

PS: I faced a lot of errors during this assignment, thus I had to reboot my pc a lot. So, I was not able to capture everything. I am really sorry for that, But I will try to describe everything here. And I took helps from Youtube, Google, Bing Co pilot and Chat GPT

I hereby state that I took help from AI copilots, Google, Youtube, my friends and other blogs. But I tried to understand every command and work.

1. Install KVM

First of all, I used the `"sudo apt update"` command to check if my device is up to date.

```
ishmam@binrofi-22301229: sudo apt update
[sudo] password for ishmam-22301229binrofi:
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:2 http://bd.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://bd.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages
```

Then I used the command `"sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virtinst virt-manager"` to install qemu-kvm , daemon library and virt-manager.

```
Terminal
ishmam@binrofi-22301229: sudo apt install qemu-kvm libvirt-daemon-system libvirt
-clients bridge-utils virtinst virt-manager
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
bridge-utils is already the newest version (1.7-1ubuntu3).
```

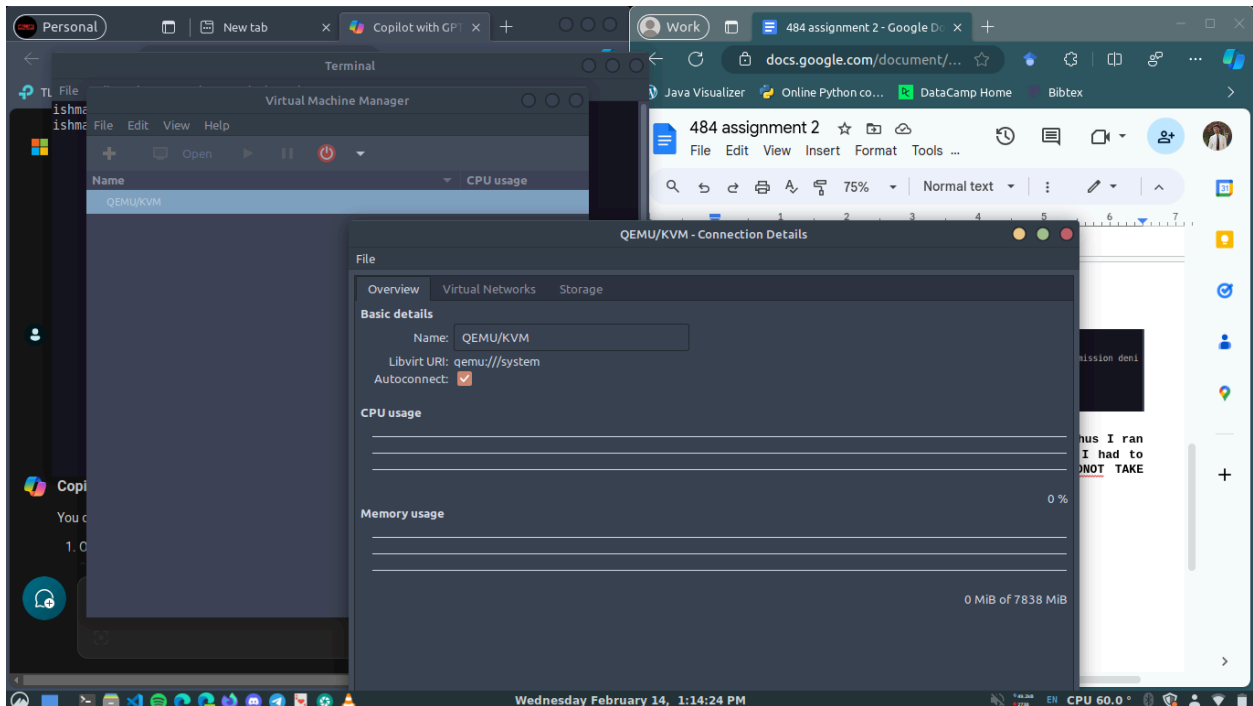
Now I will be adding me "ishmam" to libvirt and kvm user group using this command:

```
"Sudo adduser $(whoami) libvirt
Sudo adduser $(whoami) libvirt-qemu
Sudo virsh -c qemu:///system list
Sudo reboot"
```

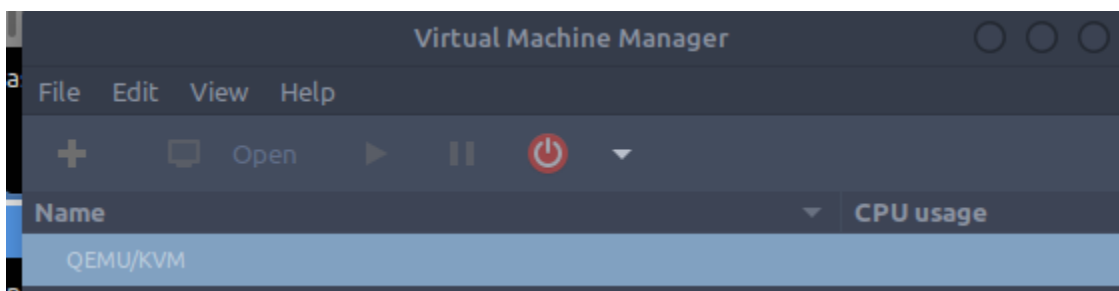
```
ishmam@binrofi-22301229:~$sudo adduser ishmam libvirt
The user `ishmam' is already a member of `libvirt'.
ishmam@binrofi-22301229:~$sudo adduser ishmam libvirt-qemu
Adding user `ishmam' to group `libvirt-qemu' ...
Adding user ishmam to group libvirt-qemu
Done.
```

```
ishmam@binrofi-22301229:~$virsh -c qemu:///system list
error: failed to connect to the hypervisor
error: Failed to connect socket to '/var/run/libvirt/libvirt-sock': Permission denied
ishmam@binrofi-22301229:~$sudo virsh -c qemu:///system list
Id      Name      State
-----
```

Now let's open virt-manager command. It is now connected properly



As my virtual machine is running properly, I will be installing Linux Mint XFCE virginia on my virtual machine from a local ISO file. The steps are shown below. Note that I will just test boot my OS here because of storage issue.





Create a new virtual machine

Step 1 of 5

Connection: QEMU/KVM

Choose how you would like to install the operating system

- ☒ Local install media (ISO image or CDROM)
- ☐ Network Install (HTTP, HTTPS, or FTP)
- ☐ Import existing disk image
- ☐ Manual install

Cancel

Back

Forward



Create a new virtual machine

Step 2 of 5

Choose ISO or CDROM install media:

ishmam/Downloads/Game/linuxmint-21.3-xfce-64bit.iso



Browse...

Choose the operating system you are installing:



Generic Linux 2022

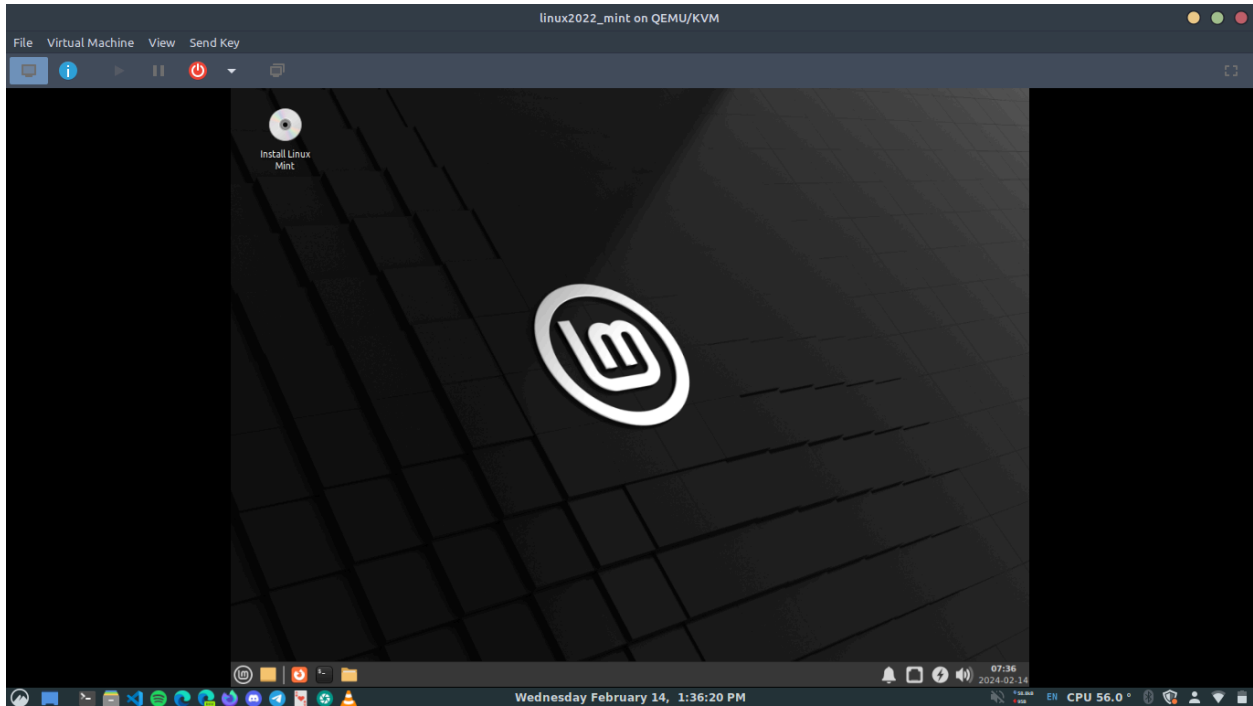


Automatically detect from the installation media / source

Cancel

Back

Forward



So, I could successfully mount and boot Linux Mint XFCE on my pc.

2. Create a VM using VMM (virtual machine manager) i.e. using GUI.

3. Create a kvm-based VM using "virt-install" cli. Check all the cli options and try it out.

3. As I completed using a virtual machine using graphical user interface or (GUI), next I will be using the command line .

For this first I had to declare an image file to store my os. Here is used this command to create a new image file:

```
"sudo dd if=/dev/zero of=/home/ishmam/my_vm_disk.img bs=1M count=20480"
```

```
ishmam@ishmam-Inspiron-3581 ~-> sudo dd if=/dev/zero of=/home/ishmam/my_vm_disk.img  
bs=1M count=20480  
20480+0 records in  
20480+0 records out  
21474836480 bytes (21 GB, 20 GiB) copied, 232.262 s, 92.5 MB/s  
ishmam@ishmam-Inspiron-3581 ~->
```

Then I ran the command declaring everything that I need for my vm:

```
virt-install \  
--name your_vm_name \  
--ram 4096 \  
--disk path=path_to_your_disk_image,size=20 \  
--vcpus 2 \  
--os-variant generic \  
--network bridge=virbr0 \  
--console pty,target_type=serial \  
--cdrom  
/home/ishmam/Downloads/Game/linuxmint-21.3-xfce-64bit.iso
```

First I installed using graphics none but it was not working on my device

```
ishmam@binrofi-22301229:~$virt-install \
--name your_vm_name \
--ram 4096 \
--disk path=path_to_your_disk_image,size=20 \
--vcpus 2 \
--os-variant generic \
--network bridge=virbr0 \
--graphics none \
--console pty,target_type=serial \
--cdrom /home/ishmam/Downloads/Game/linuxmint-21.3-xfce-64bit.iso
WARNING Using --osinfo generic, VM performance may suffer. Specify an ac
WARNING CDR0M media does not print to the text console by default, so you
r examples of using --location with CDR0M media

Starting install...

Allocating 'path_to_your_disk_image' | 0 B 00:0
Creating domain... | 0 B 00:0
Running text console command: virsh --connect qemu:///system console your
Connected to domain 'your_vm_name'
Escape character is ^] (Ctrl + )
```

```

ishmam@binrofi-22301229:~$virt-install \
--name your_vm_name \
--ram 4096 \
--disk path=path_to_your_disk_image,size=20 \
--vcpus 2 \
--os-variant generic \
--network bridge=virbr0 \
--cdrom /home/ishmam/Downloads/Game/linuxmint-21.3-xfce-64bit.iso
WARNING Using --osinfo generic, VM performance may suffer. Specify an accurate OS
for optimal results.

Starting install...
Allocating 'path_to_your_disk_image' | 0 B 00:00:00 ...
Creating domain... | 0 B 00:00:00
Running graphical console command: virt-viewer --connect qemu:///system --wait your
_vm_name

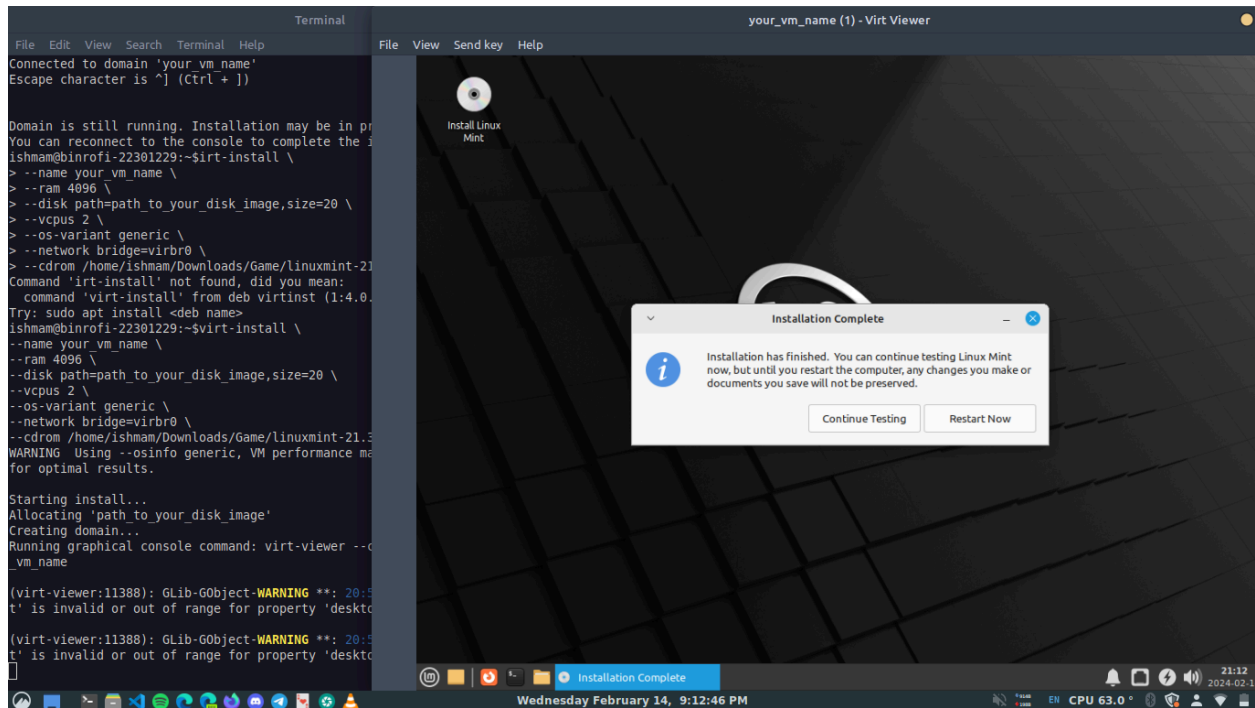
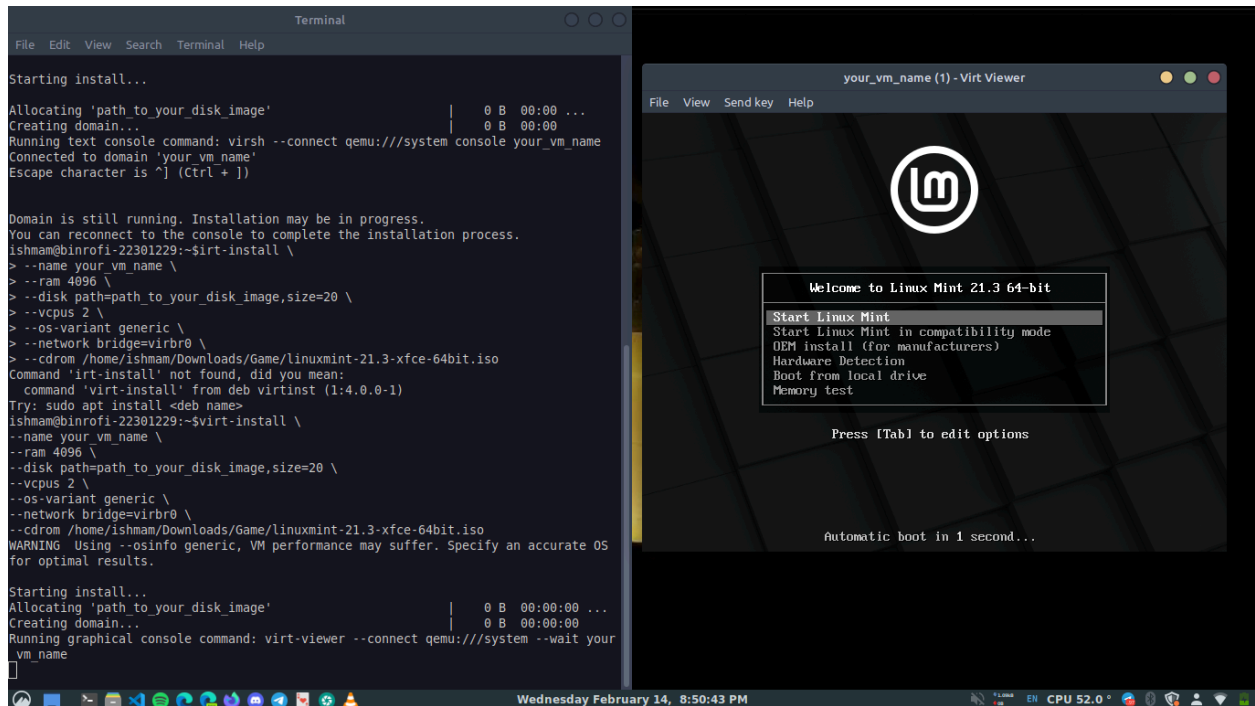
(virt-viewer:11388): GLib-GObject-WARNING **: 20:51:08.395: value "64" of type 'gint'
is invalid or out of range for property 'desktop-width' of type 'gint'

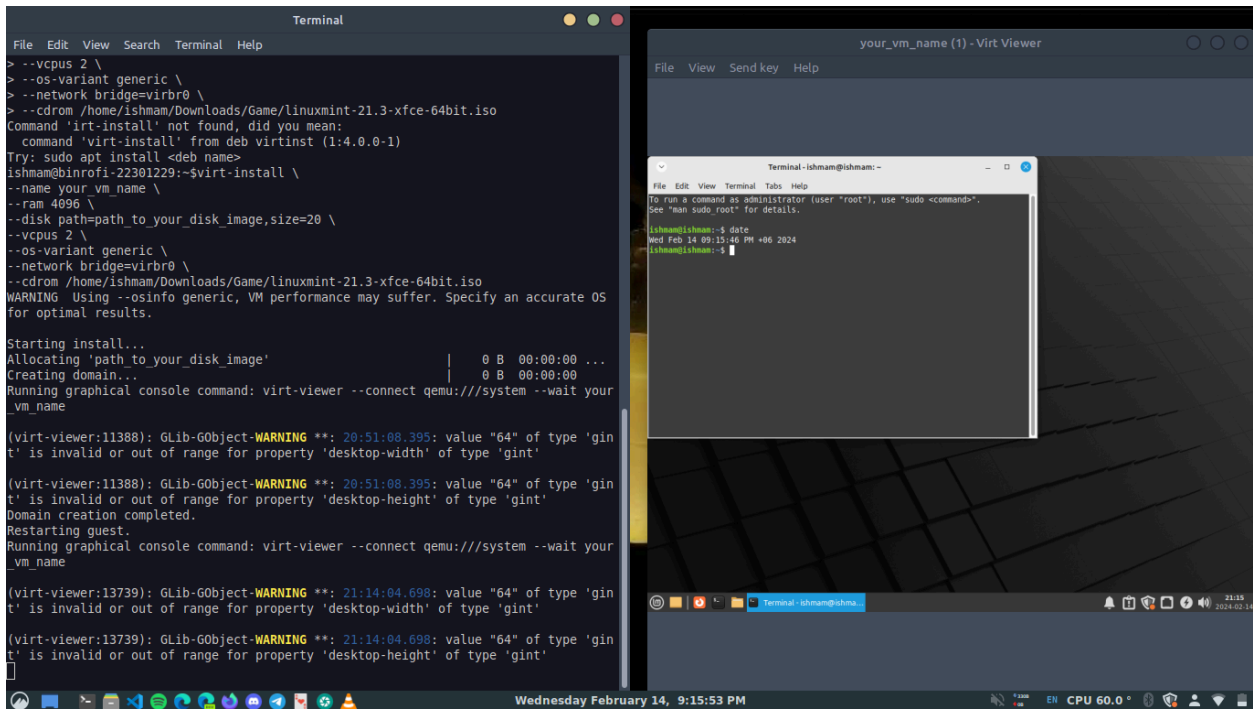
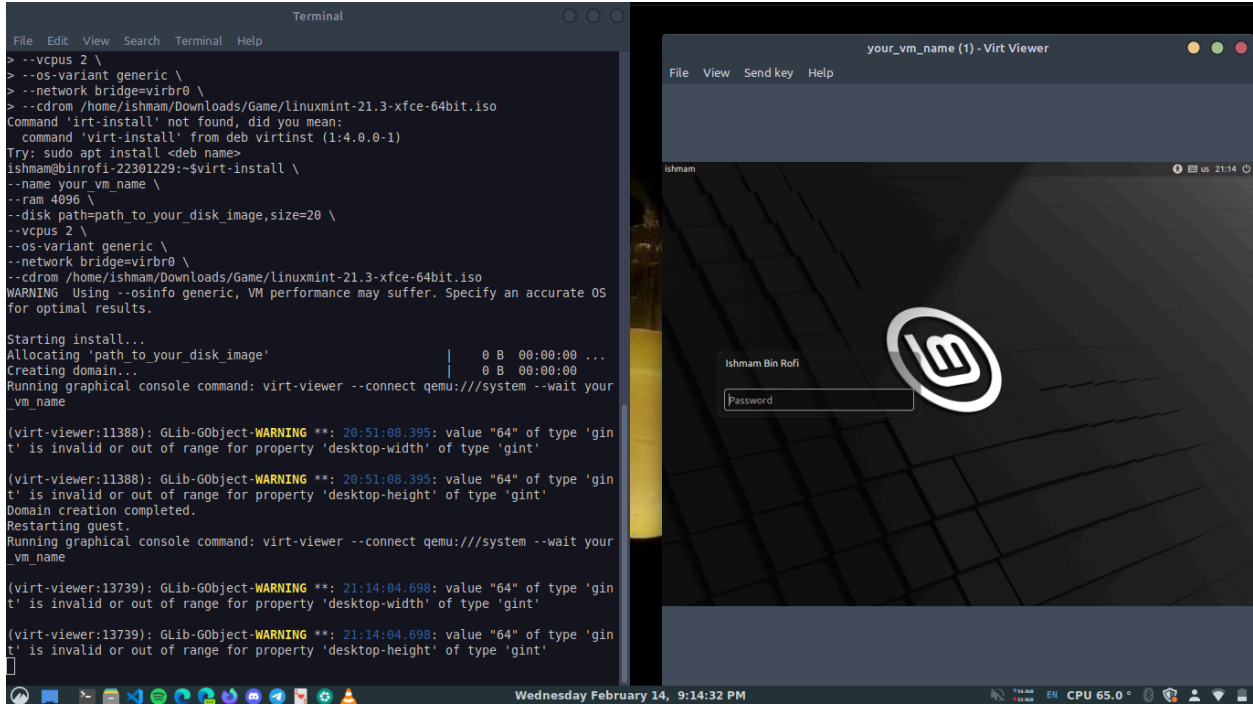
(virt-viewer:11388): GLib-GObject-WARNING **: 20:51:08.395: value "64" of type 'gint'
is invalid or out of range for property 'desktop-height' of type 'gint'
Domain creation completed.
Restarting guest.
Running graphical console command: virt-viewer --connect qemu:///system --wait your
_vm_name

(virt-viewer:13739): GLib-GObject-WARNING **: 21:14:04.698: value "64" of type 'gint'
is invalid or out of range for property 'desktop-width' of type 'gint'

(virt-viewer:13739): GLib-GObject-WARNING **: 21:14:04.698: value "64" of type 'gint'
is invalid or out of range for property 'desktop-height' of type 'gint'
ishmam@binrofi-22301229:~$

```



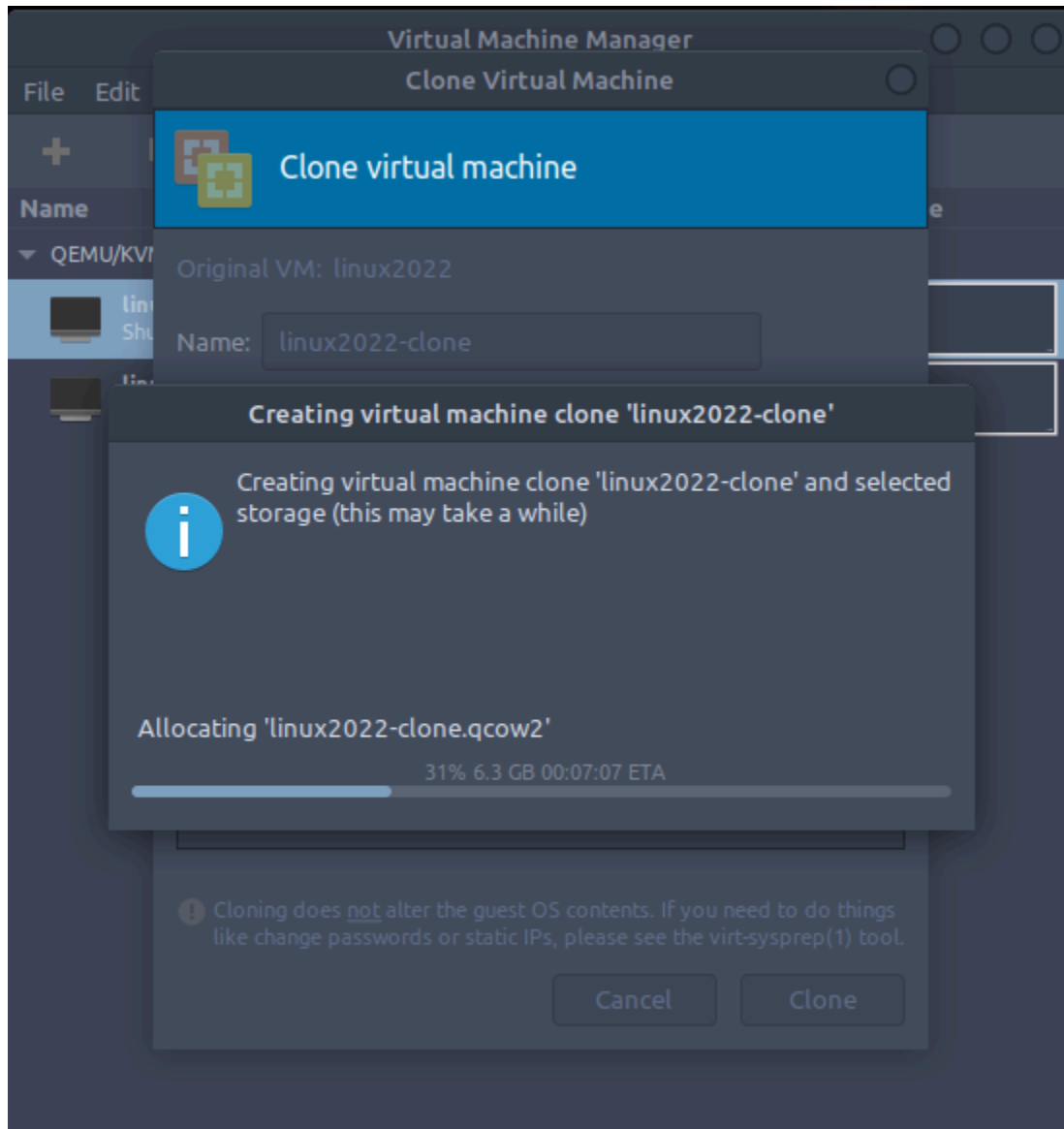
7. Clone a VM using GUI and using a kvm-based command.

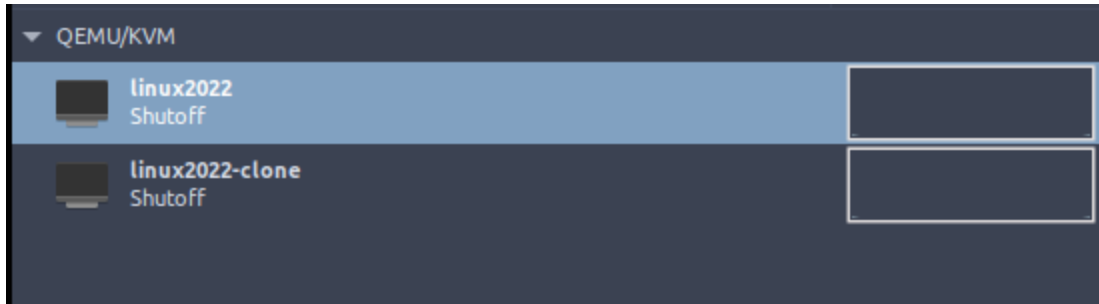
Firstly I cloned my virtual machine using the GUI of virtual machine manager. For this step

1. I chose the vm I want to clone

2. I right clicked on the VM and then selected the option

"clone"





==== CLI based clone ===

For cli based I used this command to clone my virtual machine

```
"virt-clone    -original    linux2022    -name    linux2022-clone    -file
/var/lib/libvirt/image/linux2022clone.img"
```

Here virt -clone is the command used to clone the virtual machine.

-original linux2022 is the name of the machine I am cloning

And -file /var/lib/libvirt/image/linux2022clone.img is the new image file I am creating for my cloned machine

```
ishmam@binrofi-22301229:~$virt-clone --original linux2022 --name linux2022-clone
--file /var/lib/libvirt/images/linux2022clone.img
Allocating 'linux2022clone.img' | 11 GB 03:00 ...
Allocating 'linux2022clone 53% [===== ] 50 MB/s | 11 GB 03:09 ETA
Clone 'linux2022-clone' created successfully.
ishmam@binrofi-22301229:~$
```

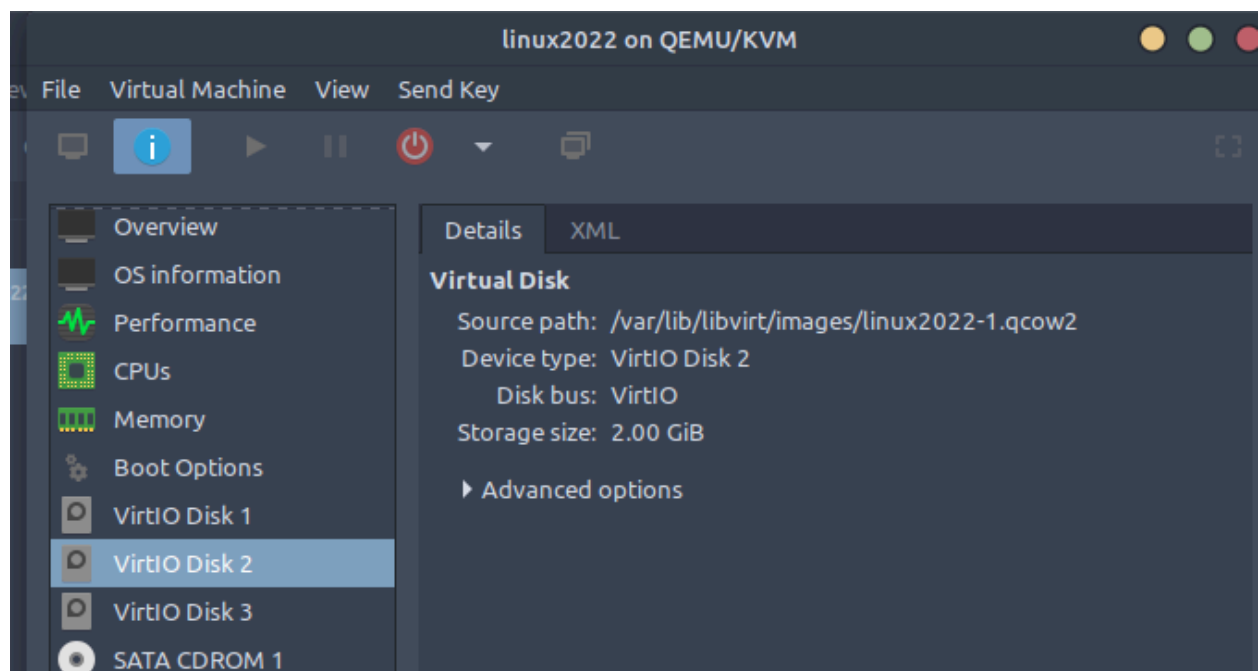
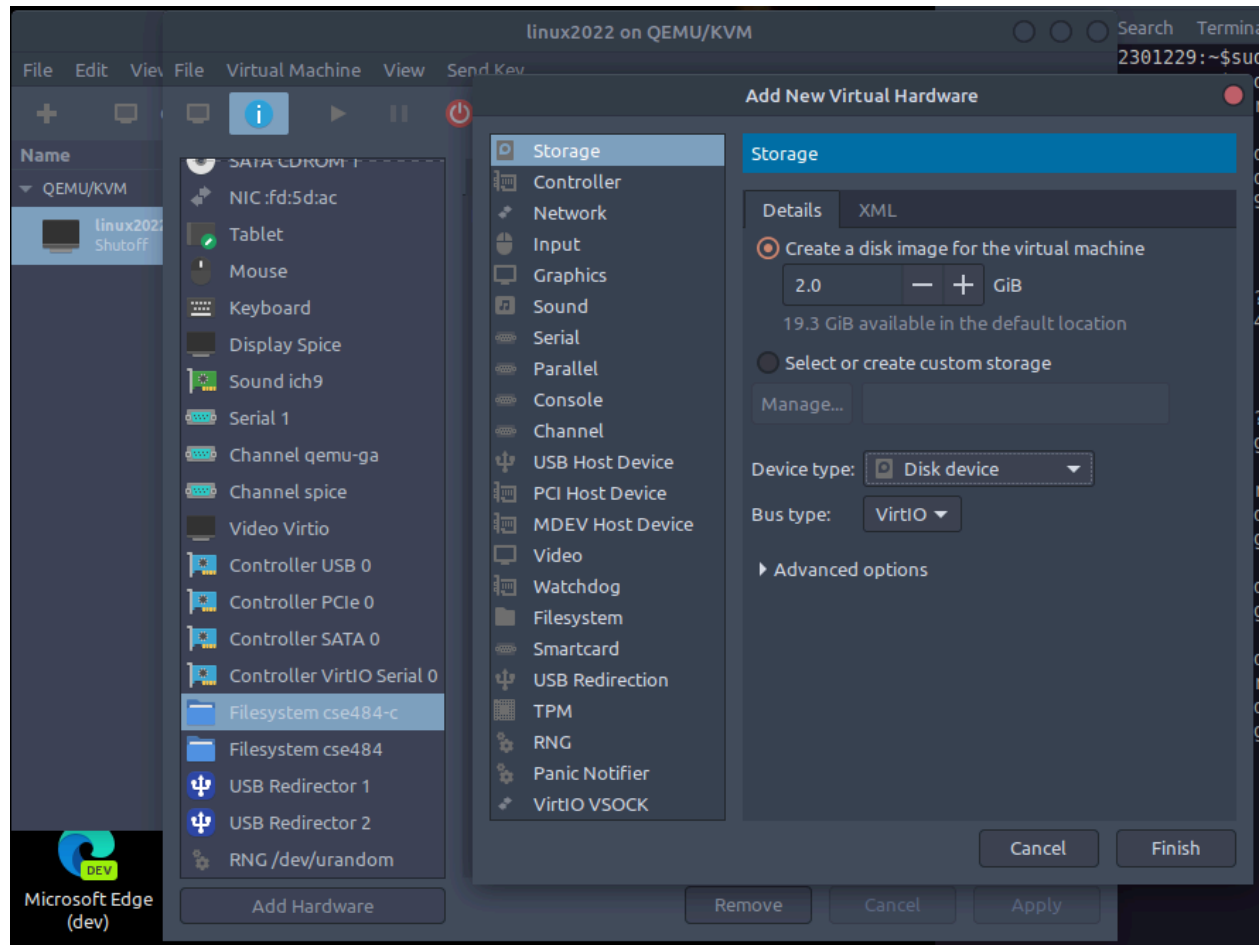


===== Add two hard disk to my cloned vm =====

Firstly I apologize that I could not do it on my cloned VM for storage shortage so I did it on my previous vm using GUI.

For this I accessed my VM by double clicking on it. Then I clicked the (i) icon on the left most corner. Thus it showed all the mounted hard wares. Then I clicked "Add Hardware" from the leftmost top, then I clicked Storage and chose

"Create a disk image for the virtual machine" and allocated 2GB for each disks.



===== USING CLI =====

First I accessed root user, by the command

```
Sudo su root
```

Then I accessed the folder of images using

```
/var/lib/libvirt/images
```

In the folder I created to image files using the commands

```
sudo qemu-img create -f raw newdisk1.img 2G
```

```
sudo qemu-img create -f raw newdisk2.img 2G
```

Then I attached the two disks with my existing vms

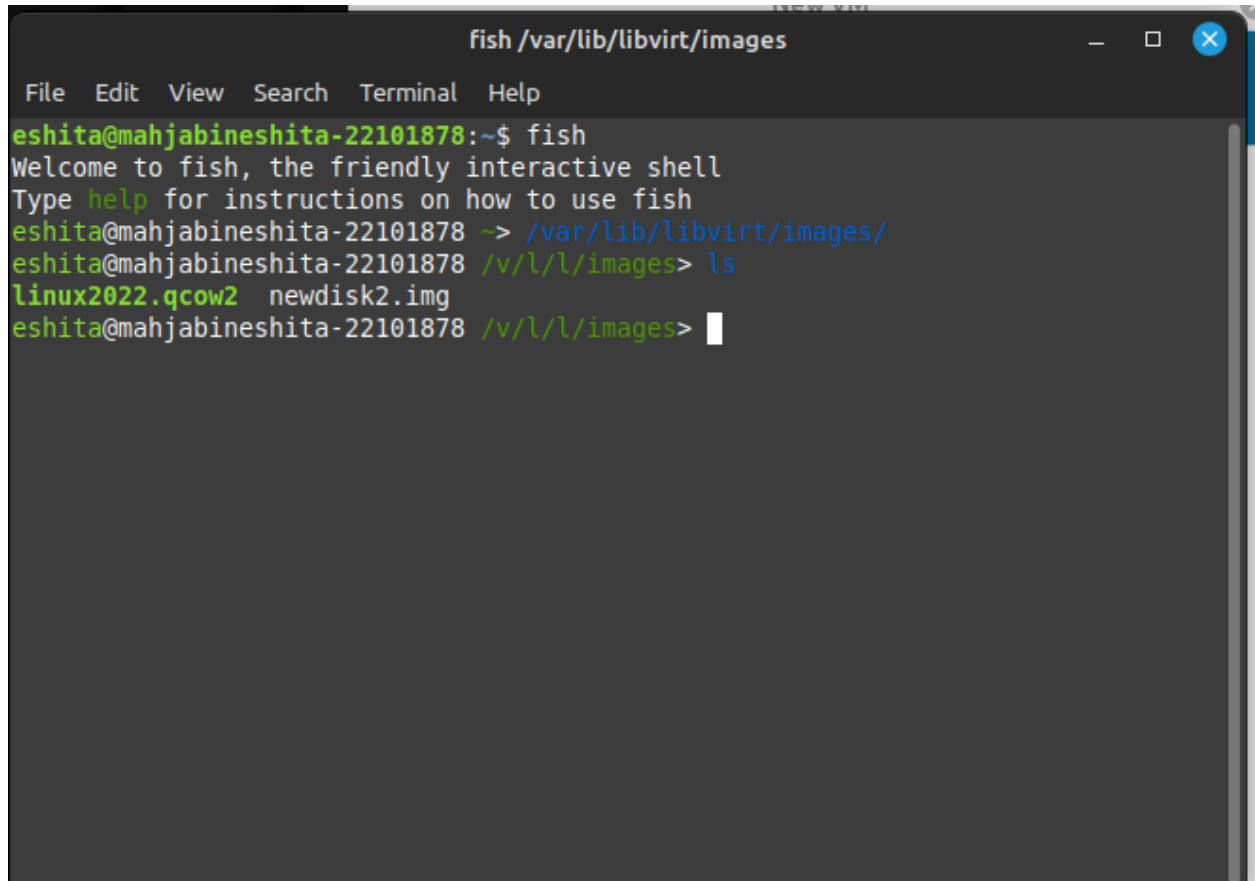
```
sudo virsh attach-disk linux2022 --source /var/lib/libvirt/images/newdisk1.img  
--target vdd --persistent
```

```
sudo          virsh          attach-disk          linux          2022          --source  
/var/lib/libvirt/images/newdisk2.img --target vde --persistent
```

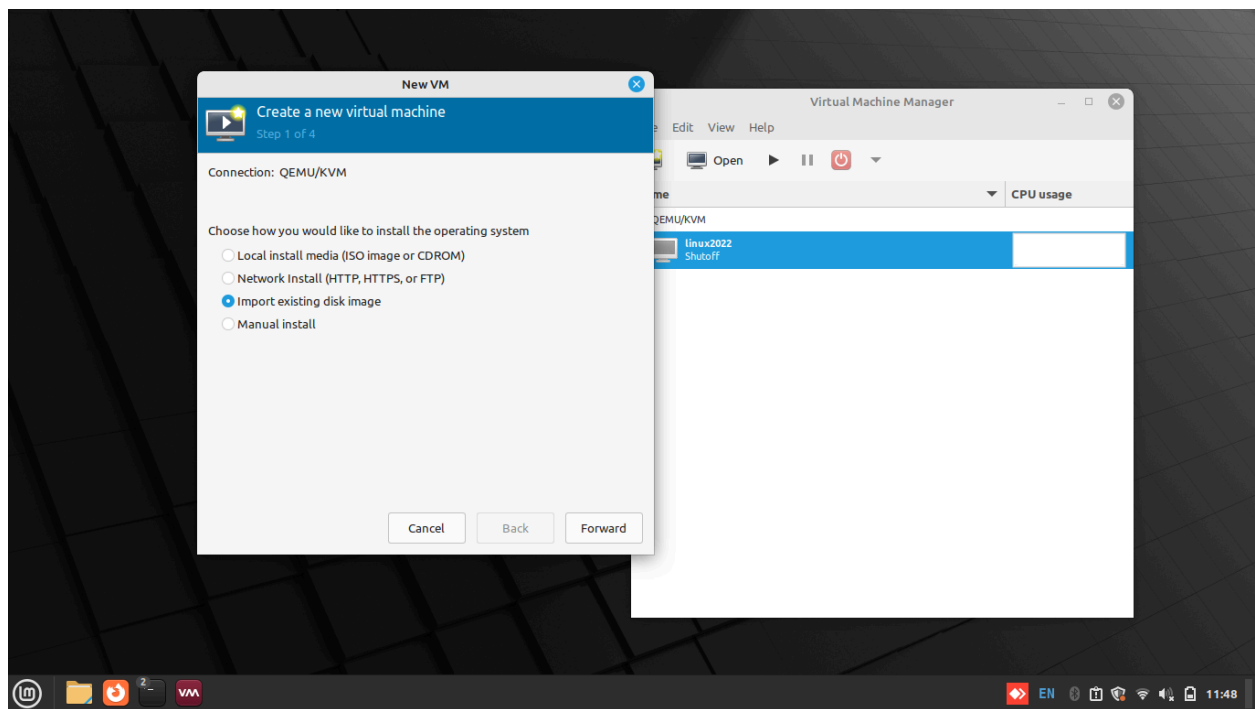
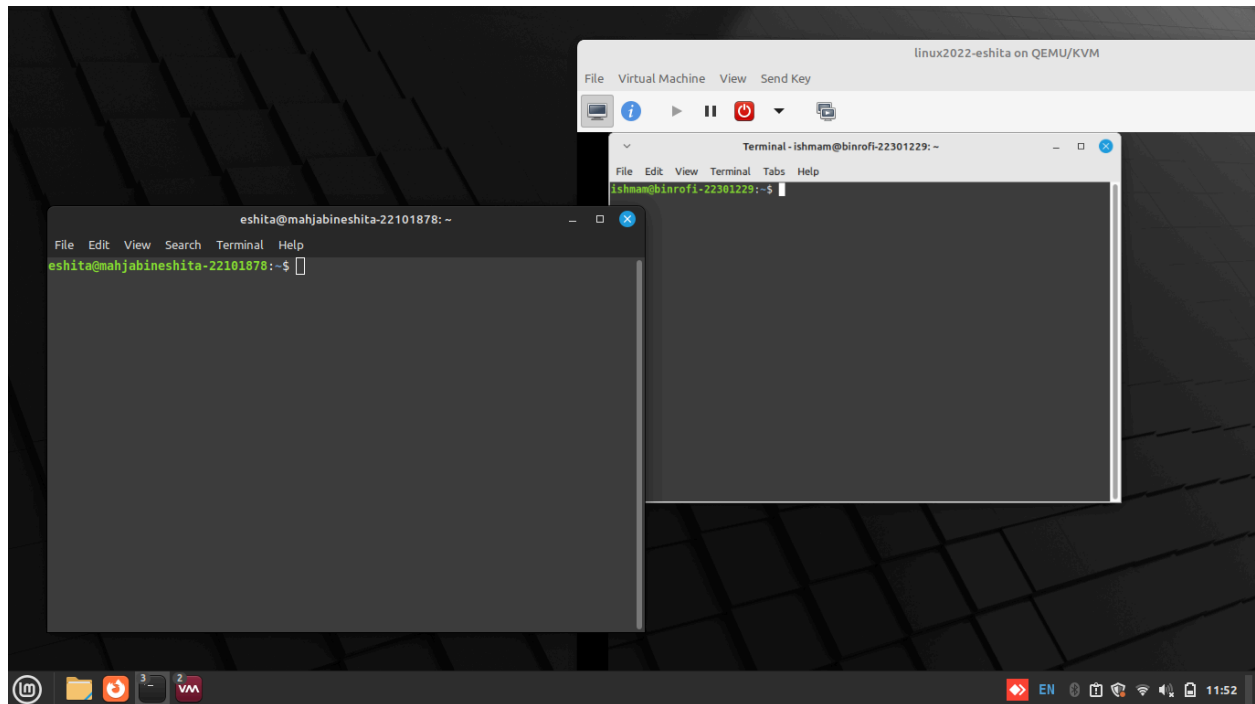
```
ishmam@binrofi-22301229:~$fish  
Welcome to fish, the friendly interactive shell  
Type help for instructions on how to use fish  
ishmam@ishmam-Inspiron-3581 ~-> sudo su root  
[sudo] password for ishmam:  
root@ishmam-Inspiron-3581:/home/ishmam# fish  
Welcome to fish, the friendly interactive shell  
Type help for instructions on how to use fish  
root@ishmam-Inspiron-3581 /h/ishmam# /var/lib/libvirt/images/  
root@ishmam-Inspiron-3581 /v/l/l/images# sudo qemu-img create -f raw newdisk1.img 2  
G  
Formatting 'newdisk1.img', fmt=raw size=2147483648  
root@ishmam-Inspiron-3581 /v/l/l/images# sudo qemu-img create -f raw newdisk2.img 2  
G  
Formatting 'newdisk2.img', fmt=raw size=2147483648  
root@ishmam-Inspiron-3581 /v/l/l/images# sudo virsh attach-disk linux2022 --source  
/var/lib/libvirt/images/newdisk1.img --target vdb --persistent  
error: Failed to attach disk  
error: Requested operation is not valid: target vdb already exists  
  
root@ishmam-Inspiron-3581 /v/l/l/images [1]# sudo virsh attach-disk linux2022 --sou  
rce /var/lib/libvirt/images/newdisk1.img --target vdd --persistent  
Disk attached successfully  
  
root@ishmam-Inspiron-3581 /v/l/l/images# sudo virsh attach-disk linux2022 --source  
/var/lib/libvirt/images/newdisk1.img --target vde --persistent  
Disk attached successfully
```

===== migrate my vm =====

At first I migrated the image files from my pc's `/var/lib/libvirt/images/` to My friend Eshita's pc. Then on her pc I started the 'virtual Machine Manager' app. Then I selected the option "Import Existing Disk Image" and imported the img file from her pc. Then I followed the same process as the task 1 and migrated my vm successfully. Now you can see it from the two terminal names.



```
fish /var/lib/libvirt/images
File Edit View Search Terminal Help
eshita@mahjabineshita-22101878:~$ fish
Welcome to fish, the friendly interactive shell
Type help for instructions on how to use fish
eshita@mahjabineshita-22101878 ~-> /var/lib/libvirt/images/
eshita@mahjabineshita-22101878 /v/l/l/images> ls
linux2022.qcow2 newdisk2.img
eshita@mahjabineshita-22101878 /v/l/l/images> 
```



Make a shared folder between guest os and host os

1. First I made a directory on my host machine and Also updated the memory backing and the storage virtiofs on my host machine

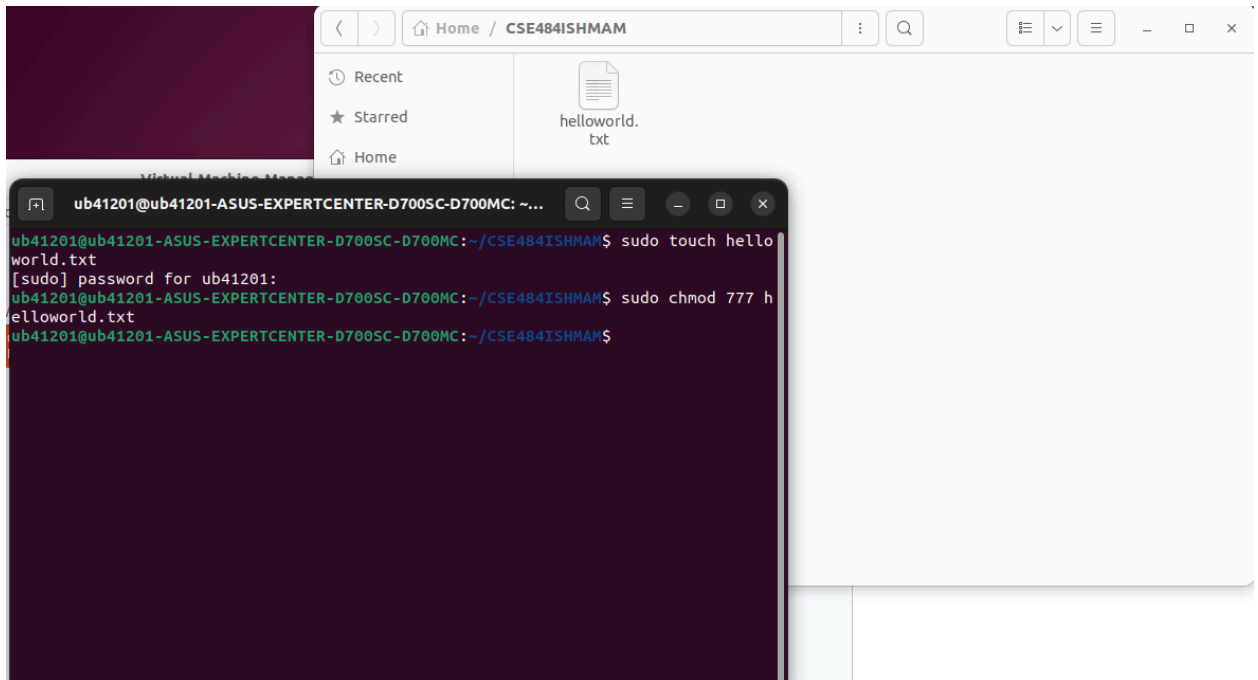
```
</controller>
<controller type='virtio-serial' index='0'>
  <address type='pci' domain='0x0000' bus='0x03' slot='0x00' function='0x0' />
</controller>
<filesystem type='mount' accessmode='passthrough'>
  <driver type='virtiofs' />
  <source dir='/home/ub41201/CSE484ISHMAM' />
  <target dir='CSE484SHAREDISHMAM' />
  <address type='pci' domain='0x0000' bus='0x07' slot='0x00' function='0x0' />
</filesystem>
<interface type='network'>
  <mac address='52:54:00:8e:43:8c' />
  <source network='default' />
  <model type='virtio' />
</interface>
```

```
<memory unit='KiB'>5132288</memory>
<currentMemory unit='KiB'>5132288</currentMemory>
<memoryBacking>
  <nosharepages />
  <source type='memfd' />
  <access mode='shared' />
</memoryBacking>
<vcpu placement='static'>4</vcpu>
```

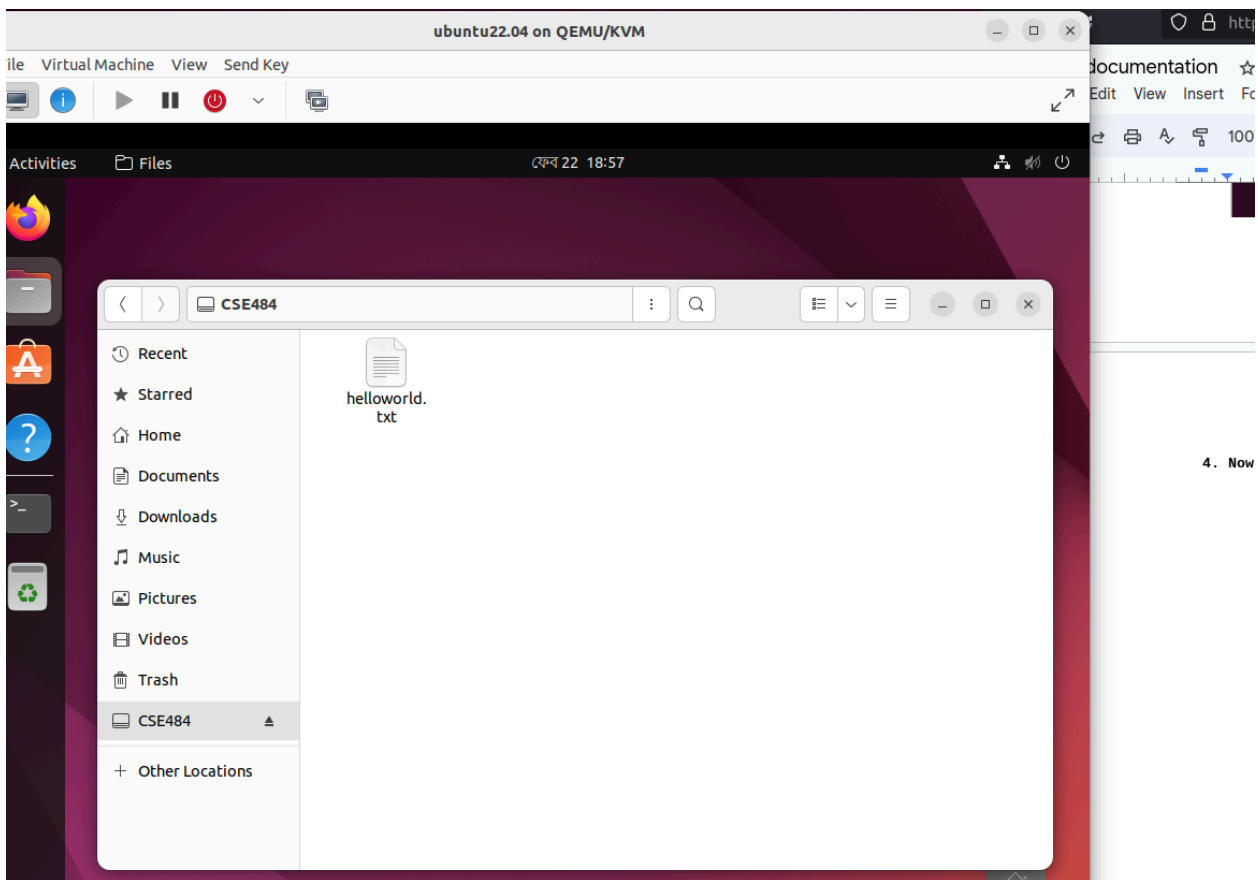
2. Then I opened my KVM and mounted the directory on my KVM

```
Try 'mount --help' for more information.
ishmam@binrofi-22301229:~$ sudo mount -v -t virtiofs CSE484SHAREDISHMAM ~/CSE484
mount: CSE484SHAREDISHMAM mounted on /home/ishmam/CSE484.
ishmam@binrofi-22301229:~$
```

3. Then I made a text file on my host pcs file folder



4. Now I can also access the file from my vm



Mount phone on KVM:

I have Redmi Note 9 and it is not compatible with KVM. Thus I had to borrow my friend's one plus and use it :3

1. First I mounted his phone on my host os. Then Unmounted it from my Host os.
2. Then I opened my KVM and ran my guest os, there under the virtual Machine tab I selected Redirect USB Device and selected the One Plus phone
3. And here we can see in the second screenshot that my phone is successfully mounted.

