

## Ubuntu Basics Reference Guide

**Objective:** Provide a foundational understanding of Ubuntu commands, navigation, and system operations.

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### Part 1: Basic Navigation

#### 1. Login and Open Terminal:

- Log into the Ubuntu system.
- Open the terminal using **Ctrl+Alt+T** or from the applications menu.

#### 2. Navigating Directories:

- List files and directories: **ls**
- Change directory: **cd <directory\_name>**
- Move up one level: **cd ..**
- Move up multiple levels: **cd ../../example**
- Print the current working directory: **pwd**

#### 3. Creating and Removing Files and Directories:

- Create a directory: **mkdir test\_directory**
- Create an empty file: **touch test\_file.txt**
- Remove a file: **rm test\_file.txt**
- Remove a directory: **rmdir test\_directory**

#### 4. Viewing File Contents:

- Display file contents: **cat <file\_name>**
  - View file contents with pagination: **less <file\_name>**
- 

### Part 2: Basic Administration

#### 1. Updating the System:

- Update package lists: **sudo apt update**
- Upgrade installed packages: **sudo apt upgrade**

#### 2. Managing Users:

- Add a new user: **sudo adduser <username>**

- Switch to another user: **su - <username>**
- Remove a user: **sudo deluser <username>**

### 3. Password Management:

- Change the current user's password: **passwd**
- Change another user's password (as admin): **sudo passwd <username>**
- Lock a user account: **sudo passwd -l <username>**
- Unlock a user account: **sudo passwd -u <username>**

### 4. Checking System Information:

- Check disk usage: **df -h**
- Check memory usage: **free -h**
- View system uptime: **uptime**

### 5. Permissions:

- Change file permissions: **chmod 755 <file\_name>**
- View file permissions: **ls -l**

### 6. Disk and Partition Information:

- List block devices: **lsblk**
- Check directory sizes: **du -sh /path/to/directory**

View partition information: **sudo fdisk -l**

## Processes:

### 1. View Running Processes:

- Open the terminal using **Ctrl+Alt+T** or from the applications menu.
- Display all running processes:

```
ps aux
```

- Display processes in a tree view for better visualization:

```
pstree
```

- Find a specific process by keyword:

```
ps aux | grep <process_name>
```

---

## 2. Find Process ID (PID):

- Display processes with their **Process IDs (PIDs)**:

```
ps -e
```

- Search for a specific process and display its PID:

```
pgrep <process_name>
```

---

## 3. Kill a Process by PID:

- Terminate a process using its PID:

```
kill <PID>
```

- Forcefully terminate a process if it doesn't stop:

```
kill -9 <PID>
```

---

## 4. Kill a Process by Name:

- Kill a process using its name:

```
pkill <process_name>
```

- Forcefully kill all processes with the same name:

```
pkill -9 <process_name>
```

---

## 5. Verify Process Termination:

- Check if a process is still running by PID:

```
ps -p <PID>
```

- Verify using `pgrep`:

```
pgrep <process_name>
```

- If no output is returned, the process has been successfully terminated.
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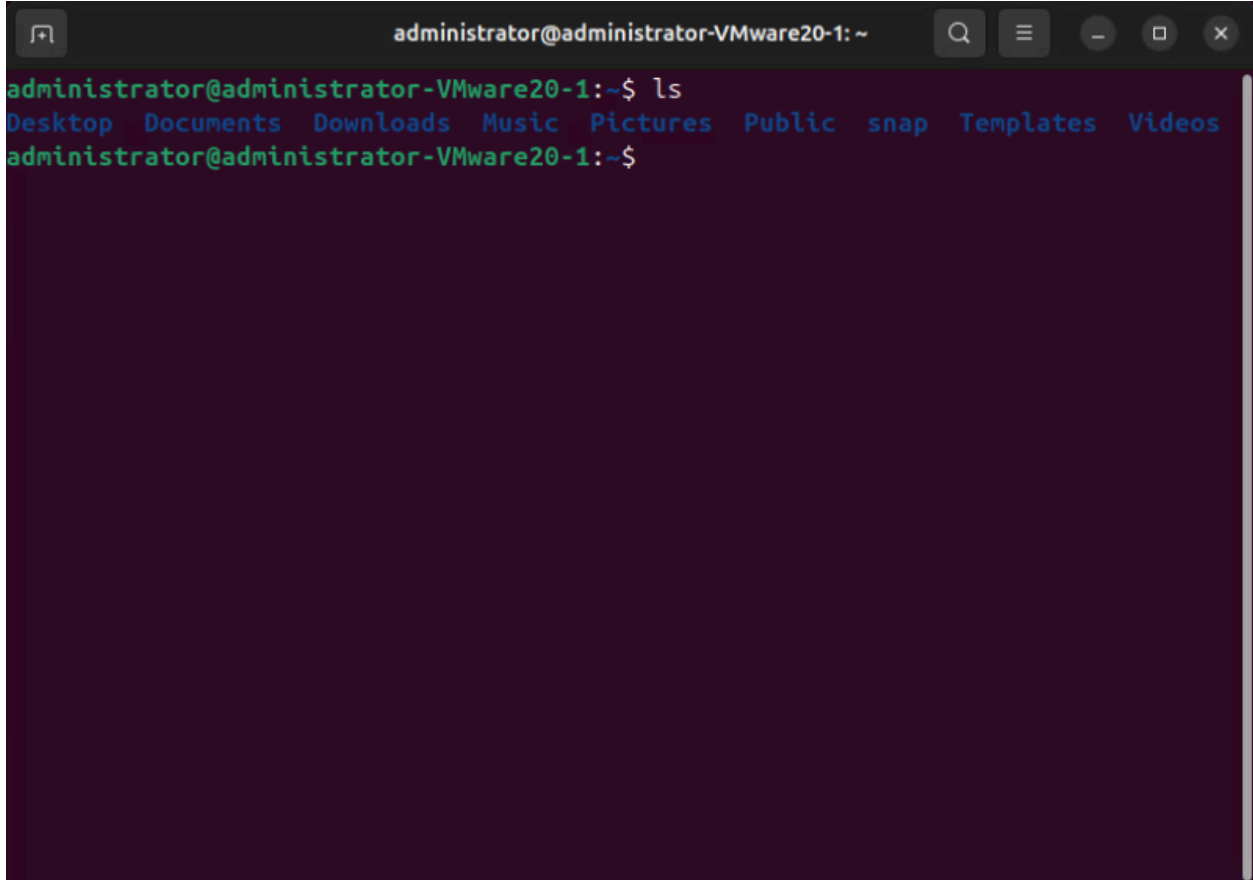
**Objective:** Learn and apply foundational Ubuntu commands for navigation, file management, and system administration.

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1. Start the Ubuntu terminal.
2. Navigate to the home directory using `cd ~`. Type “ls”

**What's the output?**

**Desktop, Documents, Downloads, Music, Pictures, Public, snap, Templates, Videos.**

A screenshot of a terminal window titled 'administrator@administrator-VMware20-1: ~'. The terminal shows the command 'ls' being executed, resulting in the output: 'Desktop Documents Downloads Music Pictures Public snap Templates Videos'. The prompt 'administrator@administrator-VMware20-1:~\$' is visible at the bottom of the terminal output.

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ ls  
Desktop Documents Downloads Music Pictures Public snap Templates Videos  
administrator@administrator-VMware20-1:~$
```

3. Create a directory called lab1 using `mkdir`. Type “ls”

**What's the output? Desktop, Documents, Downloads, Music, lab1, Pictures, Public, snap, Templates, Videos.**

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ ls  
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos  
administrator@administrator-VMware20-1:~$ mkdir lab1  
administrator@administrator-VMware20-1:~$ ls  
Desktop  Downloads  Music  Public  Templates  
Documents lab1      Pictures snap    Videos  
administrator@administrator-VMware20-1:~$
```

4. Within lab1, create three text files (file1.txt, file2.txt, and file3.txt) using `touch`.

**What command did you use? `touch file1.txt, touch file2.txt, touch file3.txt`**

```
administrator@administrator-VMware20-1: ~/lab1
administrator@administrator-VMware20-1:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
administrator@administrator-VMware20-1:~$ mkdir lab1
administrator@administrator-VMware20-1:~$ ls
Desktop  Downloads  Music  Public  Templates
Documents lab1      Pictures snap    Videos
administrator@administrator-VMware20-1:~$ cd lab1
administrator@administrator-VMware20-1:~/lab1$ touch file1.txt
administrator@administrator-VMware20-1:~/lab1$ touch file2.txt
administrator@administrator-VMware20-1:~/lab1$ touch file3.txt
administrator@administrator-VMware20-1:~/lab1$ ls
file1.txt  file2.txt  file3.txt
administrator@administrator-VMware20-1:~/lab1$
```

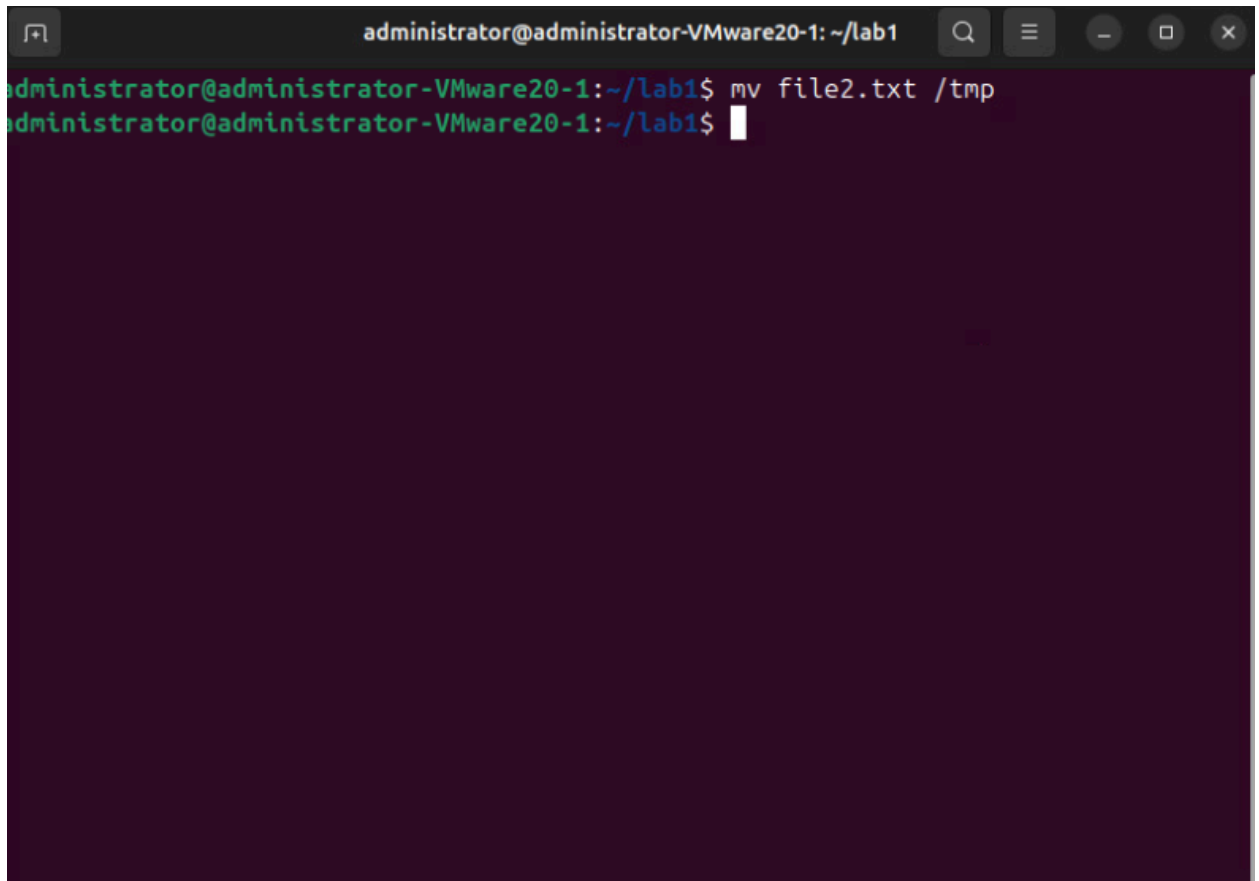
5. Check and note the permissions of `file1.txt` using `ls -l`. Change its permissions to read-only for all users using `chmod 444 file1.txt`. Verify the change with `ls -l`.

**What is your output? -r--r--r-- 1 onworks 0 Aug27 18:56 file1.txt**

```
administrator@administrator-VMware20-1: ~/lab1
administrator@administrator-VMware20-1:~/lab1$ ls -l file1.txt
-rw-rw-r-- 1 administrator administrator 0 Aug 27 15:55 file1.txt
administrator@administrator-VMware20-1:~/lab1$ chmod 444 file1.txt
administrator@administrator-VMware20-1:~/lab1$ ls -l file1.txt
-r--r--r-- 1 administrator administrator 0 Aug 27 15:55 file1.txt
administrator@administrator-VMware20-1:~/lab1$
```

6. Move `file2.txt` to the `/tmp` directory using the `mv` command.

**What command did you use? `mv file2.txt /tmp`**

A terminal window with a dark background and light-colored text. The title bar at the top reads "administrator@administrator-VMware20-1: ~/lab1". The terminal shows two lines of text: the first line is "administrator@administrator-VMware20-1:~/lab1\$ mv file2.txt /tmp" and the second line is "administrator@administrator-VMware20-1:~/lab1\$ " followed by a cursor. The window has standard Linux window controls (minimize, maximize, close) on the right side of the title bar.

```
administrator@administrator-VMware20-1: ~/lab1
administrator@administrator-VMware20-1:~/lab1$ mv file2.txt /tmp
administrator@administrator-VMware20-1:~/lab1$
```

7. Confirm the file exists in /tmp by navigating there and listing the contents.

**What command did you use? cd /tmp**



```
administrator@administrator-VMware20-1: /tmp
administrator@administrator-VMware20-1:~$ cd /tmp
administrator@administrator-VMware20-1:/tmp$ ls
file2.txt
snap-private-tmp
systemd-private-19b4664e193a4fdf8d2238edefaf3671-colord.service-z9BYaS
systemd-private-19b4664e193a4fdf8d2238edefaf3671-ModemManager.service-kD3RH3
systemd-private-19b4664e193a4fdf8d2238edefaf3671-polkit.service-iPound
systemd-private-19b4664e193a4fdf8d2238edefaf3671-power-profiles-daemon.service-Z
qxHE5
systemd-private-19b4664e193a4fdf8d2238edefaf3671-switcheroo-control.service-tJCM
d4
systemd-private-19b4664e193a4fdf8d2238edefaf3671-systemd-logind.service-5vRcRP
systemd-private-19b4664e193a4fdf8d2238edefaf3671-systemd-oemd.service-14if8I
systemd-private-19b4664e193a4fdf8d2238edefaf3671-systemd-resolved.service-Vr9mMd
systemd-private-19b4664e193a4fdf8d2238edefaf3671-systemd-timesyncd.service-kNzZD
1
systemd-private-19b4664e193a4fdf8d2238edefaf3671-upower.service-HiLySs
VMwareDnD
vmware-root_893-3988097506
administrator@administrator-VMware20-1:/tmp$
```

8. Delete file3.txt using rm.

**What is your command and output?**

**rm file3.txt**

**ls**

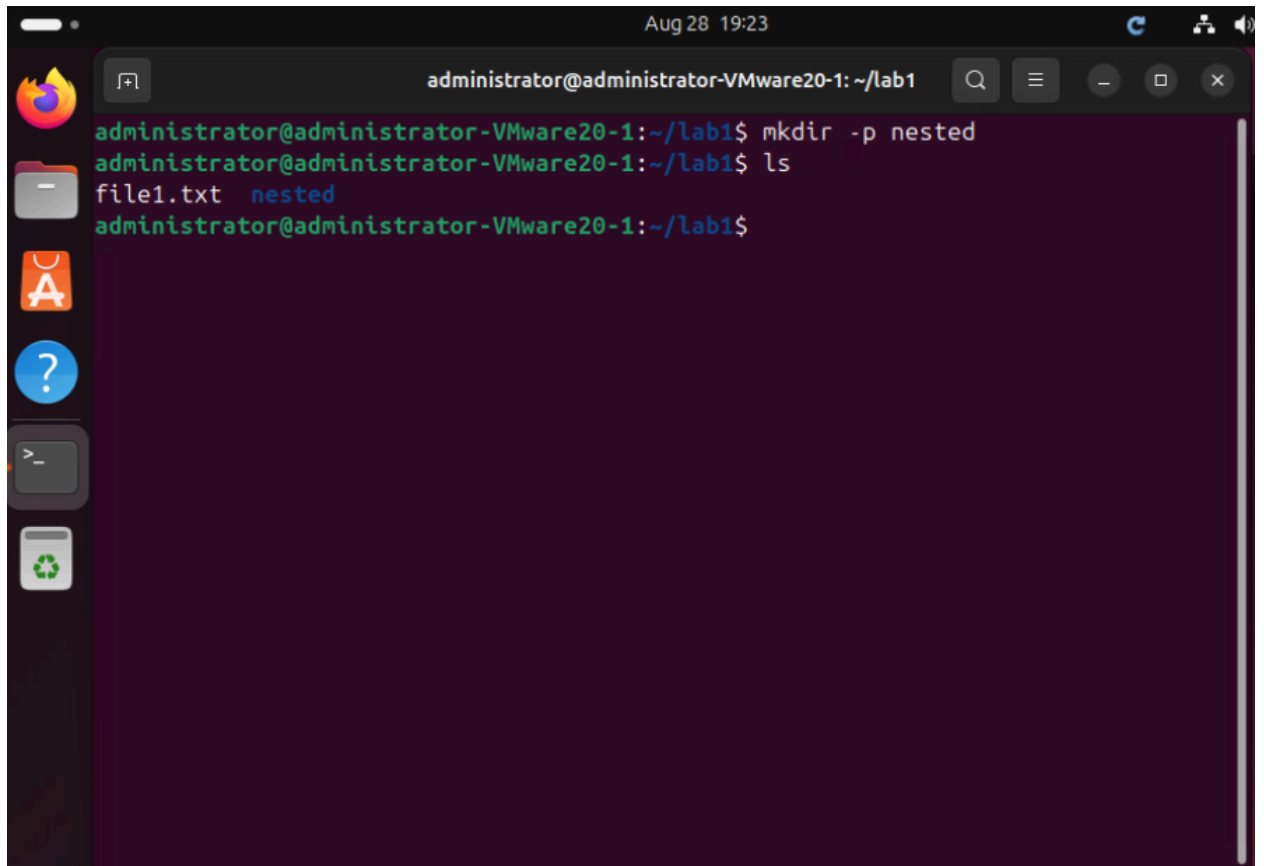
**file1.txt**

```
administrator@administrator-VMware20-1: ~/lab1
administrator@administrator-VMware20-1:~/lab1$ rm file3.txt
administrator@administrator-VMware20-1:~/lab1$ ls
file1.txt
administrator@administrator-VMware20-1:~/lab1$
```

9. Create a nested directory structure within lab1: nested/inside. Use mkdir with the -p flag.

**What command did you use?**

**mkdir -p nested**

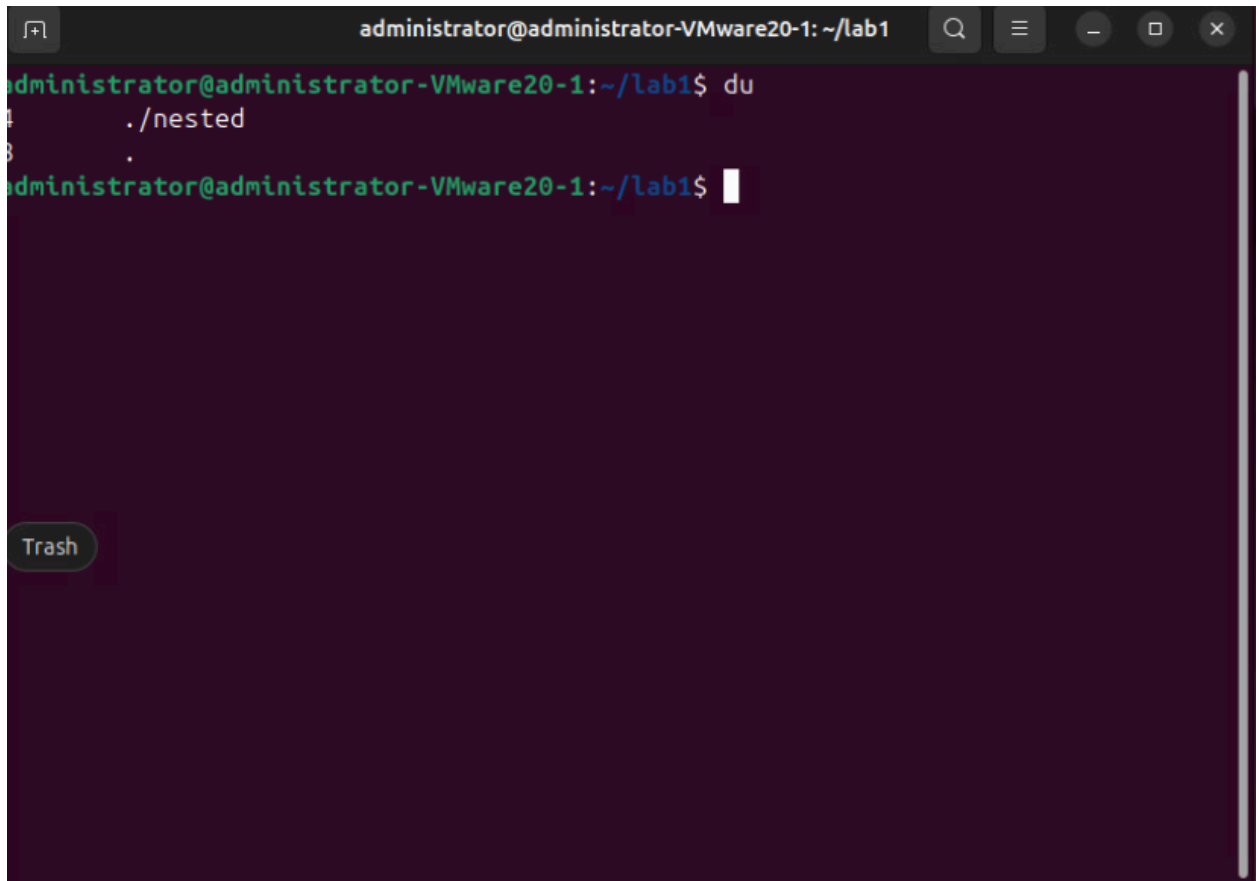
A screenshot of a Linux terminal window. The window title is 'administrator@administrator-VMware20-1: ~/lab1'. The terminal shows the following commands and output: 'mkdir -p nested' is executed successfully. Then 'ls' is executed, showing 'file1.txt' and 'nested' as the contents of the directory. The prompt returns to 'administrator@administrator-VMware20-1: ~/lab1\$'. On the left side of the terminal, there is a vertical dock with icons for Firefox, a file manager, an application store, a help icon, a terminal icon, and a trash icon. The top of the window shows the date and time 'Aug 28 19:23' and some system status icons.

```
administrator@administrator-VMware20-1: ~/lab1
administrator@administrator-VMware20-1:~/lab1$ mkdir -p nested
administrator@administrator-VMware20-1:~/lab1$ ls
file1.txt  nested
administrator@administrator-VMware20-1:~/lab1$
```

10. Use the `du` command to find the size of lab1 and its subdirectories.

**What command did you use?**

**du**

A terminal window titled 'administrator@administrator-VMware20-1: ~/lab1'. The prompt is 'administrator@administrator-VMware20-1:~/lab1\$'. The first command entered is 'du', which outputs '4 ./nested'. The second command entered is 'ls', which outputs '8 .' followed by a blank line. A 'Trash' icon is visible on the left side of the terminal window.

```
administrator@administrator-VMware20-1:~/lab1$ du
4    ./nested
8    .
administrator@administrator-VMware20-1:~/lab1$
```

11. Add a new user named student and set a password for this user. Log in as student using su student.

**What command did you use?**

sudo adduser student

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ sudo adduser student  
[sudo] password for administrator:  
info: Adding user `student' ...  
info: Selecting UID/GID from range 1000 to 59999 ...  
info: Adding new group `student' (1001) ...  
info: Adding new user `student' (1001) with group `student (1001)' ...  
info: Creating home directory `/home/student' ...  
info: Copying files from `/etc/skel' ...  
info: passwd:  
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary word  
Retype new password:  
passwd: password updated successfully  
Changing the user information for student  
Enter the new value, or press ENTER for the default  
    Full Name []: student  
    Room Number []: student  
    Work Phone []: student  
    Home Phone []: student  
    Other []: student  
Is the information correct? [Y/n] y  
info: Adding new user `student' to supplemental / extra groups `users' ...  
info: Adding user `student' to group `users' ...  
administrator@administrator-VMware20-1:~$
```

12. Change the password for student to something new and lock their account. Verify the lock status.

**What command did you use?**

**sudo passwd student && sudo passwd -l student**

**sudo passwd -S student**

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ sudo passwd student && sudo passwd -l student  
New password:  
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary word  
Retype new password:  
Sorry, passwords do not match.  
New password:  
BAD PASSWORD: The password fails the dictionary check - it is based on a dictionary word  
Retype new password:  
passwd: password updated successfully  
passwd: password changed.  
administrator@administrator-VMware20-1:~$ sudp passwd -S student  
Command 'sudp' not found, did you mean:  
  command 'ssdp' from snap ssdp (0.0.1)  
  command 'sudo' from deb sudo (1.9.15p5-3ubuntu5.24.04.1)  
  command 'sudo' from deb sudo-ldap (1.9.15p5-3ubuntu5.24.04.1)  
  command 'sfdp' from deb graphviz (2.42.2-9ubuntu0.1)  
  command 'sup' from deb sup (20100519-3)  
See 'snap info <snapname>' for additional versions.  
administrator@administrator-VMware20-1:~$ sudo passwd -S student  
student L 2025-08-28 0 99999 7 -1  
administrator@administrator-VMware20-1:~$
```

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## Lab 2: Advanced Ubuntu Features

**Objective:** Master advanced Ubuntu commands for searching, archiving, and process management.

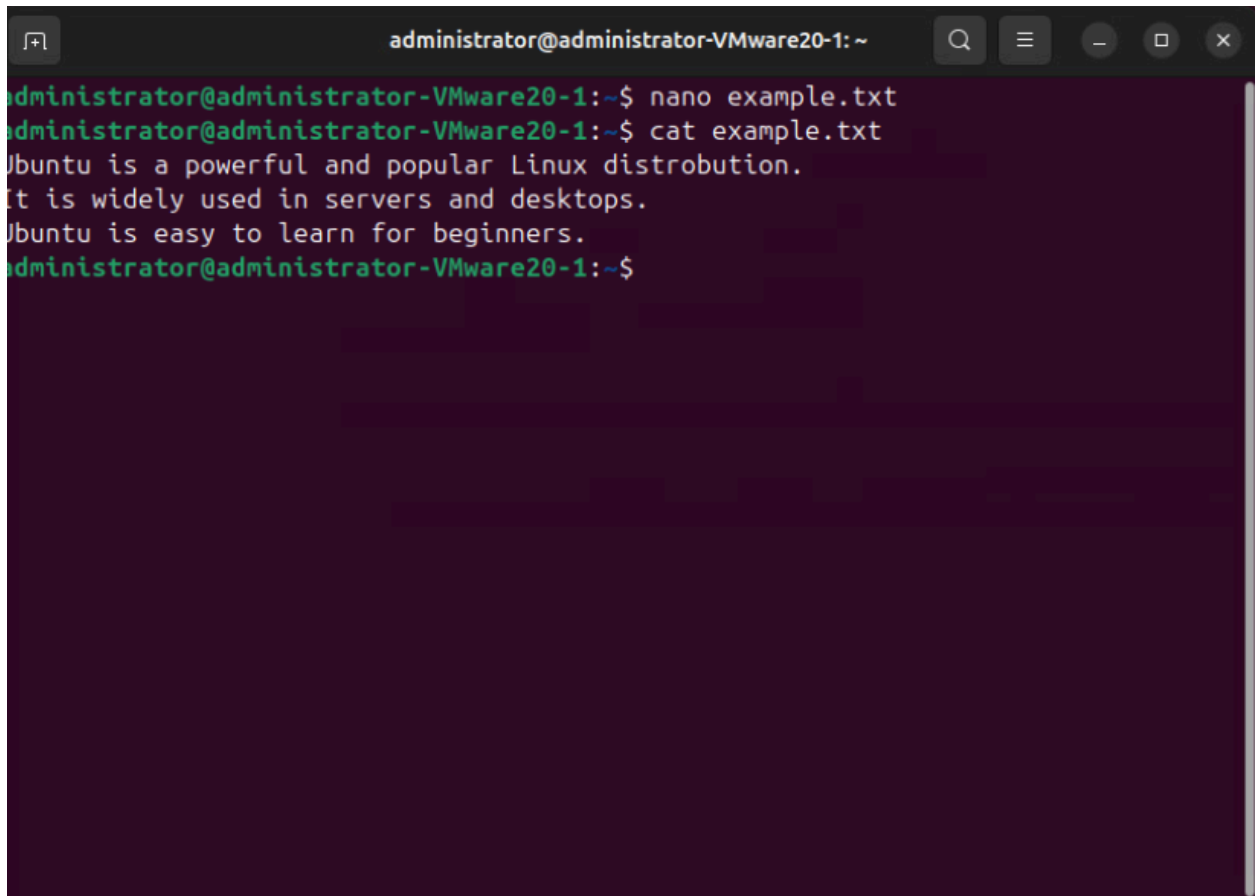
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1. Create a file called `example.txt` with the following content:

*“Ubuntu is a powerful and popular Linux distribution.*

*It is widely used in servers and desktops.*

*Ubuntu is easy to learn for beginners.”*

A terminal window titled 'administrator@administrator-VMware20-1: ~' with standard window controls. The terminal shows the following commands and output:

```
administrator@administrator-VMware20-1:~$ nano example.txt
administrator@administrator-VMware20-1:~$ cat example.txt
Ubuntu is a powerful and popular Linux distrobution.
it is widely used in servers and desktops.
Ubuntu is easy to learn for beginners.
administrator@administrator-VMware20-1:~$
```

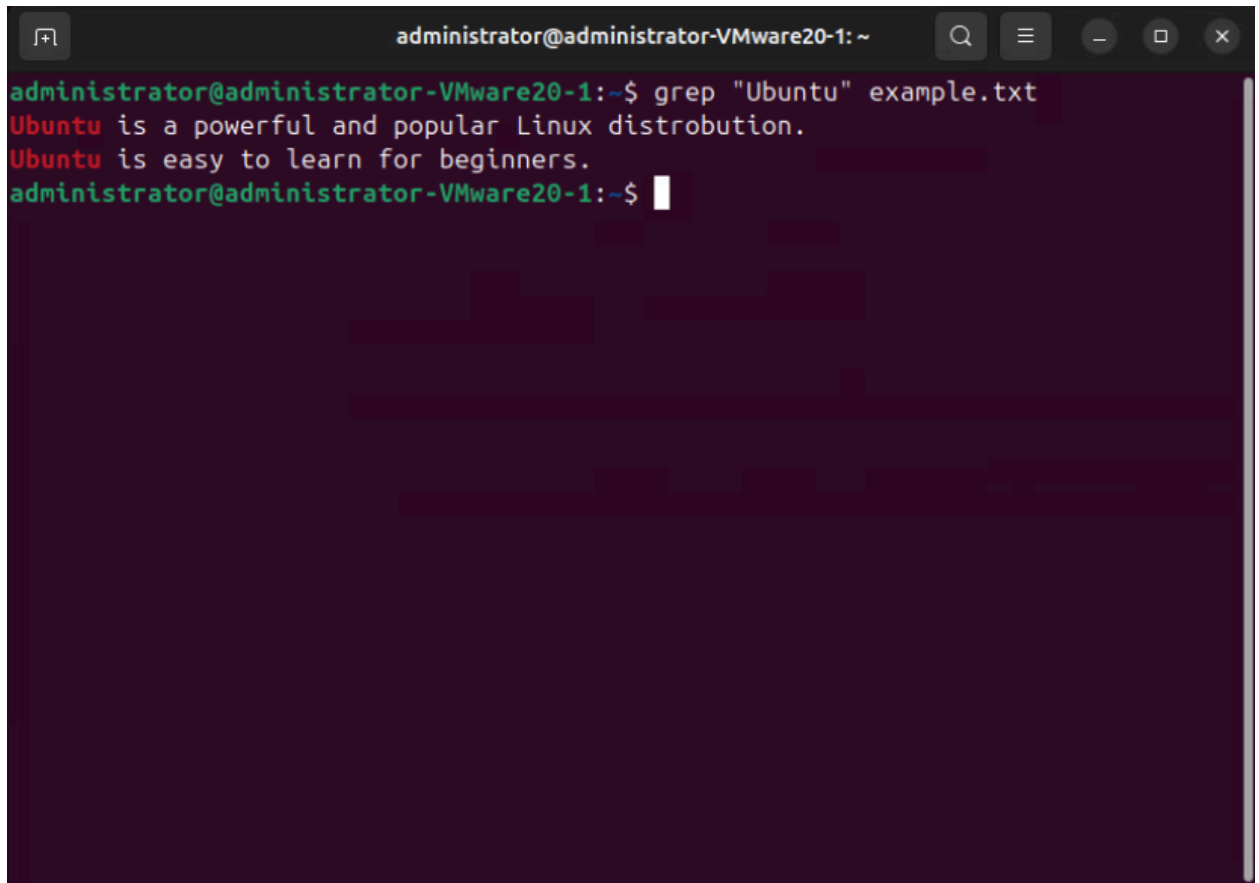
2. Use `grep` to search for the word "Ubuntu" in `example.txt`.

**What command did you use? What is your output?**

**`grep "Ubuntu" example.txt`**

**Ubuntu is a powerful and popular Linux distribution.**

**Ubuntu is easy to learn for beginners.**

A terminal window titled 'administrator@administrator-VMware20-1: ~' with standard window controls. The prompt is 'administrator@administrator-VMware20-1:~\$'. The command 'grep "Ubuntu" example.txt' has been entered. The output shows two lines: 'Ubuntu is a powerful and popular Linux distrobution.' and 'Ubuntu is easy to learn for beginners.' The word 'Ubuntu' is highlighted in red in both lines. The prompt 'administrator@administrator-VMware20-1:~\$' is followed by a white cursor.

```
administrator@administrator-VMware20-1:~$ grep "Ubuntu" example.txt
Ubuntu is a powerful and popular Linux distrobution.
Ubuntu is easy to learn for beginners.
administrator@administrator-VMware20-1:~$
```

3. Modify the search to ignore case sensitivity using an appropriate flag.

**What command did you use? What is your output?**

**grep -i "Ubuntu" example.txt**

**Ubuntu is a powerful and popular Linux distribution.**

**Ubuntu is easy to learn for beginners.**



```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ grep "Ubuntu" example.txt  
Ubuntu is a powerful and popular Linux distrobution.  
Ubuntu is easy to learn for beginners.  
administrator@administrator-VMware20-1:~$ grep -i "Ubuntu" example.txt  
Ubuntu is a powerful and popular Linux distrobution.  
Ubuntu is easy to learn for beginners.  
administrator@administrator-VMware20-1:~$
```

4. Find all lines in example.txt that begin with "Ubuntu" using grep and regex.

**What command did you use? What is your output?**

**grep '^Ubuntu' example.txt**

**Ubuntu is a powerful and popular Linux distribution.**

**Ubuntu is easy to learn for beginners.**

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ grep "Ubuntu" example.txt  
Ubuntu is a powerful and popular Linux distrobution.  
Ubuntu is easy to learn for beginners.  
administrator@administrator-VMware20-1:~$ grep -i "Ubuntu" example.txt  
Ubuntu is a powerful and popular Linux distrobution.  
Ubuntu is easy to learn for beginners.  
administrator@administrator-VMware20-1:~$ grep '^Ubuntu' example.txt  
Ubuntu is a powerful and popular Linux distrobution.  
Ubuntu is easy to learn for beginners.  
administrator@administrator-VMware20-1:~$
```

5. Compress the example.txt file using gzip (gzip example.txt). List the contents of the directory to confirm the compressed file.

**What command did you use? What is your output?**

6. Decompress the file using gunzip.

**What command did you use?**

**gzip example.txt**

**ls**

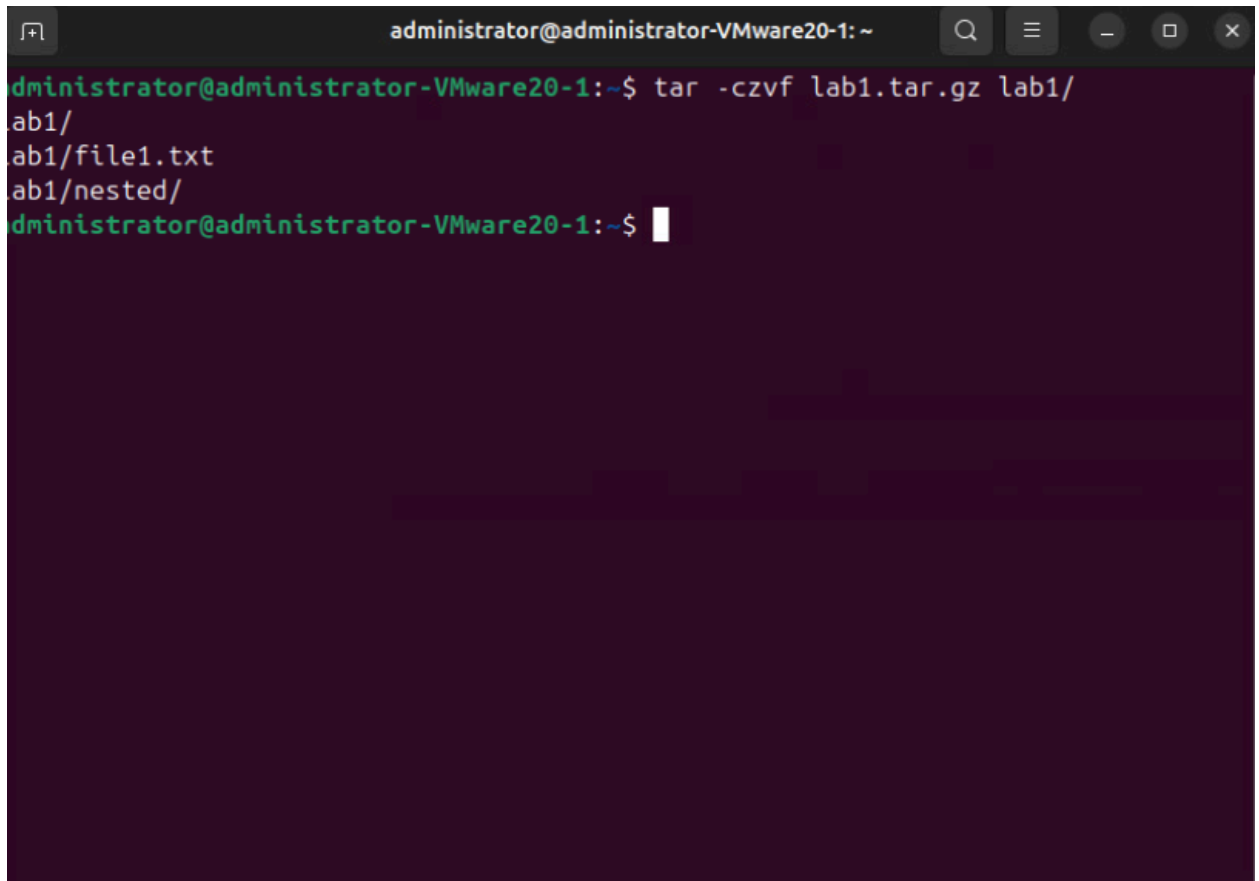
**example.txt.gz**

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ gzip example.txt  
administrator@administrator-VMware20-1:~$ ls  
Desktop    Downloads    lab1    Pictures    snap    Videos  
Documents  example.txt.gz  Music  Public    Templates  
administrator@administrator-VMware20-1:~$
```

7. Create a tar archive of the lab1 directory and compress it using gzip.

**What command did you use?**

**tar -czvf lab1.tar.gz lab1/**

A terminal window with a dark background and light green text. The title bar at the top reads 'administrator@administrator-VMware20-1: ~'. The terminal shows the command 'tar -czvf lab1.tar.gz lab1/' being executed. The output lists the files being archived: 'ab1/', 'ab1/file1.txt', and 'ab1/nested/'. The prompt returns to 'administrator@administrator-VMware20-1:~\$' with a cursor.

```
administrator@administrator-VMware20-1: ~
administrator@administrator-VMware20-1:~$ tar -czvf lab1.tar.gz lab1/
ab1/
ab1/file1.txt
ab1/nested/
administrator@administrator-VMware20-1:~$
```

8. Extract the tar.gz file to confirm its contents.

**What commands did you use?**

**tar -xzf lab1.tar.gz**

```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ tar -czvf lab1.tar.gz lab1/  
lab1/  
lab1/file1.txt  
lab1/nested/  
administrator@administrator-VMware20-1:~$ tar -xzvf lab1.tar.gz  
lab1/  
lab1/file1.txt  
lab1/nested/  
administrator@administrator-VMware20-1:~$
```

9. Use `ps aux` to list all processes. Identify the most resource-intensive process.

**What is your output? adminis+ 4701 0.0 2.1 676484 175032 ? SNI Aug27 0:03 /usr/bin/pyth**

```
administrator@administrator-VMware20-1: ~  
adminis+ 3037 0.0 0.1 710284 14492 ? Ssl Aug27 0:02 /usr/libexec/  
adminis+ 3048 0.0 0.2 275540 24148 ? Sl Aug27 0:00 /usr/libexec/  
adminis+ 3049 0.0 0.0 244940 6612 ? Ssl Aug27 0:00 /usr/libexec/  
adminis+ 3054 0.0 0.3 816956 26068 ? Sssl Aug27 0:00 /usr/libexec/  
adminis+ 3055 0.0 1.0 1085868 87852 ? Ssl Aug27 0:00 /usr/libexec/  
adminis+ 3061 0.0 1.2 1257004 98240 ? Sl Aug27 0:00 /usr/libexec/  
adminis+ 3104 0.0 0.3 426456 26140 ? Ssl Aug27 0:00 /usr/libexec/  
adminis+ 3458 0.0 0.7 2881744 61944 ? Sl Aug27 0:03 gjs /usr/shar  
adminis+ 3569 0.0 0.3 651140 31584 ? Sl Aug27 0:02 /usr/bin/upda  
root 3785 0.0 0.5 602272 43196 ? Ssl Aug27 0:06 /usr/libexec/  
adminis+ 4701 0.0 2.1 676484 175032 ? SNI Aug27 0:03 /usr/bin/pyth  
root 5295 0.0 0.1 47504 12740 ? Ss Aug27 0:00 /usr/sbin/cup  
cups-br+ 5298 0.0 0.2 268880 20202 ? Ssl Aug27 0:00 /usr/sbin/cup  
root 8417 0.0 0.2 50400 17224 ? S-s 06:50 0:00 /usr/lib/syst  
systemd+ 8580 0.0 0.0 91044 7852 ? Ssl 06:50 0:00 /usr/lib/syst  
root 8775 0.0 0.1 30540 8604 ? Ss 06:50 0:00 /usr/lib/syst  
root 8779 0.0 0.0 0 0 ? S 06:50 0:00 [psimon]  
systemd+ 8927 0.0 0.0 17556 7748 ? Ss 06:50 0:12 /usr/lib/syst  
systemd+ 9223 0.0 0.1 21672 13460 ? Ss 06:50 0:00 /usr/lib/syst  
root 20856 0.0 0.1 56064 12484 ? Ss 06:51 0:00 /usr/bin/VGAu  
root 20858 0.1 0.1 318732 9792 ? Ssl 06:51 0:52 /usr/bin/vmto  
root 21062 0.0 0.0 152476 1412 ? Ssl 06:51 0:00 vmware-vmblc  
root 25785 0.0 0.0 0 0 ? I< 06:52 0:00 [kworker/1:0H  
root 25922 0.0 0.0 0 0 ? S 06:52 0:00 [psimon]  
root 25929 0.0 0.1 469604 14488 ? Ssl 06:52 0:01 /usr/libexec/  
syslog 26245 0.0 0.0 222564 5508 ? Ssl 06:52 0:00 /usr/sbin/rsy  
root 30239 0.0 0.0 0 0 ? I 16:29 0:00 [kworker/1:0-  
root 30307 0.0 0.0 0 0 ? I 17:20 0:00 [kworker/2:3-  
root 30426 0.0 0.0 0 0 ? I 18:10 0:00 [kworker/0:0-  
root 30503 0.0 0.0 0 0 ? I 19:17 0:00 [kworker/u12:  
root 30506 0.0 0.0 0 0 ? I 19:20 0:00 [kworker/0:2-  
root 30521 0.0 0.0 0 0 ? I< 19:21 0:00 [kworker/u13:  
adminis+ 30582 0.0 0.2 31904 19360 ? S 19:24 0:00 /usr/bin/pyth  
adminis+ 30585 0.0 0.3 458972 29344 ? Sl 19:24 0:00 /usr/bin/gnom
```

10. Use kill to terminate a dummy process you create (e.g., running sleep 1000 in another terminal).

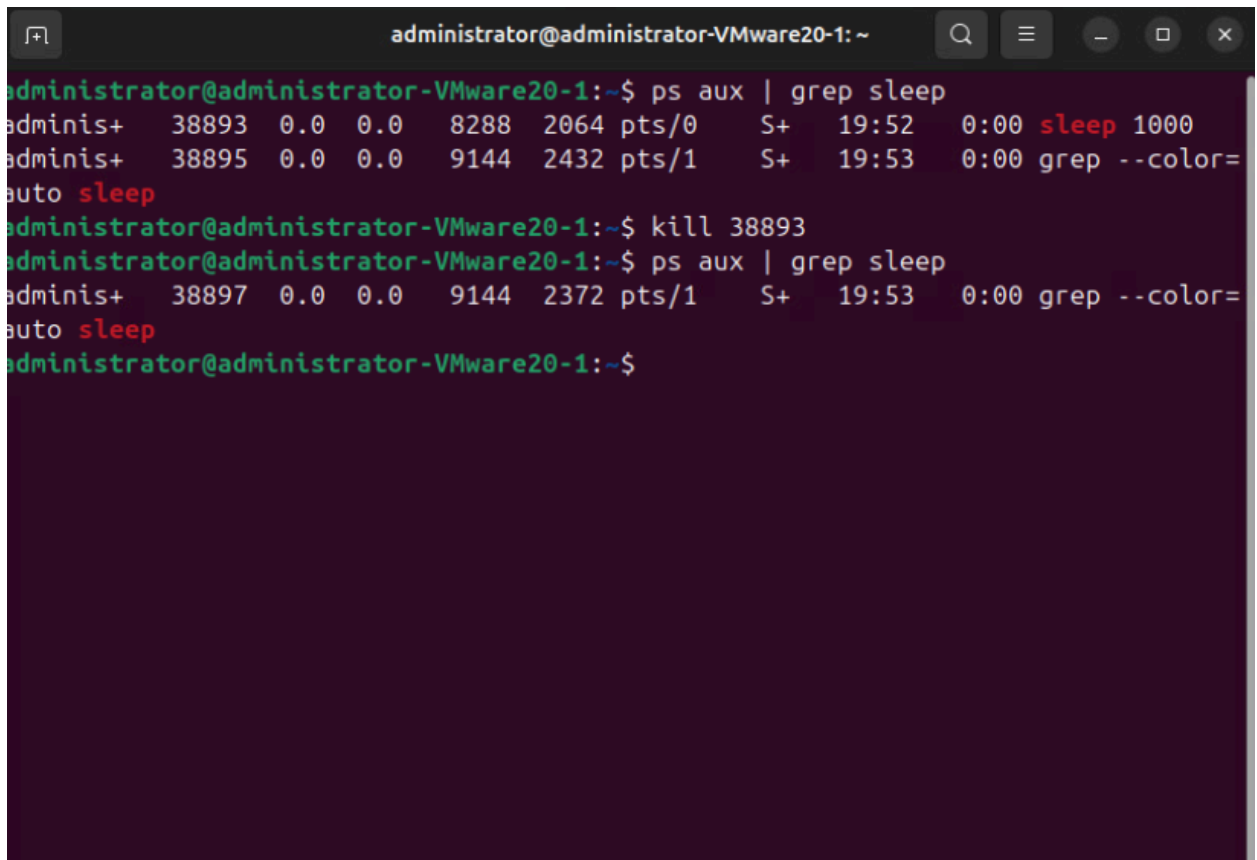
What is your output?

sleep 1000

ps aux | grep sleep

kill 38893

ps aux | grep sleep



```
administrator@administrator-VMware20-1: ~  
administrator@administrator-VMware20-1:~$ ps aux | grep sleep  
adminis+  38893  0.0  0.0   8288  2064 pts/0    S+   19:52   0:00  sleep 1000  
adminis+  38895  0.0  0.0   9144  2432 pts/1    S+   19:53   0:00  grep --color=  
auto sleep  
administrator@administrator-VMware20-1:~$ kill 38893  
administrator@administrator-VMware20-1:~$ ps aux | grep sleep  
adminis+  38897  0.0  0.0   9144  2372 pts/1    S+   19:53   0:00  grep --color=  
auto sleep  
administrator@administrator-VMware20-1:~$
```

**Submission:** Submit a single Word or PDF document with:

- The answers to the questions highlighted with blue font.
  - Screenshots showing the output of each step.
-