Introduction to Linux

CEIS106
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Introduction

- Created by Linus Torvalds, Linux was not made for profit, but as a solution to a problem, and for creating useful tools that others could share for free

- Linux is an Open Source Software (OSS), this means developers can view, modify, and redistribute each others source code allowing for more improvements and bug fixes

- For companies Linux is a top choice as the software is free, and easily maintained by a community of developers or even the company itself

Linux Filesystem Hierarchy

- Navigating the Linux filesystem

- Creating, moving, copying, removing and locating files and directories

Navigating the filesystem

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

         pwd-print working directory
         cd-change directory

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

         An absolute path is the path that you take to get from the root to your target file. The absolute path for the Course Project file would be */home/student/Documents/Course Project.txt*

         A relative path is a path that is relative to your current directory. So, let's say you are in the student directory, and you want to open the *Course Project.txt*. Your relative path would be *Documents/Course Project.txt*. (Varshni, D)

Creating directories and files

Copy and remove directories and files

Locate directories and files

Linux Shell Scripts

- Creating a shell script

- Changing file permissions

- Setting the PATH variable and making it permanent

Creating a shell script

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

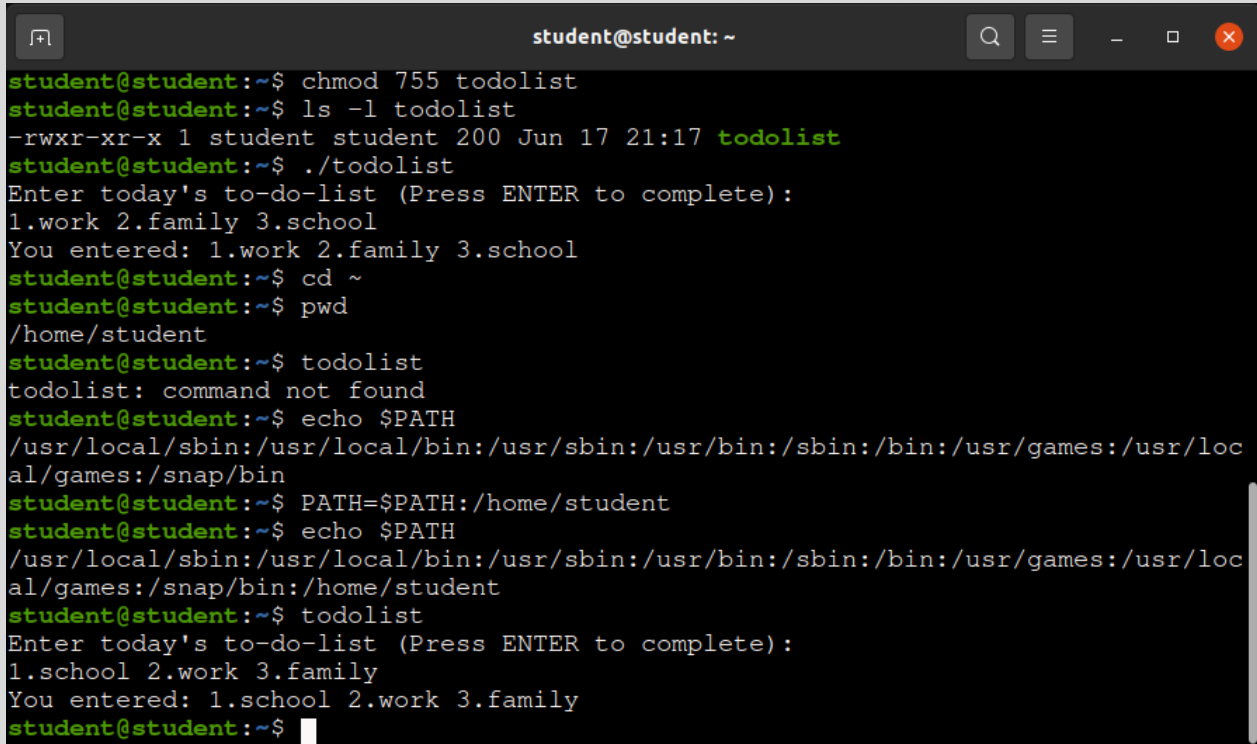3. Which redirection meta-character is used in the script? What does it do?

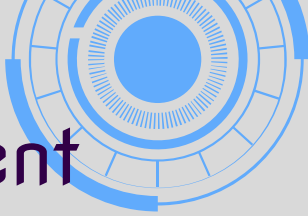   >>-append data of an existing file and $-used to access the value stored in a variable

Change the script permissions

Set the PATH variable

Making the PATH variable permanent

User and Group Management

- Add users and groups in CLI

- Test user and group settings

- Using the graphical interface to add users

- Removing users and groups
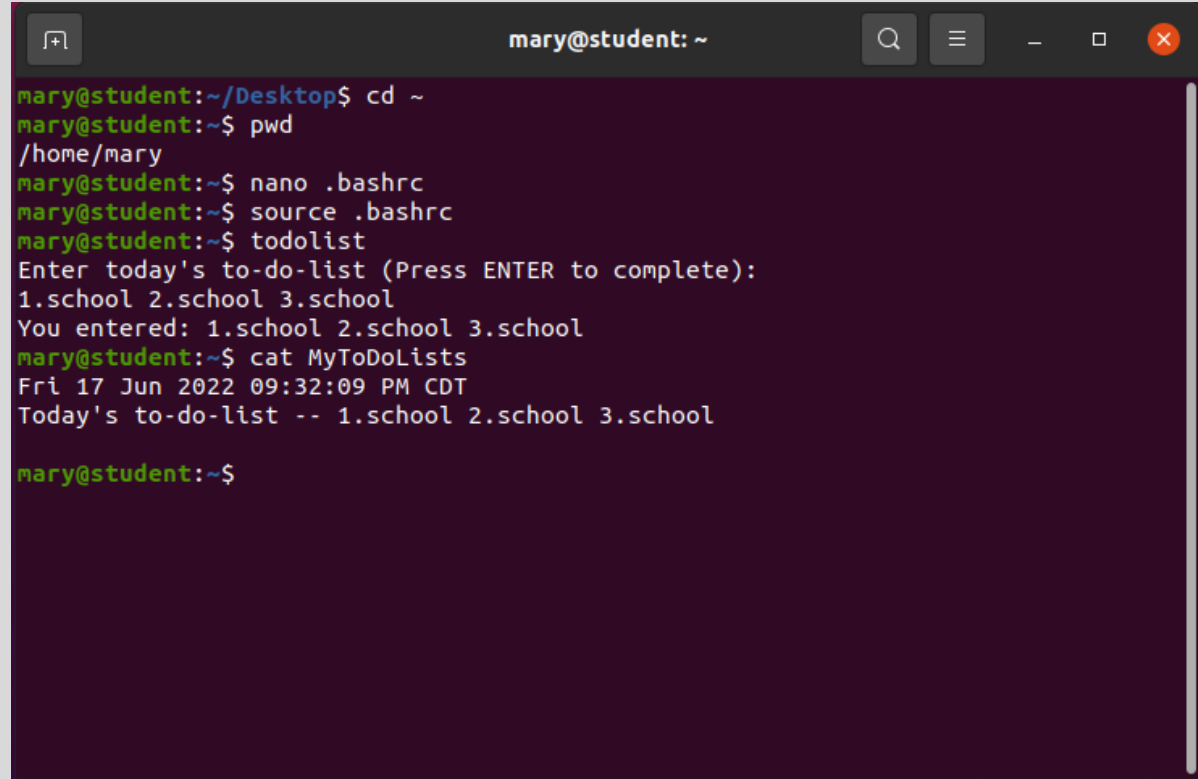
Add users and groups in CLI

1. What does the –m option in the useradd command do?
   Creates a home directory for new user.
2. What does the -3 option in the tail command do?
   Allows you to read the last 3 lines from a specific text file.
3. Which line of the /etc/group file lists members of the "students" group?

```
students:x:1002:student,mary
```
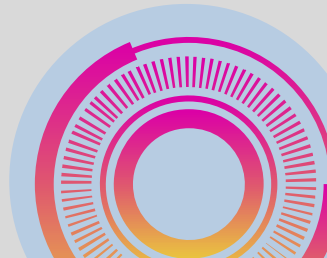
Test user and group settings

Add users in the GUI


```
john@student:~/Desktop$ cd ~
john@student:~$ pwd
/home/john
john@student:~$ nano .bashrc
john@student:~$ source .bashrc
john@student:~$ todolist
Enter today's to-do-list (Press ENTER to complete):
1.family 2.family 3.family
You entered: 1.family 2.family 3.family
john@student:~$ cat MyToDoLists
Fri 17 Jun 2022 09:41:31 PM CDT
Today's to-do-list -- 1.family 2.family 3.family

john@student:~$
```

Remove users and groups

student

mary

John

Not listed?

student

Not listed?

Network Configuration

- Discover host IP configurations

- Manage network interfaces

- User network utilities

Discover host IP configurations

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

     192.168.4.112

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

     192.168.4.1

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

     192.168.4.1

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

     127.0.0.53


```
student@student: /var/lib/dhcp

#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 71.10.216.1
nameserver 71.10.216.2
nameserver 2607:f428:ffff:ffff::1
# Too many DNS servers configured, the following entries may be ignored.
nameserver 2607:f428:ffff:ffff::2
student@student:/var/lib/dhcp$ ping -c 4 192.168.4.1
PING 192.168.4.1 (192.168.4.1) 56(84) bytes of data.
64 bytes from 192.168.4.1: icmp_seq=1 ttl=64 time=2.55 ms
64 bytes from 192.168.4.1: icmp_seq=2 ttl=64 time=3.41 ms
64 bytes from 192.168.4.1: icmp_seq=3 ttl=64 time=0.713 ms
64 bytes from 192.168.4.1: icmp_seq=4 ttl=64 time=0.708 ms

--- 192.168.4.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3016ms
rtt min/avg/max/mdev = 0.708/1.844/3.405/1.173 ms
student@student:/var/lib/dhcp$
```
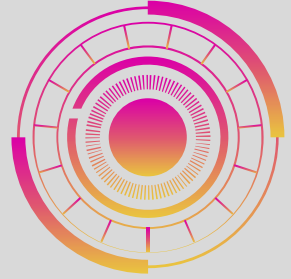
Manage network interfaces

1. Which DHCP message is shown in the output of the *sudo dhclient –v –r enp0s3* command?

    DHCPRELEASE of 192.168.4.96 on enp0s3 to 192.168.4.1 port 67 (xid=0x3efc4bb1)

2. Which four DHCP messages are shown in the output of the *sudo dhclient –v enp0s3* command?

    DHCPDISCOVER on enp0s3 to 255.255.255.255 port 67 interval 3 (xid=0x9343037c)

Ip DHCPOFFER of 192.168.4.96 from 192.168.4.1

DHCPREQUEST for 192.168.4.96 on enp0s3 to 255.255.255.255 port 67 (xid=0x7c034393)

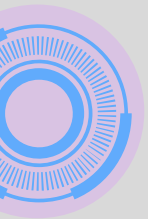DHCPACK of 192.168.4.96 from 192.168.4.1 (xid=0x9343037c)

Use network utilities

System Performance Monitoring

- Monitor processes, activities and network bandwidth usage
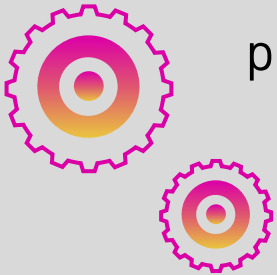
Monitor Linux processes

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

   Kill or end 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?

   gnome-shell

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.
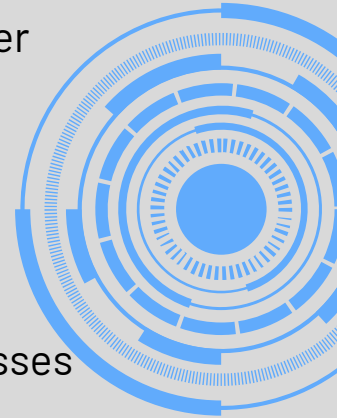
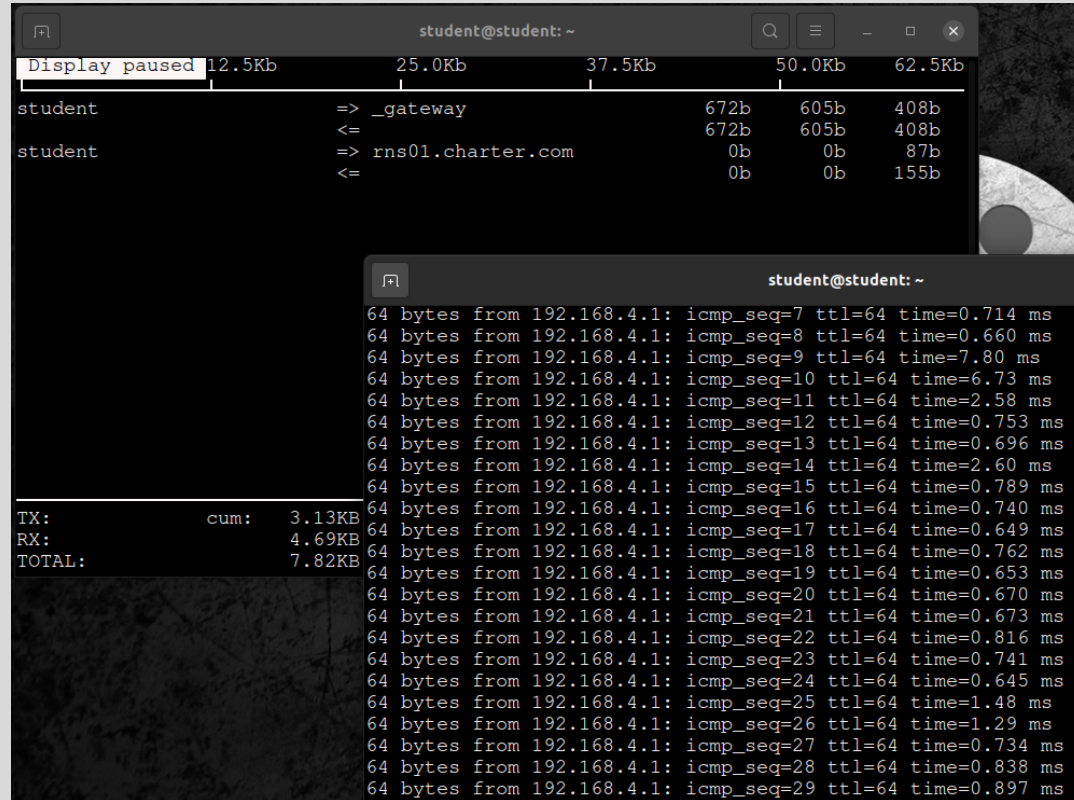1. What flag value is displayed in the output?

S-executed by superuser(root)

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

We put sudo in front of the command, which executes the command by root
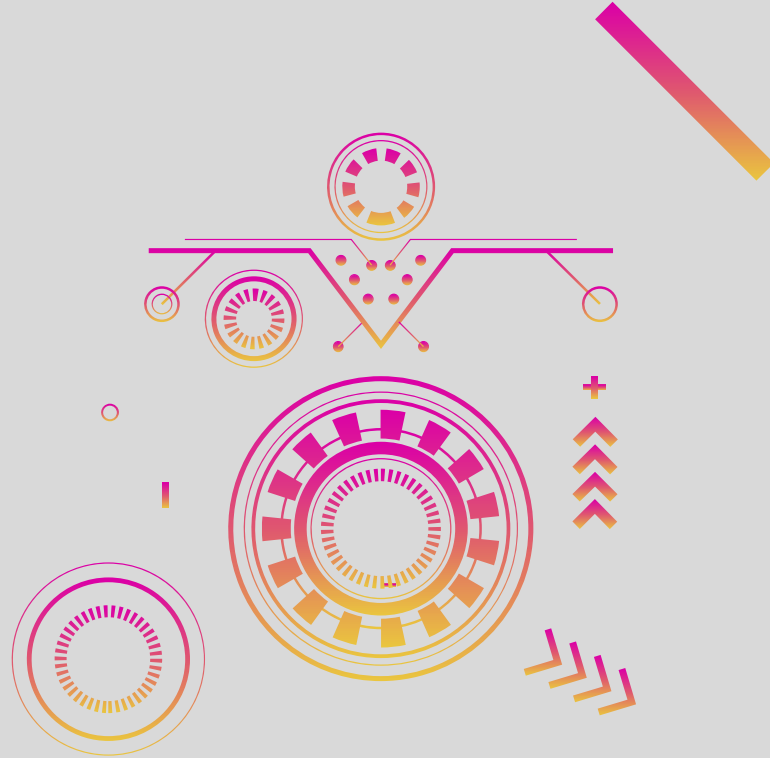
Monitor network bandwidth usage

Challenges

- It was difficult to remember additional attributes of a command, I used the man command quite a lot

- Knowing when to switch from user to administrator

- Assigning permissions and understanding the alphabetical command versus the numerical command

Skills

- Creating, copying, moving, and removing files and directories

- Adding, removing, and assigning permissions to users and groups

- Configuring networks

Conclusion

- The experience gained from installing and configuring my own virtual box and Linux system gives me the ability to apply that knowledge to other operating systems

- Using commands in the terminal instead of the GUI is such a great learning opportunity, I feel more capable learning how things are working step by step
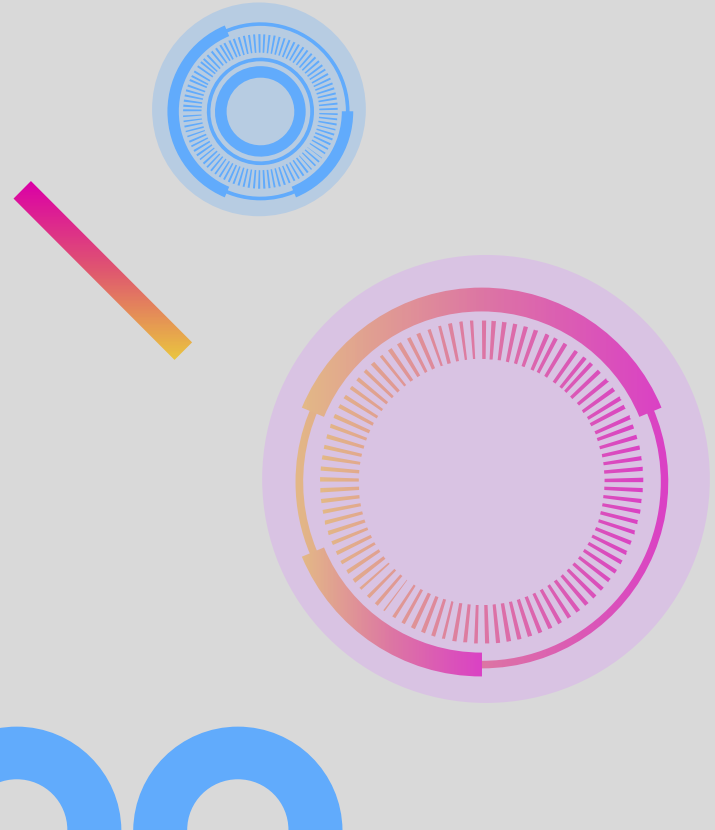
List of references

Varshni,D, Retrieved on 05/13/2022,
https://www.geeksforgeeks.org/absolute-relative-pathnames-unix/

CEIS106 recorded/live lessons

Linux+ and LPIC-1 Guide to Linux Certification,5th Ed., Jason Eckert(2020)

Thanks!

Do you have any questions?

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