Individual Assessment Coversheet

To be attached to the front of the assessment.

Campus: Pretoria

Faculty: Information Technology

Module Code: ITVNAO-B22

Group: Group 1

Lecturer's Name: Ms.Ngwane.N.

Student Full Name: Kelebogile Nanikie Mathebula

Student Number:

Indicate	Yes	No
Plagiarism report attached	✓	

Declaration:

I declare that this assessment is my own original work except for source material explicitly acknowledged. I also declare that this assessment or any other of my original work related to it has not been previously, or is not being simultaneously, submitted for this or any other course. I am aware of the AI policy and acknowledge that I have not used any AI technology to generate or manipulate data, other than as permitted by the assessment instructions. I also declare that I am aware of the Institution's policy and regulations on honesty in academic work as set out in the Conditions of Enrolment, and of the disciplinary guidelines applicable to breaches of such policy and regulations.

Signature KNP MATHEBULA	**Date:** 11/06/2025

Lecturer's Comments:

Marks Awarded:	**%**

Signature	Date

Contents

Question 1

1.1 With the necessary tools, record a video of yourself providing step by step instructions on how to create a UTP straight cable for this small home office.

The video is separately submitted. (Network, 2021)

1.2. Based on the subnet address calculate the following (show all calculations/table)

KEY (S):

Binary	Decimal
10000000	128
11000000	192
11100000	224
11110000	240
11111000	248
11111100	252
11111110	254
11111111	255

Binary	Decimal
10101000	168
01000010	66
00000001	1

a) The subnet mask and subnet address.

Address: 192.168.1.66/28

11111111.11111111.11111111.11110000

Subnet: 255.255.255.240

Network Address: 192.168.1.64/28

IP : 11000000.10101000.00000001.01000010

Subnet: 11111111.11111111.11111111.11110000

Network: 11000000.10101000.00000001.01000000

Therefore: 192.168.1.64 is the network address.

b) The first and last host for the subnet.

The first and last host address are in between the network address as well as the broadcast address.

Therefore:

Broadcast Address

Network address: 192.168.1.64

11000000.10101000.00000001.01000000

Subnet mask: 255.255.255.240

11111111.11111111.11111111.11110000

2.Host bits: They are the ones in red.

11111111.11111111.11111111.1111**0000**

3.Set the host bits to 1: 1111**1111**

4. Combine the network portion with the host bits set to 1.

11000000.10101000.00000001.0100**1111**

Broadcast Address: 192.168.1.79**-1**

Last host=192.168.1.78

Network Address

11000000.10101000.00000001.01000001

Network Address: 192.168.1.64**+1**

First host=192.168.1.65

First host: 192.168.1.65

Last host: 192.168.1.78

Therefore:

Range: 192.168.1.65**-**192.168.1.78

c) The broadcast address for the subnet.

Broadcast address: 192.168.1.78

1.Network address: 192.168.1.64

11000000.10101000.00000001.01000000

Subnet mask: 255.255.255.240

11111111.11111111.11111111.11110000

2.Host bits: They are the ones in red.

11111111.11111111.11111111.11110000

3.Set the host bits to 1: 11111111

4. Combine the network portion with the host bits set to 1.

11000000.10101000.00000001.01001111

Therefore: 192.168.1.79 is the broadcast address.

Question 2

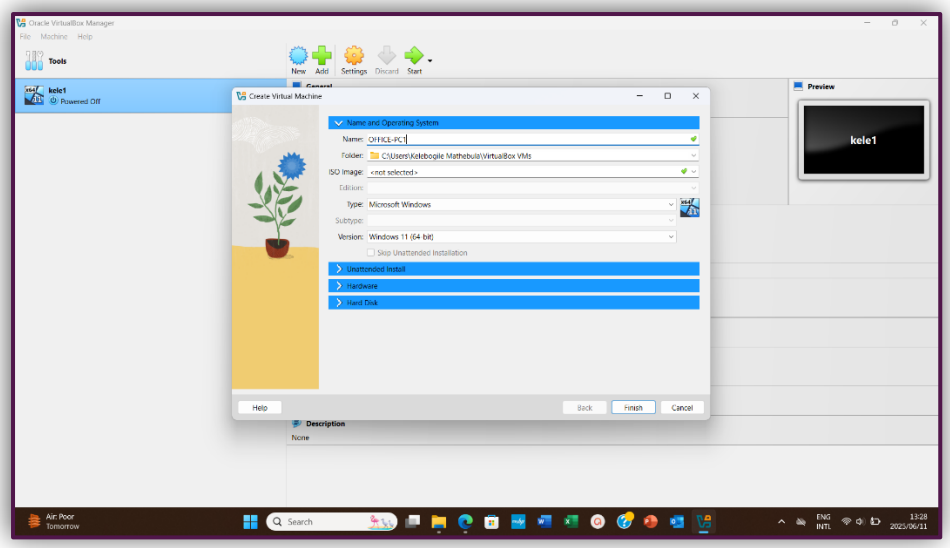
2.1. For VM1, install Windows 8.1 OS, the computer must be named OFFICE-PC1, and for VM2 install Windows 10 OS with the computer named as OFFICE-PC2. (Use your own RAM and VHD size)

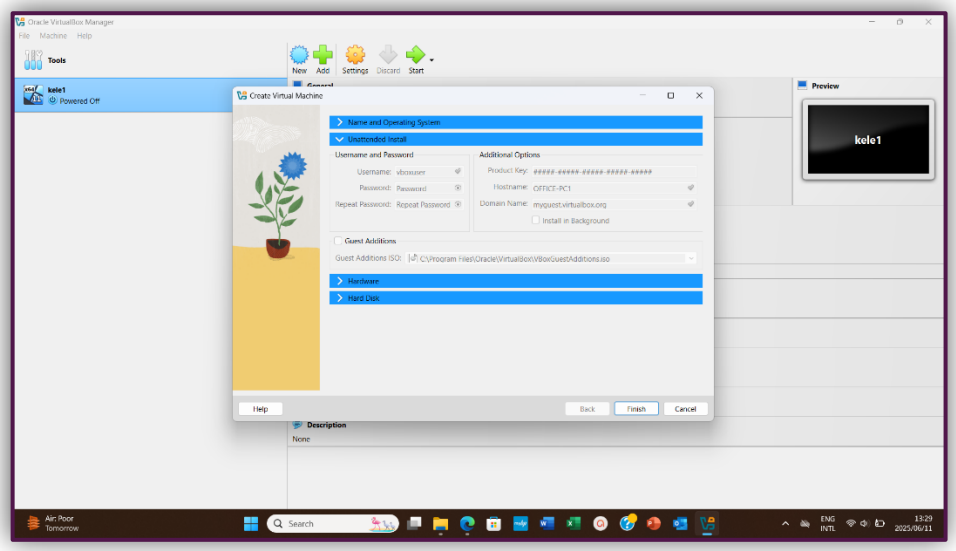
NB: ZOOM IN TO SEE PICTURES PROPERLY

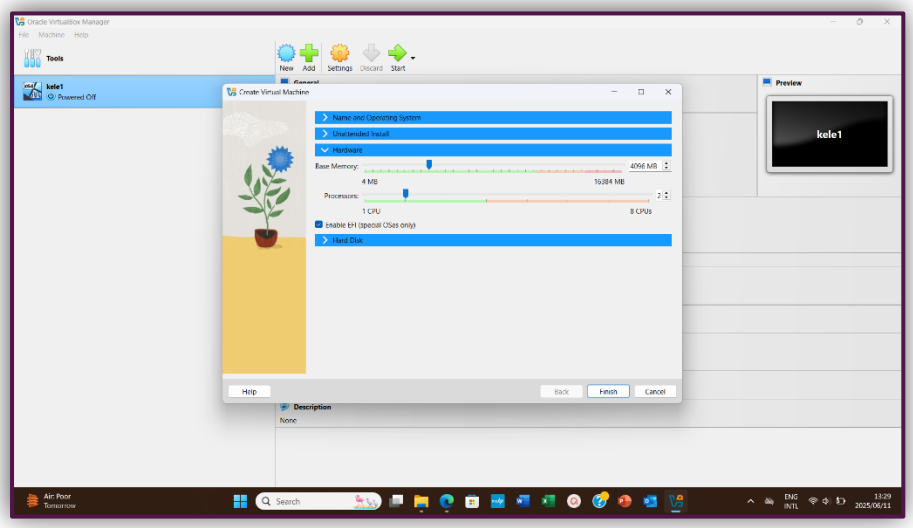
Step 1: I first opened Oracle VirtualBox.

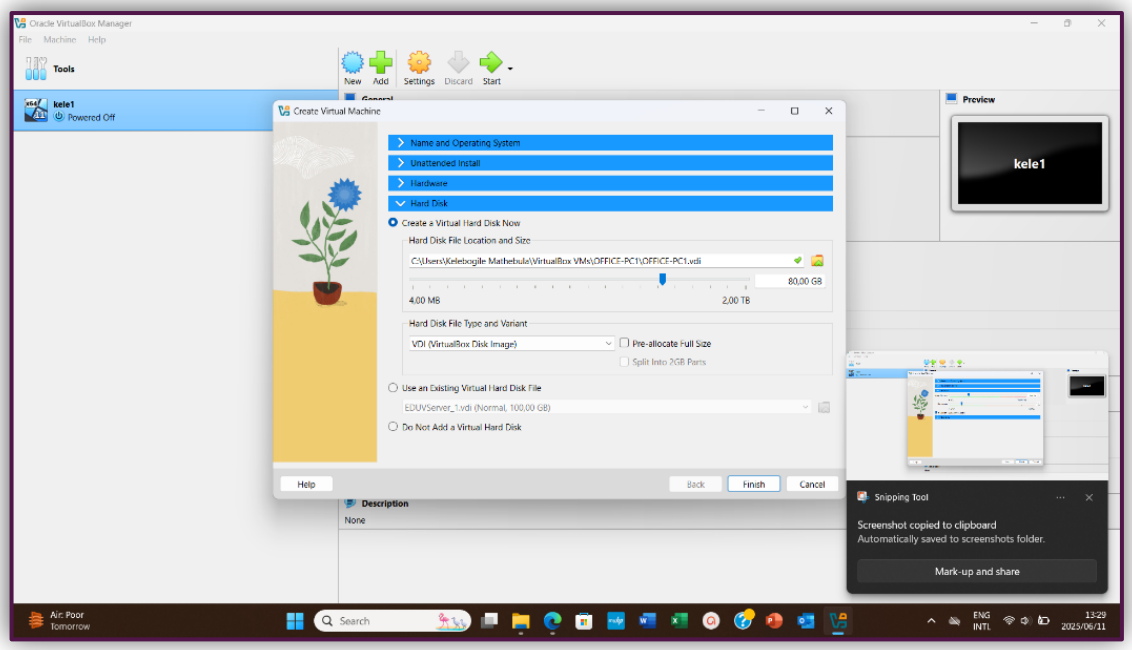
Step 2: This is where I created two VMs, one with windows 8.1 (OFFICE-PC1) and one with windows 10 (OFFICE-PC2).

OFFICE-PC1

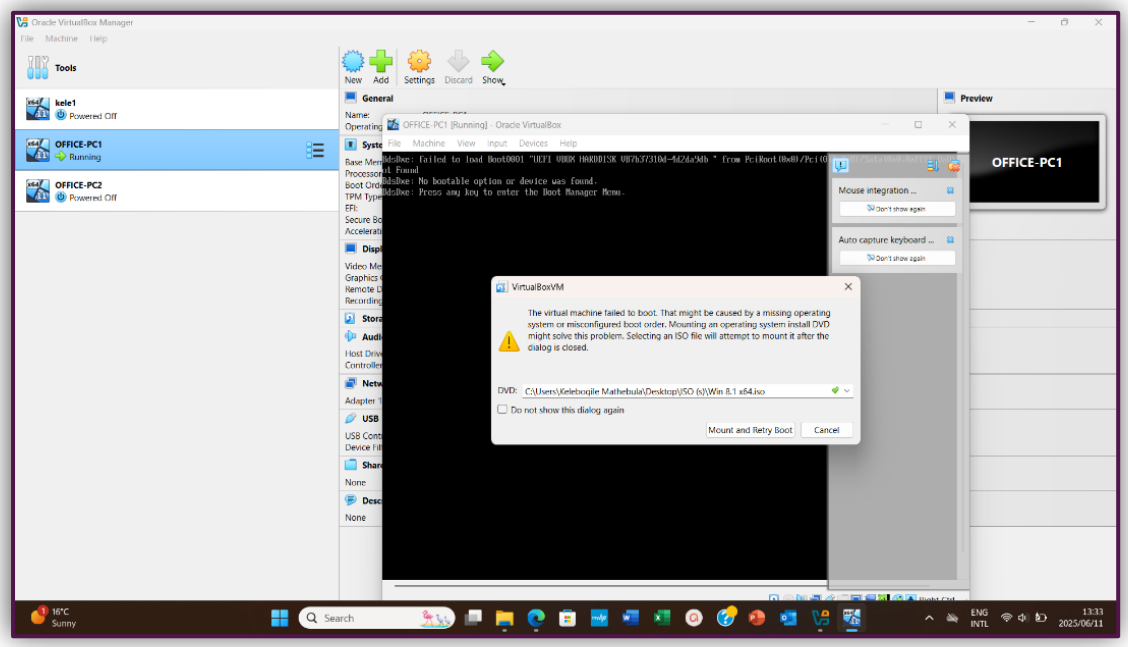




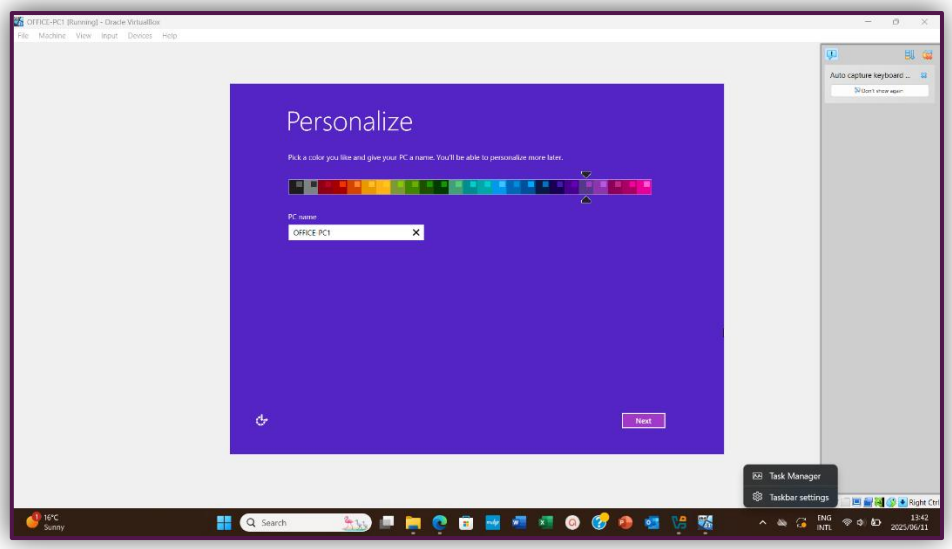


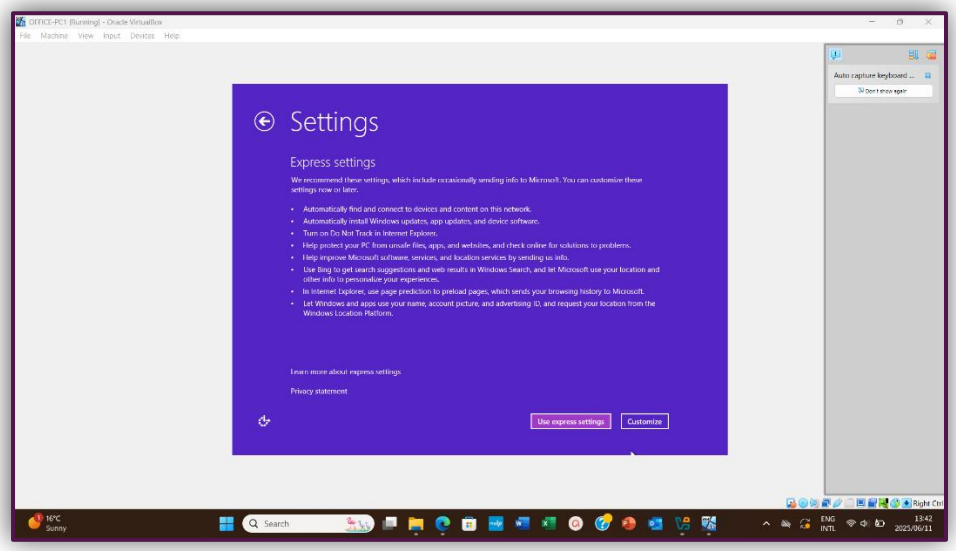


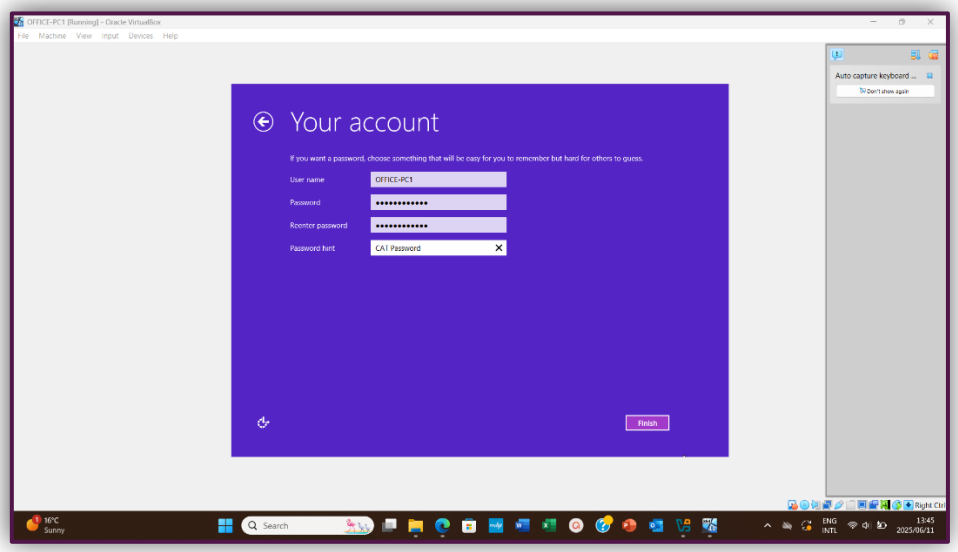
This where I then added the ISO file/image.

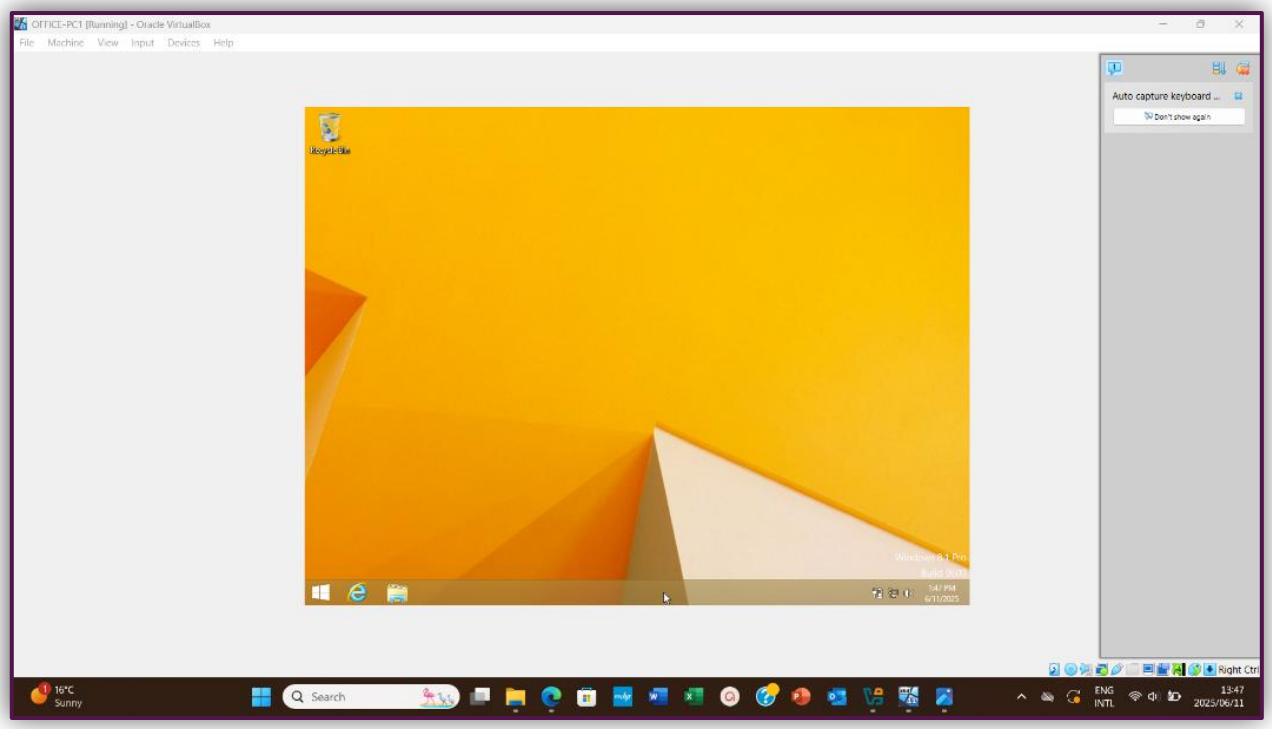


After that there will be a pop up that says “press any key to boot CD or DVD…”, once you that your machine will install the Windows 8.1 ISO. It will then finally require you to set up your profile or sign in.

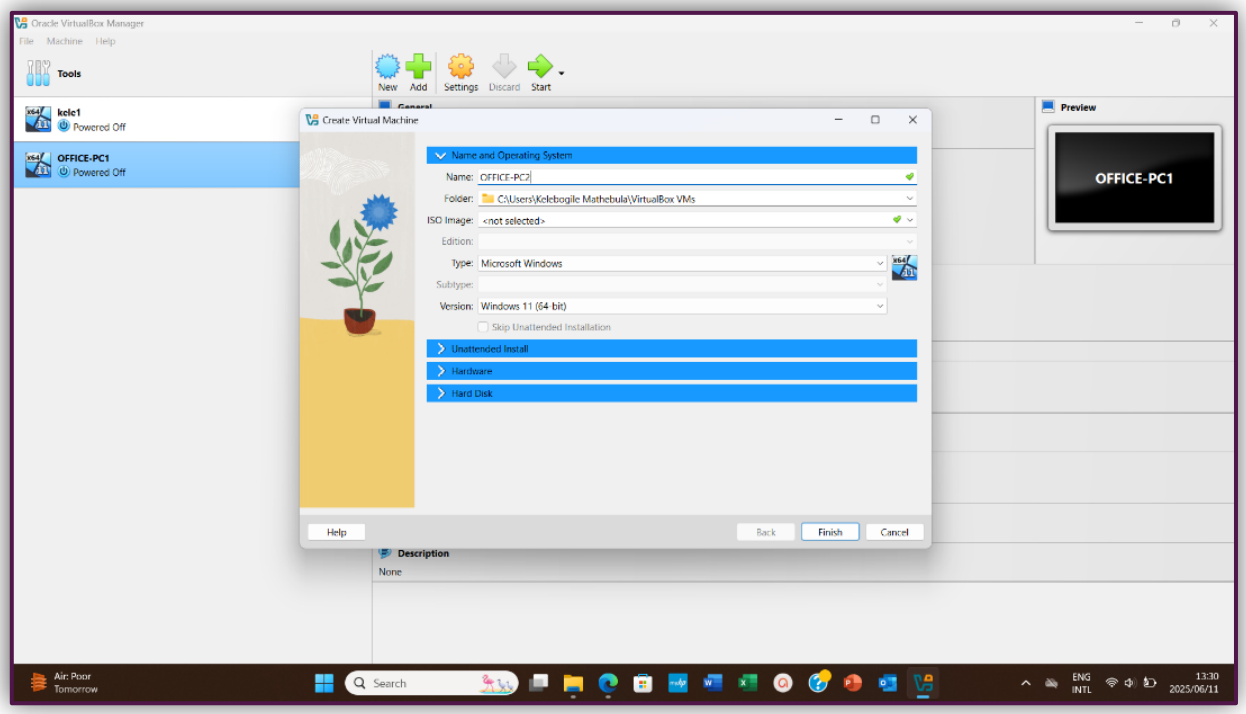

Personalize
Pick a color you like and give your PC a name. You'll be able to personalize more later.
PC name
OFFICE-PC1
Next
Task Manager
Taskbar settings

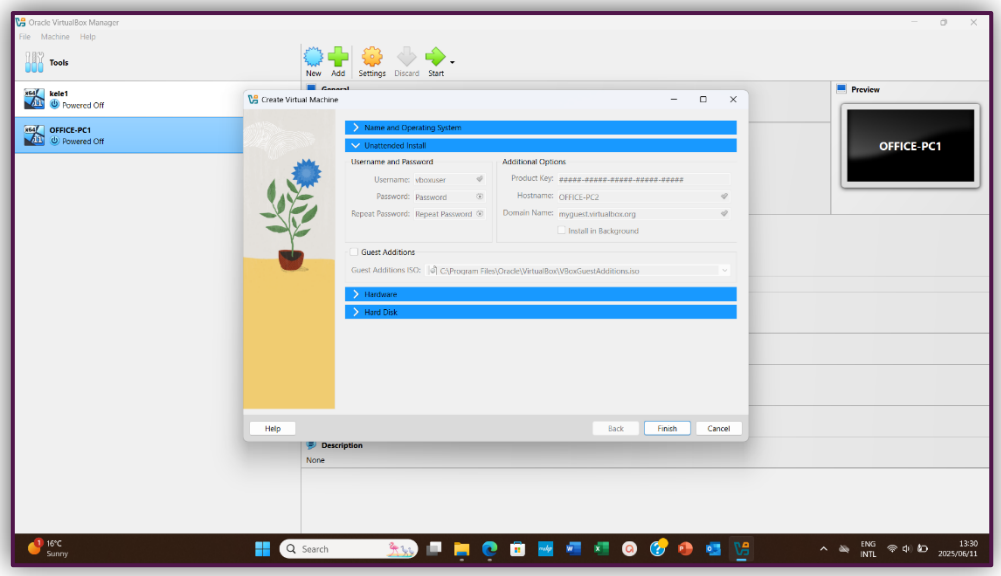

Settings
Express settings
We recommend these settings, which include occasionally sending info to Microsoft. You can customize these settings now or later.
Automatically find and connect to devices and content on this network.
Automatically install Windows updates, app updates, and device software.
Turn on Do Not Track in Internet Explorer.
Help protect your PC from unsafe files, apps, and websites, and check online for solutions to problems.
Help improve Microsoft software, services, and location services by sending us info.
Use Bing to get search suggestions and web results in Windows Search, and let Microsoft use your location and other info to personalize your experiences.
In Internet Explorer, use page prediction to preload pages, which sends your browsing history to Microsoft.
Let Windows and apps use your name, account picture, and advertising ID, and request your location from the Windows Location Platform.
Learn more about express settings
Privacy statement
Use express settings
Customize

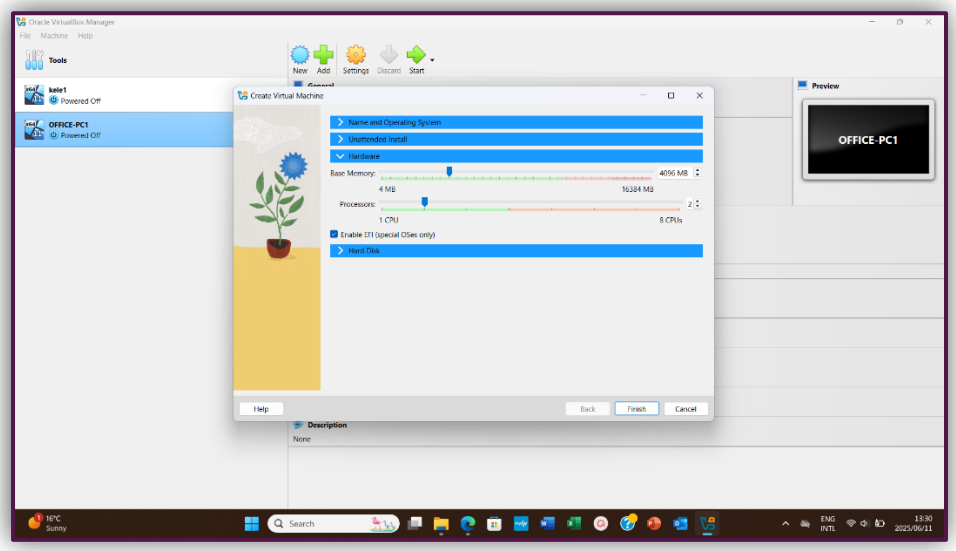

Your account
If you want a password, choose something that will be easy for you to remember but hard for others to guess.
User name
OFFICE-PC1
Password
Reenter password
Password hint
CAT Password
Finish

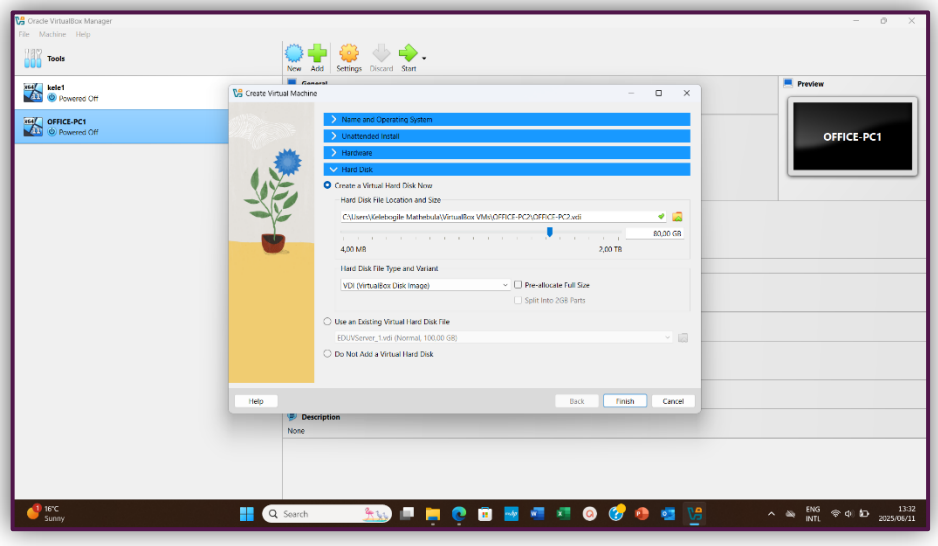


OFFICE-PC2

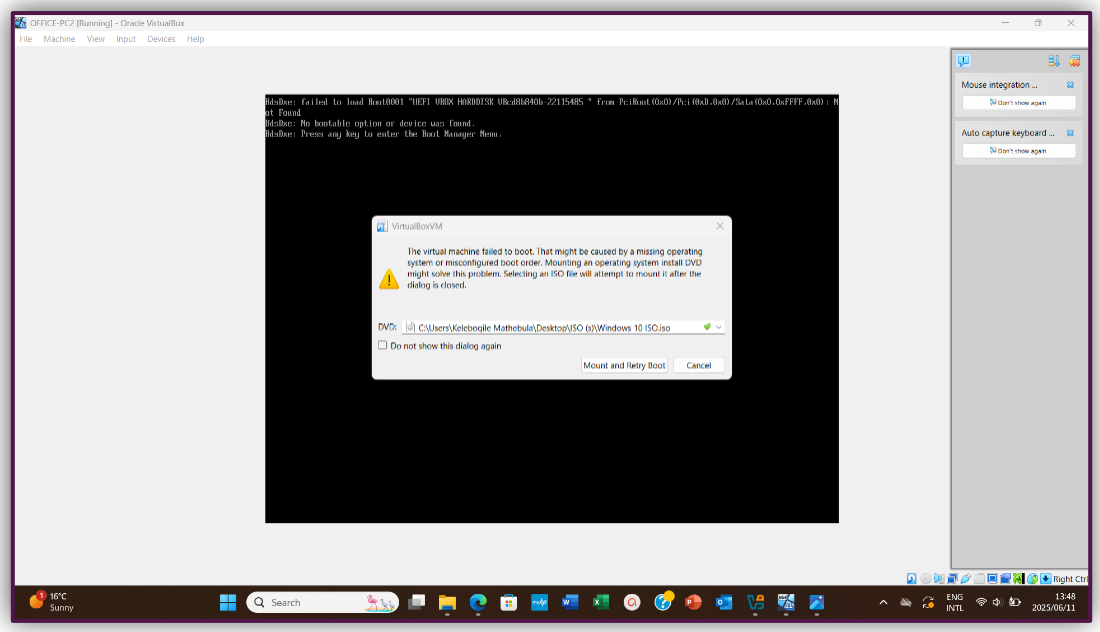

Oracle VirtualBox Manager
Tools
kele1
Powered Off
OFFICE-PC1
Powered Off
New
Add
Settings
Discard
Start
Create Virtual Machine
Name and Operating System
Name: OFFICE-PC2
Folder: C:\Users\Kelebogile Mathebula\VirtualBox VMs
ISO Image: <not selected>
Edition:
Type: Microsoft Windows
Subtype:
Version: Windows 11 (64-bit)
Skip Unattended Installation
Unattended Install
Hardware
Hard Disk
Help
Back
Finish
Cancel
Preview
OFFICE-PC1
Description
None



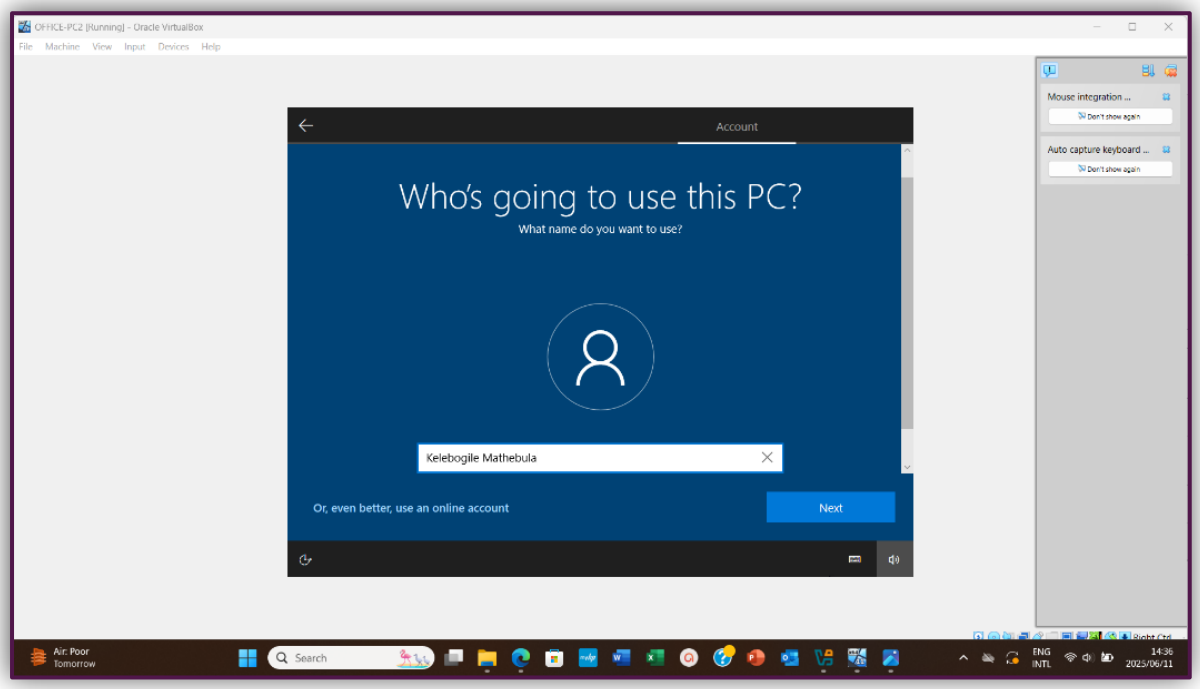


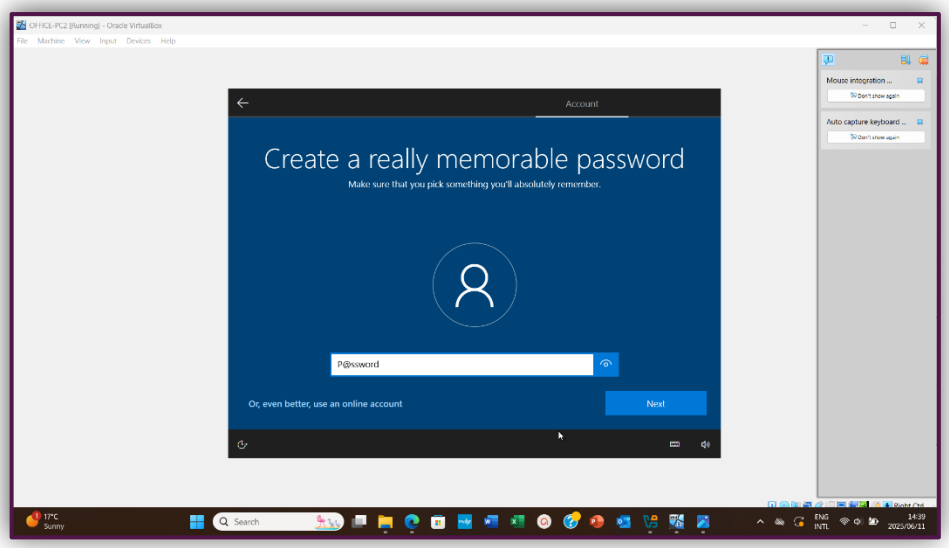


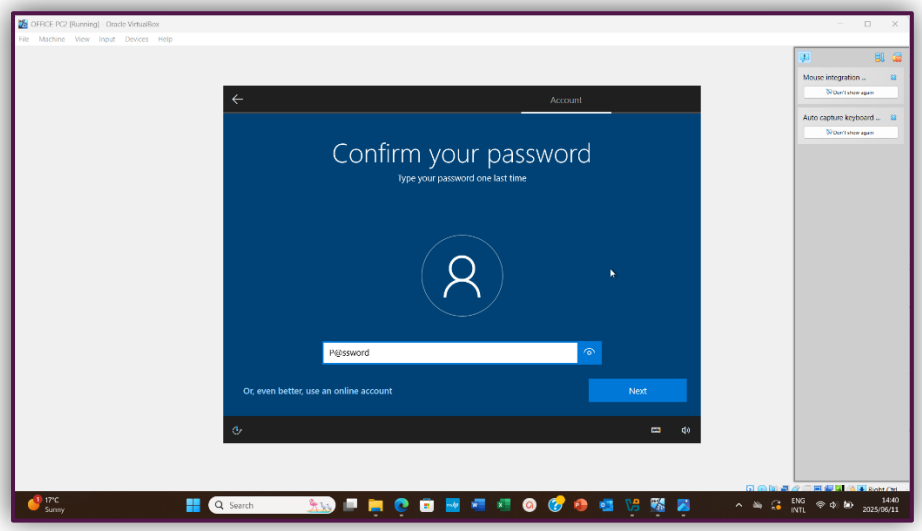
This is where I then installed the ISO image/file.

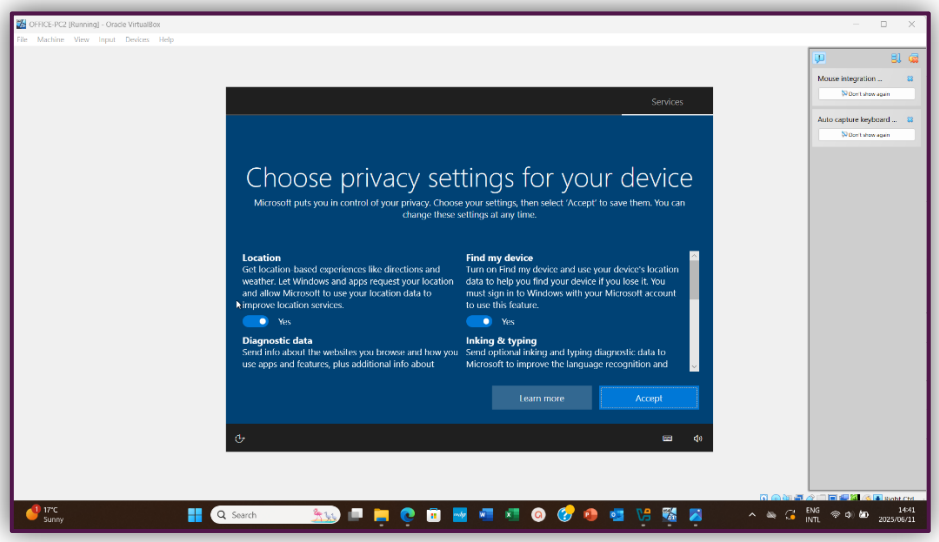


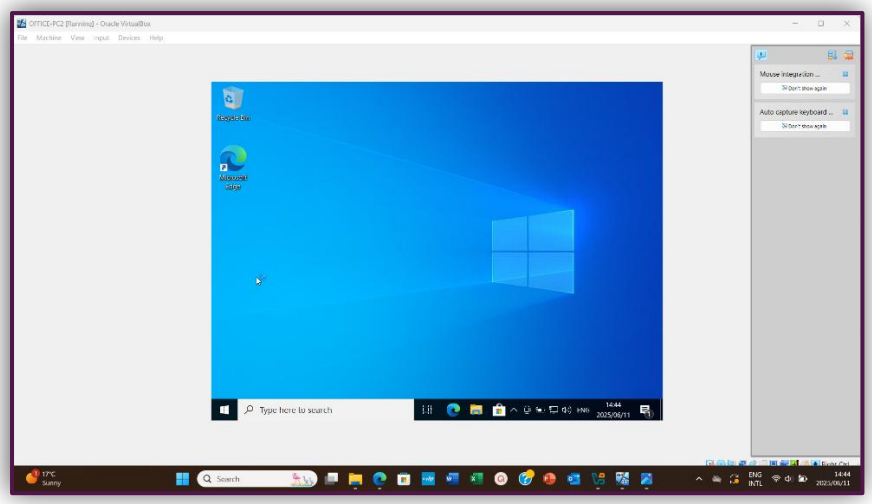
After inserting the ISO a pop up will appear that says “Press any key to boot CD or DVD…”, after doing that Windows 10 will install. Once that is done the VM will want you sign in.




Account
Create a really memorable password
Make sure that you pick something you'll absolutely remember.
P@ssword
Or, even better, use an online account
Next


Account
Confirm your password
Type your password one last time
P@ssword
Or, even better, use an online account
Next

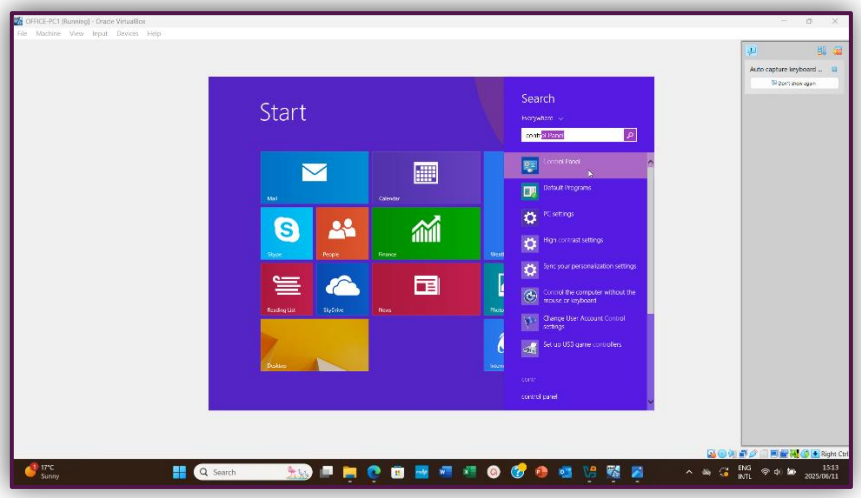

Services
Choose privacy settings for your device
Microsoft puts you in control of your privacy. Choose your settings, then select 'Accept' to save them. You can change these settings at any time.
Location
Get location-based experiences like directions and weather. Let Windows and apps request your location and allow Microsoft to use your location data to improve location services.
Yes
Find my device
Turn on Find my device and use your device's location data to help you find your device if you lose it. You must sign in to Windows with your Microsoft account to use this feature.
Yes
Diagnostic data
Send info about the websites you browse and how you use apps and features, plus additional info about
Inking & typing
Send optional inking and typing diagnostic data to Microsoft to improve the language recognition and
Learn more
Accept

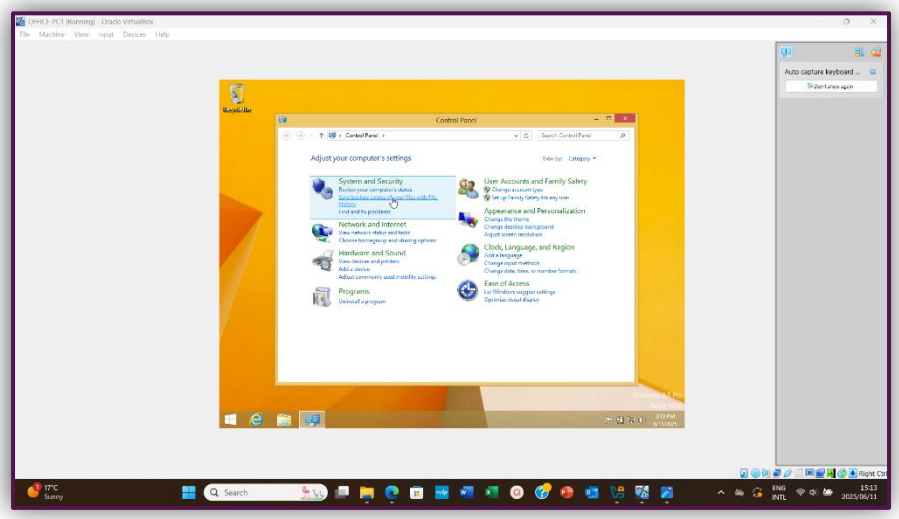


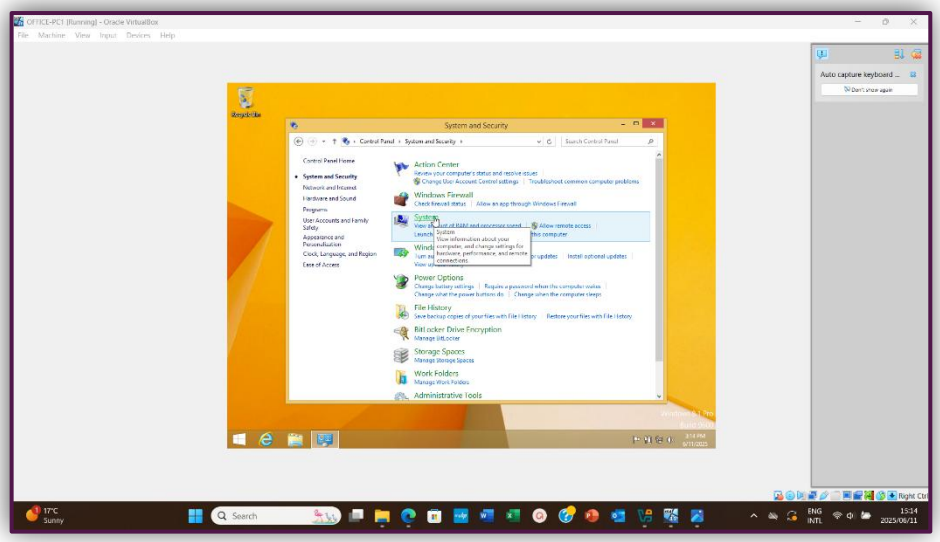
2.2. The workgroup for OFFICE-PC1 and OFFICE-PC2 must be set to REMOTE-2025.

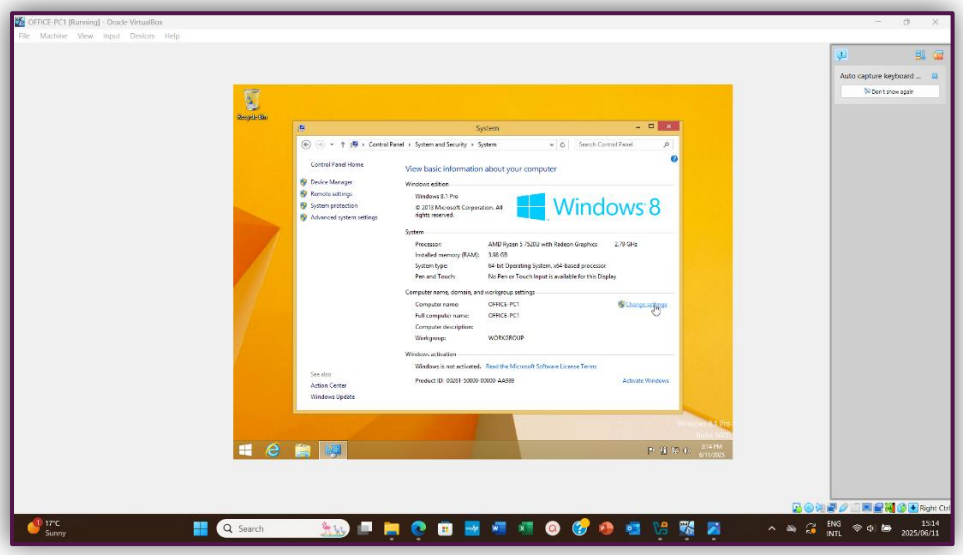
Step 3: This is where I created a workgroup for both the VMs named REMOTE-2025.

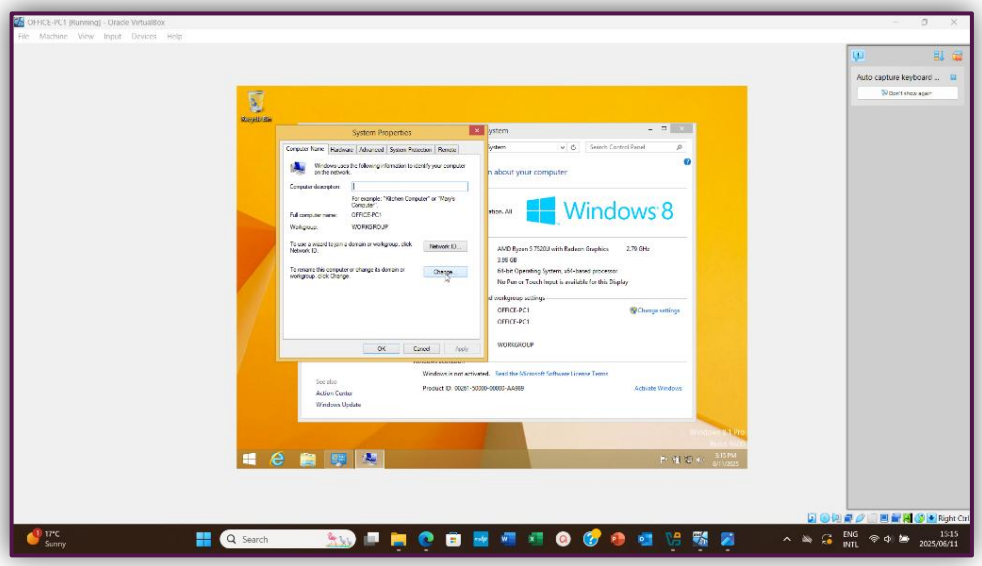
OFFICE-PC1

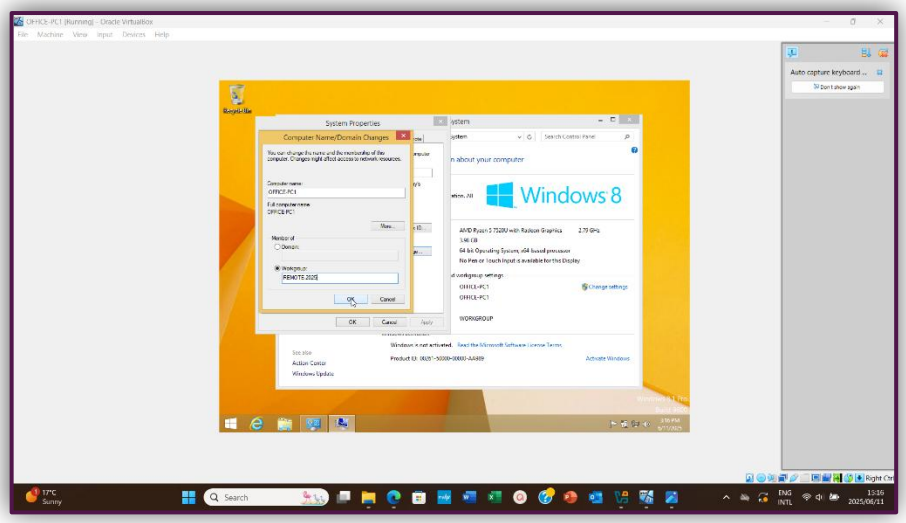


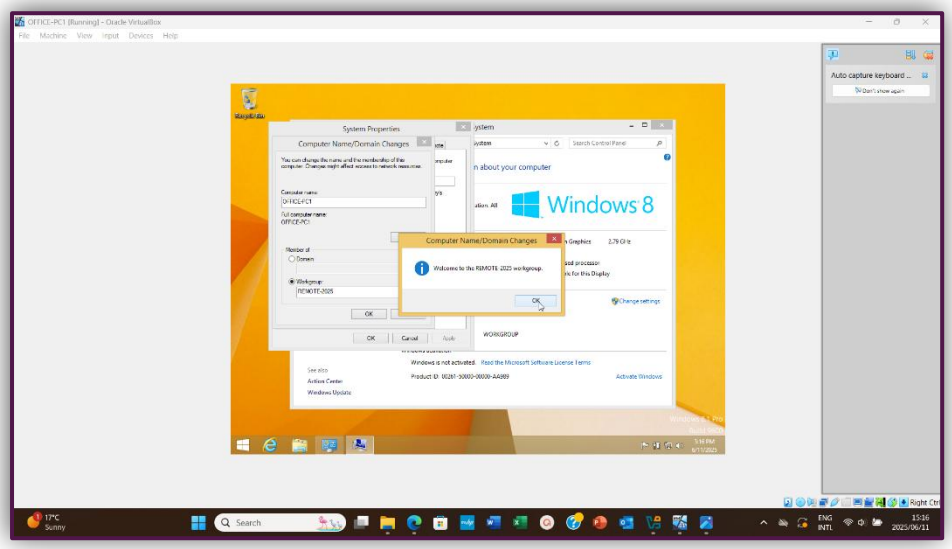


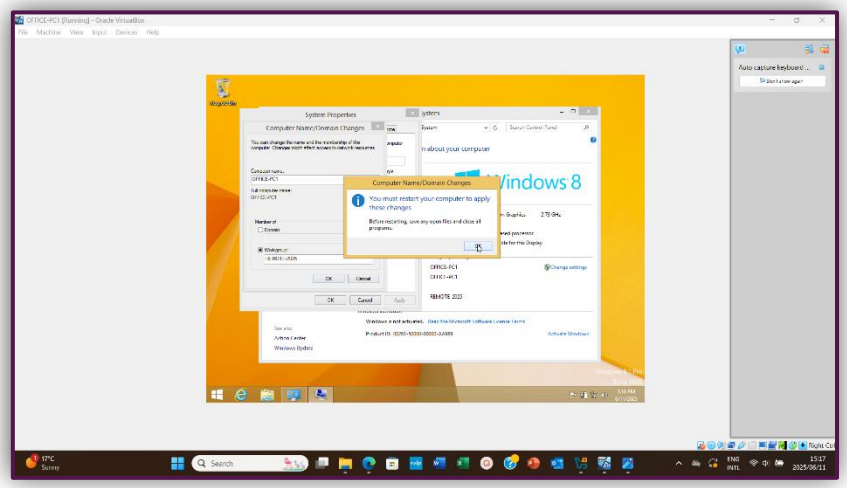

System and Security
Action Center
Windows Firewall
System
Power Options
File History
BitLocker Drive Encryption
Storage Spaces
Work Folders
Administrative Tools

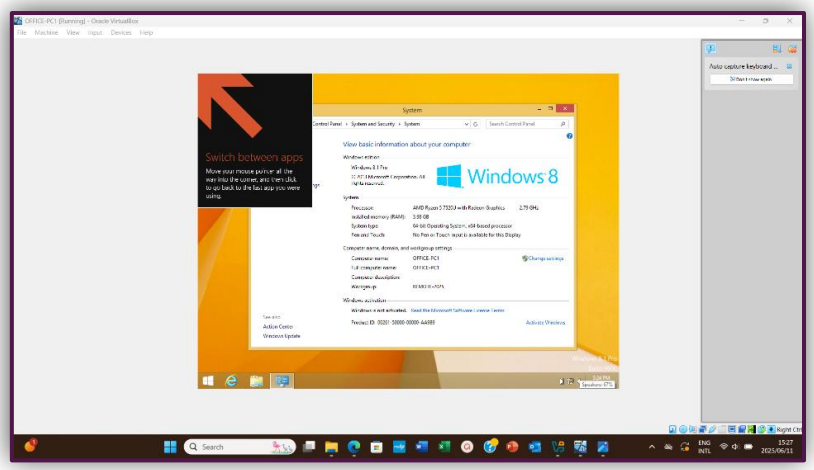

System
View basic information about your computer
Windows 8


System Properties
Windows 8



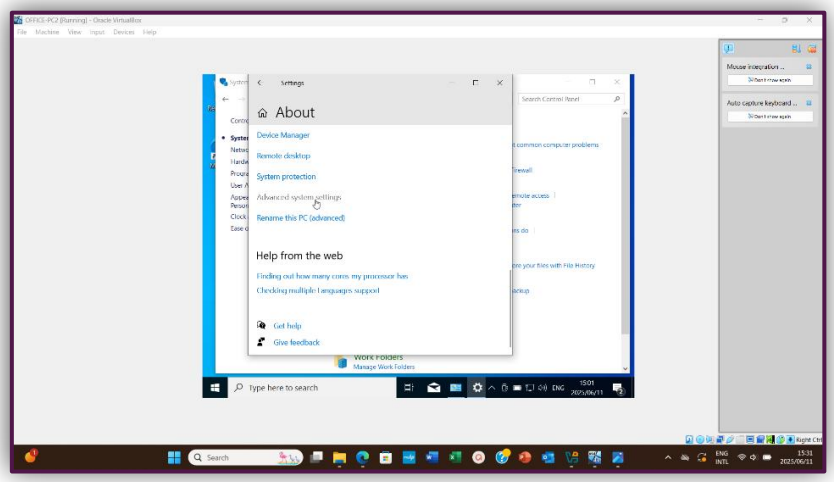


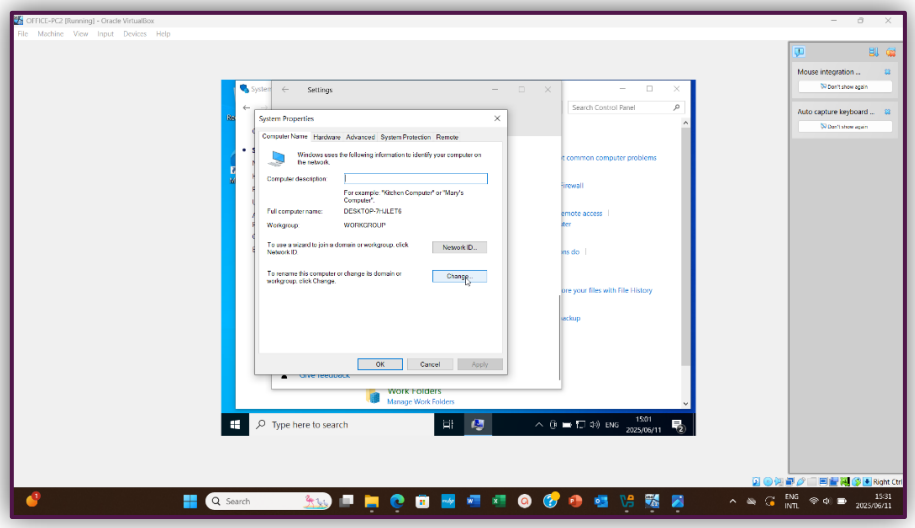


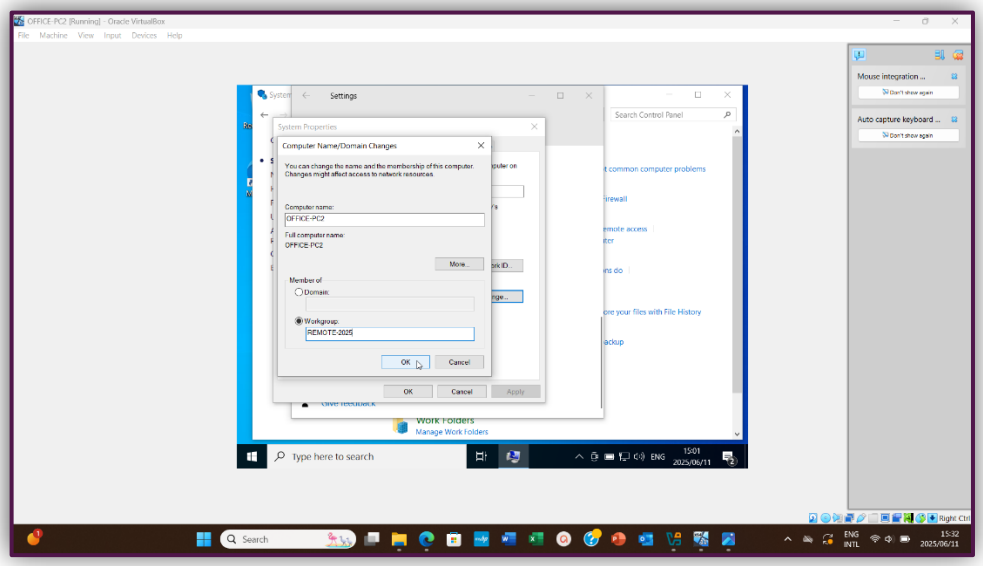


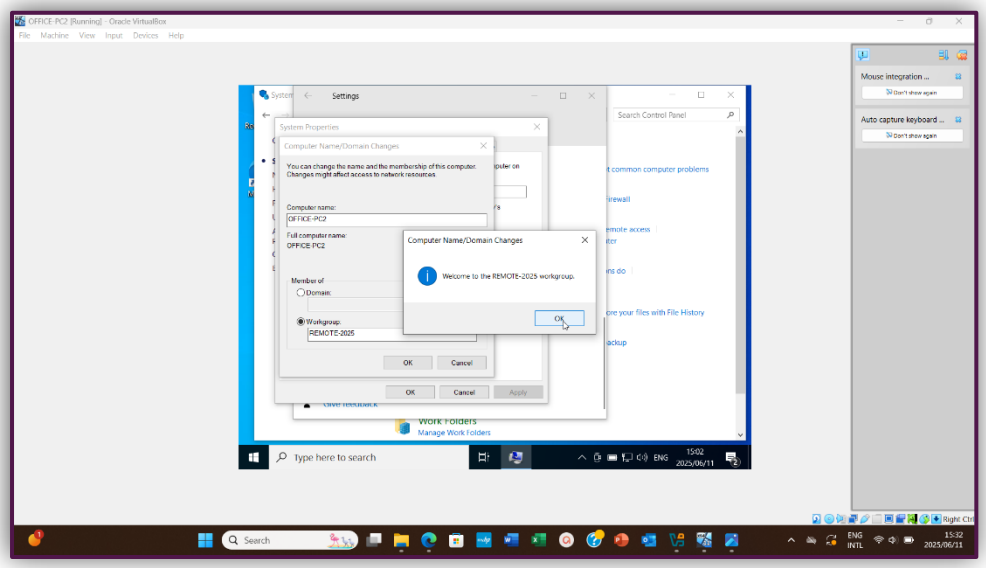
OFFICE-PC2

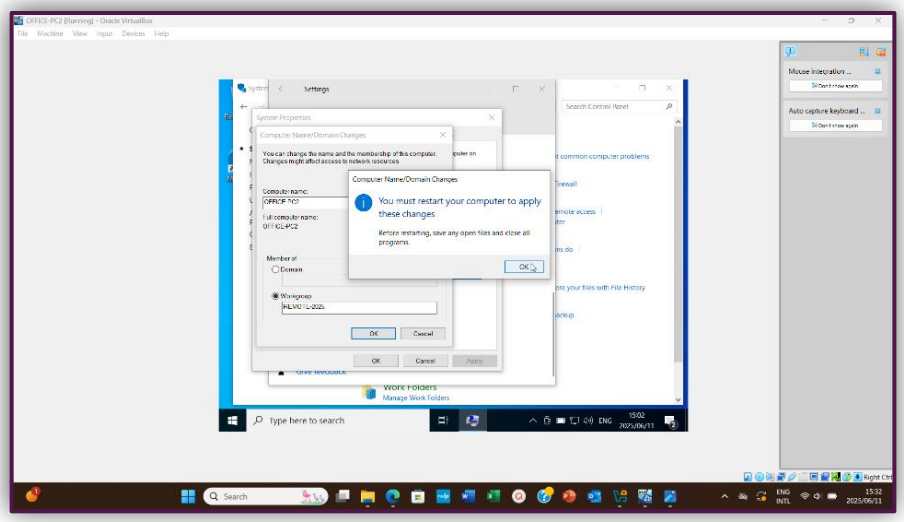
The process is going to be same as OFFICE-PC1, I went to Control Panel, then System and Security, then System and then under system I scrolled down to Advanced system settings then the process continues.



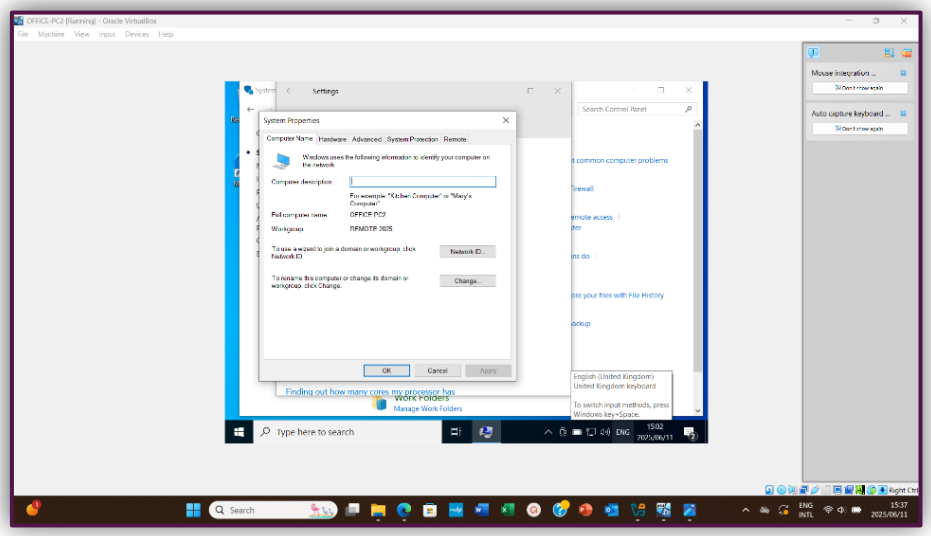



Computer Name/Domain Changes
You can change the name and the membership of this computer. Changes might affect access to network resources.
Computer name:
OFFICE-PC2
Full computer name:
OFFICE-PC2
More...
Member of
Domain:
Workgroup:
REMOTE-2025
OK
Cancel
Apply
Type here to search


Computer Name/Domain Changes
You can change the name and the membership of this computer. Changes might affect access to network resources.
Computer name:
OFFICE-PC2
Full computer name:
OFFICE-PC2
Member of
Domain:
Workgroup:
REMOTE-2025
Computer Name/Domain Changes
Welcome to the REMOTE-2025 workgroup.
OK
Cancel
Apply
Type here to search


Computer Name/Domain Changes
You must restart your computer to apply these changes
Before restarting, save any open files and close all programs.
OK
Cancel
Apply
Type here to search

The next image shows that the workgroup has been changed to REMOTE-2025.



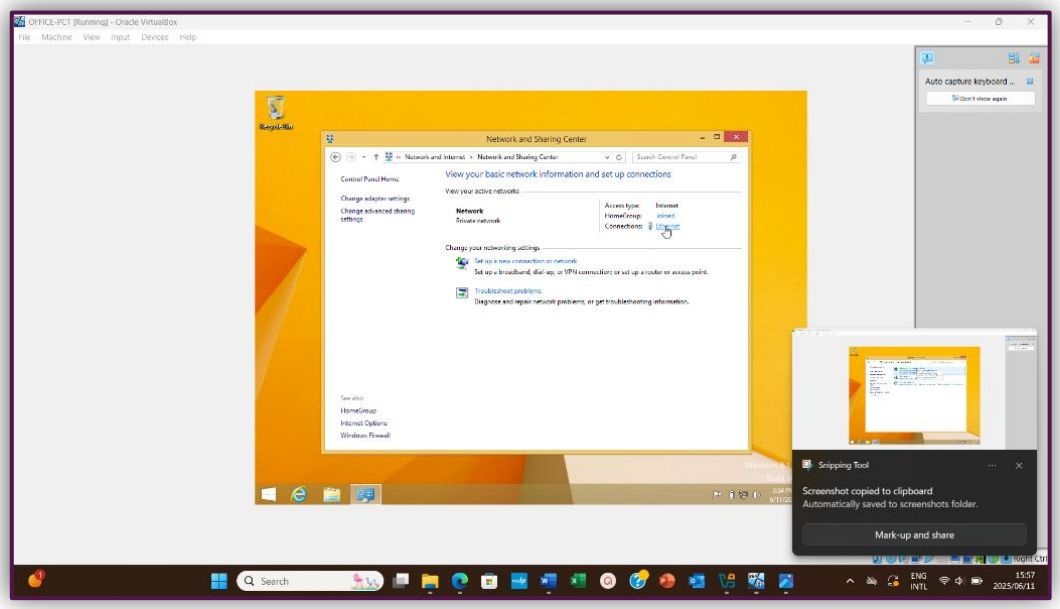
(Tang, 2019)

2.3. Using your answers for 1.2b, configure OFFICE-PC1 with your first host IPv4 address, and configure OFFICE-PC2W with your last host IPv4 address. The subnet mask for both computers will be the answer for 1.2a.

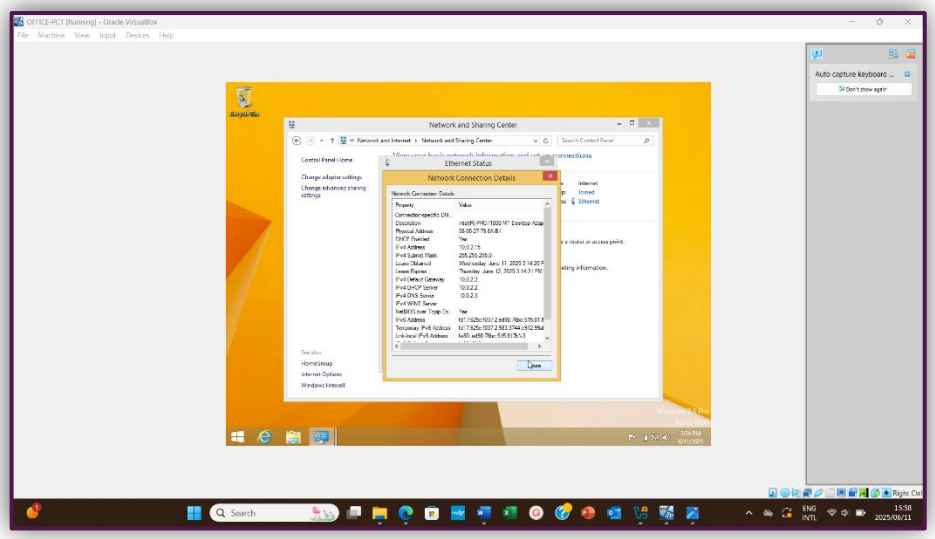
Step 4: This is where I assigned the first and last IP addresses to the VMs.

OFFICE-PC1

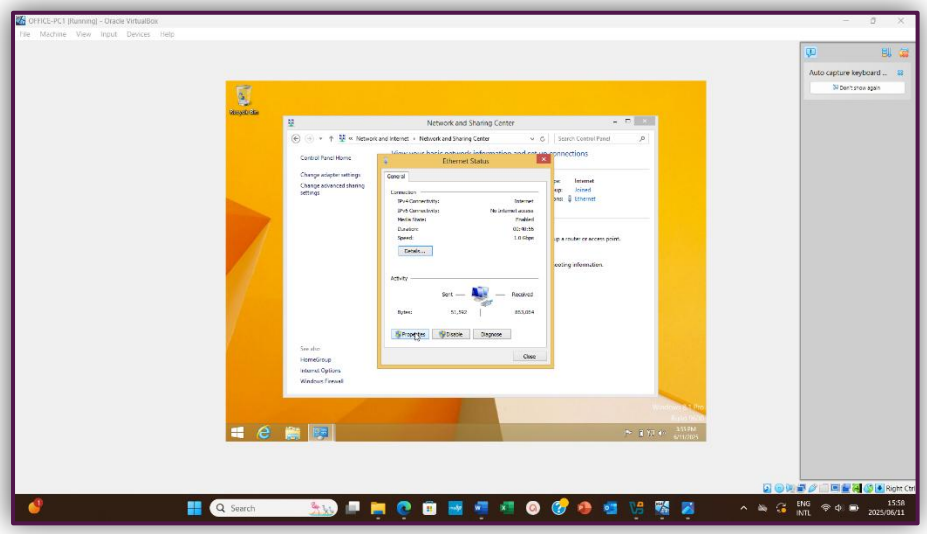
For this VM I assigned the first host IPv4 address from question 1.2b, I went to Control Panel, I then went to Network and Internet, then Network and Sharing Centre, I then spotted Ethernet and double clicked it, the following images represent the process.

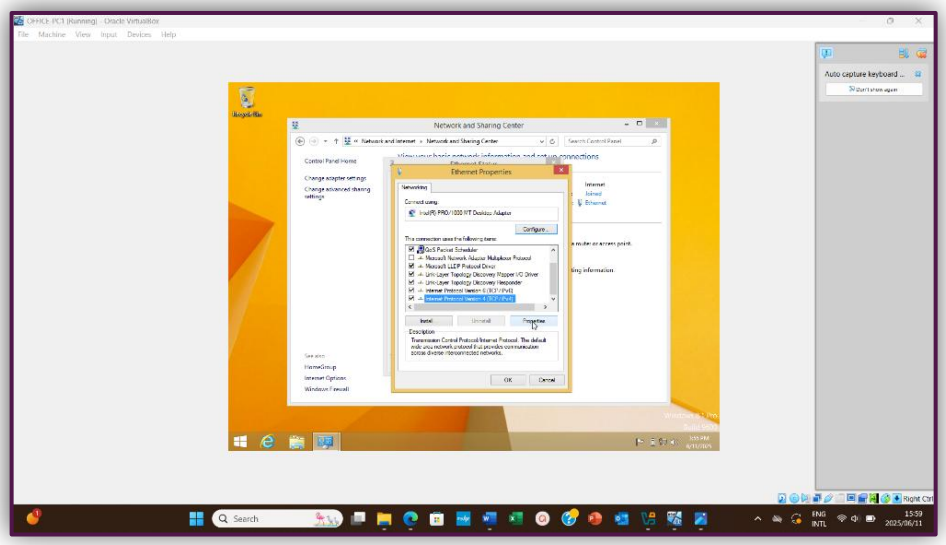


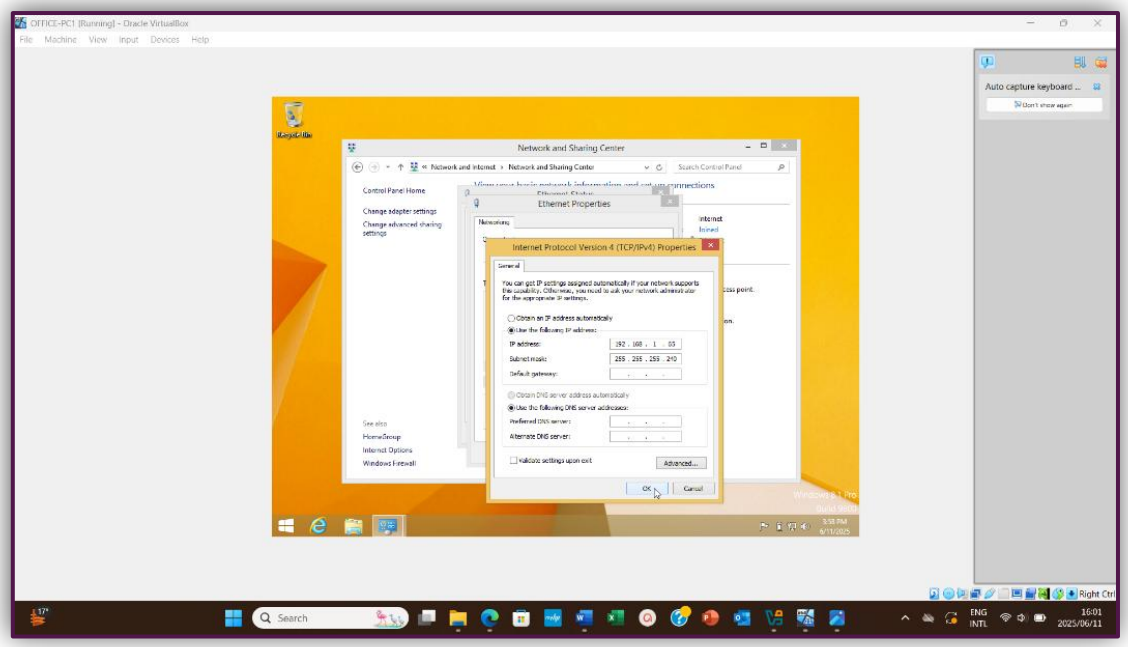
The following is before I changed the address.



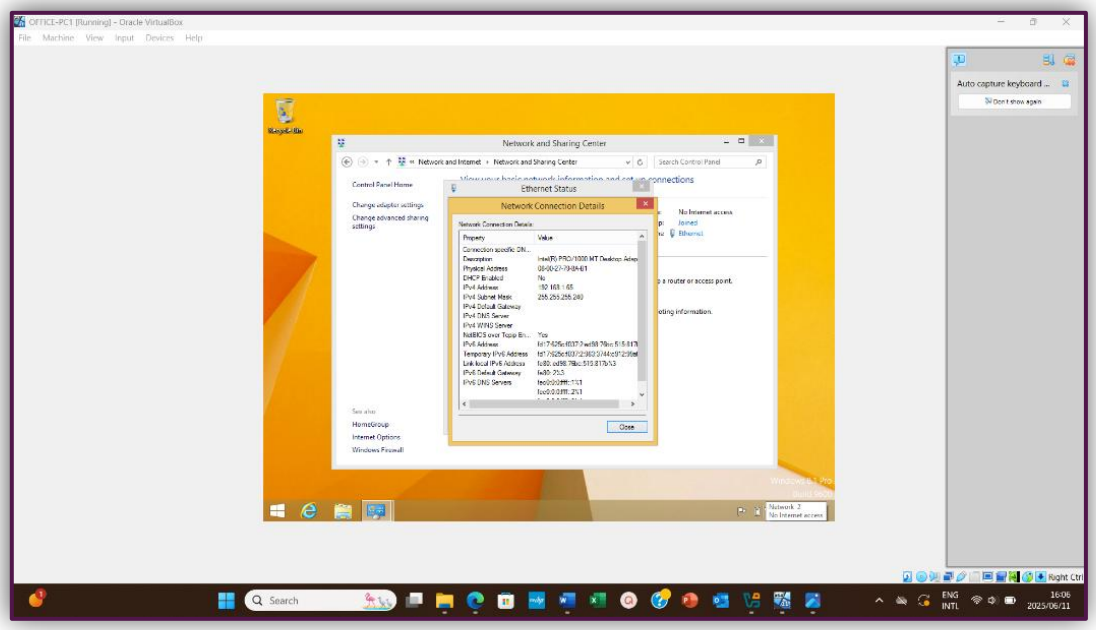
The following is the process of changing the address, I went to properties.





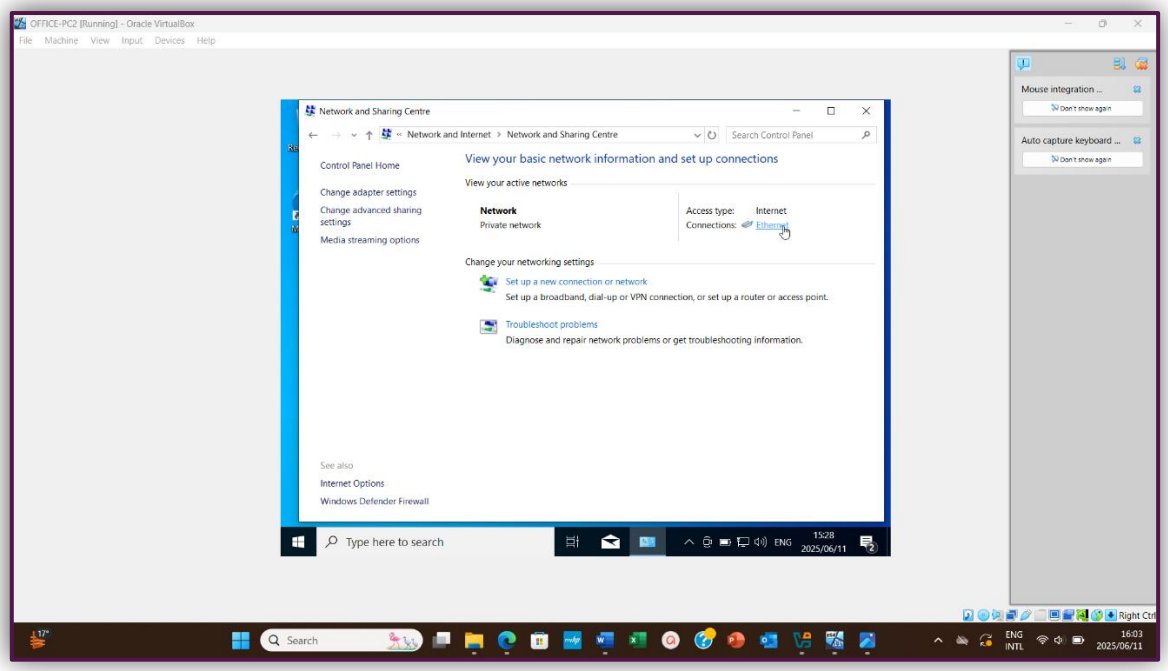


The following image shows the changed address.

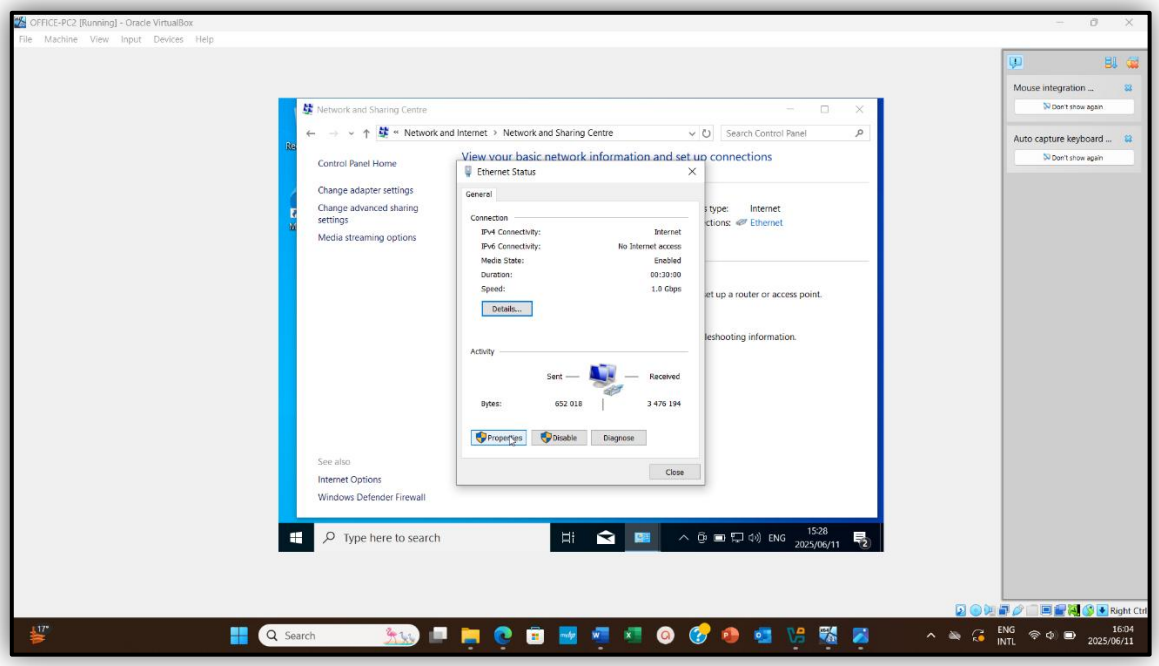


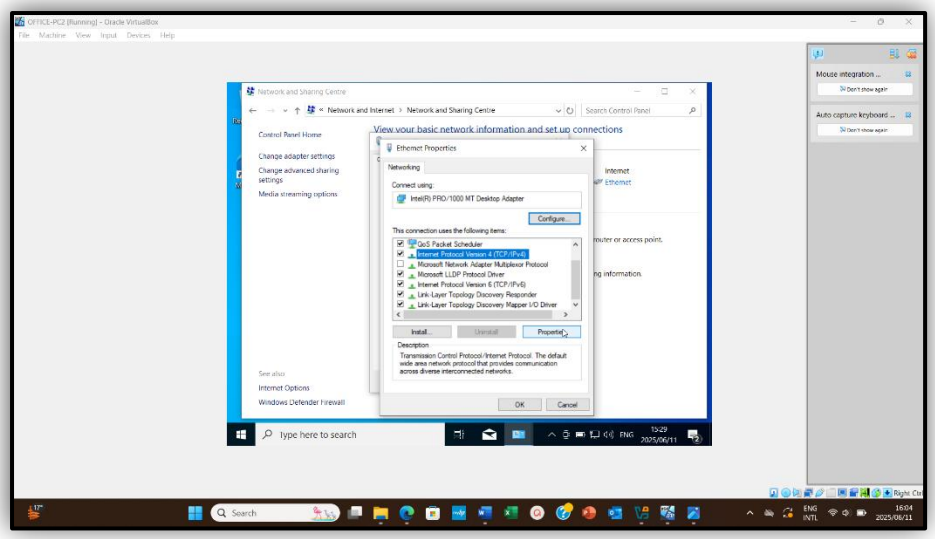
OFFICE-PC2

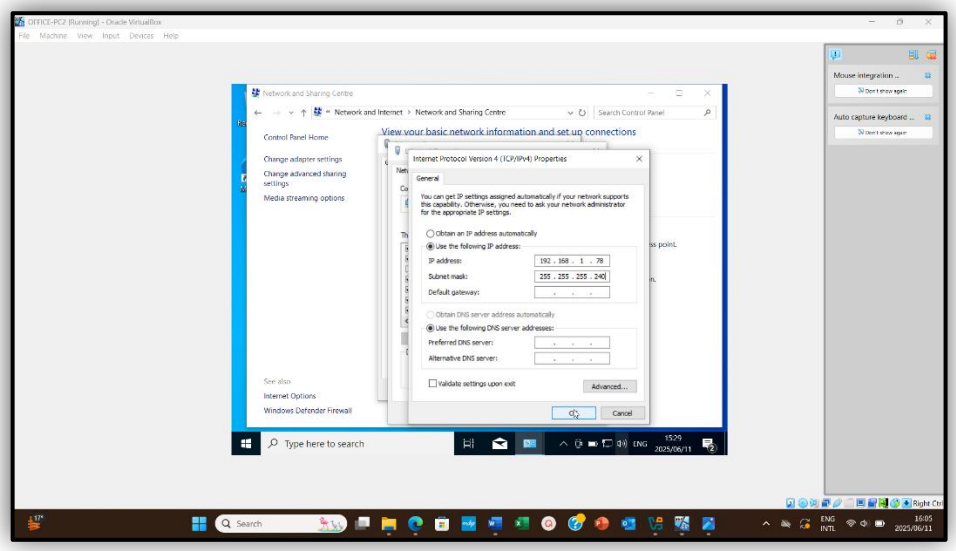
The process for the VM is the exact same as the previous VM. For this VM I assigned the last host IPv4 address from question 1.2b, I went to Control Panel, I then went to Network and Internet, then Network and Sharing Centre, I then spotted Ethernet and double clicked it, the following images represent the process.



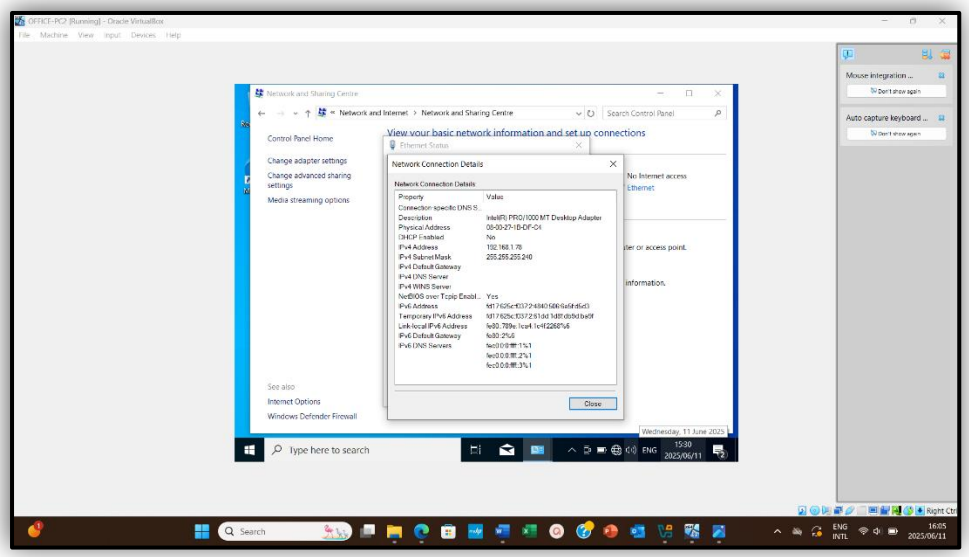
I went to properties.







The following image represents the changed IP address.

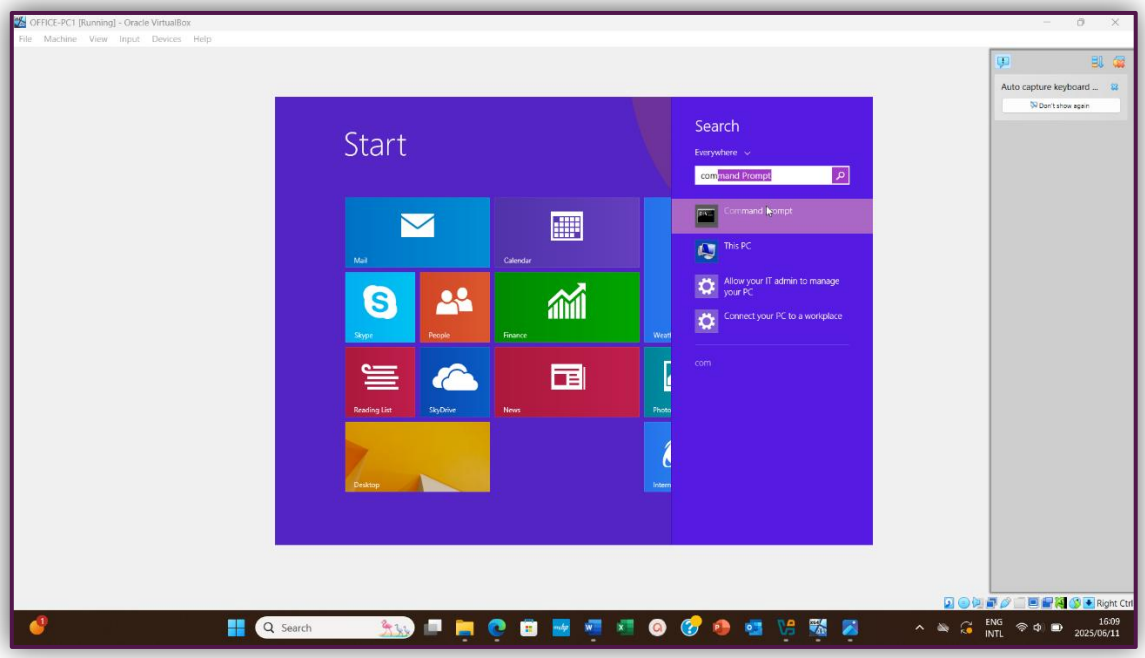


2.4. Ensure that OFFICE-PC1 and OFFICE-PC2 can contact each other by pinging both PCs.

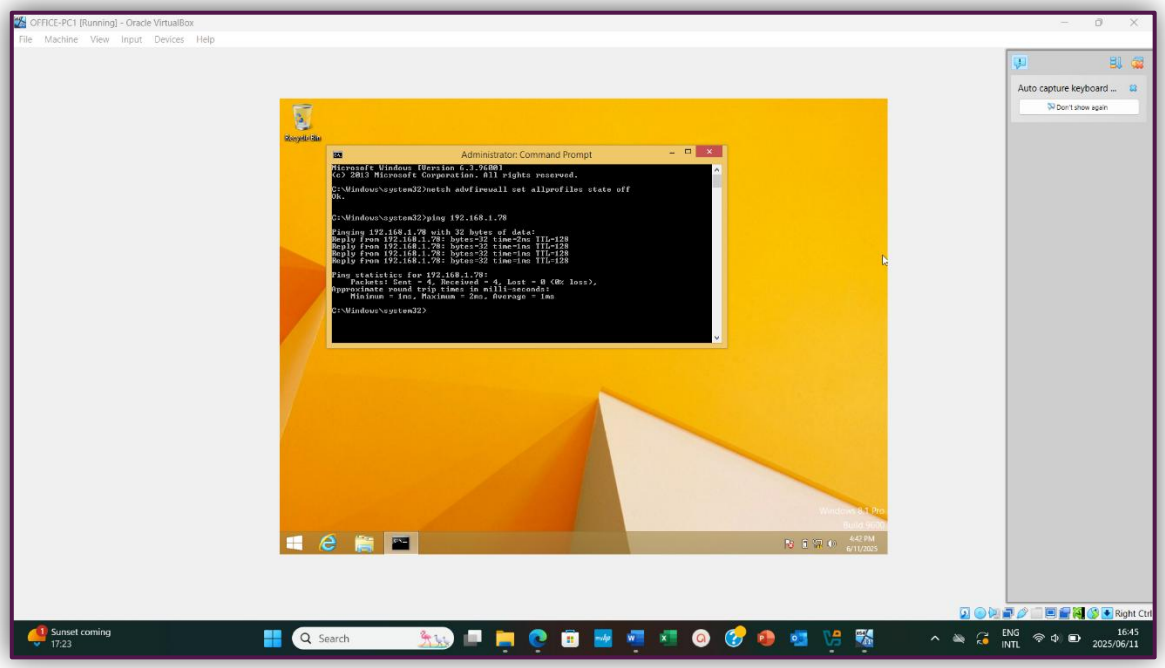
Step 5: This is where I used the IP addresses I assigned to the VMs to ping them to each other, I dis that via Command Prompt.

OFFICE-PC1

I first opened Command Prompt.

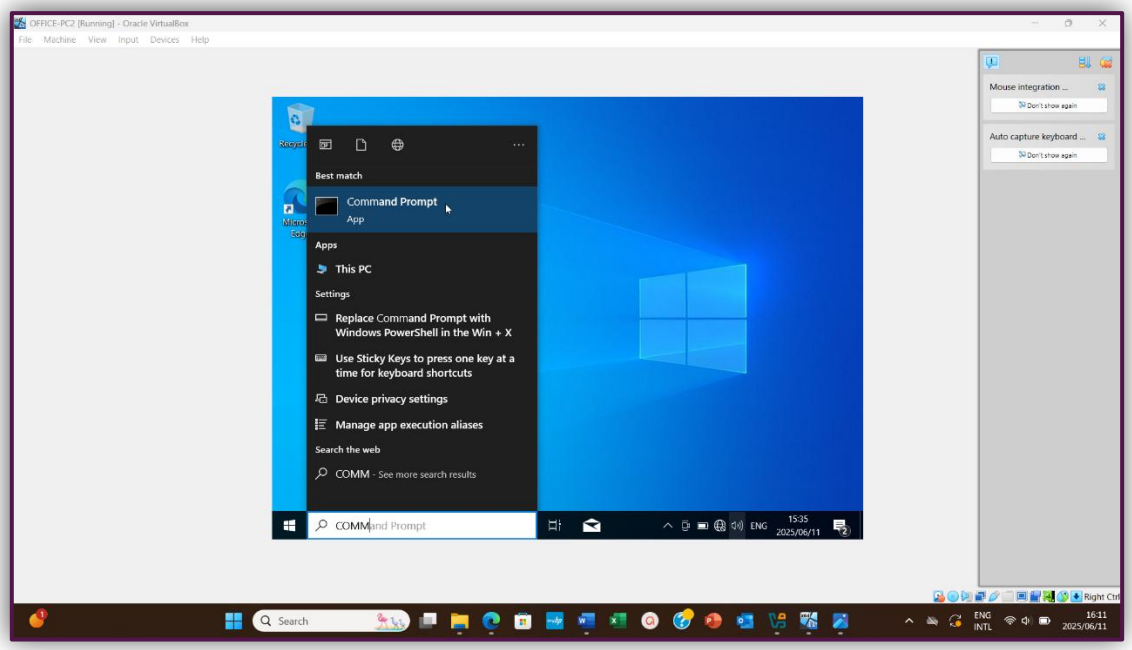


OFFICE-PC1 was able to find or communicate with OFFICE-PC2.

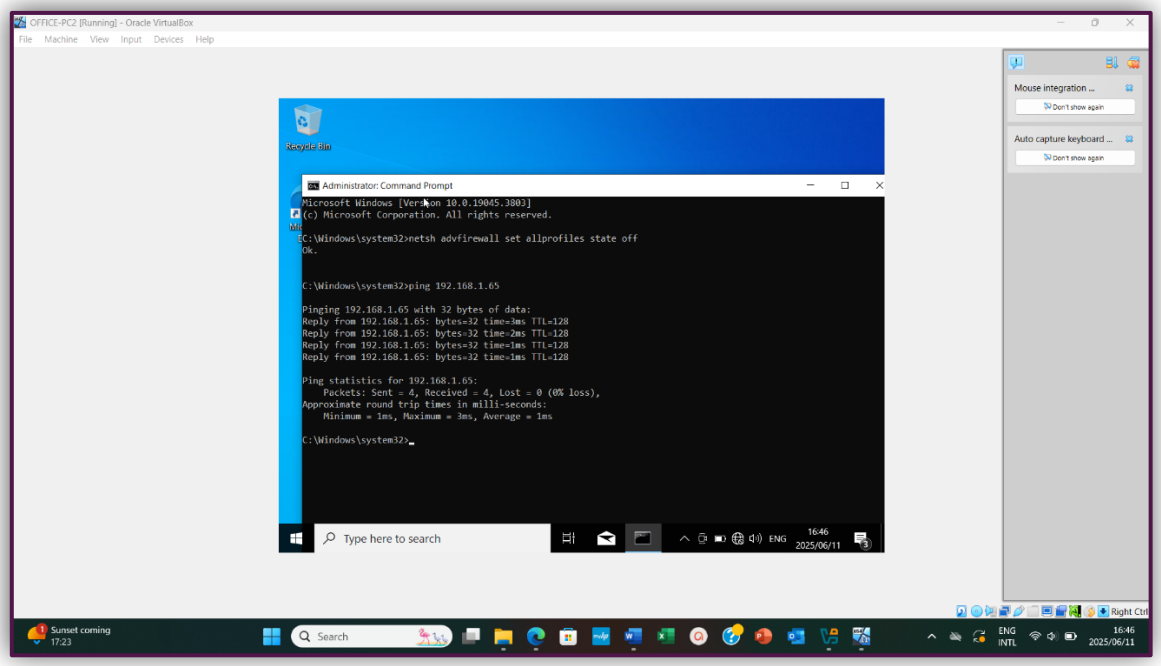


OFFICE-PC2

The process is the same for OFFICE-PC2, I started by opening Command Prompt.



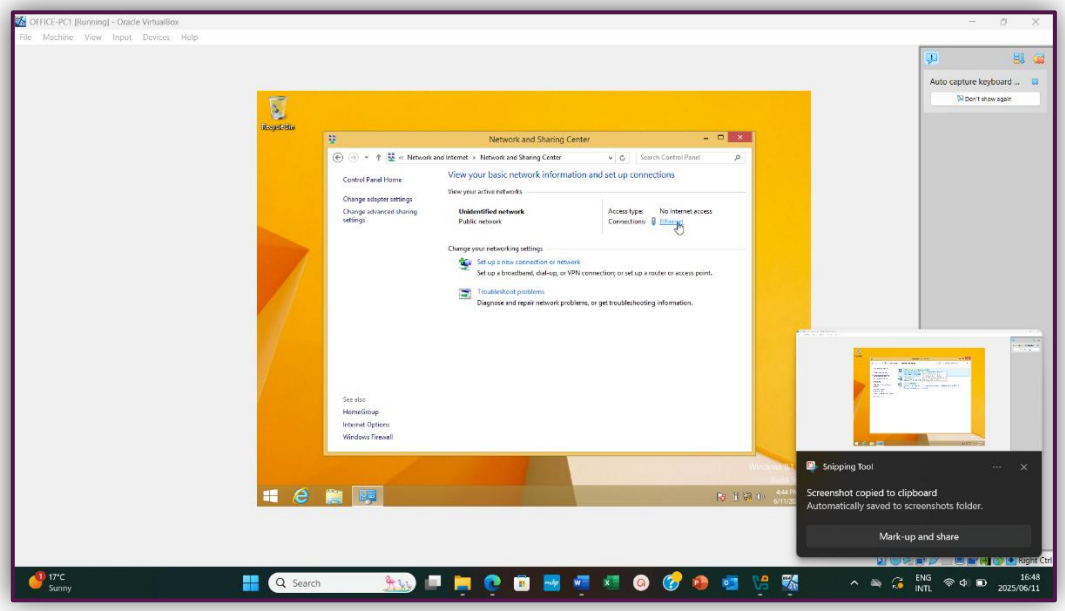
OFFICE-PC2 was able to find or communicate with OFFICE-PC1.

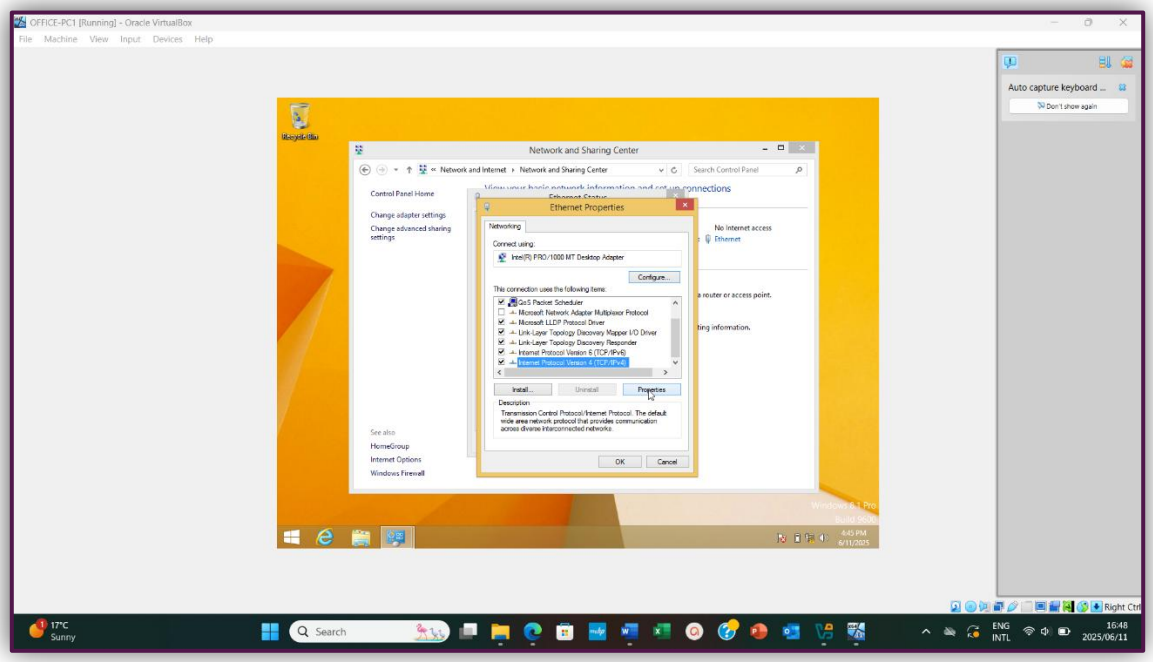


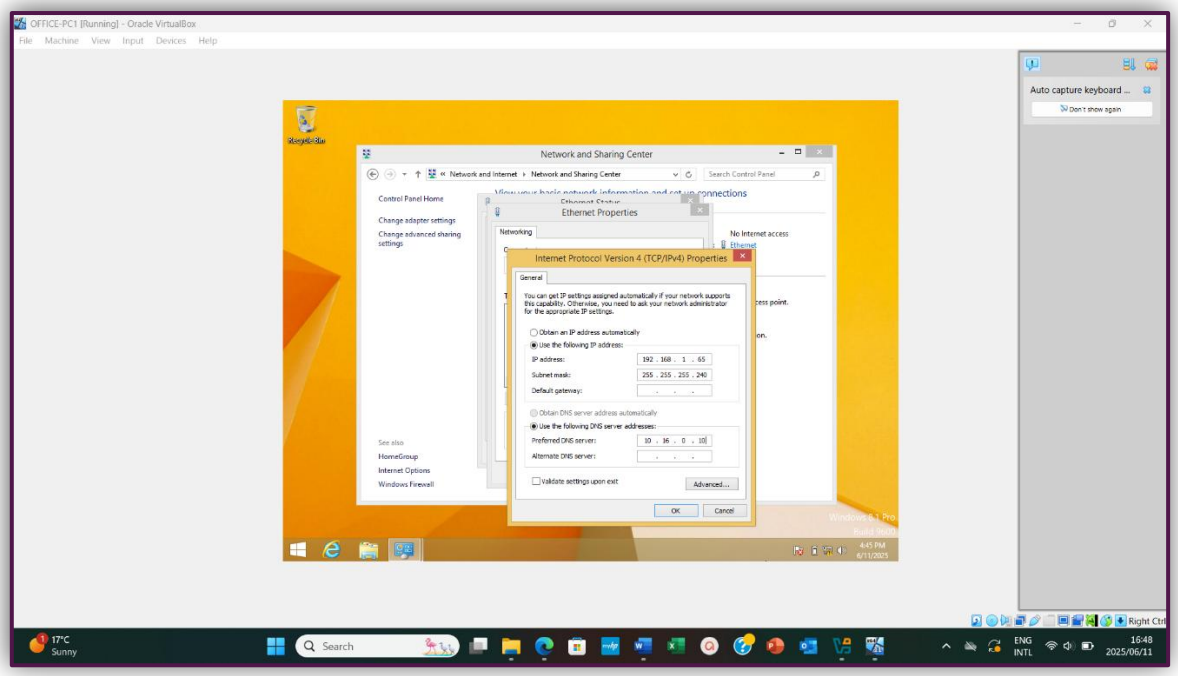
2.5. Ensure that both OFFICE-PC1 and OFFICE-PC2 use the server at 10.16,0,10 for domain name-to-IP address resolution.

Step 6: This is where I assigned both the VMs DNS server an address, so for both VMs I went to Control Panel, I then went to Network and Internet, then Network and Sharing Centre where by I double clicked Ethernet, the images below represent the process for both VMs starting from the Ethernet.

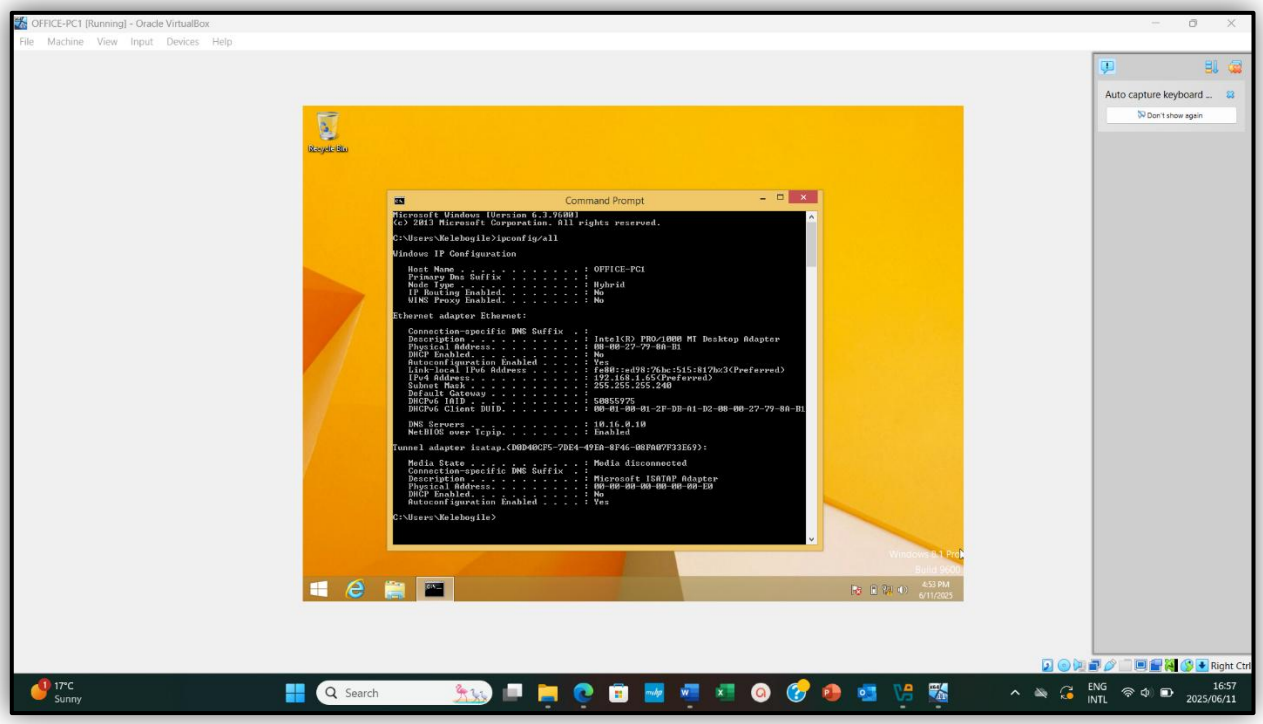
OFFICE-PC1





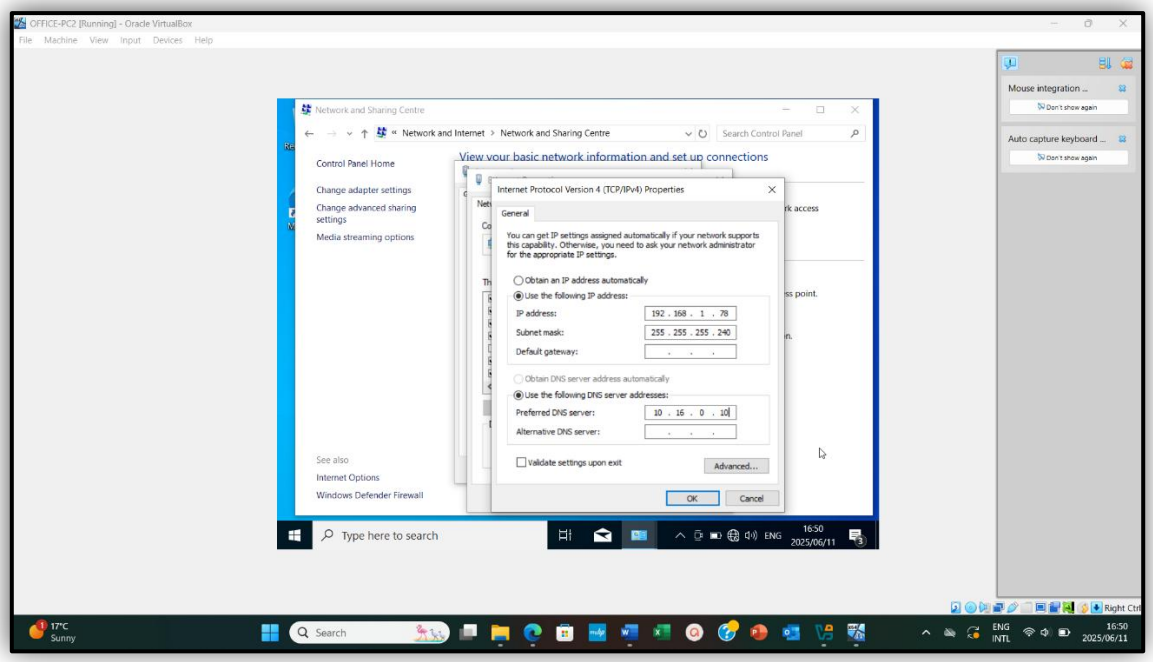


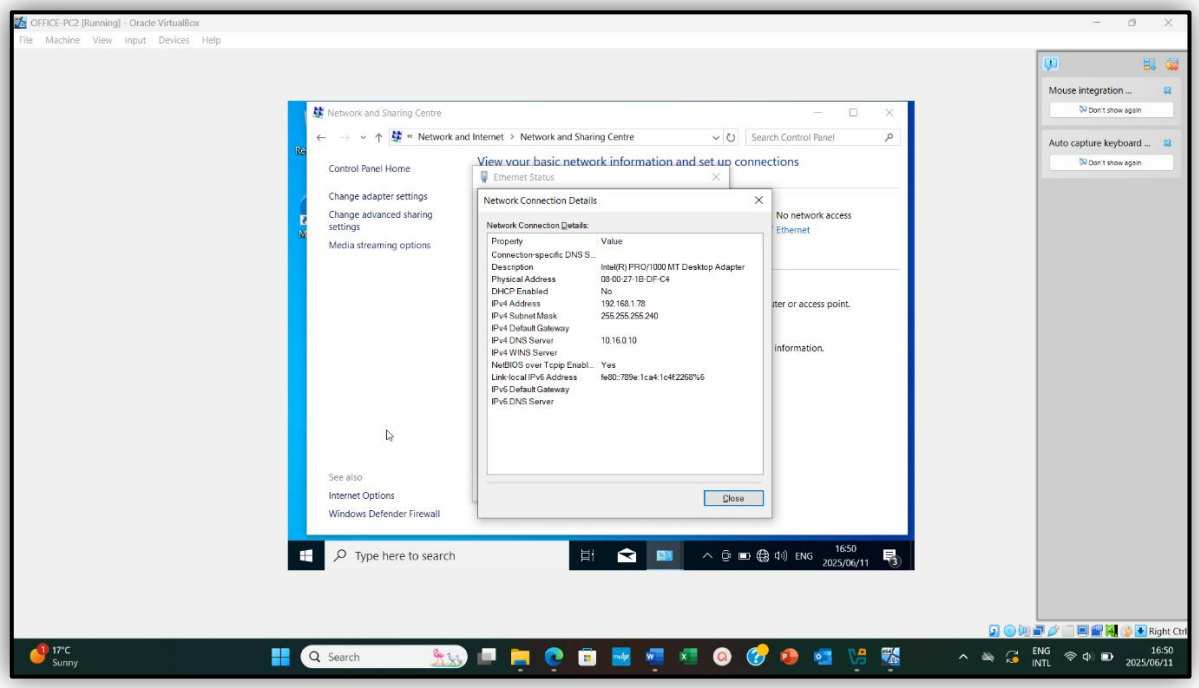
The following shows the DNS server address.



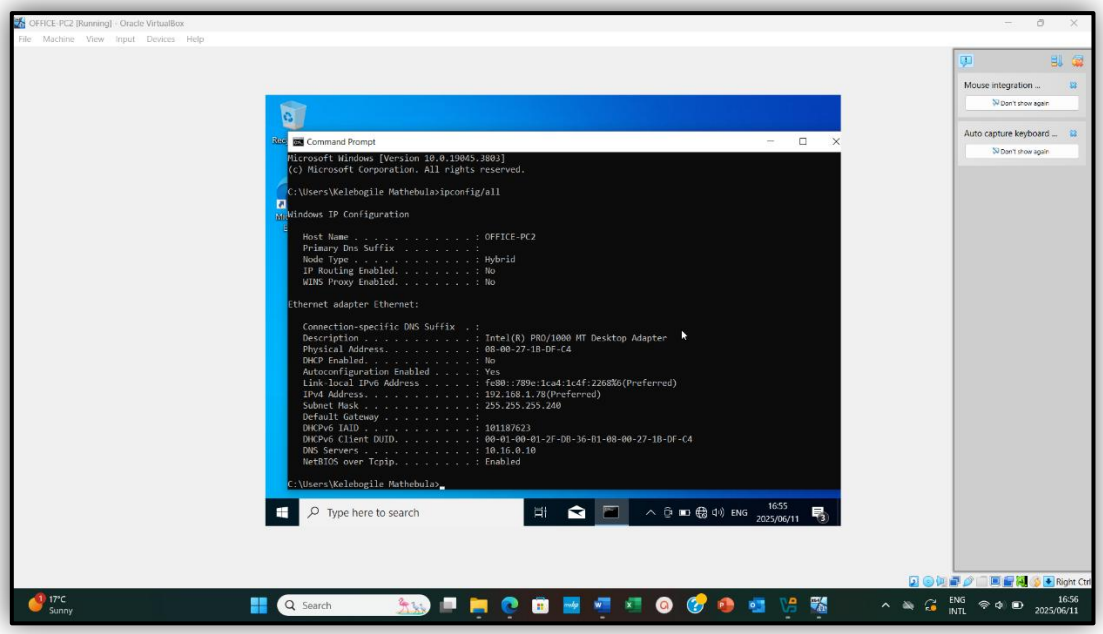
OFFICE-PC2

For this VM I started from the Internet Protocol Version 4 (TCP/IPv4) properties.





The following image shows the DNS address.



Question 3

Question:

Study the scenario below and answer the question that follows:

Heinrich, a Network Intern at the Bloemfontein campus, can successfully connect to the server using its IP address. However, when attempting to connect using the server's hostname, the connection fails, and he receives the following error message:

What might be causing Heinrich's network connectivity issues, and what solutions would you recommend to help him resolve it based on your words and understanding.

Answer:

Problem at hand:

There IP connection is successful meaning Heinrich can connect using the server's IP address, which then means that the physical network is working, there are no firewall or routing issue(s)and the server is up and accepting connections. **Secondly** the hostname connection failed, it fails every time he tries to use the hostname (e.g., server04), when ever he tries the host name he gets an error message saying "the DNS server is not responding" which points to a DNS issue-the system that translates hostnames to IP addresses.

Possible Cause:

The DNS server is down or unreachable, **secondly** the server settings on Heinrich's computer are incorrect. **Thirdly,** the hostname is not correctly registered in the DNS, **fourthly** the DNS client service is not running on Heinrich's machine, the problem might also be the network firewall or misconfigured router blocking the DNS traffic (it is typically port 53). His computer might also be caching an old or broken DNS entry. **Lastly**, Heinrich's device might be using static Ip settings with incorrect DNS information.

Possible Solutions:

The first thing to do is to check the DNS Server Status by using ping to check if the DNS server is reachable or Heinrich can ask to use a mutual's computer to see if it will work on their computer, if it does not work then the issue could be that the DNS server is offline, in that case he would have to ask a network administrator to check it.

Secondly Heinrich would have to verify the DNS settings on his computer. He can start by opening the Control Panel or search for Network Connections or he can find his WIFI or Ethernet connection, right click on it and choose Properties. He would then have to click on Internet Protocol Version 4 (TCP/IPv4) and then choose properties. Heinrich will need make sure that the TCP/IPv4 is set to either:

(The 1.1.1.1 is Cloudflare, the 8.8.8.8 and 8.8.4.4 are google servers)

- Obtain DNS server address automatically
- Use correct DNS: 8.8.8.8 or 1.1.1.1
- Alternative DNS: 8.8.4.4

Heinrich will then click ok and restart the computer.

He would have to restart DNS Service which gives the DNS processes a fresh start (e.g., restarting an app that was frozen). **Fourthly,** he has to flush the DNS cache by opening the command prompt and typing ipconfig/flushdns, after he presses enter, he will see a message that says the DNS cache is cleared out. This whole process forces the computer to ask for fresh DNS information.

Heinrich will also have to check the hostname entry; he can do that by opening the command prompt and typing nslookup servername but he would have to replace the server's name with the actual name of his server or the server he is using and the server's name and IP address have to be in the DNS records. Heinrich can alternatively add the hostname manually. (FIXsage, 2022)

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Network, S. O. (2021, May 27). *Switched On Network*. Retrieved from How to Wire Up Ethernet Plugs the Easy Way! (Cat5e/ Cat6 RJ45 Pass Through Connectors): https://youtu.be/NWhoJp8UQpo?si=8XUk9yhg5jT8U1RT

Tang, S. (2019, September 27). *S.K Tang*. Retrieved from win10 changw workgroup & comp name: https://youtu.be/bB-dmc9T5Ek?si=VXgijUuWKUpIMy8t

AI Decleration

I carefully read the assignment instructions, and the extent to which AI may be used for the assignment.
I used the following AI system(s)/tool(s) None
I used it for the following: None
If I quoted or paraphrased an AI output, I have referenced the relevant tool, version, and the date I used the tool.
I still consider this work my own (i.e., I have not outsourced the final product, or significant portions of it, to AI tools/systems).
If required, I can defend my argument/perspective, explain my choices and approach, and can show that I am knowledgeable about the details of my work.