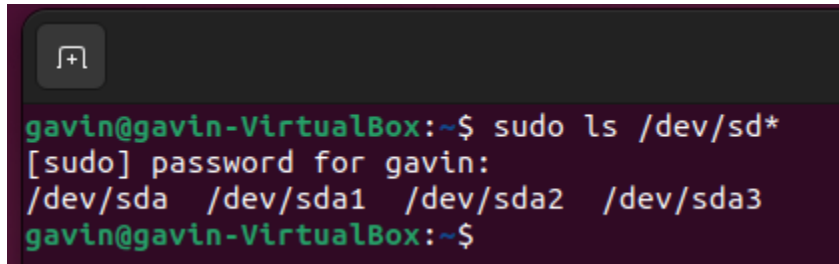**CYSE 270: Linux System for Cybersecurity**

<mark>Part I</mark>– Check your file system (30 points).

Submit the screenshot for All the three steps.

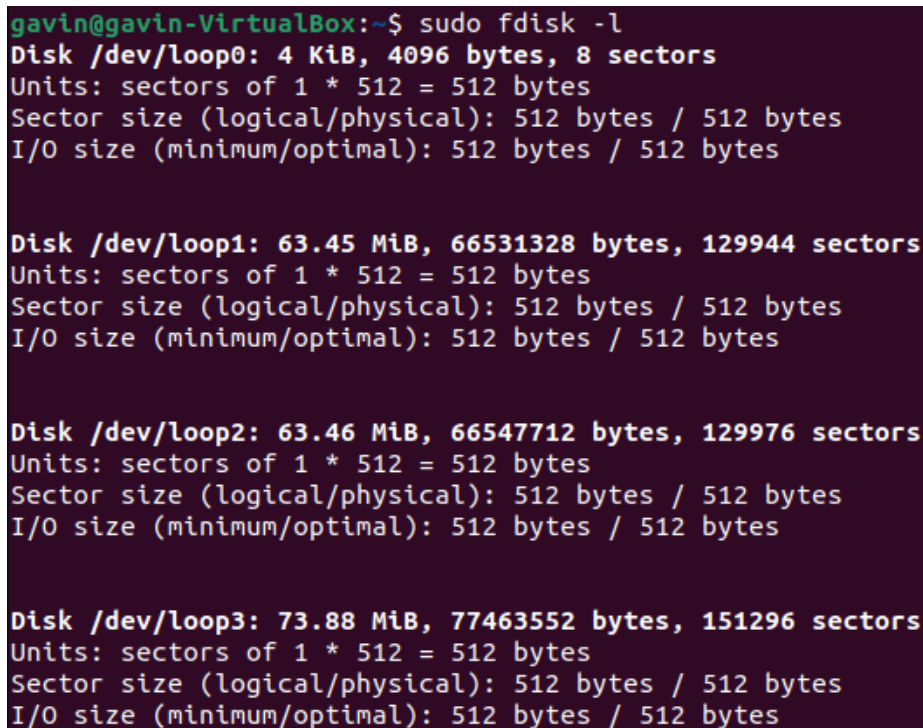**Step 1.** Execute the ls /dev/sd* command to see the current hard disk devices.

[use sudo]

```
gavin@gavin-VirtualBox:~$ sudo ls /dev/sd*
[sudo] password for gavin:
/dev/sda  /dev/sda1  /dev/sda2  /dev/sda3
gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ sudo fdisk -l
Disk /dev/loop0: 4 KiB, 4096 bytes, 8 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/loop1: 63.45 MiB, 66531328 bytes, 129944 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/loop2: 63.46 MiB, 66547712 bytes, 129976 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/loop3: 73.88 MiB, 77463552 bytes, 151296 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
```

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

```
gavin@gavin-VirtualBox:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 54.3GB
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   540MB   538MB    fat32        EFI System Partition      boot, esp
 3      540MB    54.3GB  53.7GB   ext4


Warning: Unable to open /dev/sr0 read-write (Read-only file system).  /dev/sr0
has been opened read-only.
Error: /dev/sr0: unrecognised disk label
Model: VBOX CD-ROM (scsi)
Disk /dev/sr0: 53.5MB
Sector size (logical/physical): 2048B/2048B
Partition Table: unknown
Disk Flags:

gavin@gavin-VirtualBox:~$ 
```
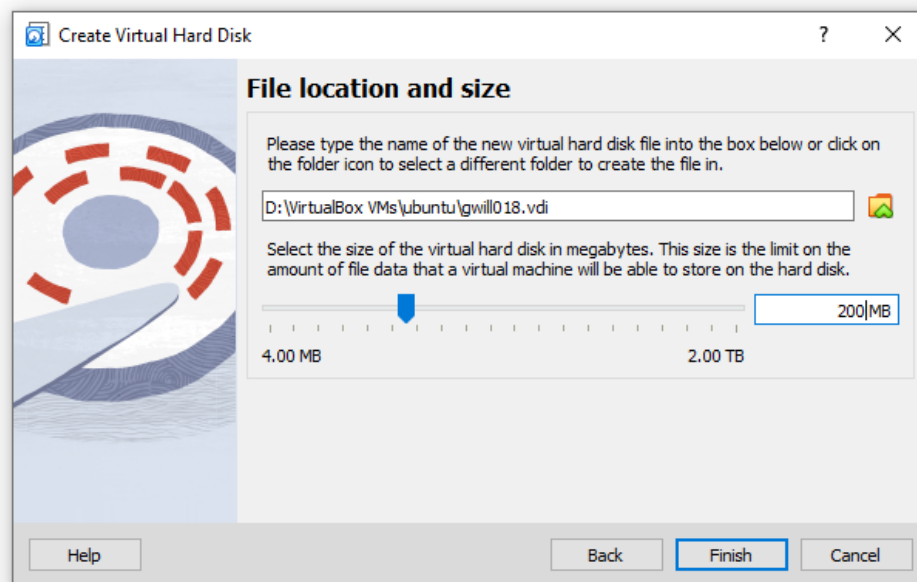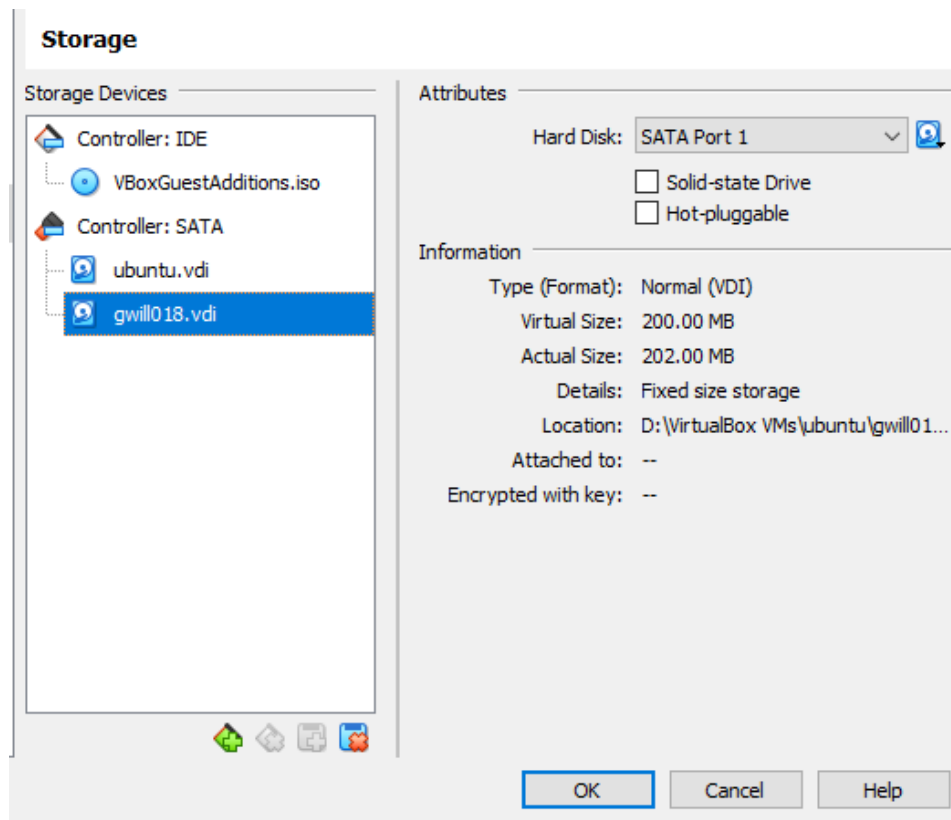
Part II– Create a new virtual disk (30 points)

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_midas.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.

Storage

Storage Devices

- Controller: IDE
  - VBoxGuestAdditions.iso
- Controller: SATA
  - ubuntu.vdi
  - **gwill018.vdi**

Attributes

Hard Disk: SATA Port 1

☐ Solid-state Drive
☐ Hot-pluggable

Information

Type (Format): Normal (VDI)
Virtual Size: 200.00 MB
Actual Size: 202.00 MB
Details: Fixed size storage
Location: D:\VirtualBox VMs\ubuntu\gwill01...
Attached to: --
Encrypted with key: --

OK   Cancel   Help

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

```
gavin@gavin-VirtualBox:~$ sudo ls /dev/sd*
[sudo] password for gavin:
/dev/sda  /dev/sda1  /dev/sda2  /dev/sda3  /dev/sdb
gavin@gavin-VirtualBox:~$
```

```
Disk /dev/sdb: 200 MiB, 209715200 bytes, 409600 sectors
Disk model: VBOX HARDDISK
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/loop8: 496.98 MiB, 521121792 bytes, 1017816 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
```

```
gavin@gavin-VirtualBox:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 54.3GB
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   540MB   538MB    fat32        EFI System Partition   boot, esp
 3      540MB    54.3GB  53.7GB   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:

Warning: Unable to open /dev/sr0 read-write (Read-only file system).  /dev/sr0
has been opened read-only.
Error: /dev/sr0: unrecognised disk label
Model: VBOX CD-ROM (scsi)
Disk /dev/sr0: 53.5MB
Sector size (logical/physical): 2048B/2048B
Partition Table: unknown
Disk Flags:

gavin@gavin-VirtualBox:~$
```

Part III– Creating Partitions and Filesystems (60 points)

Submit the screenshot for All eight steps.

Step 1. Use the fdisk command to create a new primary partition on the new

virtual hard disk attached in Part II.

```
gavin@gavin-VirtualBox:~$ sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.37.2).
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 disklabel with disk identifier 0x160267fe.

Command (m for help): m
```

```
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): 2048
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-409599, default 409599): 409599

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

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

gavin@gavin-VirtualBox:~$ 
```

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

partition.

```
gavin@gavin-VirtualBox:~$ sudo mkfs.ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 50944 4k blocks and 50944 inodes
Filesystem UUID: 4a1a5cb2-a3a9-4e1e-b24e-49e1b7305883
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

gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ sudo ls /dev/sd*
/dev/sda  /dev/sda1  /dev/sda2  /dev/sda3  /dev/sdb  /dev/sdb1
gavin@gavin-VirtualBox:~$
```

```
Disk /dev/sdb: 200 MiB, 209715200 bytes, 409600 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x160267fe

Device     Boot Start    End Sectors  Size Id Type
/dev/sdb1        2048 409599  407552  199M 83 Linux
```

```
gavin@gavin-VirtualBox:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 54.3GB
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   540MB    538MB    fat32         EFI System Partition    boot, esp
 3      540MB    54.3GB   53.7GB   ext4


Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 210MB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start    End     Size    Type     File system  Flags
 1      1049kB   210MB   209MB   primary  ext4


Warning: Unable to open /dev/sr0 read-write (Read-only file system).  /dev/sr0
has been opened read-only.
Error: /dev/sr0: unrecognised disk label
Model: VBOX CD-ROM (scsi)
Disk /dev/sr0: 53.5MB
Sector size (logical/physical): 2048B/2048B
Partition Table: unknown
Disk Flags:

gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ mkdir cyse
gavin@gavin-VirtualBox:~$ sudo mount /dev/sdb1 cyse
gavin@gavin-VirtualBox:~$
```

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

```
gavin@gavin-VirtualBox:~$ sudo df
Filesystem      1K-blocks      Used Available Use% Mounted on
tmpfs              812332      1496    810836   1% /run
/dev/sda3        51328472  12802628  35886024  27% /
tmpfs             4061648         0   4061648   0% /dev/shm
tmpfs                5120         4      5116   1% /run/lock
/dev/sda2          524252      6216    518036   2% /boot/efi
tmpfs              812328       108    812220   1% /run/user/1000
/dev/sr0            52244     52244         0 100% /media/gavin/VBox_GAs_7.0.10
/dev/sdb1          174432        24    160148   1% /home/gavin/cyse
gavin@gavin-VirtualBox:~$
```

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.

```
gavin@gavin-VirtualBox:~/cyse$ sudo nano gwill018.txt
gavin@gavin-VirtualBox:~/cyse$ cat gwill018.txt
Gavin Williams

gavin@gavin-VirtualBox:~/cyse$ 
```

Step 7. Unmount /cyse directory.

```
gavin@gavin-VirtualBox:~/cyse$ cd ~
gavin@gavin-VirtualBox:~$ sudo umount /dev/sdb1
```

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

```
gavin@gavin-VirtualBox:~$ cat cyse/gwill018.txt
cat: cyse/gwill018.txt: No such file or directory
gavin@gavin-VirtualBox:~$ ls
copyright_cyse270   cyse   data   Desktop   Documents
gavin@gavin-VirtualBox:~$ cd cyse
gavin@gavin-VirtualBox:~/cyse$ ls
gavin@gavin-VirtualBox:~/cyse$ 
```

When I checked the contents of the /cyse directory I found that the gwill018.txt file was missing.

```
gavin@gavin-VirtualBox:~$ sudo mount /dev/sdb1 cyse
gavin@gavin-VirtualBox:~$ cd cyse
gavin@gavin-VirtualBox:~/cyse$ ls
gwill018.txt
gavin@gavin-VirtualBox:~/cyse$ cat gwill018.txt
Gavin Williams

gavin@gavin-VirtualBox:~/cyse$ 
```

When I remounted the file system to the directory, I was able to open gwill018.txt again.