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CEIS 106

Final Project

June 25, 2022

Introduction

- CIS and Networking Professionals use Linux
- Linux servers are very popular in corporations
  - Web servers
  - Database servers
  - Email servers
  - File servers
- 64% of world's servers run some variant of Unix or Linux
- Linux / Unix used on 77%+ of web servers

WHAT ARE IOT DEVICES?

INTERNET OF THINGS

- Devices With Sensors That Connect To The Network

LINUX IS USED ON 71.8% OF IOT DEVICES

EXAMPLES OF IOT DEVICES

- Ring Doorbells And Cameras
- Samsung Smart Refrigerators
- Networking Hardware
- Medical Devices (e.g., Pacemakers)
- Smart Locks
- Starship Autonomous Food Delivery Robots
- Kuri Mobile Robots
- Tesla Cars

Module 2
Linux Filesystem Hierarchy

Navigate the Linux filesystem tree

1. WHAT IS THE *PWD* COMMAND AN ACRONYM FOR? WHAT ABOUT THE *CD* COMMAND?

   Answer:

   - Print Working Directory
   - Change Directory

2. EXPLAIN THE DIFFERENCES BETWEEN A RELATIVE PATH AND AN ABSOLUTE/FULL PATH IN LINUX

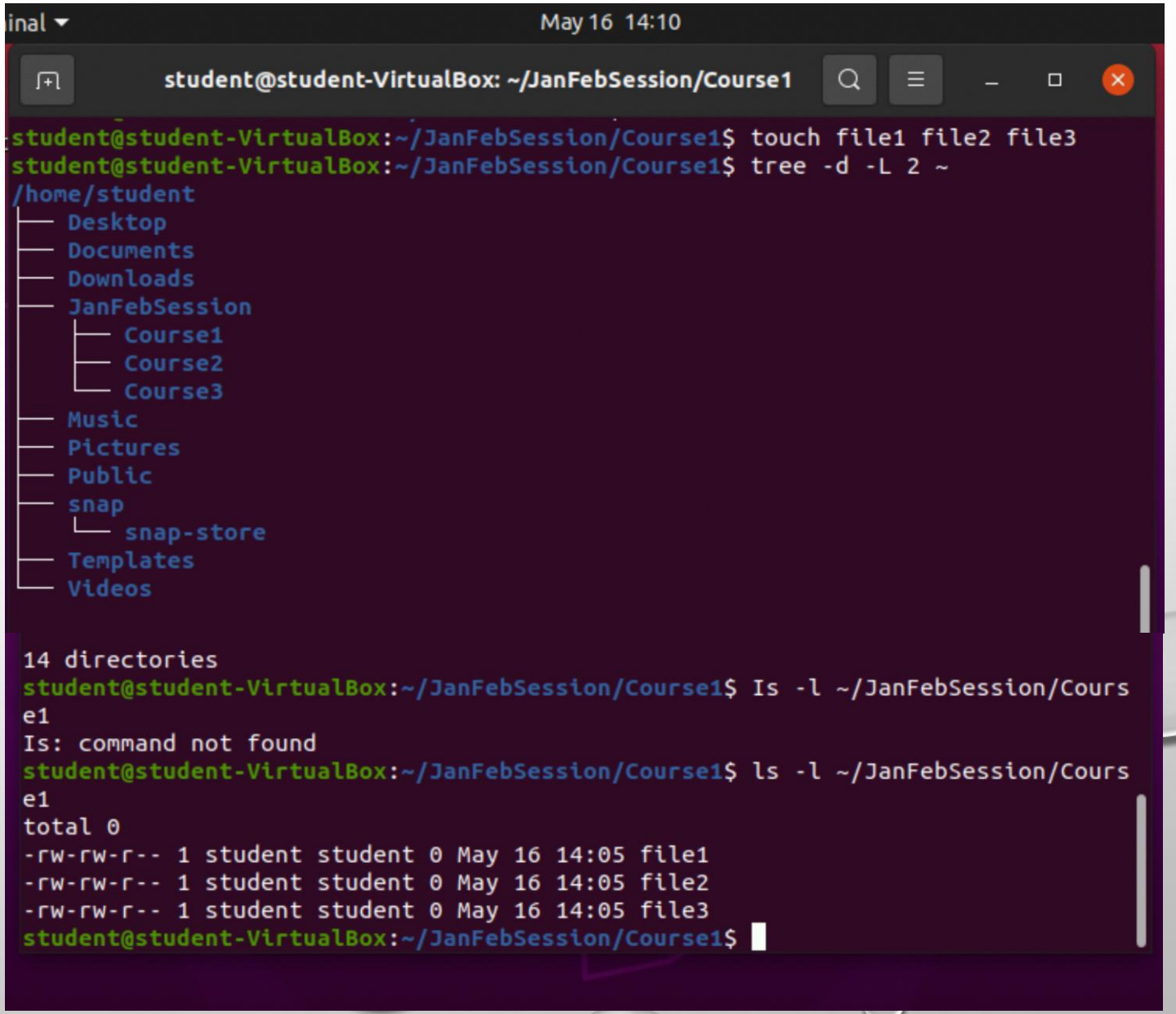
   Answer:

   - Absolute Pathname is the root directory to a certain file or directory.
   - Relative Pathname is a current directory to a certain file or directory and can be used in place of an absolute pathname to reduce typing.

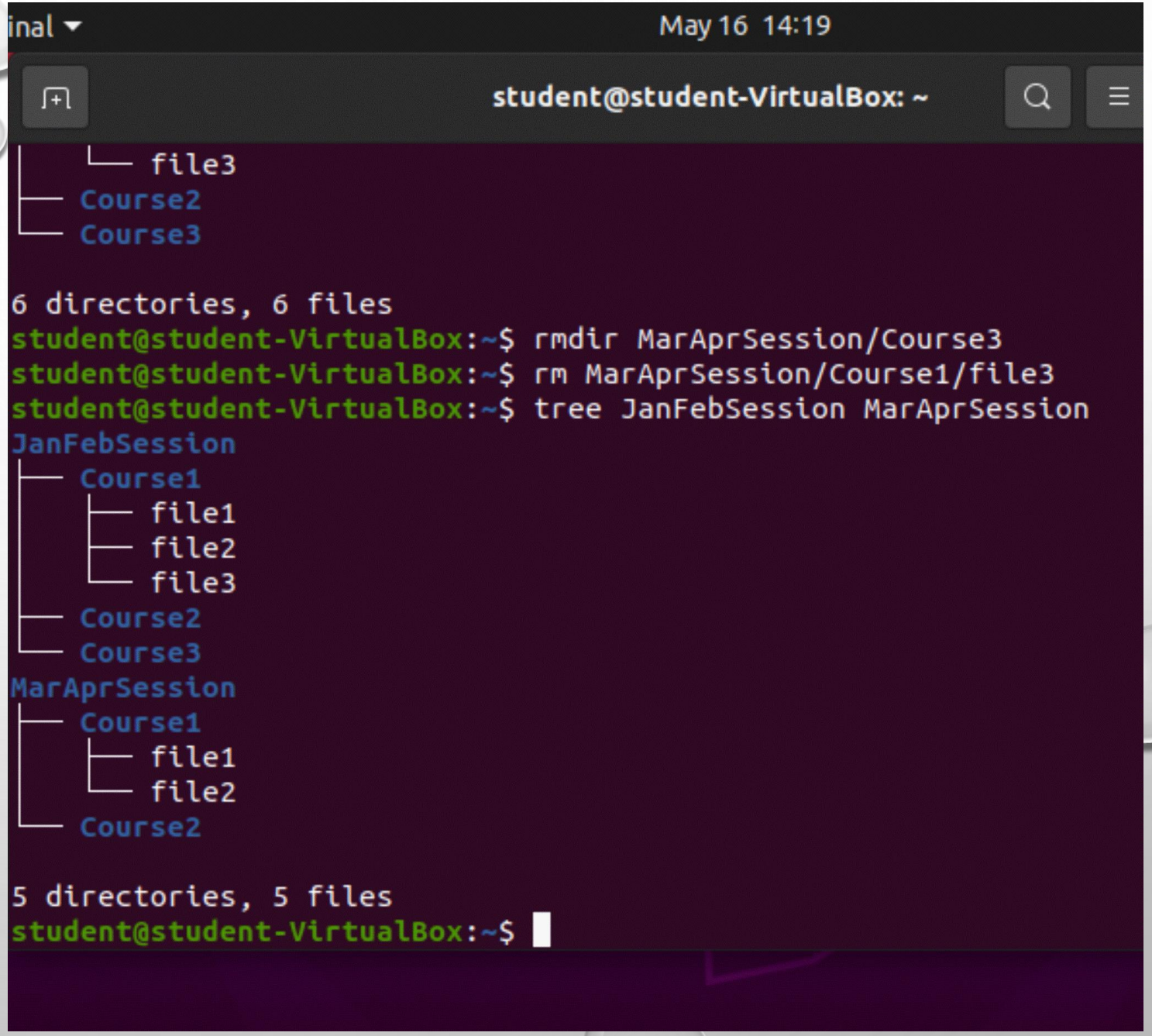
REFERENCES:

- Absolute Pathname: /JanFebSessions/Course1/File1
- Relative Pathname: Course1/File1

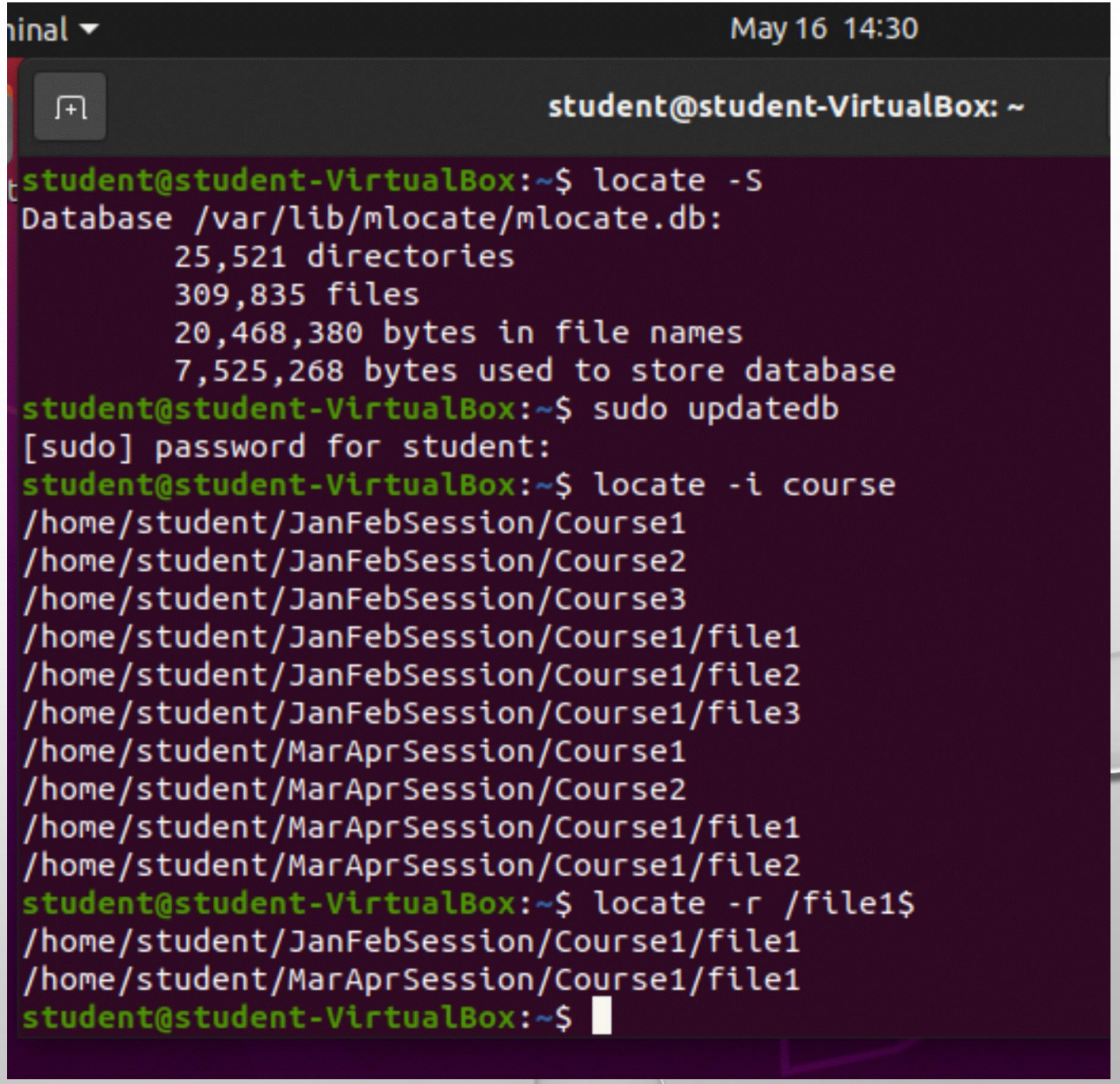
Create Directories And Files



Copy And Remove Directories And Files



Locate Directories And Files



Module 3:
Linux Shell Scripts

Create A Shell Script

1. What Are The File Permissions Of The Script?

   Answer:
   rw- For The Owner – Read And Write Only (No Execute)
   rw- For The Group – Read And Write Only (No Execute)
   r-- For Anyone Else – Read Only (No Write Or Execute)

2. What's The Name Of The User-defined Variable In The Script?

   Answer:
   Text

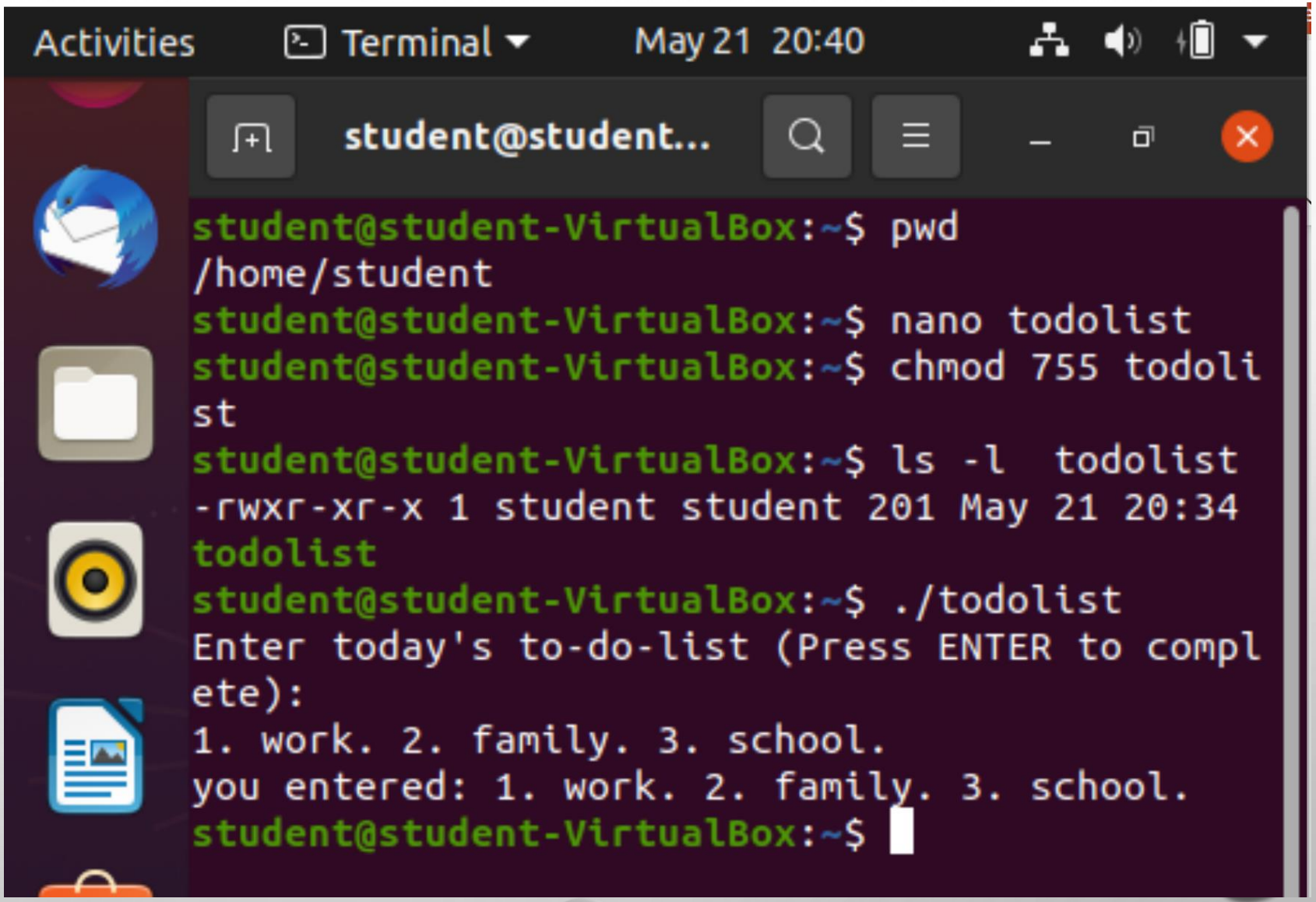
3. Which Redirection Meta-character Is Used In The Script? What Does It Do?

   Answer:
   >> -- Redirects Output To The File And Appends To The File
   (Single Arrow, > -- Will Overwrite The File)

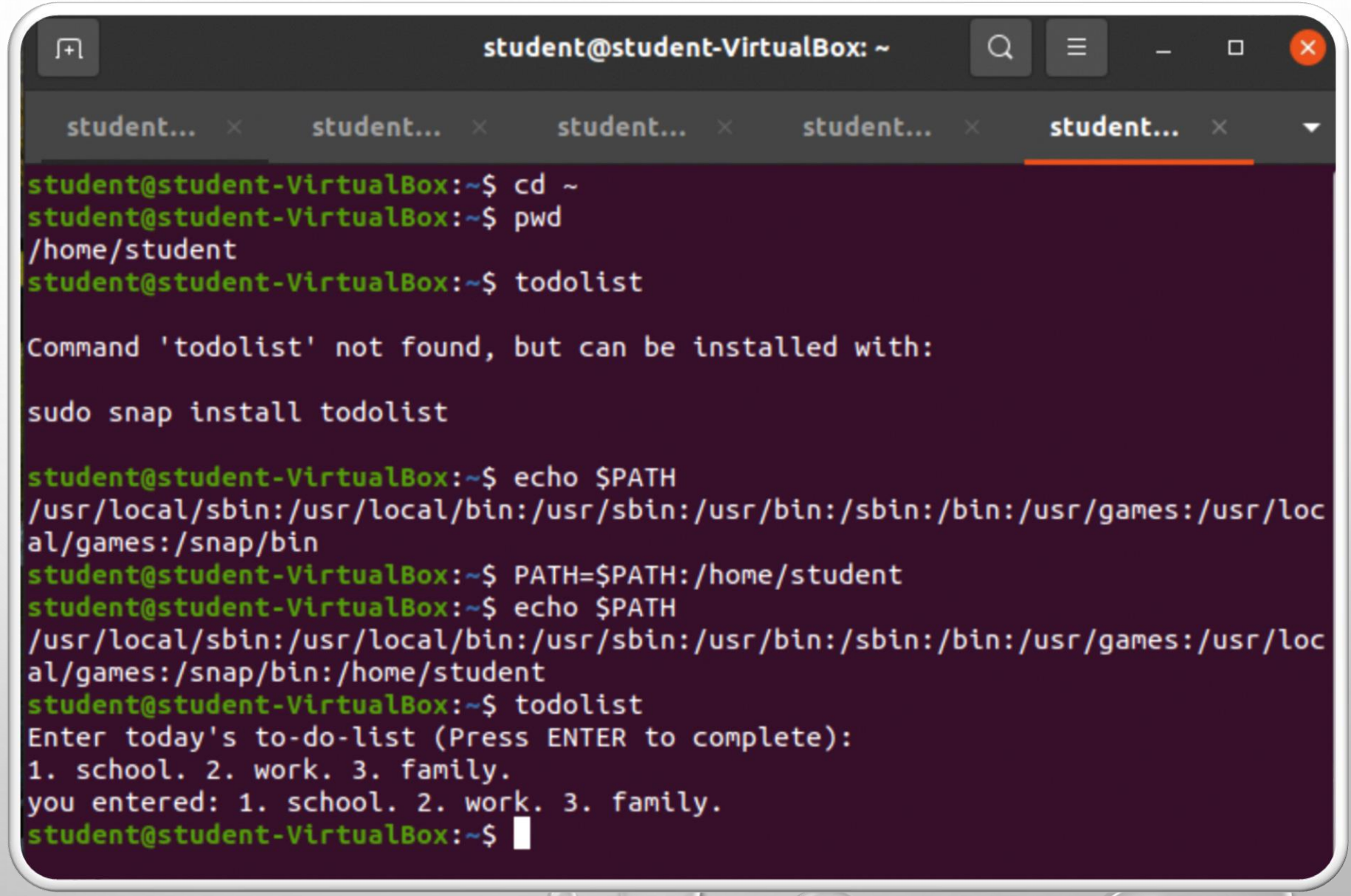
References:

Live Lecture
Recorded Lecture

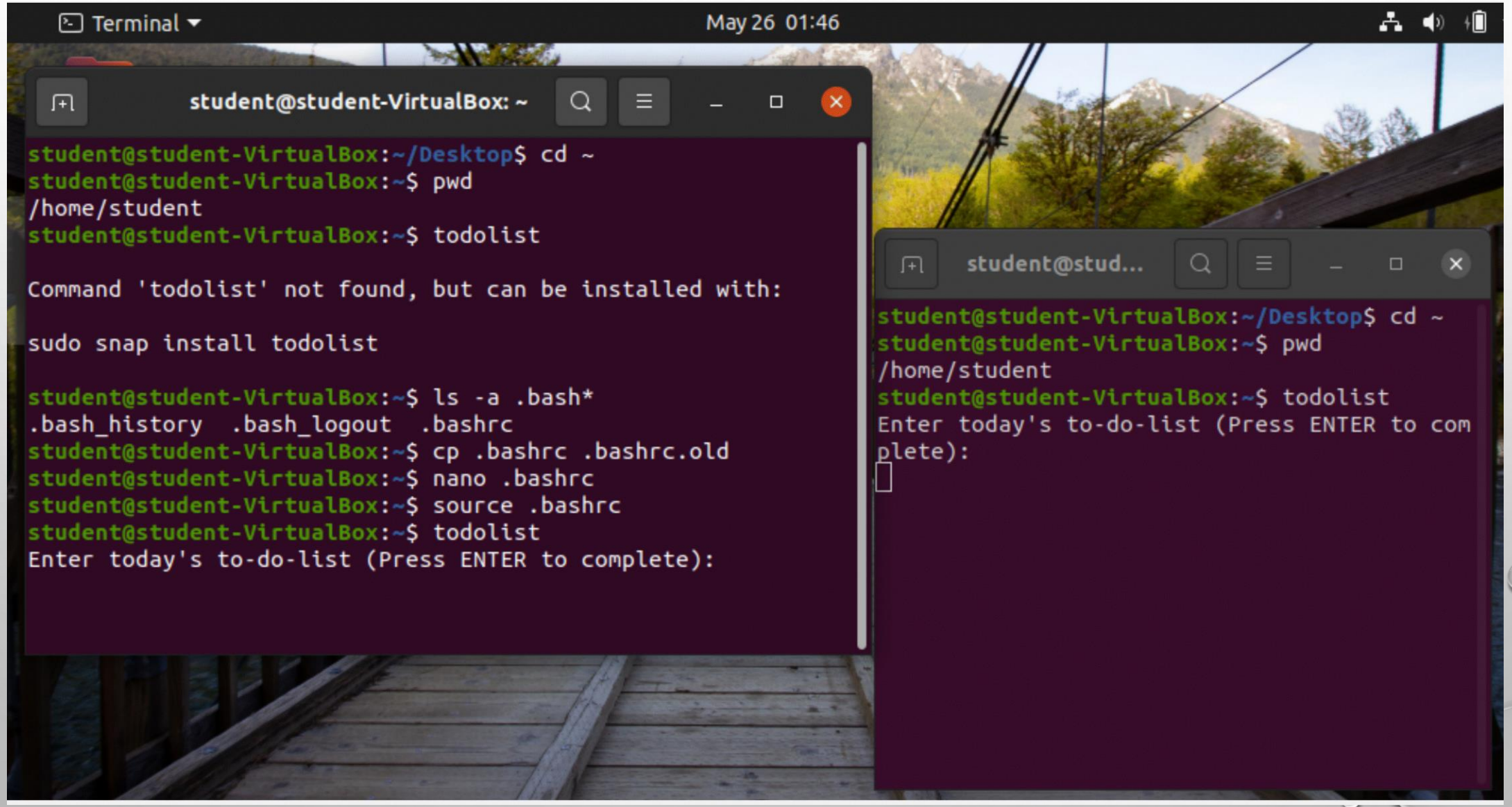
Change Script File Permissions



Set The PATH Variable



Make The PATH Variable Permanent



Module 4:
Linux Administrative Tasks

Add Users And Groups In CLI

1. What Does The –M Option In The Useradd Command Do?

   Answer:

   Create A Home Directory For The User

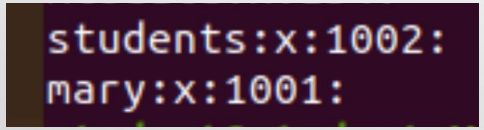
2. What does the -3 option in the tail command do?

   Answer:

   Show the last three lines

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

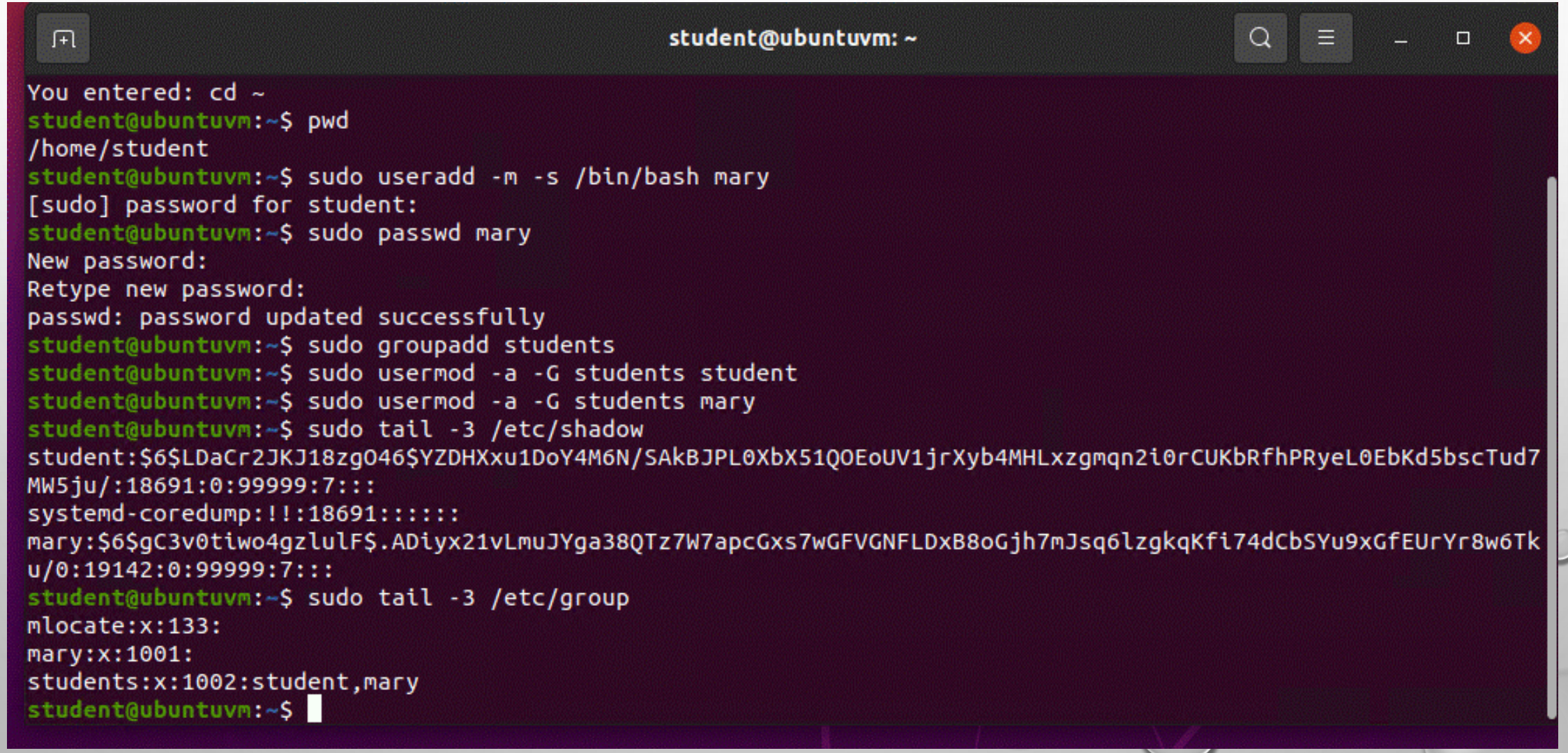
   Answer:



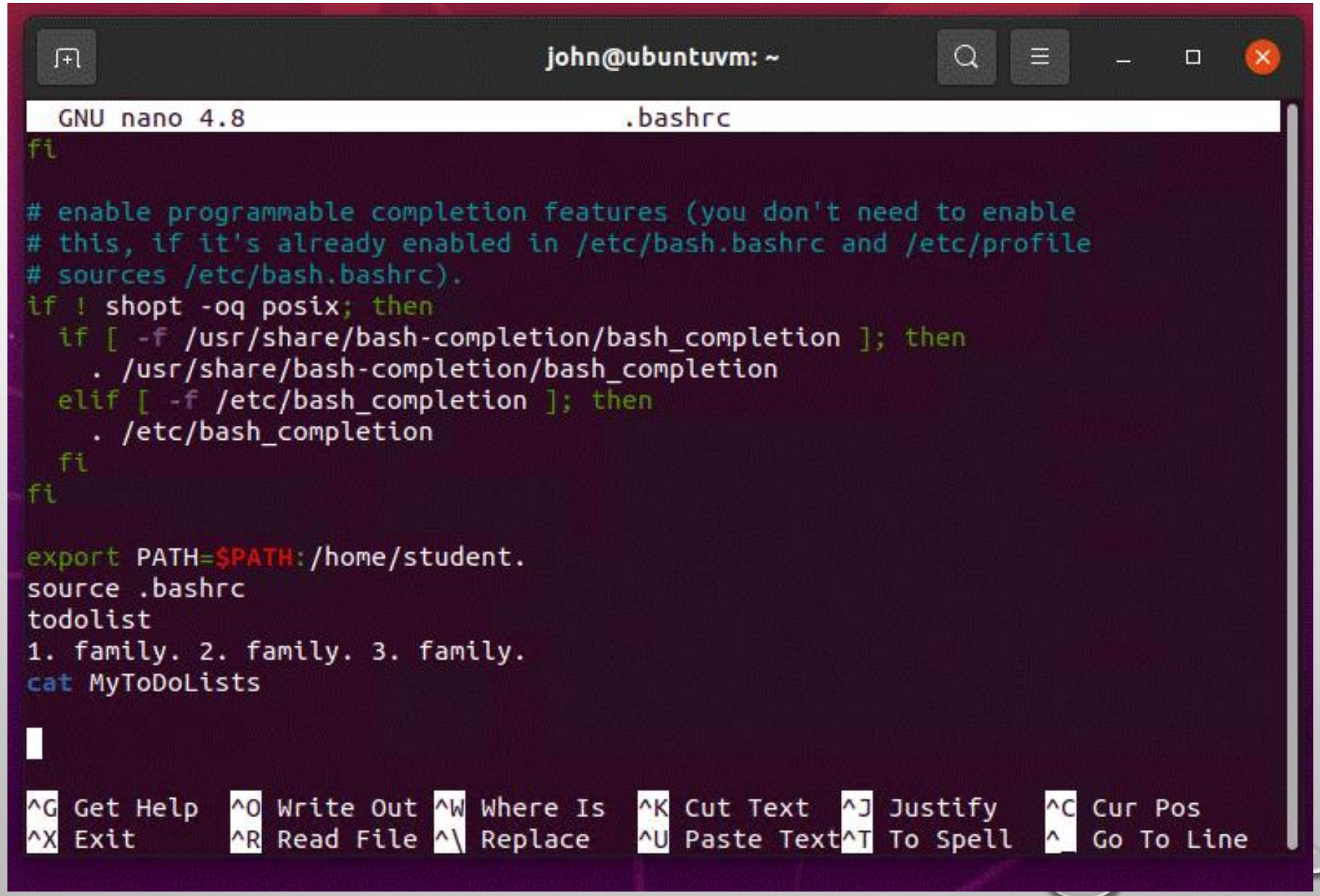
References:

Recorded Project Help

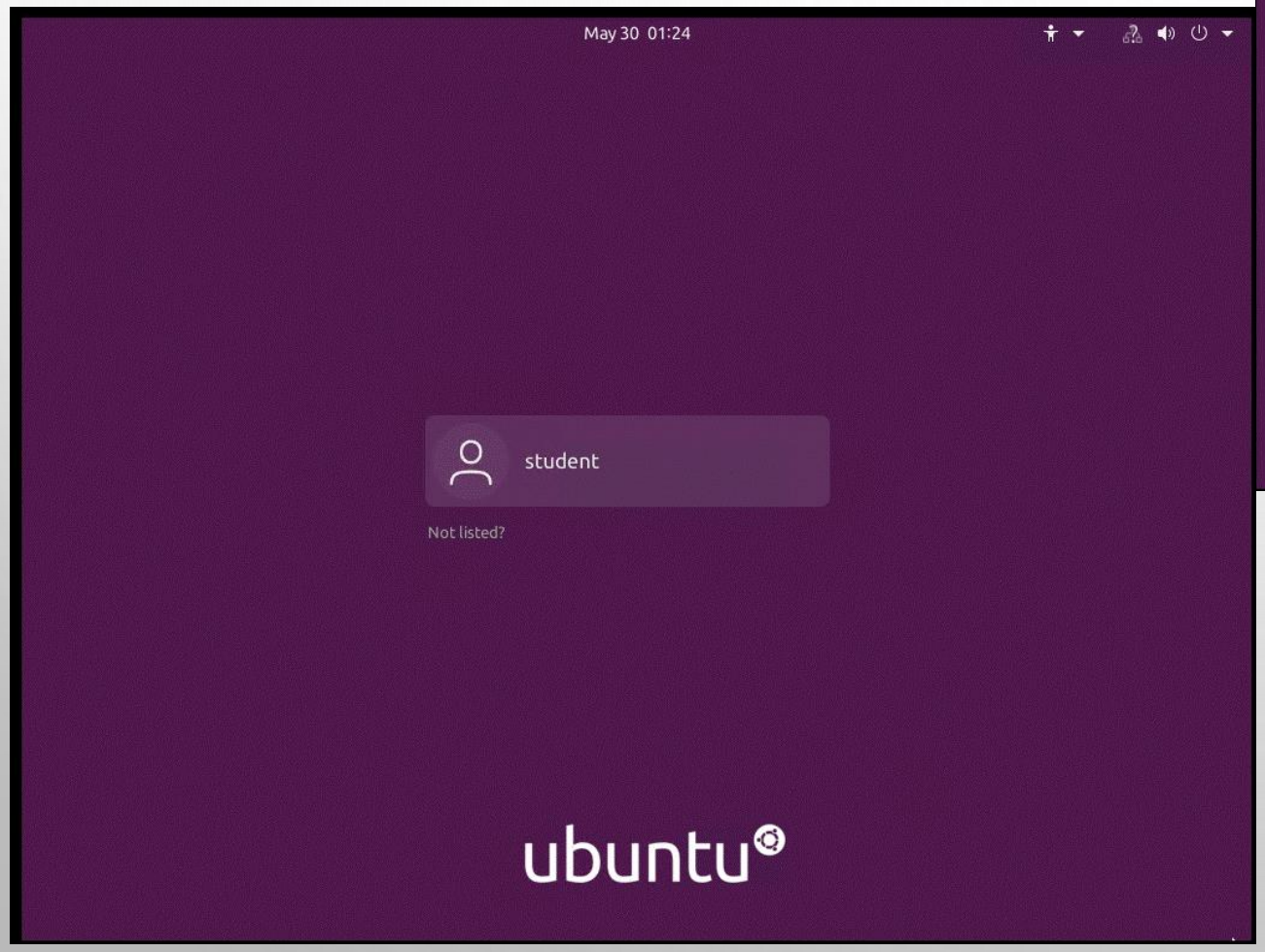
Test User And Group Settings

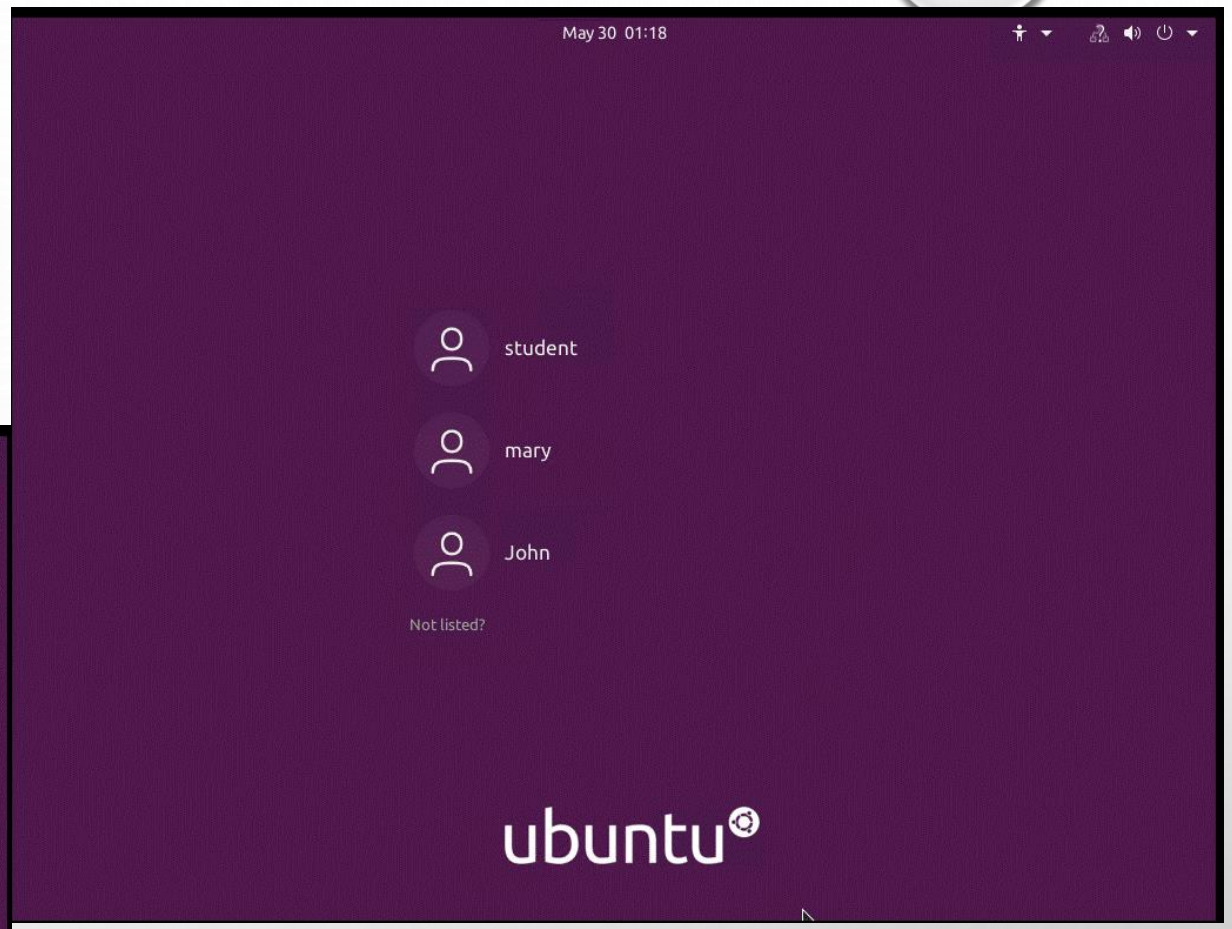


Add Users In GUI



Remove Users And Groups





Module 5: Networking

Discover Host IP Configurations

1. What Is The IP Address Of Your Ubuntu Machine?

Answer:

192.168.1.104

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

Answer:

192.168.1.1

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

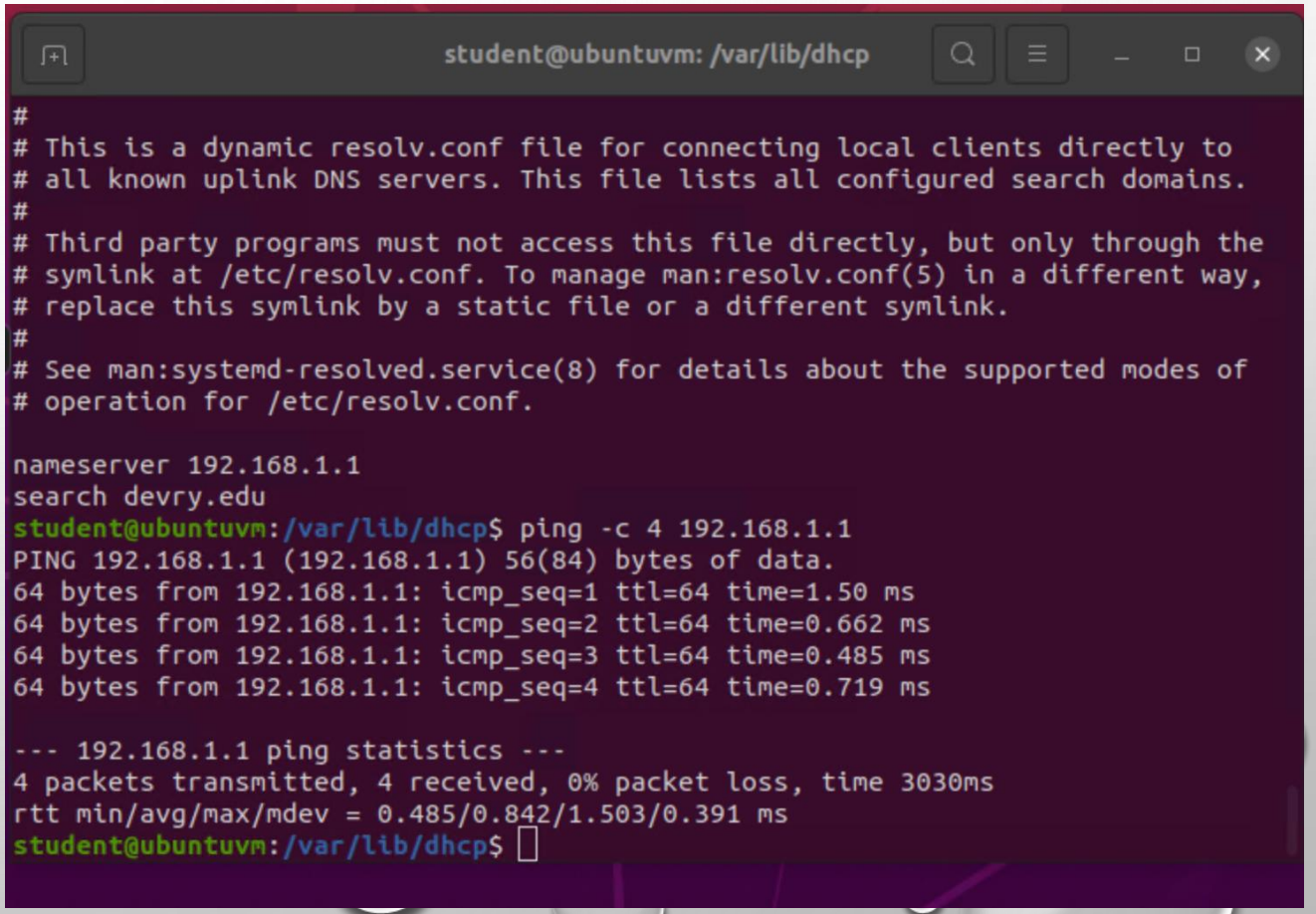
Answer:

192.168.1.1

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

Answer:

192.168.1.1



Manage Network Interfaces

1. Which DHCP Message Is Shown In The Output Of The **SUDO DHCLIENT –V –R ETH0** Command?

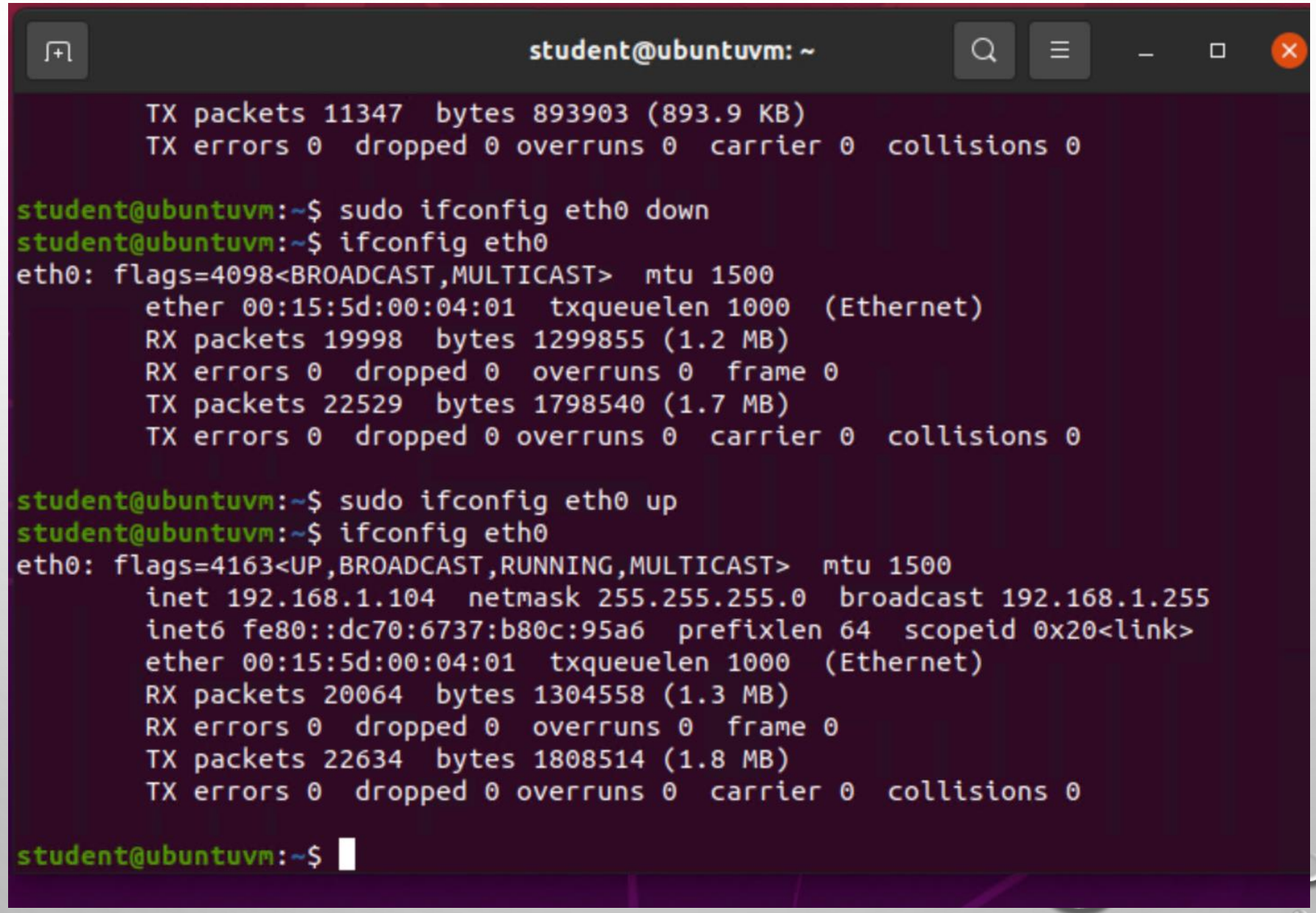
Answer:
DHCPRELEASE

2. Which Four DHCP Messages Are Shown In The Output Of The **SUDO DHCLIENT –V ETH0** Command?

Answer:
DHCPDISCOVER, DHCPOFFER, DCHPREQUEST, DHCPACK

References:
Project Recording

Use Network Utilities



Module 6:
Security, Troubleshooting, Performance

Monitor Linux Processes

1. What Is The Default Action Of The *15 SIGTERM* Kill Signal?

Answer:

Killed/ended selected 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:

gnome-shell and Firefox were both 24%

References:

Live Project Guidance

Monitor User Activities

- Issue **Sudo Accton On** Command To Turn On GNC Accounting
- Run **Sudo Updatedb** Command
- Enter **Lastcomm Updatedb** To Check If *Updatedb* Command Was Executed Before
- Turn Off GNC Accounting (**Sudo Accton Off**)

1. What Flag Value Is Displayed In The Output?

   Answer:

   S - ROOT

2. Why Is The Name Of The User Who Ran The Processes Shown As Root, Not Student?

   Answer:

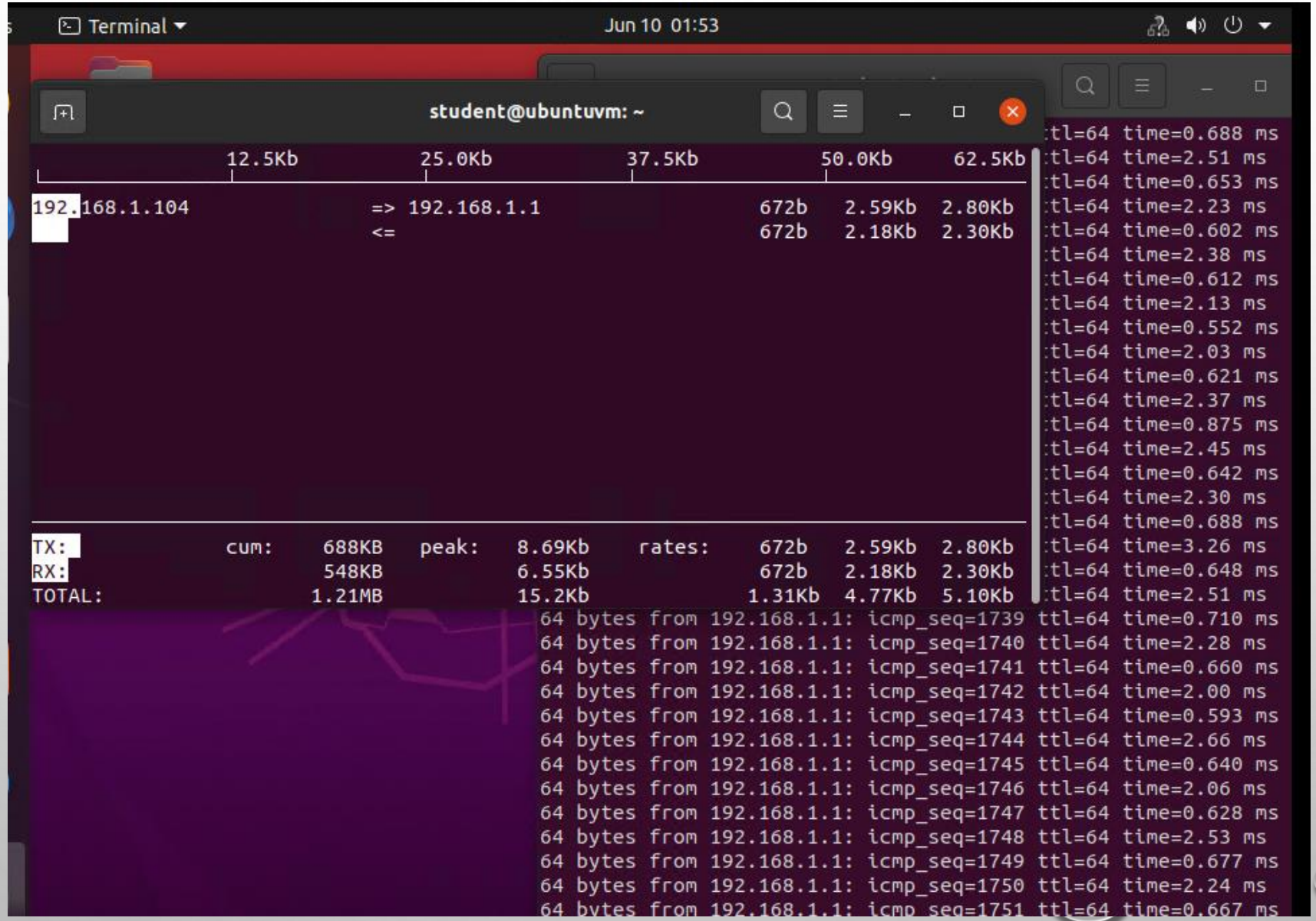
   We Used Sudo To Execute As A Superuser Which Changed The Status From Student To Root

References:

Live Lecture

Recorded Project Guidance

Monitor Network Bandwidth Usage



Challenges

Challenges

1. We were introduced to virtual machines to install and run Ubuntu either on our desktop or in a class lab. Setting up and installing wasn't difficult, but since we were using the terminal and the command line instead of a graphical interface, it took some time to get used to remembering and working with the commands for Ubuntu (otherwise you get an error message or no response)

2. There are a lot of commands to learn and I keep forgetting them and have to keep looking them up. I know from past experience, only practice will make them second nature.

Career Skills

Career Skills

1. Attention to Details: If you aren't detail oriented when you start working with the command line in Linux, you will learn to be. Using the wrong punctuation or the wrong case when writing a command will create an error or no result at all and you will have to be patient while you find the problem.

2. Investigative Skills: Searching for the reason your program isn't working will teach you to patiently examine your code.

3. Patience: It's hard to be patient with myself when I know how capable I am of learning new skills and subjects. Learning Linux will take a lot of practice before I'm as comfortable using it as I am with other computer products.

Conclusion

Why Learn Linux?

- Linux servers are very popular in corporations
  - Web servers
  - Database servers
  - Email servers
  - File servers
- 64% of world's servers run some variant of Unix or Linux
- Linux / Unix used on 77%+ of web servers
- Linux is used on 71.8% of IOT Devices

Lessons Learned

- ✓ Navigate the Linux filesystem tree
- ✓ Create Directories and files
- ✓ Copy and remove directories and files
- ✓ Locate Directories and Files
- ✓ Create a Shell Script
- ✓ Change Script File Permissions
- ✓ Set the PATH Variable
- ✓ Make the PATH Variable Permanent
- ✓ Add Users and Groups in CLI
- ✓ Test User and Group Settings
- ✓ Add Users in GUI
- ✓ Remove Users and Groups
- ✓ Discover Host IP Configurations
- ✓ Manage Network Interfaces
- ✓ Use Network Utilities
- ✓ Monitor Linux Processes
- ✓ Monitor User Activities
- ✓ Monitor Network Bandwidth Usage

Challenges

- Learning and remembering how to write commands
- Using the command line instead of using a graphical interface

Career Skills

- Attention to Details
- Investigative Skills
- Patience with Self