

Assignment 3 Answers

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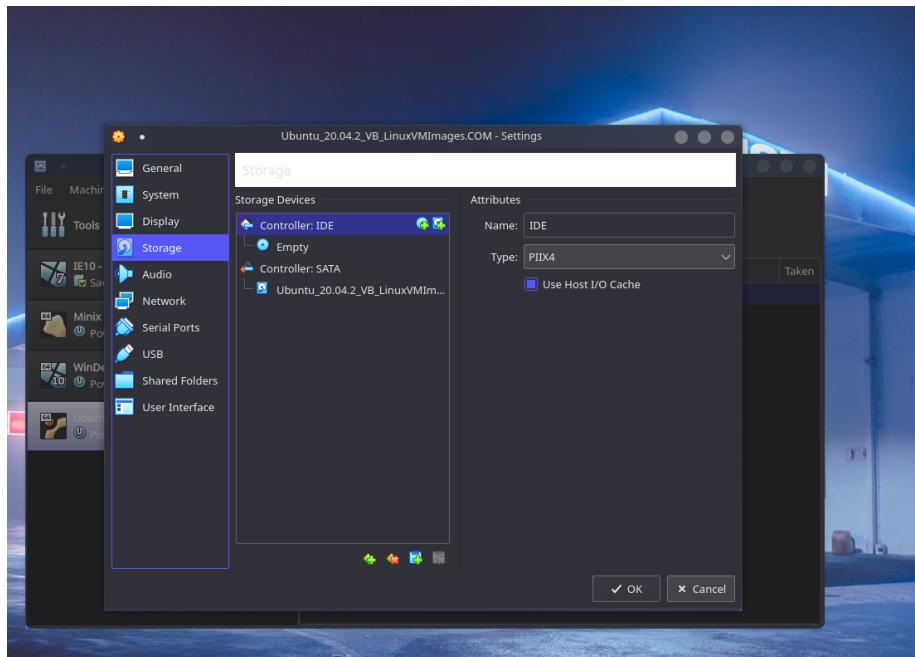
Class: Operating Systems

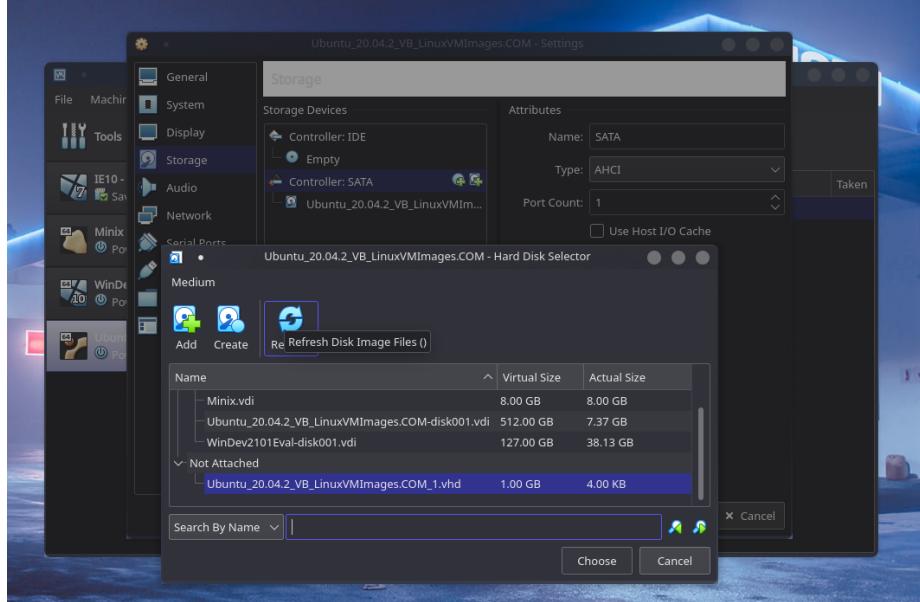
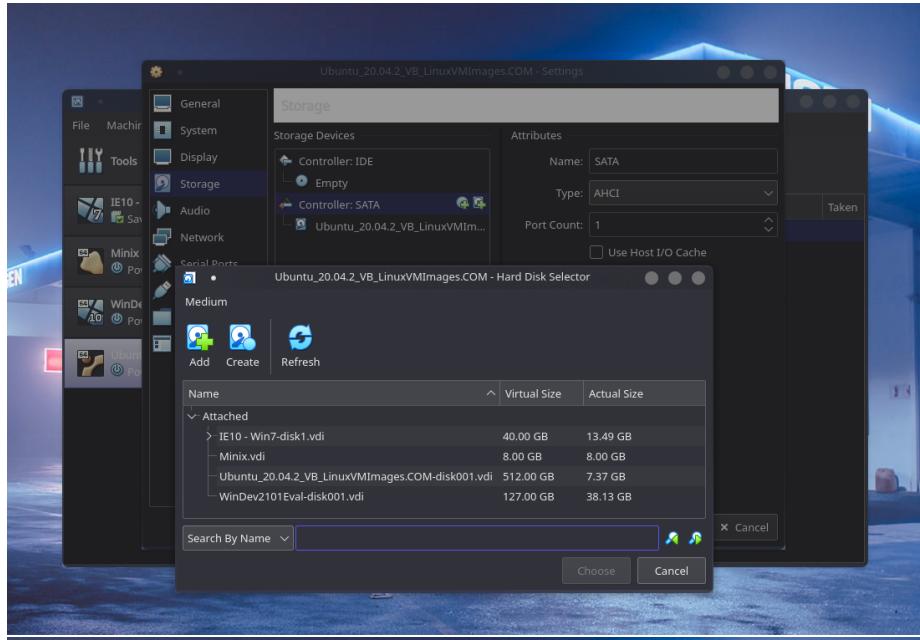
Question 1

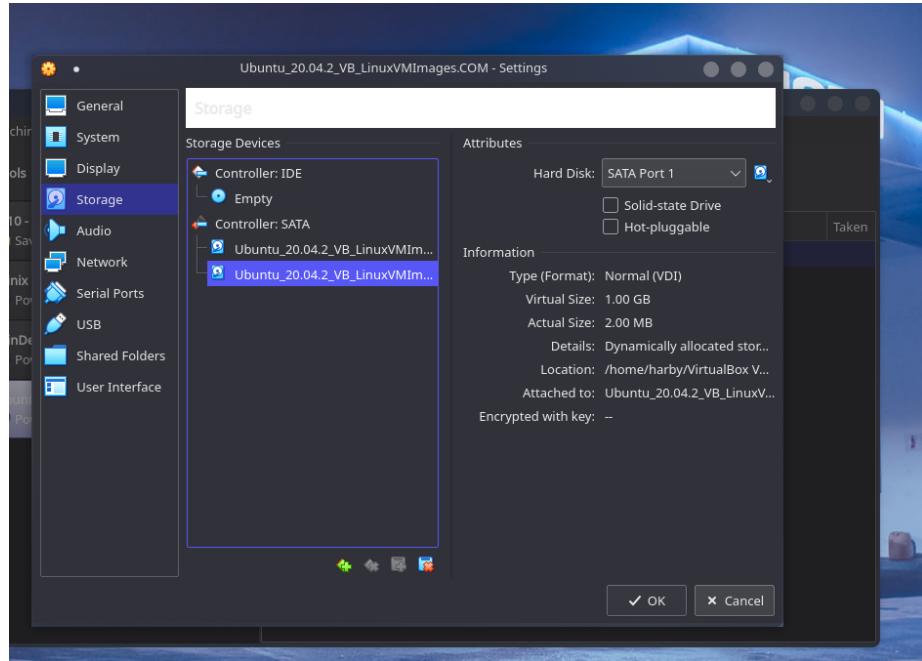
Create some space on your hard drive to work on this assignment (highly recommended to use VirtualBox or other virtual machine software to assign some space for the Guest OS to create partition and file system). This would mimic a new hard drive attached to your Guest OS. You can also use a separate USB drive for this assignment but it is not recommended.

Answer: Through the GUI of virtual box we can add a virtual harddrive where we can do the assignment with

VM settings> storage > add virtual drive> follow gui instructions and make it a secondary drive







Question 2

Verify the new disk (new space) in the Guest OS (Linux through GUI and Terminal)

Answer: we can use the following command to find harddrive, since we have given it a virtual size of 1 GB, it should list the size as such

`sudo fdisk -l`

Or Menu> search 'disks'> open disks program

The image shows a dual-terminal session on an Ubuntu desktop. The top terminal window displays the output of the `fdisk -l` command, listing the system's disk geometry and partition table. The bottom terminal window displays the output of the `sudo fdisk -l` command, which includes the `/dev/loop` devices used for the experiment.

Top Terminal (Output of `fdisk -l`):

```
/dev/sda1      2048    1050623   1048576  512M  b W95 FAT32
/dev/sda2     1052670  1073739775 1072687106 511.5G  5 Extended
/dev/sda5     1052672  1073739775 1072687106 511.5G  8e Linux LVM

Disk /dev/sdb: 1 GiB, 1073741824 bytes, 2097152 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/mapper/vgubuntu-root: 510.54 GiB, 548174561280 bytes, 1070653440 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/mapper/vgubuntu-swap_1: 976 MiB, 1023410176 bytes, 1998848 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
ubuntu@ubuntu2004:~
```

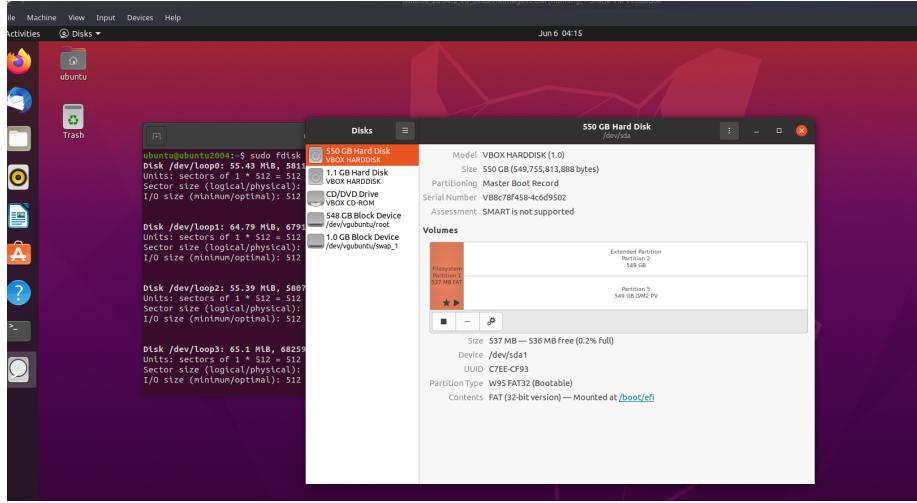
Bottom Terminal (Output of `sudo fdisk -l`):

```
ubuntu@ubuntu2004:~$ sudo fdisk -l
Disk /dev/loop0: 55.43 MiB, 58114048 bytes, 113504 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: 64.79 MiB, 67915776 bytes, 132648 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: 55.39 MiB, 58073088 bytes, 113424 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: 65.1 MiB, 68259840 bytes, 133320 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
ubuntu@ubuntu2004:~
```



Question 3

Get the name of the new disk before partitioning it (you can use any built-in utilities in Linux for getting the name)

`sudo fdisk -l`

Answer: with the above command we can get both the name of the new disk, and

```

Disk /dev/sdb: 1 GiB, 1073741824 bytes, 2097152 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

```

its size before the partitioning

Question 4

4. Partition the new disk with the following settings (you can use any utility in Linux but it should be command line interface based and should NOT be GUI based):

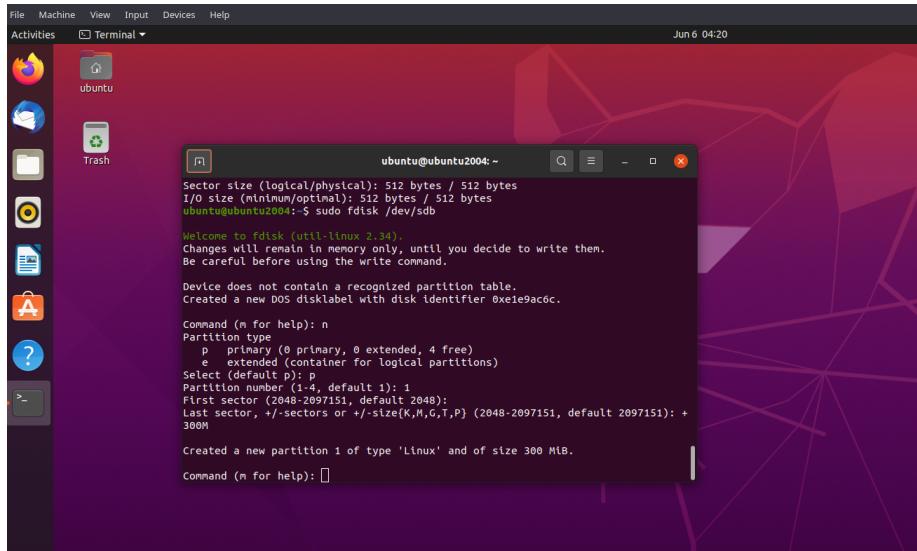
- Type: Primary
- Number: 1
- First Sector: Default
- Last Sector / Size: 300M

Answer: to do this, we can also used fdisk command and passing the directory of the virtual drive as follows as follows

`sudo fdisk /dev/sdb`

This will lead us to be greeted with a CLI that asks for arguments to the parameters stated in the question

NOTE: to end the partition, need to enter 'w', see the menu with 'm' for more details.



A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Terminal" and the date and time are "Jun 6 04:20". The terminal content shows the following command and its output:

```
ubuntu@ubuntu2004:~$ sudo fdisk /dev/sdb
Welcome to fdisk (util-linux 2.34).
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 0xe1e9ac6c.

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 (2048-2097151, default 2048):
Last sector, +/sectors or +/-size(K,M,G,T,P) (2048-2097151, default 2097151): +
300M

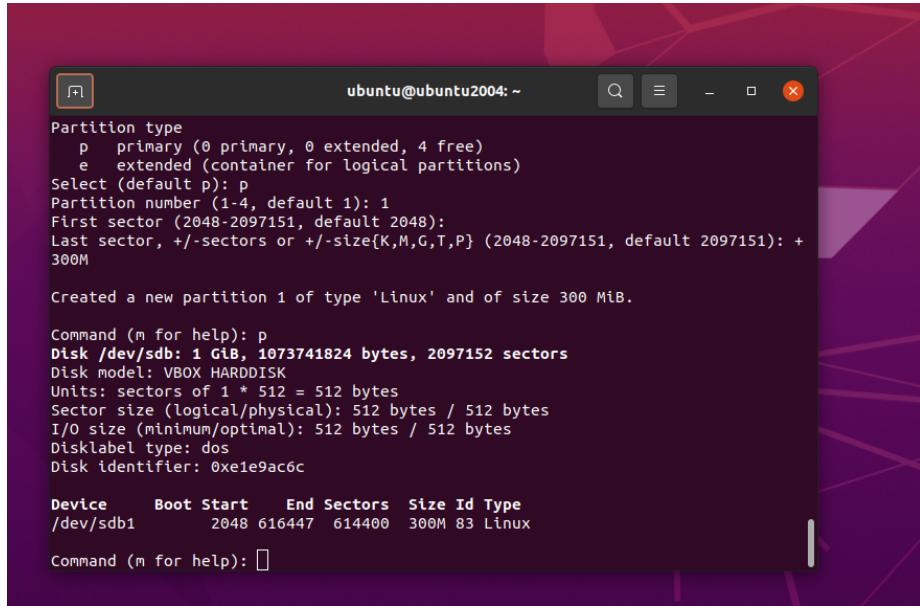
Created a new partition 1 of type 'Linux' and of size 300 MiB.
Command (m for help):
```

Question 5

Print the partition table to view the partition and ensure that type is Linux

Answer: there are two ways to do this, one would be from the fdisk command by entering 'p' or with the following command

```
sudo fdisk -l
```



```
ubuntu@ubuntu2004: ~
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 (2048-2097151, default 2048):
Last sector, +/sectors or +/-size{K,M,G,T,P} (2048-2097151, default 2097151): +300M

Created a new partition 1 of type 'Linux' and of size 300 MiB.

Command (m for help): p
Disk /dev/sdb: 1 GiB, 1073741824 bytes, 2097152 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: 0xe1e9ac6c

Device      Boot Start   End Sectors  Size Id Type
/dev/sdb1        2048 616447  614400 300M 83 Linux

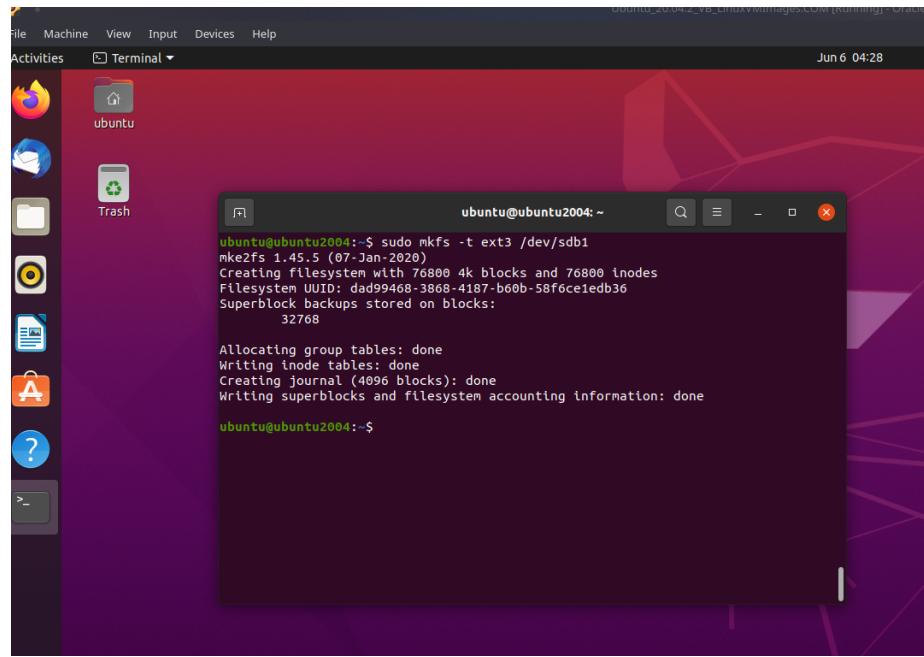
Command (m for help):
```

Question 6

Make an ext3 filesystem for this newly created partition that allows Journaling system

we can make a filesystem with the mkfs command, like so

```
sudo mkfs -t ext3 /dev/sdb1
```

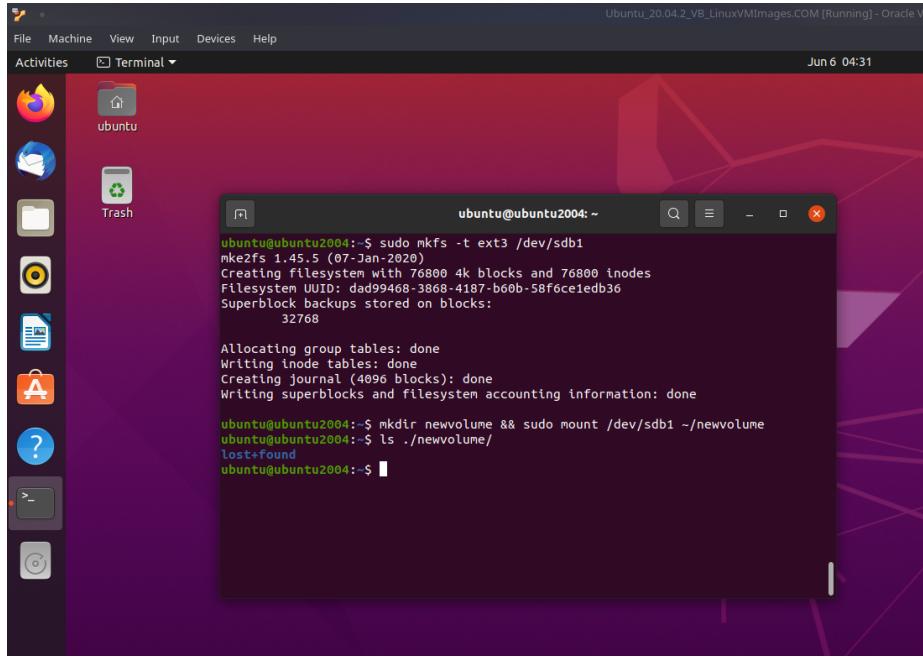


Question 7

Mount this filesystem at `~/newvolume` (where `newvolume` is a directory)

Answer: from home or '`~`'

```
mkdir newvolume && sudo mount /dev/sdb1 ~/newvolume
```

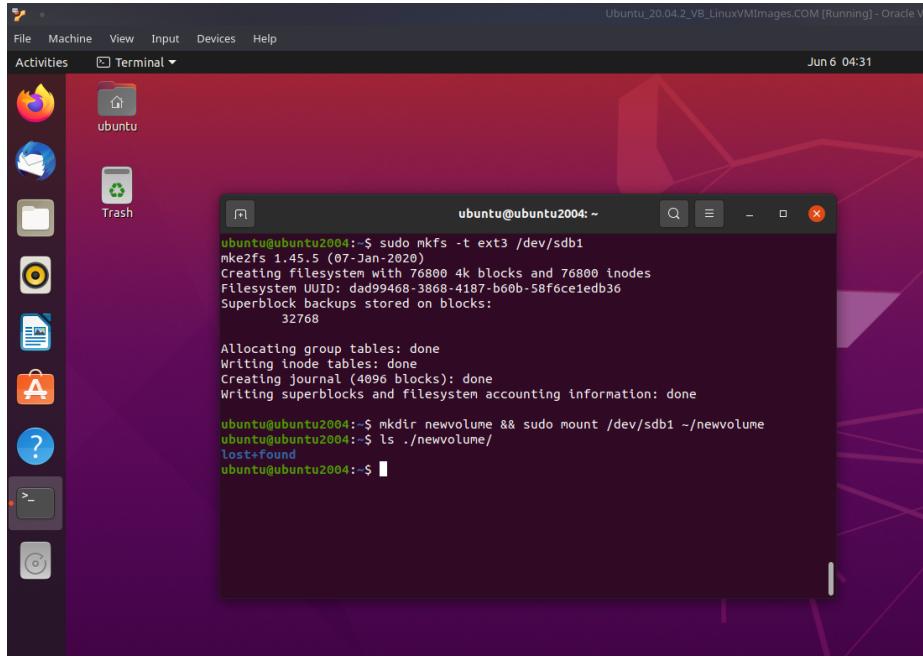


Question 8

Navigate to this directory to verify the filesystem is mounted, e.g.,
should contain lost+found

Answer:

```
ls ~/newvolume
```

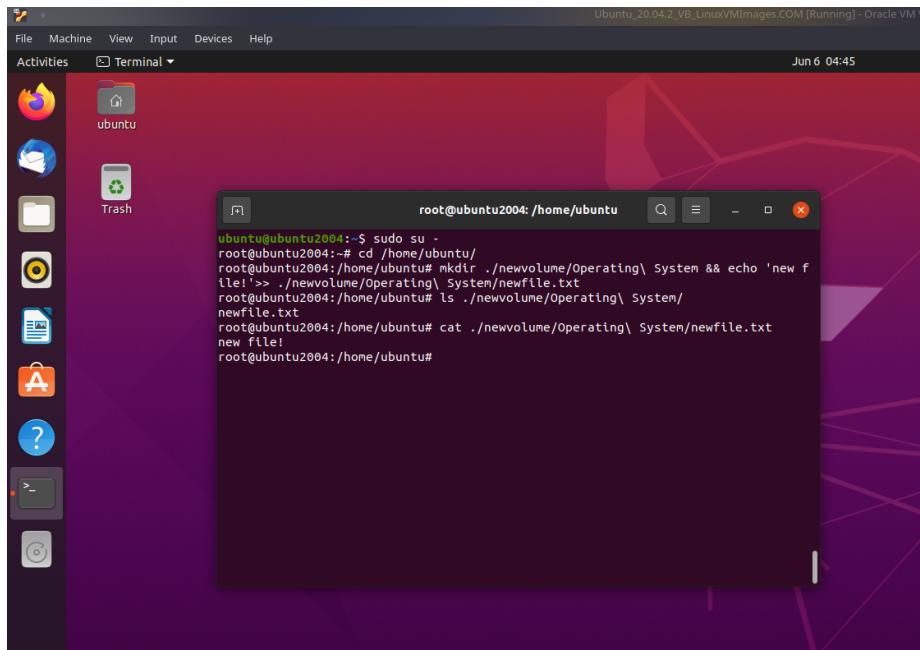


Question 9

Finally, create a directory named, “Operating System” on this volume and place any file inside this directory.

Answer: first be root, then make the directory and new file

```
sudo su -
cd /home/ubuntu
mkdir ./newvolume/Operating\ System && echo 'new file!'>> ./newvolume/Operating\ System/newfile.txt
cat ./newvolume/Operating\ System/newfile.txt
```



Question 10

This newly created directory named, “Operating System” should be read-only for all the users on the system except “root” that has read, write and executable permissions on this directory.

Answer: using the chmod command we can change the permissions , we'll use it as follows while we are still in root

```
chmod 744 ~/newvolume/Operating\ System
```

```
total 20K  
drwxr--r-- 2 root root 4.0K 'Operating System'  
drwx----- 2 root root 16K lost+found
```