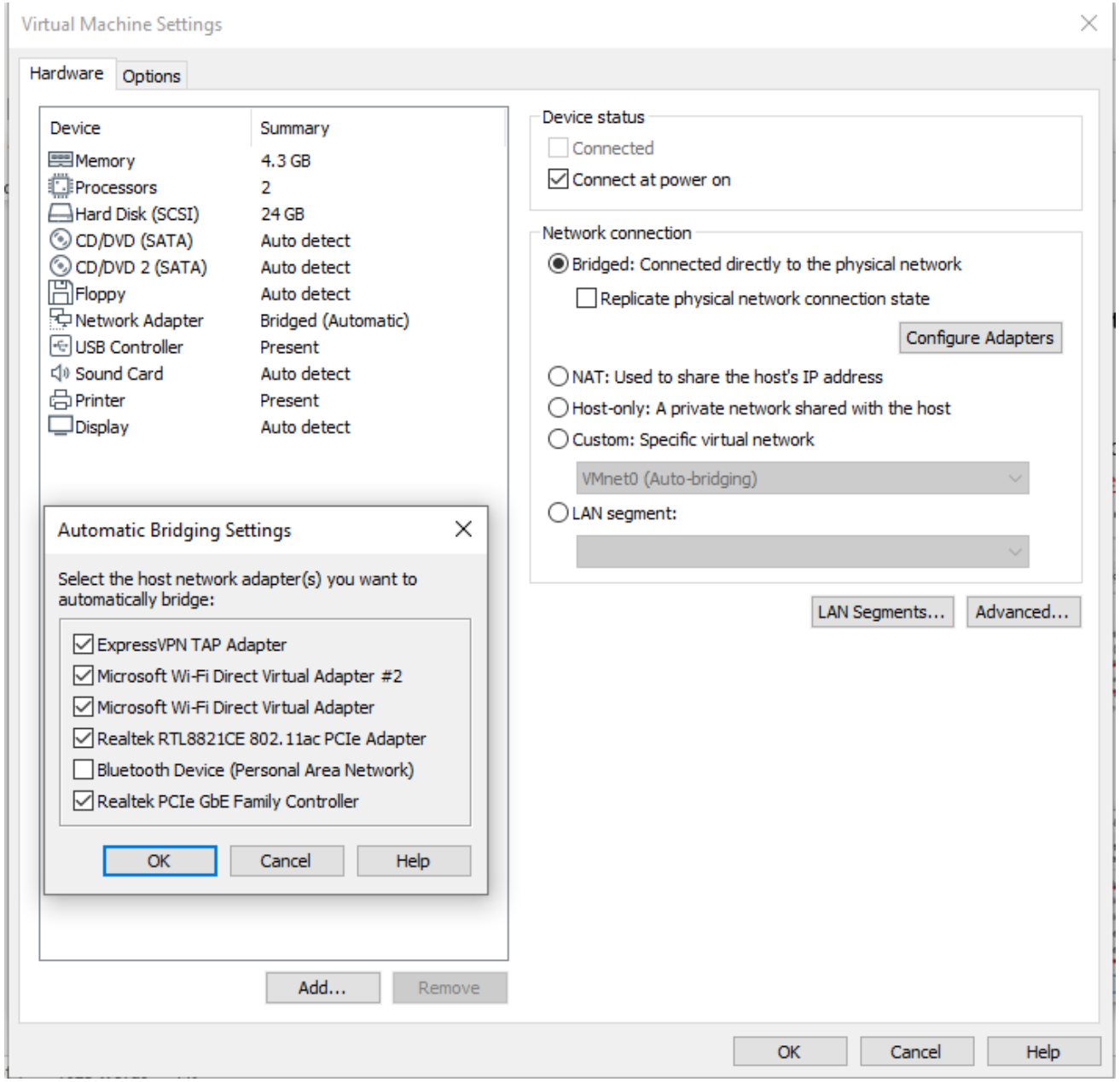
Module 2: Linux Filesystem Hierarchy

In this module, the following five objectives had to be completed:

1. *Connecting the Virtual Machine (VM) to the Internet.*
2. *Navigating the Linux filesystem tree.*
3. *Create directories and files.*
4. *Copy and remove directories and files.*
5. *Locating the directories and files.*

Connect the Ubuntu VM to the Internet

A screen capture of the Automatic Bridging Settings window.



Navigate the Linux filesystem tree

1. What is the pwd command an acronym for? What about the cd command?

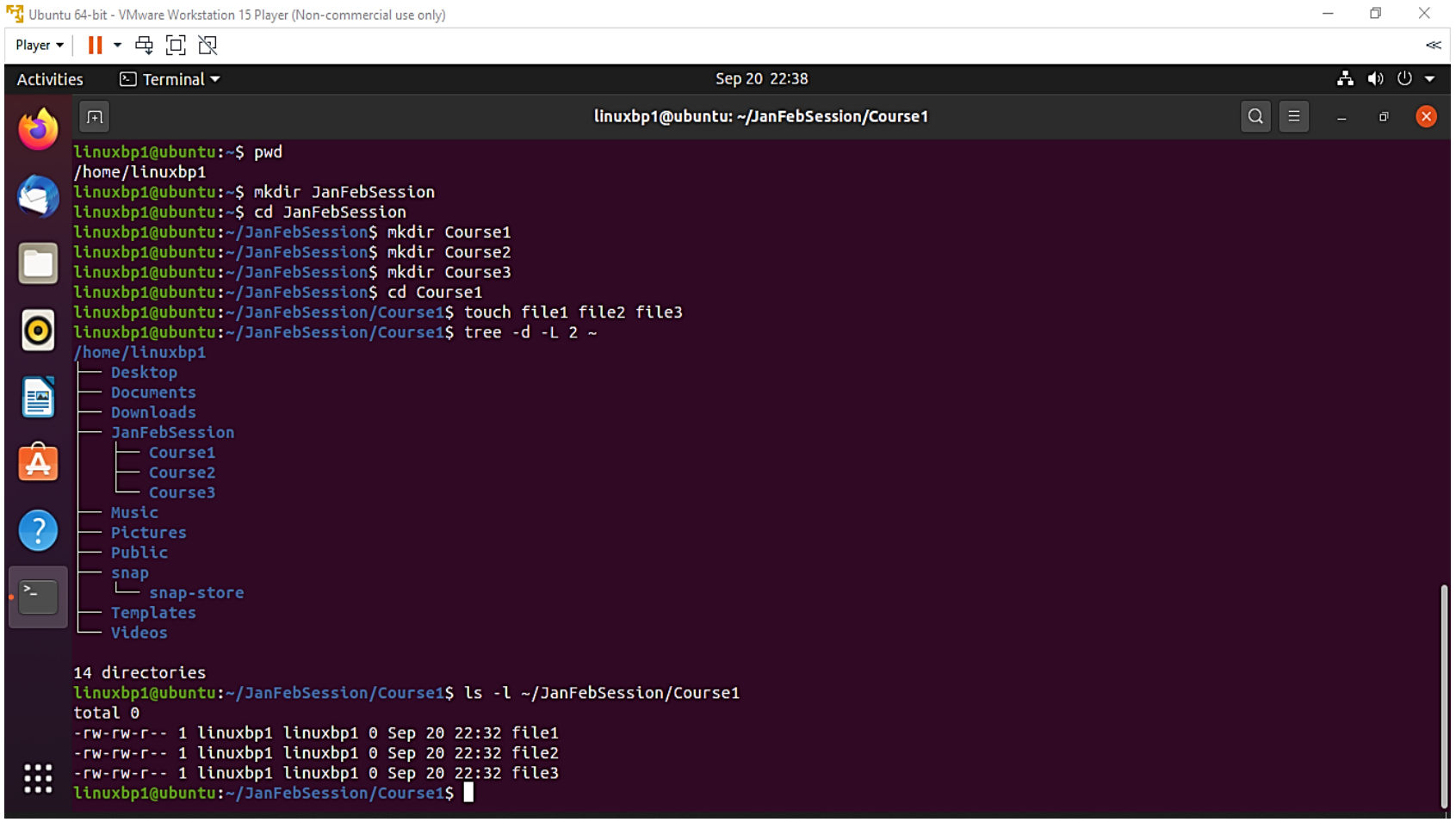
Answer: *The pwd command (print working directory) would write the full pathname of the current working directory to the normal output. The cd (change directory) command is a command-line shell command used to modify the existing working directory in different operating systems.*

2. Explain the differences between a relative path and an absolute/full path in Linux.

Answer: *The absolute (full) path begins from the root directory (/) and goes up to the actual object (file or directory). It contains the names of all directories that come in the middle of the root directory and the actual file. The name of the parent directory is written to the left. The relative path begins from the current directory and works up to the actual object. The relative path is based on the current directory. When we change the directory, the relative path changes as well. Just like the absolute direction, the name of the parent directory is written on the left side. In comparison to the absolute path, all the slashes in the relative path represent the directory separator.*

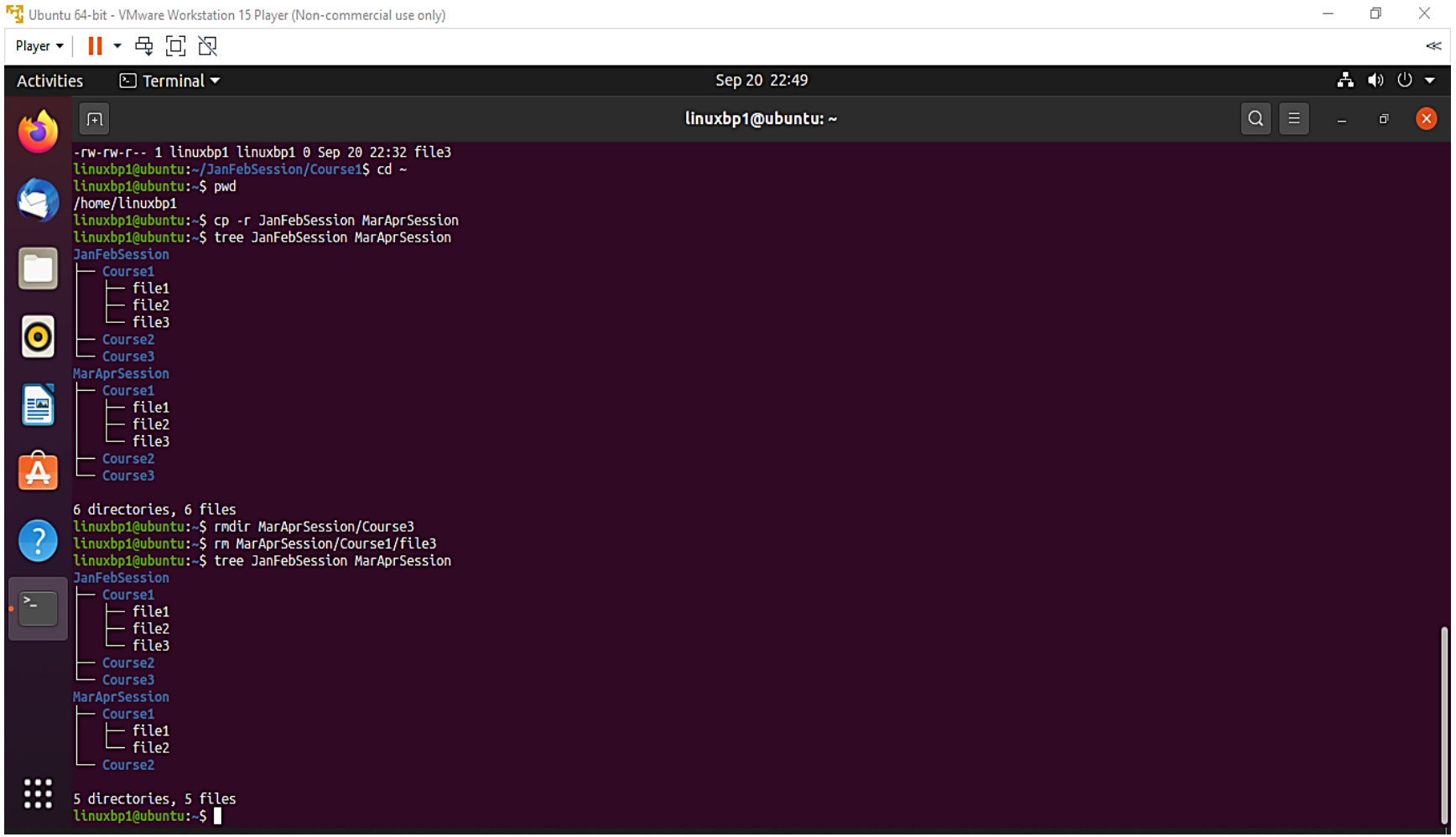
Create directories and files

A screen capture of the output.



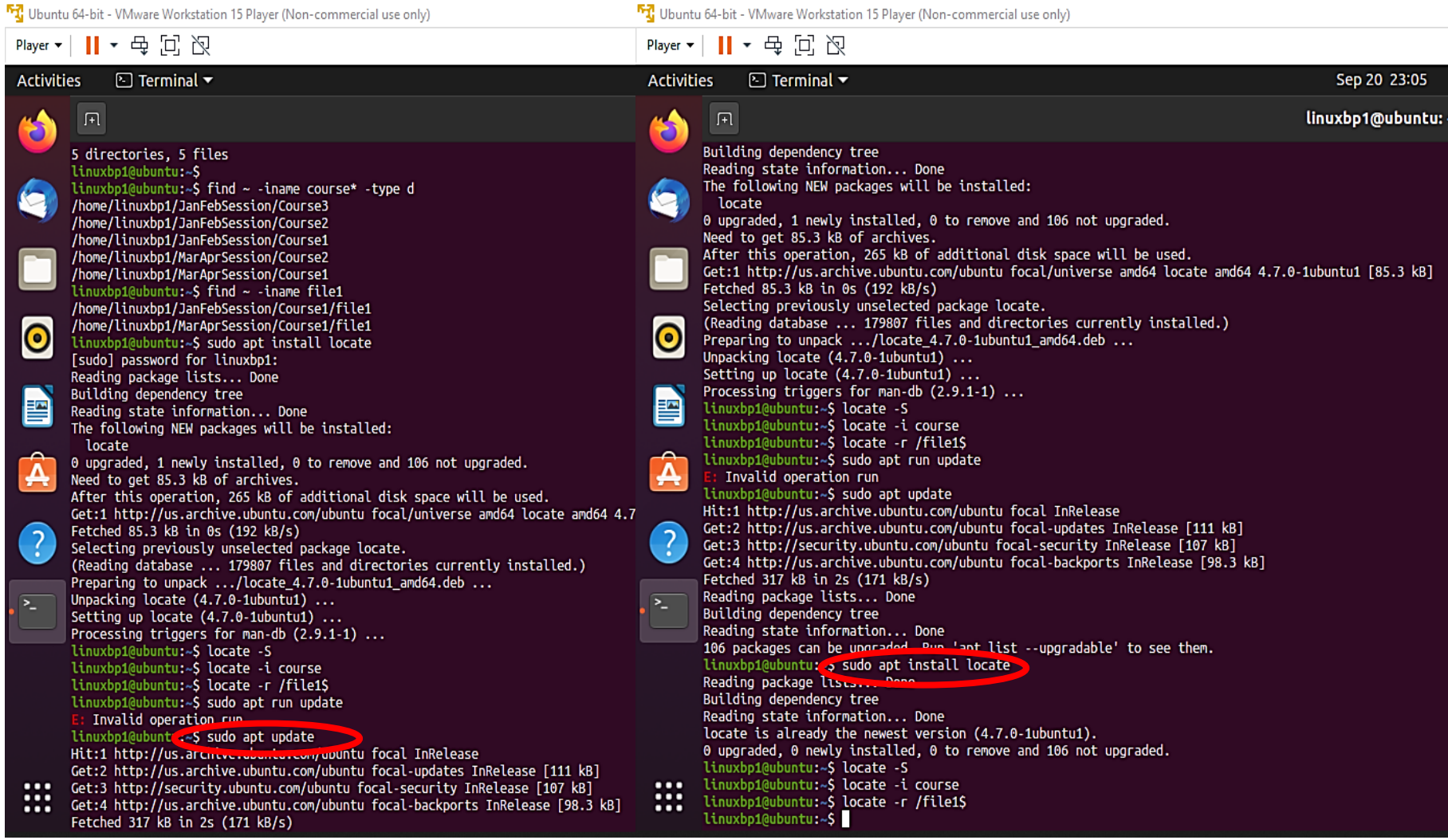
Copy and remove directories and files

A screen capture of the output.



Locate directories and files

A screen capture of the output.



Note: *I had tried to the "sudo apt update" and then tried the "sudo apt install locate"; nothing came up.*

Challenges in the module:

- *Investigating the “sudo apt update” and the “sudo apt install locate” and nothing was ever found.*
- *Figuring out what commands to enter in the output.*
- *Defining certain commands and when they should be used.*

Module 3: Linux Shell Scripts

The purpose of this module was to execute a shell script by experimenting with the standard input, user-defined variables, redirection, file permissions, and environment variables.

Create a shell script

1. What are the file permissions of the script?

Answer: *I was expecting the permission such as rwx-rwr-rrr. This is available from running ls -l command.*

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

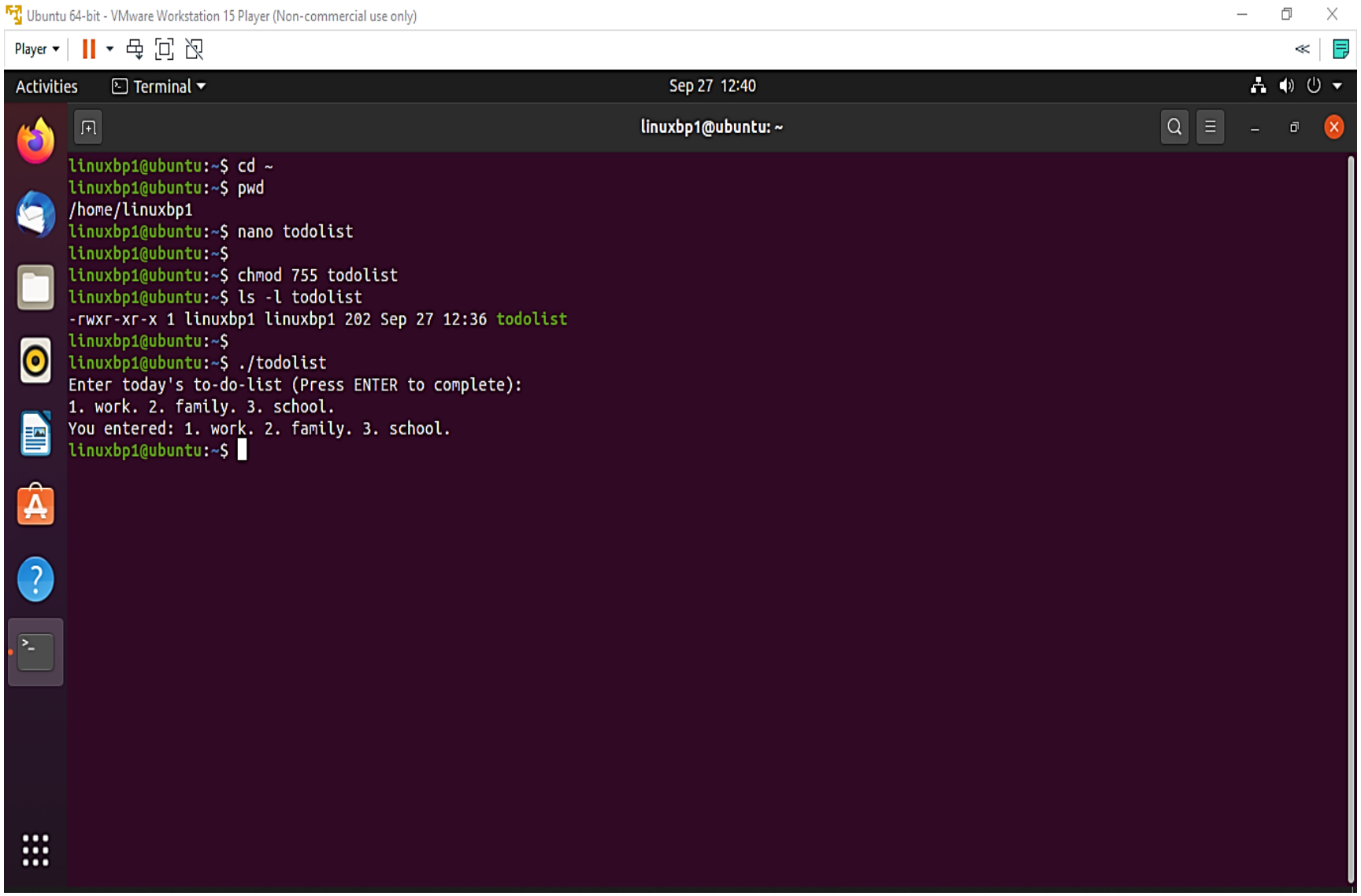
Answer: *The user variable that I have defined is "text" in the script.*

3. Which redirection meta-character is used in the script? What does it do?

Answer: *">>" – This redirection meta-character is the standard output for the script.*

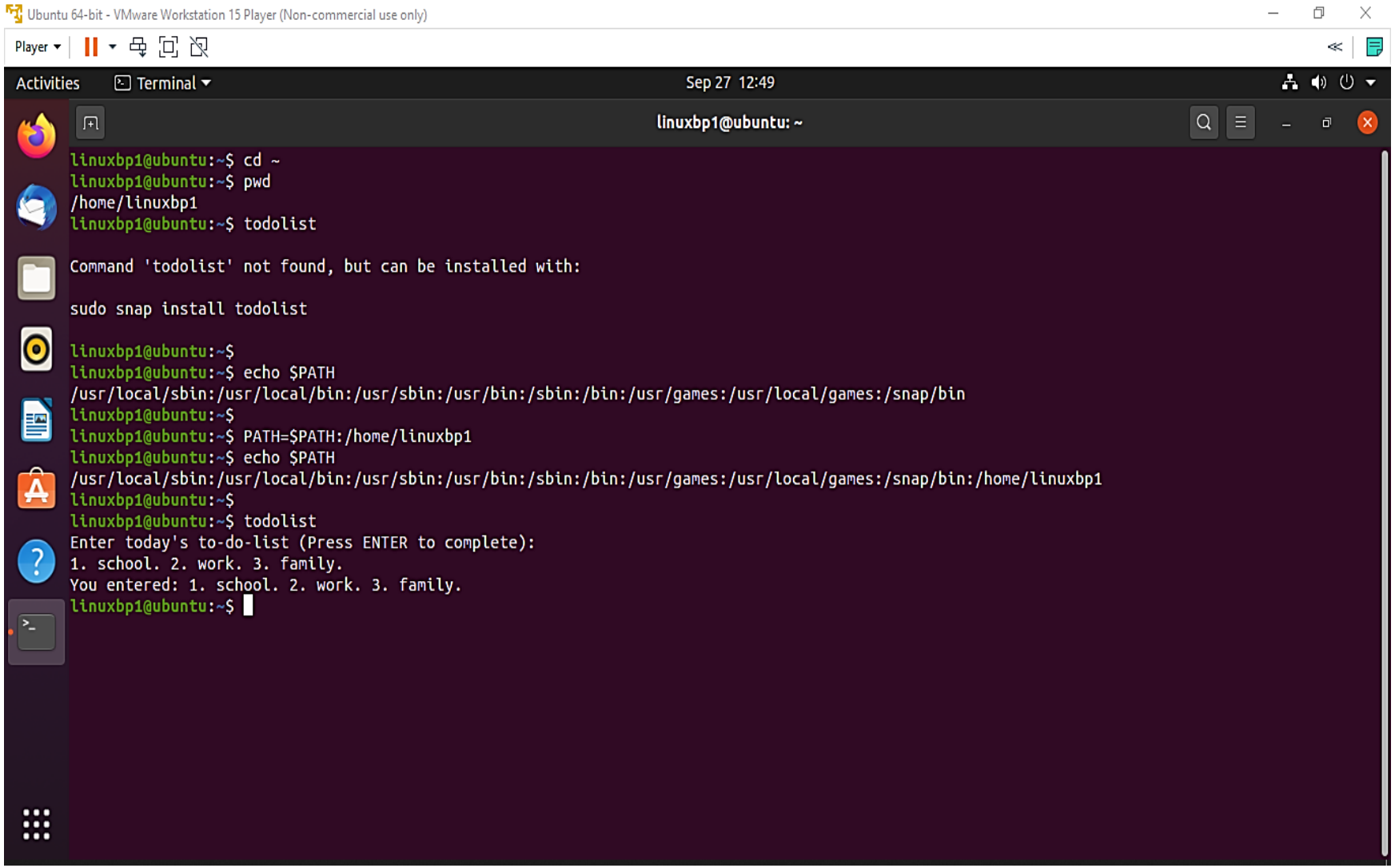
Change script file permissions

A screen capture of the output.



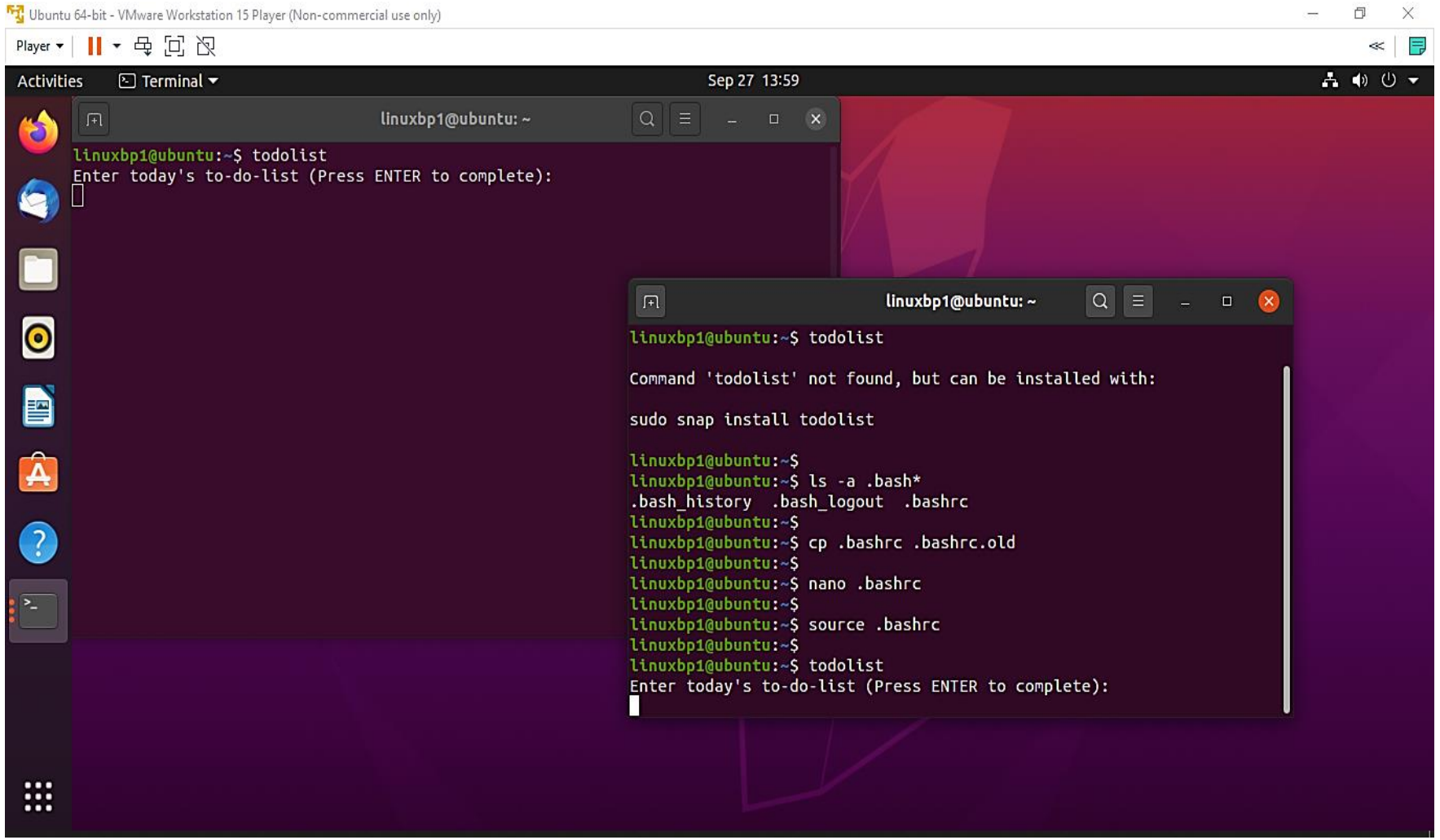
Set the PATH variable

A screen capture of the output.



Make the PATH variable permanent

Run the “todolist” script in both windows.



Challenges in the module:

- *Defining what a shell script and a PATH variable are.*
- *Determining what commands to enter to confirm the output.*

Module 4: User and Group Management

In this module, we were to create, modify, and delete user and group account; using both the Command Line Interface (CLI) and the graphical user interface (GUI).

Add users and groups in CLI

1. What does the –m option in the useradd command do?

Answer: *The -m choice is used to make a new user without having a home directory for that user.*

2. What does the -3 option in the tail command do?

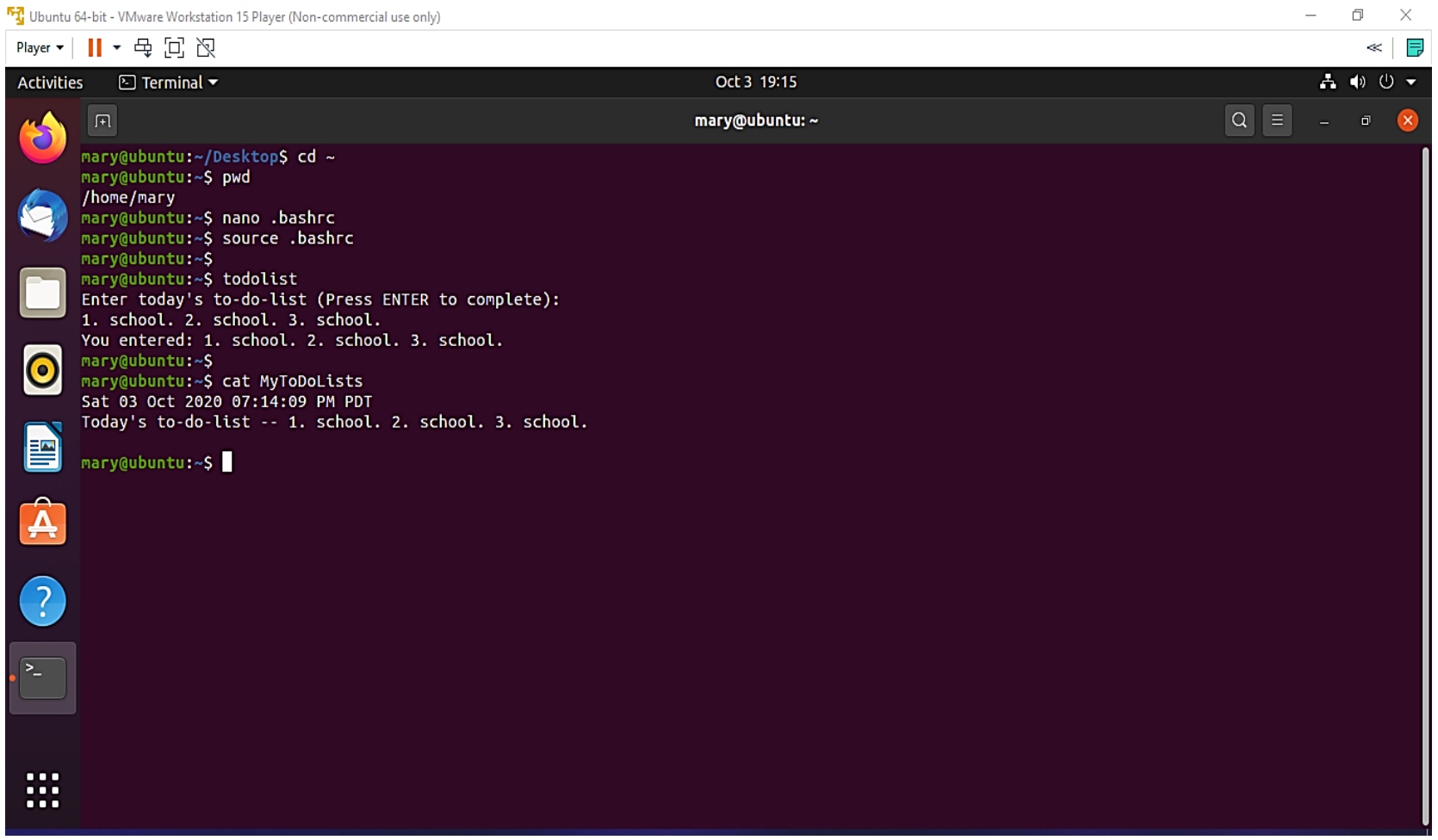
Answer: *The -3 option confirms the new user account and confirms that both the new user and another user are under the same group name.*

3. Which line of the /etc/group file lists members of the “students” group? Copy it here.

Answer: *The file is listed as shown here: students:x:1002:linuxbp1,mary*

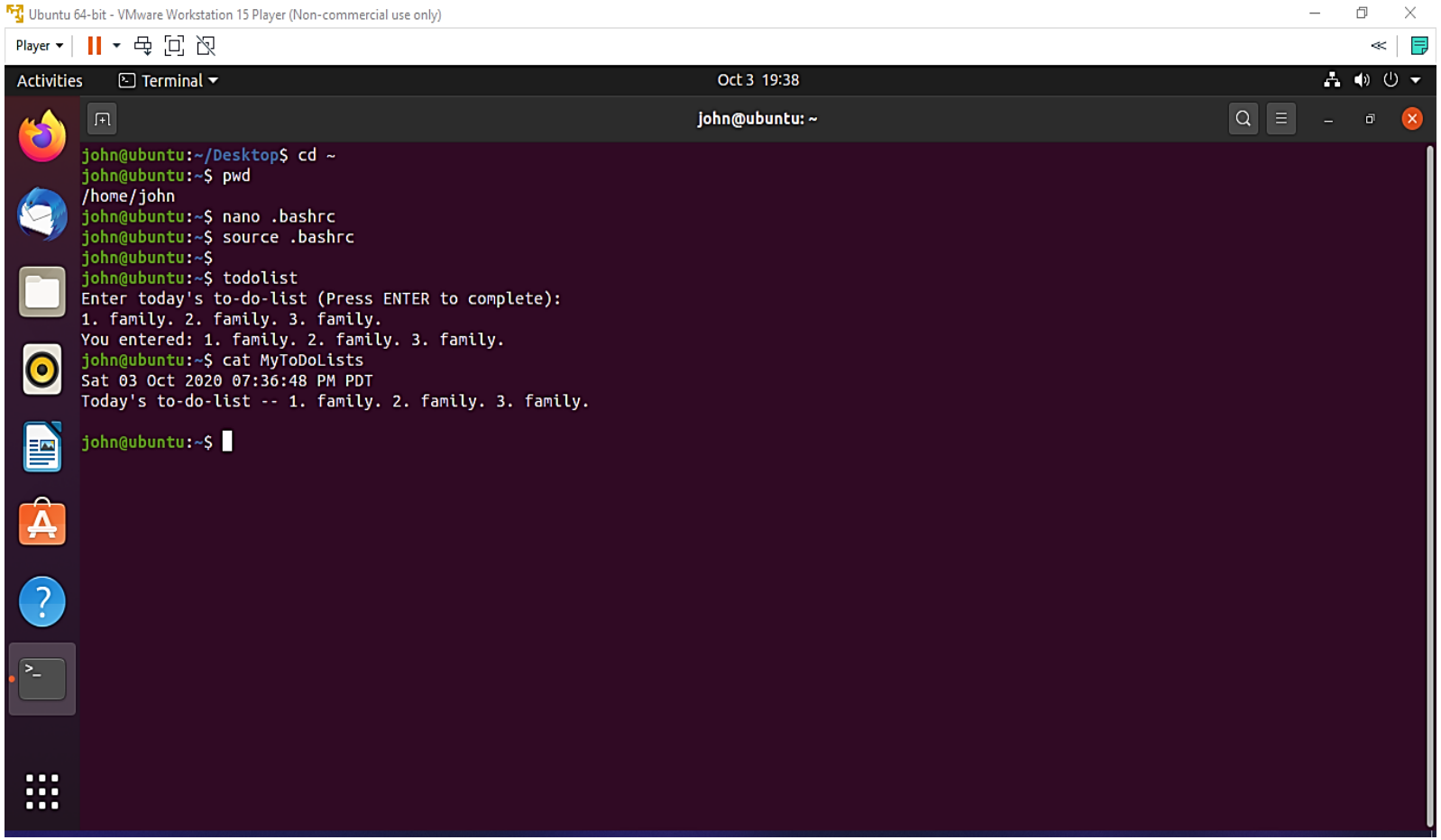
Test user and group settings

A screen capture of the output.



Add users in GUI

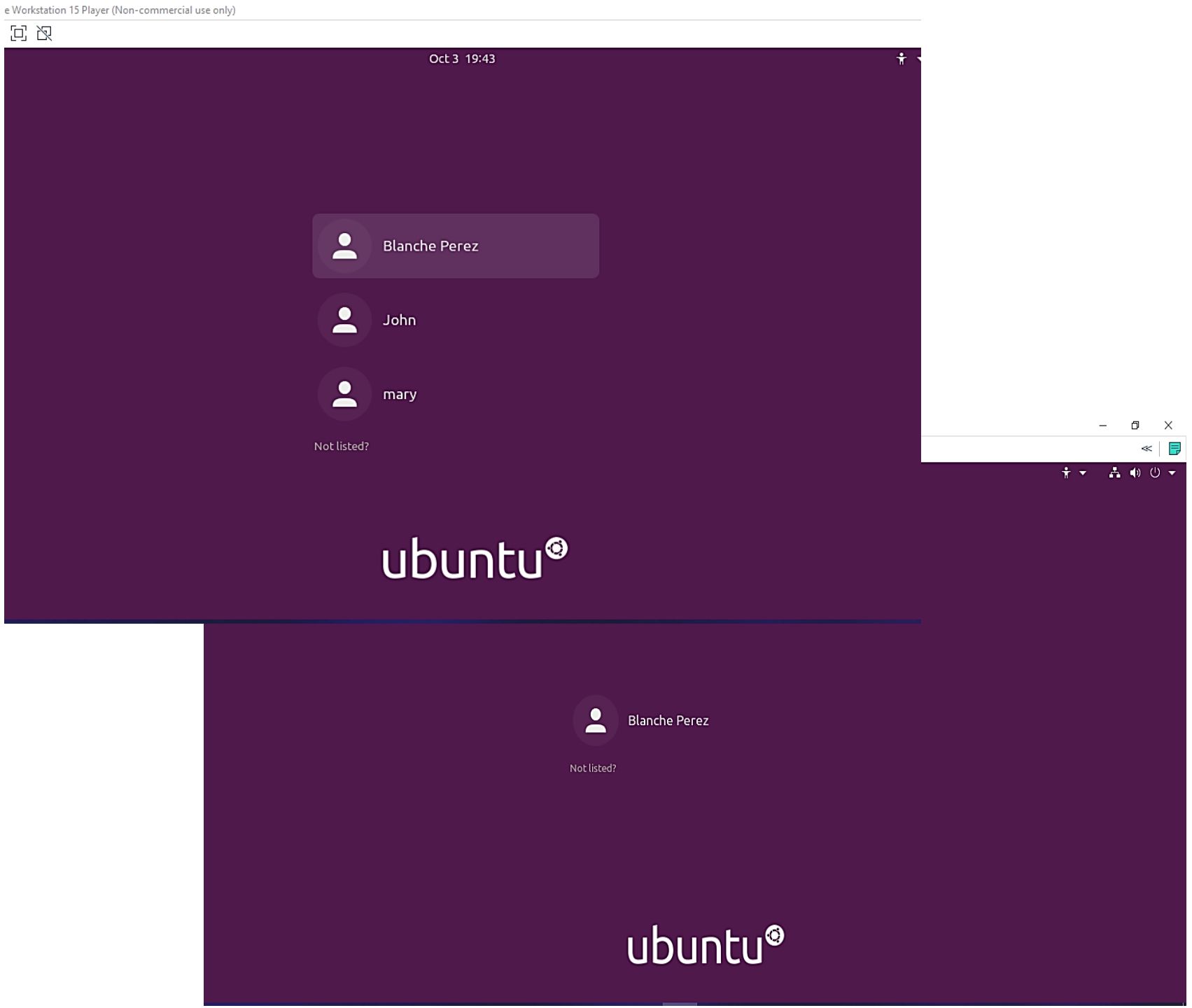
A screen capture of the output.



Remove users and groups

A screen capture of the log on page with three user accounts.

Also, the log on page with only my user account.



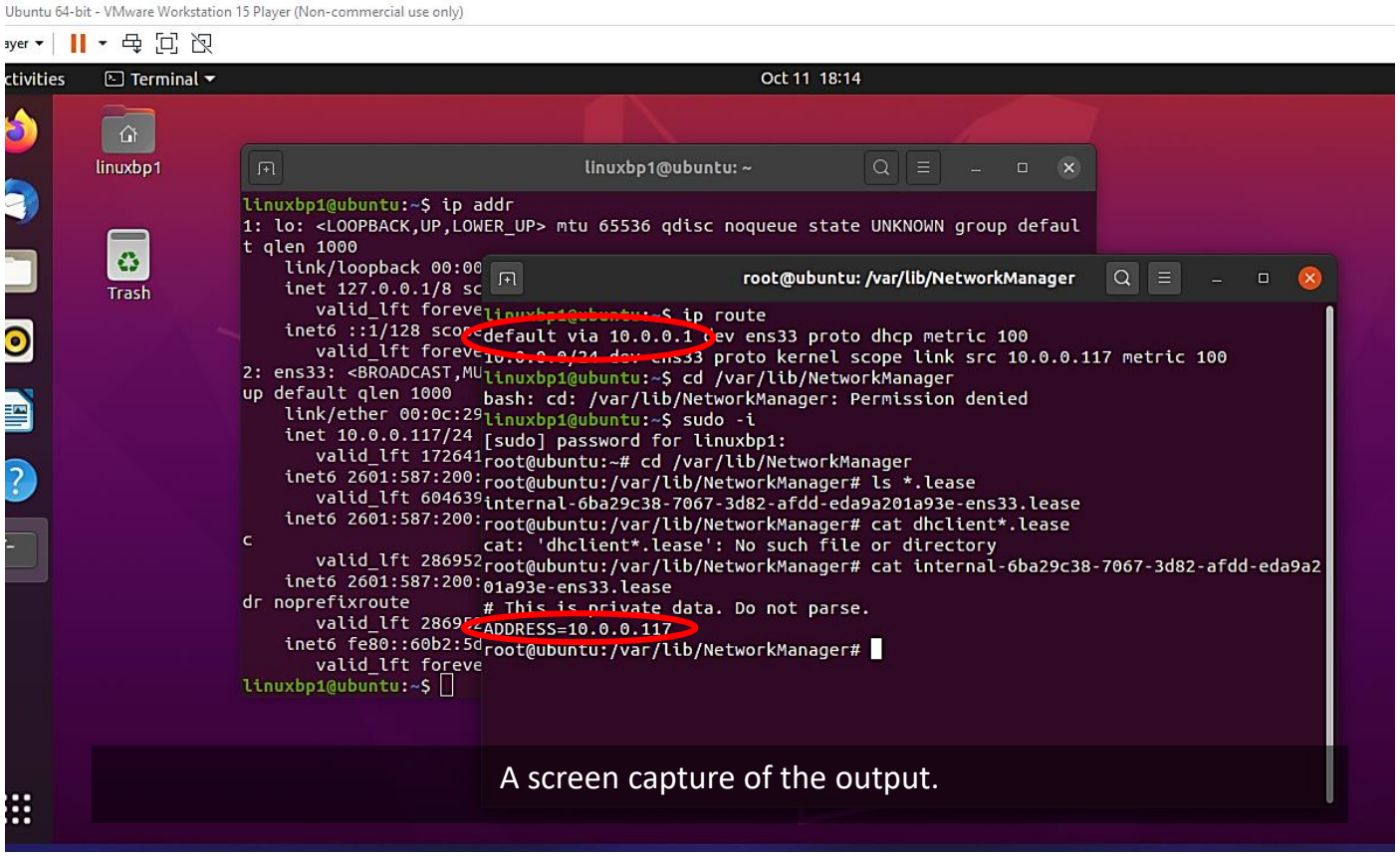
Challenges in the module:

- *Investigating how to add more users through the terminal.*
- *Adding and removing users from a group.*
- *Using specific commands to run through other users.*

Module 5: Network Configuration

In this module, I had to learn the IP configurations of my Linux machine and explore different networking utility programs.

Discover host IP configurations



A screen capture of the output.

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

Answer: *10.0.0.117*

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

Answer: *10.0.0.1*

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

Answer: *It is the same as the default and Ubuntu.*

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

Answer: *It is the same as above. (I was unable to go any further. Even under root, I could not gain access.)*

Manage network interfaces

1. Which DHCP message is shown in the output of the **sudo dhclient –v –r ens33** command?

Answer: *The message displayed as follows:*

- Internet Systems Consortium DHCP Client 4.4.1
- Copyright 2004-2018 Internet Systems Consortium.
- All rights reserved.
- For info, please visit https://www.isc.org/software/dhcp/

- Listening on LPF/ens33/00:0c:29:0e:95:ff
- Sending on LPF/ens33/00:0c:29:0e:95:ff
- Sending on Socket/fallback

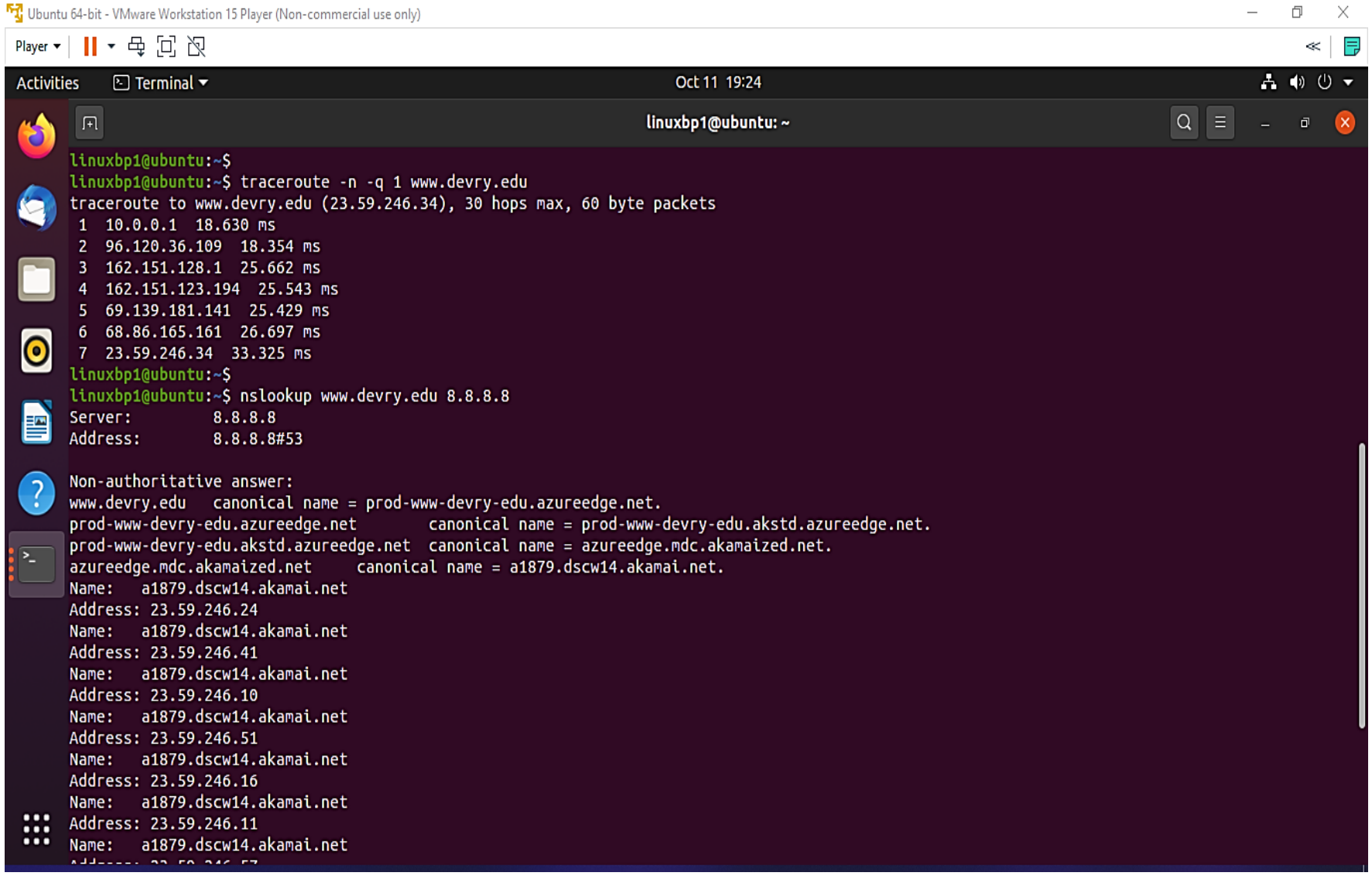
2. Which four DHCP messages are shown in the output of the **sudo dhclient –v ens33** command?

Answer: *The four DHCP messages displays as follows:*

- DHCPDISCOVER on ens33 to 255.255.255.255 port 67 interval 3 (xid=0xa6b3ee03)
- DHCPOFFER of 10.0.0.117 from 10.0.0.1
- DHCPREQUEST for 10.0.0.117 on ens33 to 255.255.255.255 port 67 (xid=0x3eeb3a6)
- DHCPACK of 10.0.0.117 from 10.0.0.1 (xid=0xa6b3ee03)

Use network utilities

A screen capture of the output.



Challenges in the module:

- *Determine where to locate the IP addresses and what they are for.*
- *Learning about the DHCP messages and what they mean.*
- *Investigating the use of the network utilities.*

Module 6: System Performance Monitoring

In this final module, exploring the Linux utilities that monitor processes, user activities, and network usage were investigated.

Monitor Linux processes

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

Answer: *The (obvious) default action for all signals is to allow the process to stop. The SIGTERM signal is a generic signal used to end the program. In comparison to SIGKILL, this signal can be blocked, managed, and ignored. It's the usual way to respectfully ask the program to terminate.*

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: *The two processes are the gnome-shell and gnome-system-monitor are both showing high (or low) percentages.*

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?

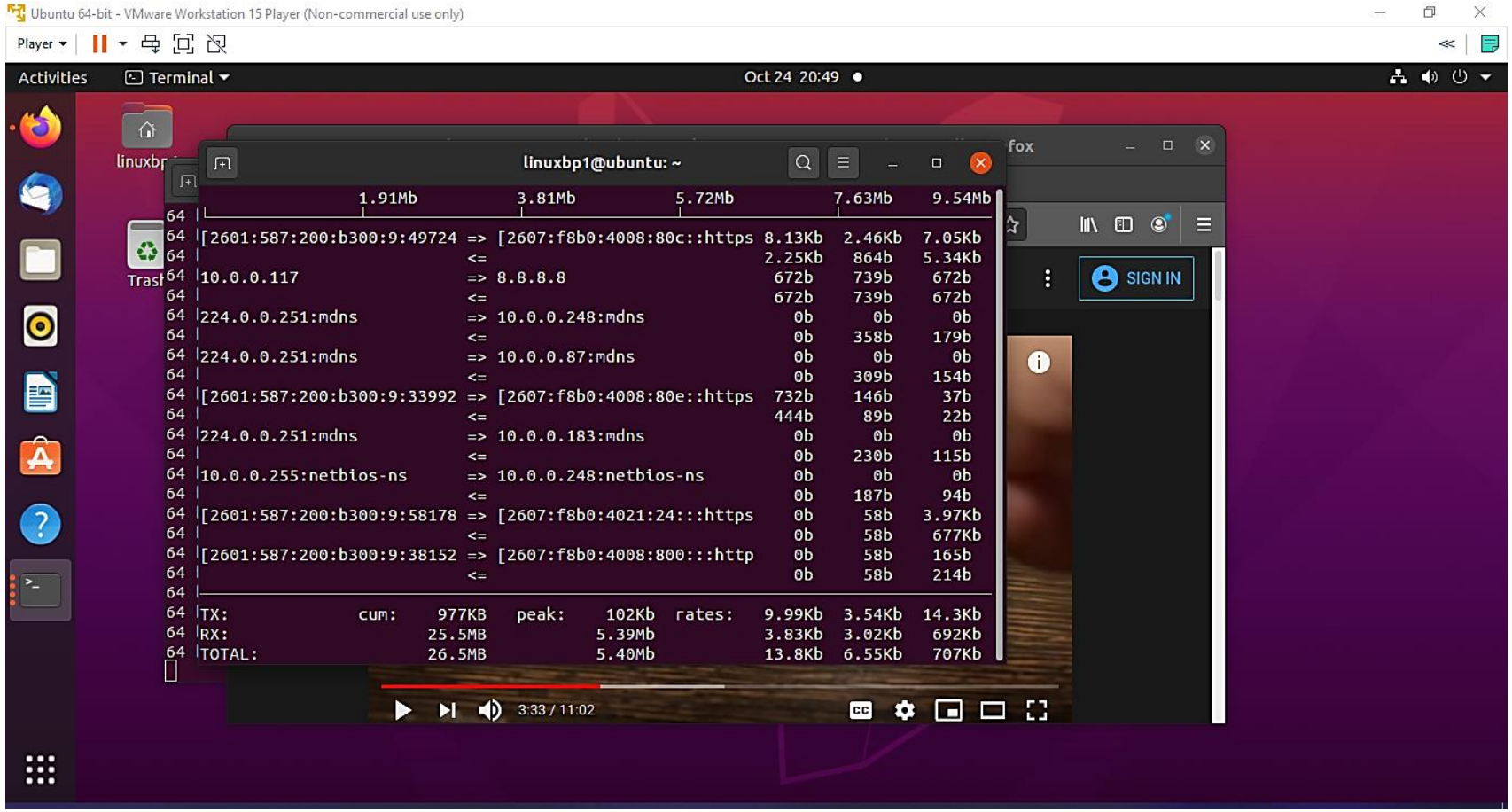
Answer here: *There was not a flag value displayed, other than ac –d, ac –dp, and sa –m.*

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

Answer here: *The root is a user or account that has access to all commands and files on a Linux or other Unix-like operating system by default. It is sometimes referred to as root user, root account, and superuser.*

Monitor network bandwidth usage

When the DNS resolution is off and only IP addresses are displayed on the output.



Challenges in the module:

- *Understanding what a flag value is and how it confirms certain commands in the output.*
- *Investigating how network bandwidth usage works, using the command prompt.*
- *Figuring out why the root user is used when monitoring processes.*

What Was Learned…

In a nutshell, Linux is an operating system (OS) which is mostly used for IT professions. It requires plenty of time and management to maintain a working OS and its data bases. Throughout the course, learning about an operating system, such as Linux (Ubuntu) was a definite learning experience. Especially, when a single person is very new to trying a software skill that is far beyond his or her knowledge.

Thank you.

Feedback is welcome!