

## CYSE 270: Linux System for Cybersecurity

### Lab 7 – Manage Local Storage

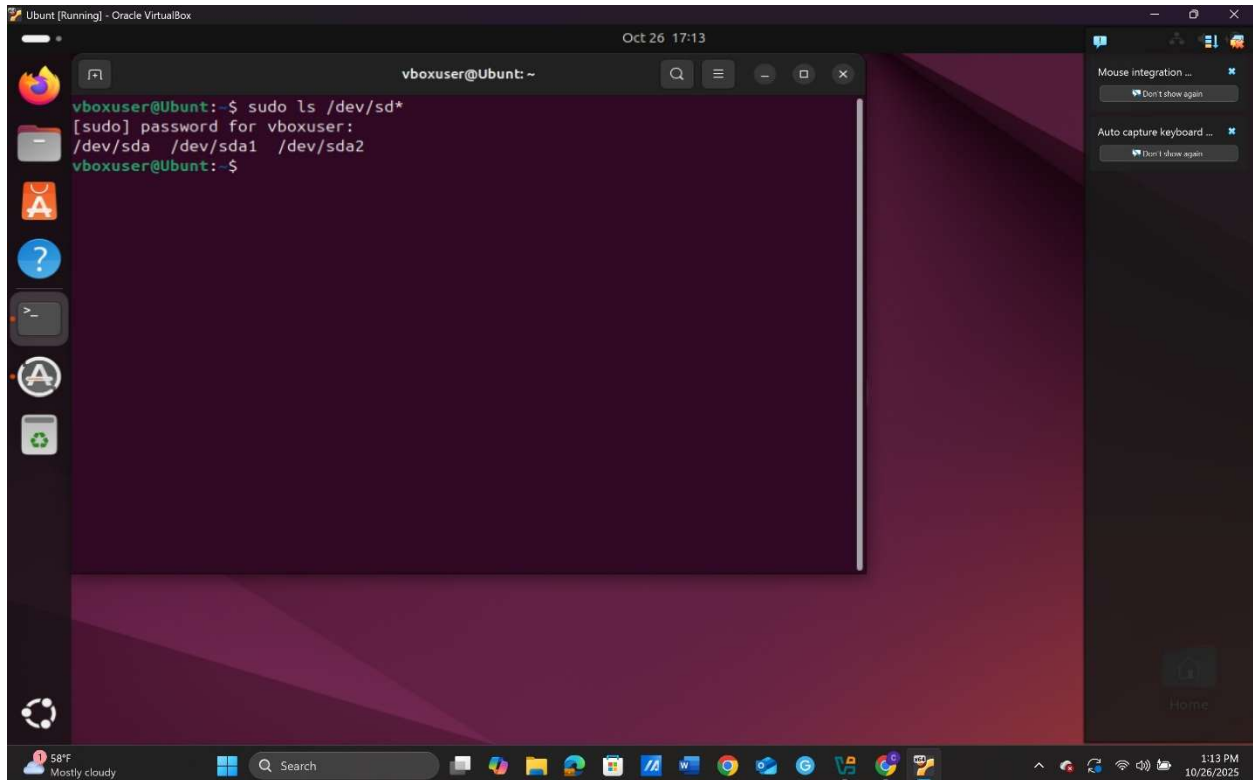
Christos Dotson

CYSE 270: Linux System for Cybersecurity

Part I– Check your file system (30 points).

Submit the screenshot for All the three steps.

Step 1. Execute the `ls /dev/sd*` command to see the current hard disk devices. [use sudo ]



The screenshot shows a terminal window titled 'vboxuser@Ubuntu: ~' with a search bar and window controls. The terminal output is as follows:

```
vboxuser@Ubuntu:~$ sudo ls /dev/sd*
[sudo] password for vboxuser:
/dev/sda /dev/sda1 /dev/sda2
vboxuser@Ubuntu:~$
```

The terminal is open on a desktop environment with a purple and red gradient background. On the left is a dock with icons for Firefox, Files, Applications, a question mark, a terminal, and a trash can. On the right is a sidebar with 'Mouse integration ...' and 'Auto capture keyboard ...' options. The bottom of the screen shows a system status bar with a weather icon (58°F, Mostly cloudy), a search bar, and a taskbar with various application icons. The system clock in the bottom right corner shows '1:13 PM' and '10/26/2025'.

Step 2. Execute the `fdisk -l` command to list the current hard disk partitions. [use sudo ]

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:20
vboxuser@Ubunt: ~

Disk /dev/loop11: 49.29 MiB, 51687424 bytes, 100952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop13: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop14: 18.49 MiB, 19386368 bytes, 37864 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 66.84 MiB, 70090752 bytes, 136896 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubunt:~$
```

Step 3. Execute the parted -l command to list the current hard disk partition table. [use sudo]

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:20
vboxuser@Ubunt: ~

Disk /dev/loop14: 18.49 MiB, 19386368 bytes, 37864 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 66.84 MiB, 70090752 bytes, 136896 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubunt:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 26.8GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

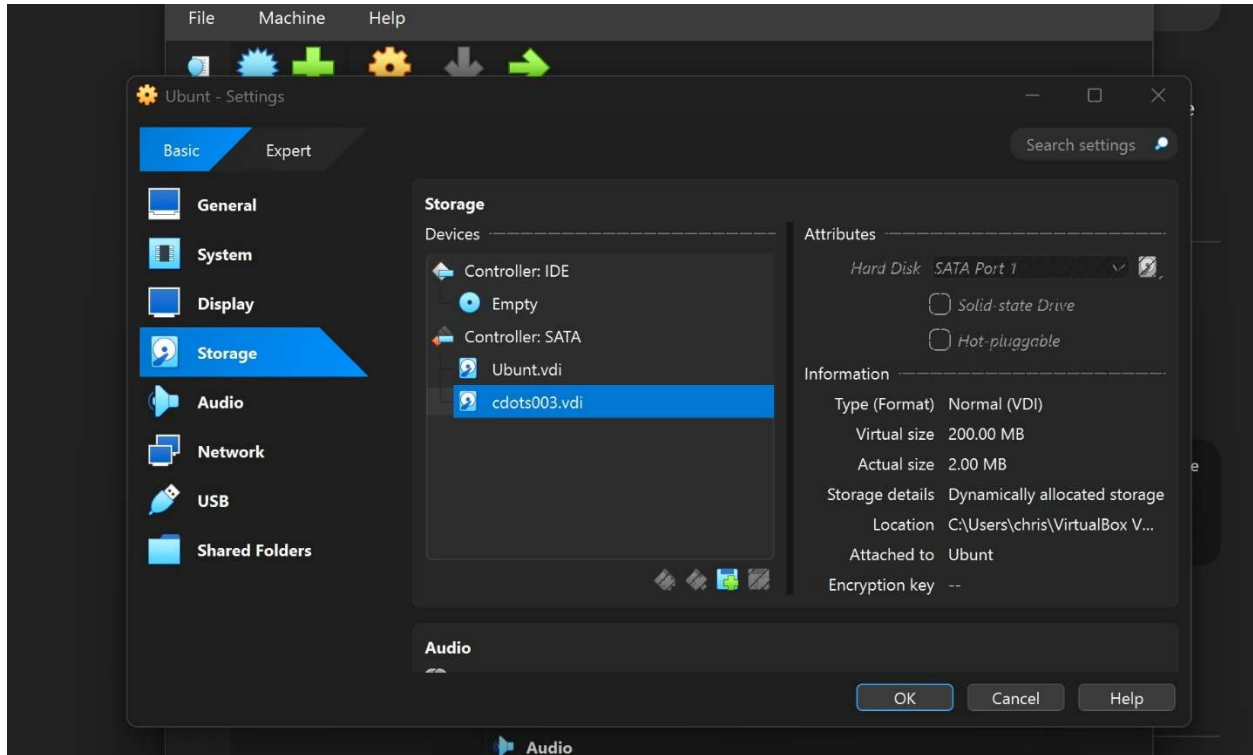
Number  Start   End     Size    File system  Name  Flags
  1      1049kB  2097kB  1049kB             bios_grub
  2      2097kB  26.8GB  26.8GB  ext4

vboxuser@Ubunt:~$
```

## Part II– Create a new virtual disk (30 points)

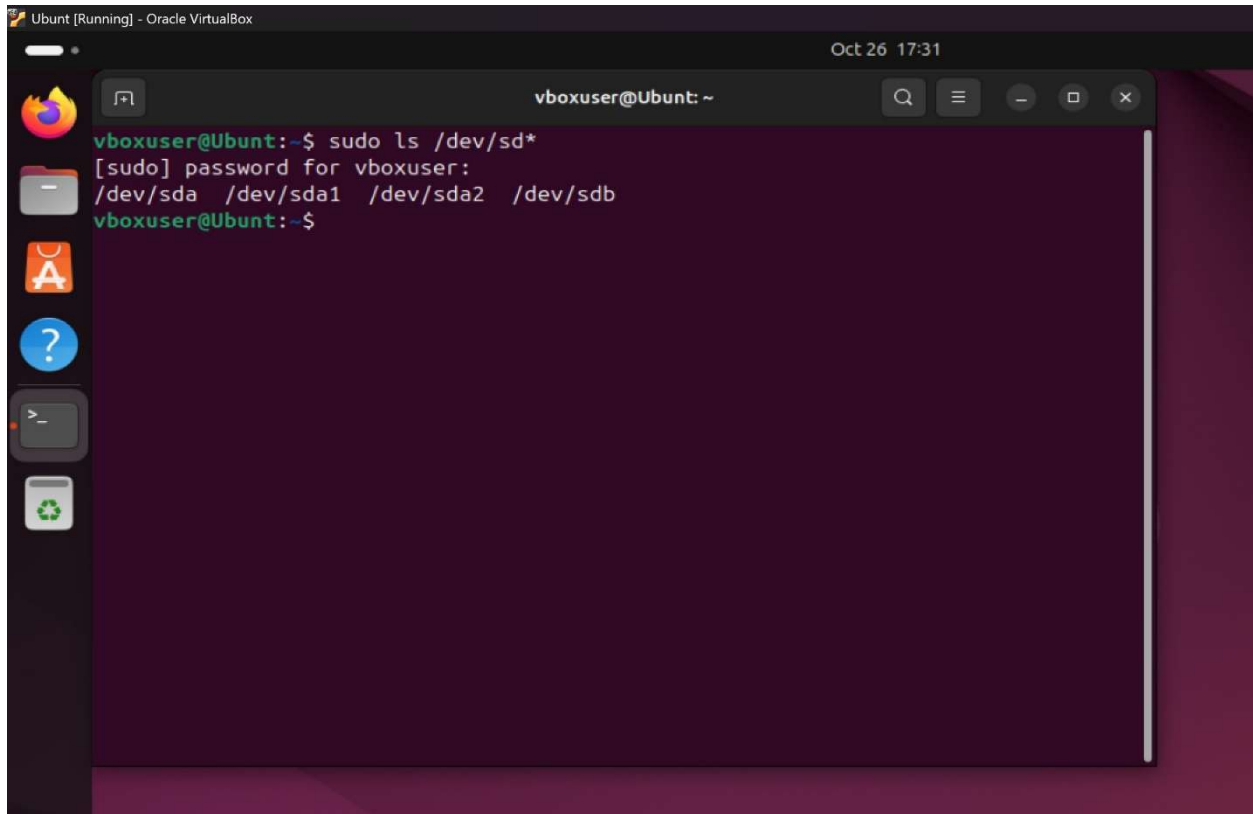
Submit the screenshot for All the three steps.

Step 1. In the VM setting, attach a new virtual hard disk with the size of 200 MB to our current Linux

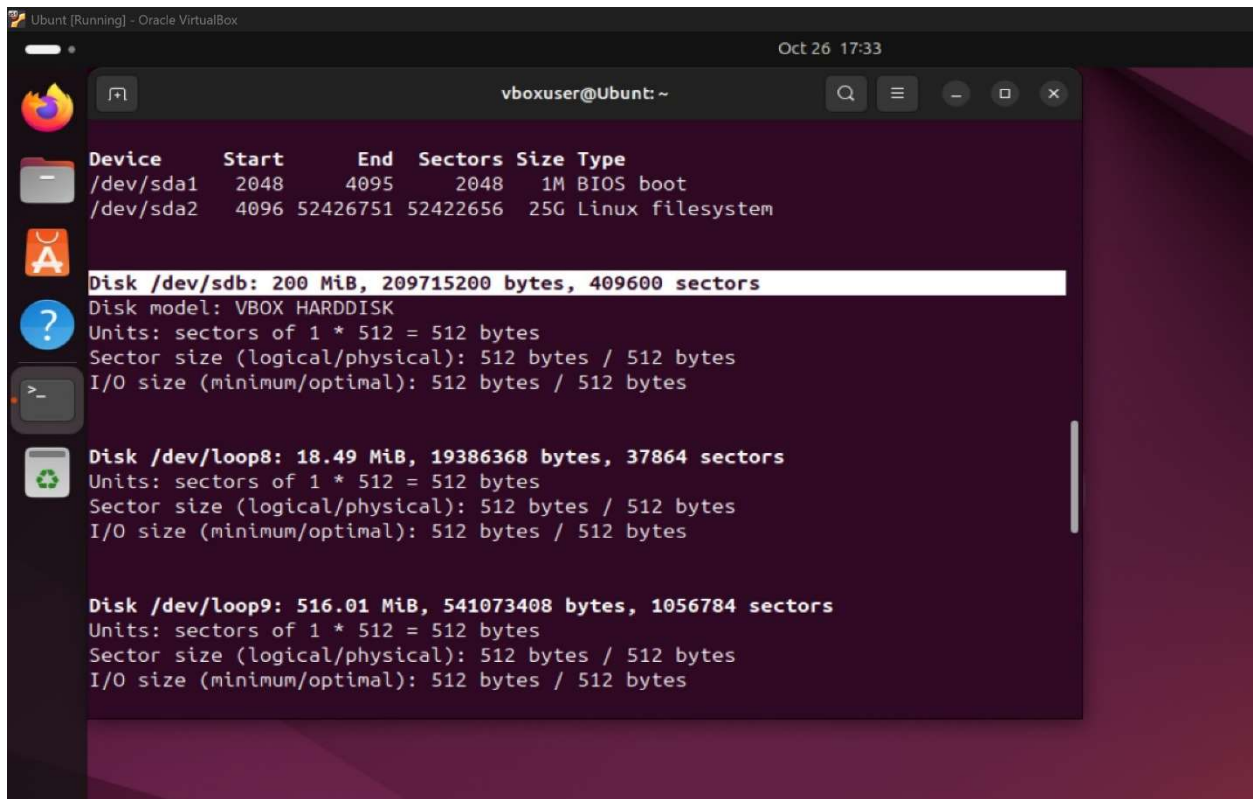


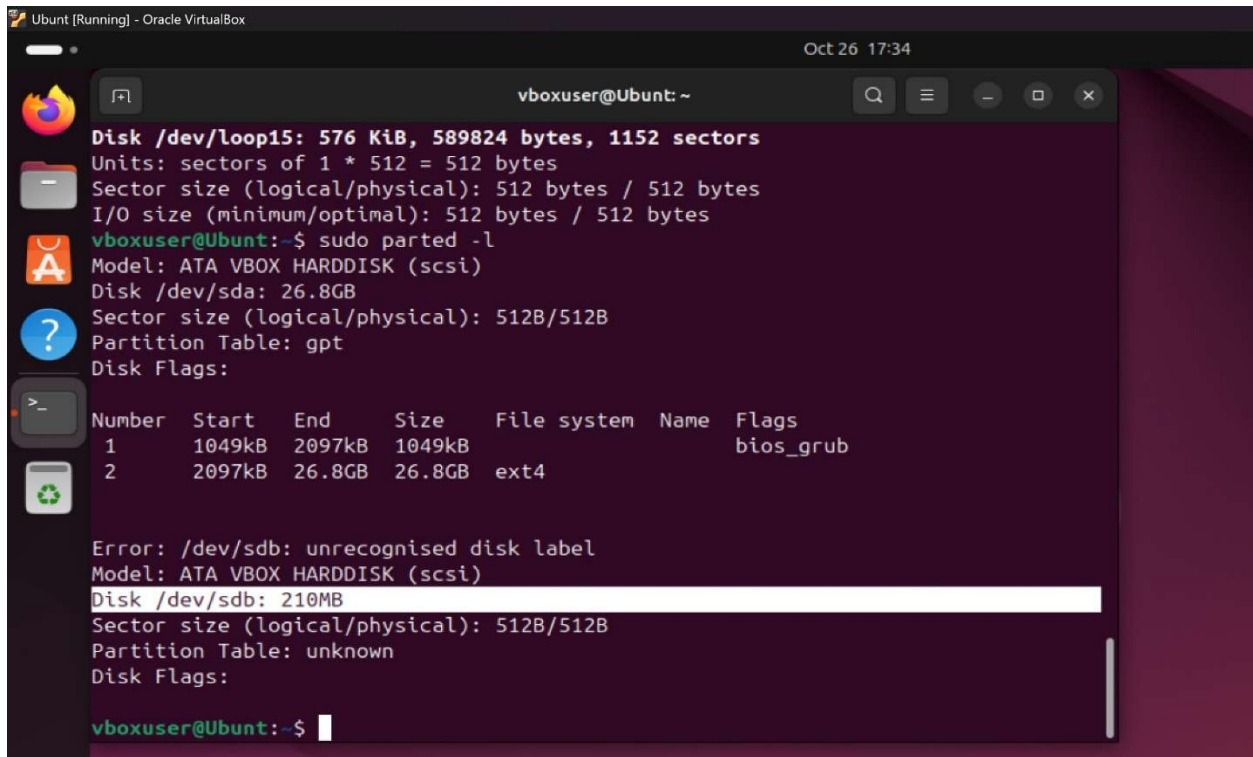
VM. Name it as “your\_midat.vdi” [ HINT: Please refer to the slides and discussion during the class for week 7]

Step 2. Load this virtual hard disk to your virtual machine.



Step 3. Repeat the steps in Part I and highlight the differences after adding the new virtual hard disk.





The screenshot shows a terminal window titled 'vboxuser@Ubuntu: ~' with a search icon and window controls. The terminal output displays disk information for /dev/loop15 and /dev/sda, followed by the execution of the 'sudo parted -l' command. It shows a table of partitions on /dev/sda, including a bios\_grub partition and an ext4 partition. Below this, it shows an error for /dev/sdb and its disk information.

```
Oct 26 17:34
vboxuser@Ubuntu: ~
Disk /dev/loop15: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 26.8GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  Flags
 1      1049kB  2097kB  1049kB             bios_grub
 2      2097kB  26.8GB  26.8GB   ext4

Error: /dev/sdb: unrecognised disk label
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 210MB
Sector size (logical/physical): 512B/512B
Partition Table: unknown
Disk Flags:

vboxuser@Ubuntu:~$
```

### Part III– Creating Partitions and Filesystems (60 points)

Submit the screenshot for All the three eight steps.

Step 1. Use the fdisk command to create a new primary partition on the new virtual hard disk attached in Part II.

```
Ubuntu [Running] - Oracle VirtualBox
vboxuser@Ubuntu: ~
Welcome to fdisk (util-linux 2.39.3).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS (MBR) disklabel with disk identifier 0x7658f601.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-409599, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-409599, default 409599):

Created a new partition 1 of type 'Linux' and of size 199 MiB.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

vboxuser@Ubuntu:~$
```

Step 2. Use the correct command to create an ext4 filesystem on the new partition.

```
Ubuntu [Running] - Oracle VirtualBox
vboxuser@Ubuntu: ~
Partition number (1-4, default 1): 1
First sector (2048-409599, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-409599, default 409599):

Created a new partition 1 of type 'Linux' and of size 199 MiB.

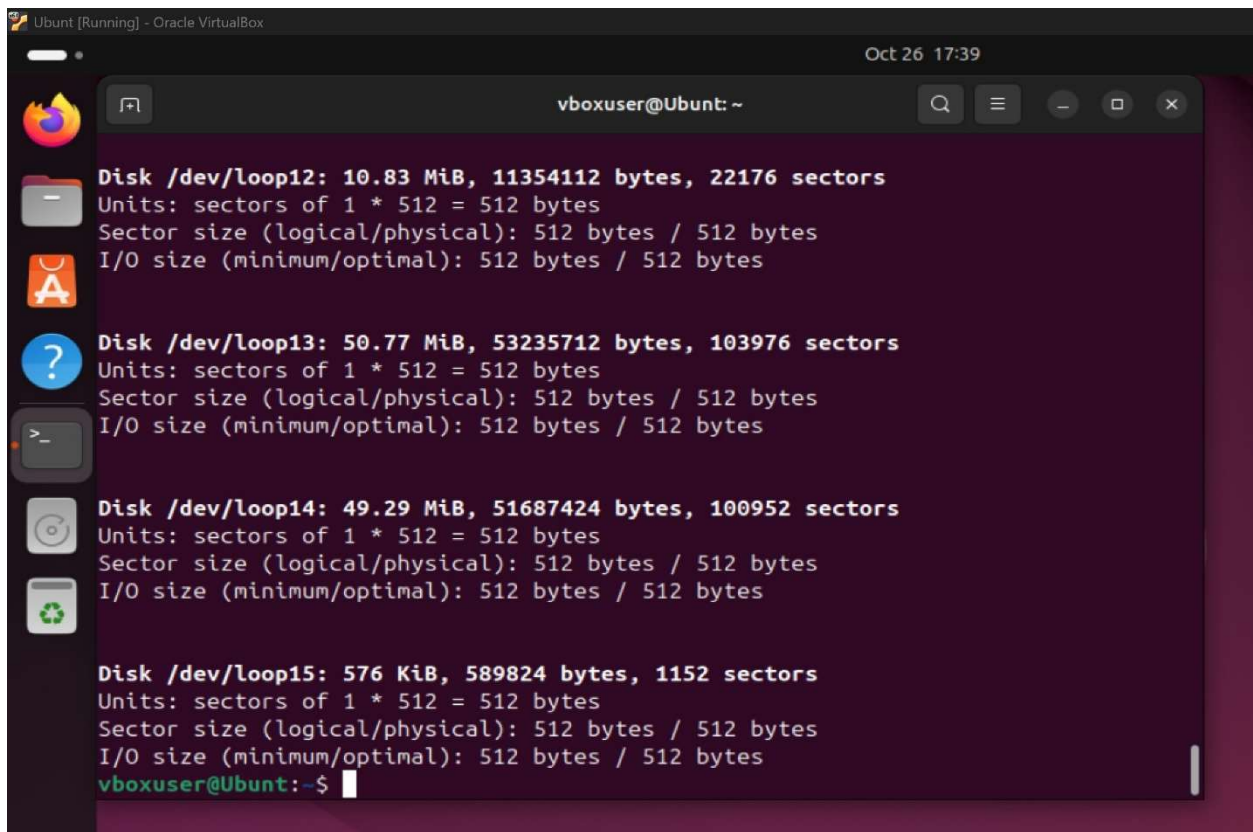
Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

vboxuser@Ubuntu:~$ sudo mkfs.ext4 /dev/sdb1
mke2fs 1.47.0 (5-Feb-2023)
Creating filesystem with 50944 4k blocks and 50944 inodes
Filesystem UUID: 92715beb-61dd-40a3-8804-6c7c373a3271
Superblock backups stored on blocks:
    32768

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

vboxuser@Ubuntu:~$
```

Step 3. Repeat the steps in Part I and highlight the differences.



The screenshot shows a terminal window titled 'vboxuser@Ubuntu: ~' with a search icon, a menu icon, and window control buttons. The terminal output displays disk information for four loop devices. Each entry includes the device name, size in MiB, total bytes, number of sectors, units (sectors of 1 \* 512 = 512 bytes), sector size (logical/physical), and I/O size (minimum/optimal). The devices are /dev/loop12, /dev/loop13, /dev/loop14, and /dev/loop15. The prompt 'vboxuser@Ubuntu:~\$' is visible at the bottom.

```
Oct 26 17:39
vboxuser@Ubuntu: ~
Disk /dev/loop12: 10.83 MiB, 11354112 bytes, 22176 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop13: 50.77 MiB, 53235712 bytes, 103976 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop14: 49.29 MiB, 51687424 bytes, 100952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$
```

Step 4. Make a new directory named /cyse. And mount the new partition under this directory.

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:41
vboxuser@Ubuntu: ~
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop13: 50.77 MiB, 53235712 bytes, 103976 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop14: 49.29 MiB, 51687424 bytes, 100952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$ sudo mkdir /cyse
vboxuser@Ubuntu:~$ sudo mount /dev/sdb1 /cyse
vboxuser@Ubuntu:~$
```

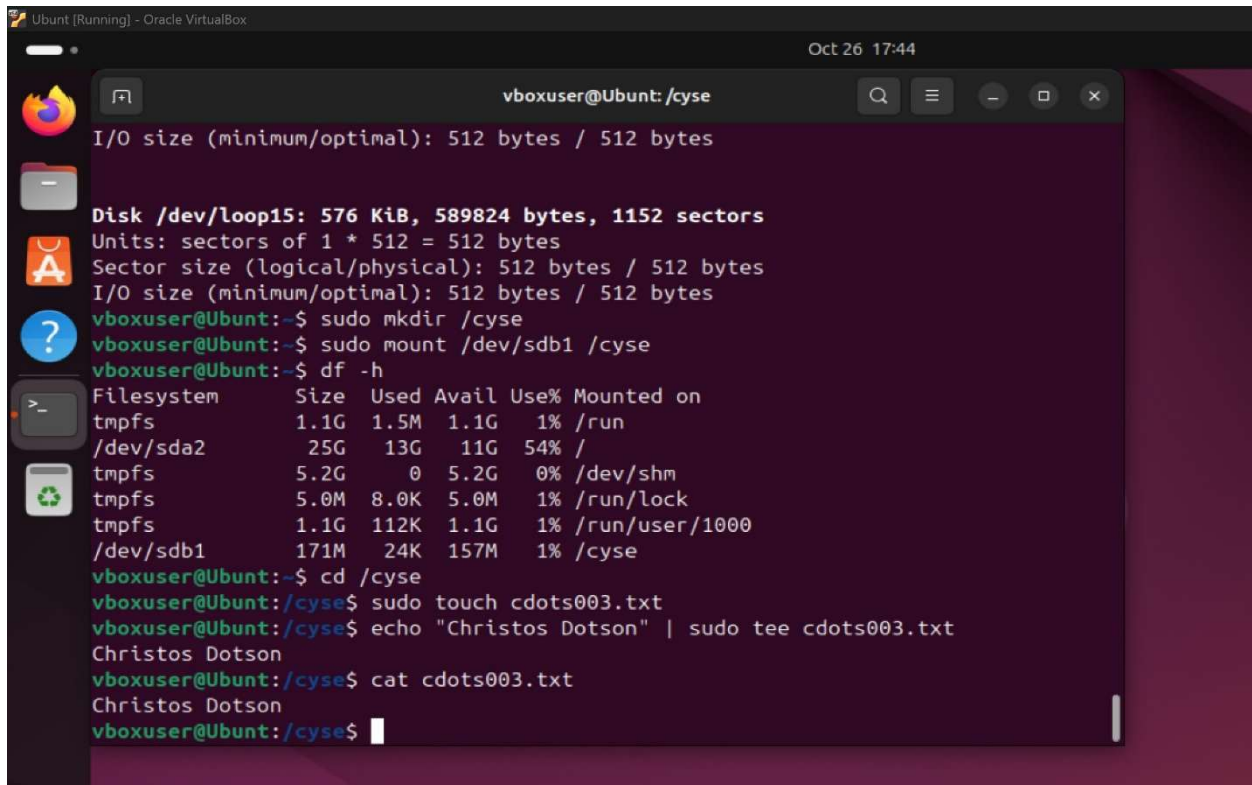
Step 5. Use the df command to check the mounting point of the new partition.

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:41
vboxuser@Ubuntu: ~
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop14: 49.29 MiB, 51687424 bytes, 100952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$ sudo mkdir /cyse
vboxuser@Ubuntu:~$ sudo mount /dev/sdb1 /cyse
vboxuser@Ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           1.1G  1.5M  1.1G   1% /run
/dev/sda2       25G   13G   11G  54% /
tmpfs           5.2G     0  5.2G   0% /dev/shm
tmpfs           5.0M   8.0K  5.0M   1% /run/lock
tmpfs           1.1G  112K  1.1G   1% /run/user/1000
/dev/sdb1       171M   24K  157M   1% /cyse
vboxuser@Ubuntu:~$
```

Step 6. Create a new file named for YourMIDAS.txt (replace YourMIDAS with your MIDAS ID) in the directory /cyse and put your name in that file.



The screenshot shows a terminal window titled 'vboxuser@Ubuntu: /cyse' with a search icon, menu icon, and window controls. The terminal output includes disk information for /dev/loop15 and /dev/sdb1, followed by commands to create the /cyse directory, mount /dev/sdb1 to it, and verify the mount with 'df -h'. A table of filesystem usage is shown, including /dev/sdb1 mounted at /cyse. Finally, a file 'cdots003.txt' is created in /cyse, and the name 'Christos Dotson' is written to it using 'tee'.

```
vboxuser@Ubuntu: /cyse
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 576 KiB, 589824 bytes, 1152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$ sudo mkdir /cyse
vboxuser@Ubuntu:~$ sudo mount /dev/sdb1 /cyse
vboxuser@Ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs            1.1G  1.5M  1.1G   1% /run
/dev/sda2        25G   13G   11G  54% /
tmpfs            5.2G   0  5.2G   0% /dev/shm
tmpfs            5.0M  8.0K  5.0M   1% /run/lock
tmpfs            1.1G  112K  1.1G   1% /run/user/1000
/dev/sdb1        171M   24K  157M   1% /cyse
vboxuser@Ubuntu:~$ cd /cyse
vboxuser@Ubuntu:/cyse$ sudo touch cdots003.txt
vboxuser@Ubuntu:/cyse$ echo "Christos Dotson" | sudo tee cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$ cat cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$
```

Step 7. Unmount /cyse directory.

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:45

vboxuser@Ubuntu: ~
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
vboxuser@Ubuntu:~$ sudo mkdir /cyse
vboxuser@Ubuntu:~$ sudo mount /dev/sdb1 /cyse
vboxuser@Ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           1.1G  1.5M   1.1G   1% /run
/dev/sda2       25G   13G   11G   54% /
tmpfs           5.2G   0    5.2G   0% /dev/shm
tmpfs           5.0M  8.0K   5.0M   1% /run/lock
tmpfs           1.1G  112K   1.1G   1% /run/user/1000
/dev/sdb1       171M   24K  157M   1% /cyse
vboxuser@Ubuntu:~$ cd /cyse
vboxuser@Ubuntu:/cyse$ sudo touch cdots003.txt
vboxuser@Ubuntu:/cyse$ echo "Christos Dotson" | sudo tee cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$ cat cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$ cd ~
vboxuser@Ubuntu:~$ sudo umount /cyse
sudo: umount: command not found
vboxuser@Ubuntu:~$ sudo umount /cyse
vboxuser@Ubuntu:~$
```

Step 8. Check the contents in /cyse directory. What do you find?

```
Ubuntu [Running] - Oracle VirtualBox
Oct 26 17:46

vboxuser@Ubuntu: ~
vboxuser@Ubuntu:~$ sudo mkdir /cyse
vboxuser@Ubuntu:~$ sudo mount /dev/sdb1 /cyse
vboxuser@Ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           1.1G  1.5M   1.1G   1% /run
/dev/sda2       25G   13G   11G   54% /
tmpfs           5.2G   0    5.2G   0% /dev/shm
tmpfs           5.0M  8.0K   5.0M   1% /run/lock
tmpfs           1.1G  112K   1.1G   1% /run/user/1000
/dev/sdb1       171M   24K  157M   1% /cyse
vboxuser@Ubuntu:~$ cd /cyse
vboxuser@Ubuntu:/cyse$ sudo touch cdots003.txt
vboxuser@Ubuntu:/cyse$ echo "Christos Dotson" | sudo tee cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$ cat cdots003.txt
Christos Dotson
vboxuser@Ubuntu:/cyse$ cd ~
vboxuser@Ubuntu:~$ sudo umount /cyse
sudo: umount: command not found
vboxuser@Ubuntu:~$ sudo umount /cyse
vboxuser@Ubuntu:~$ ls cyse
ls: cannot access 'cyse': No such file or directory
vboxuser@Ubuntu:~$ ls /cyse
vboxuser@Ubuntu:~$
```

