UNIVERSITI TUN HUSSEIN ONN MALAYSIA
FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
(FSKTM)
SEMESTER I 2023/2024

OPERATING SYSTEM
BIC 20803
SECTION 04

GROUP ASSIGNMENT 1 (**GROUP 29**)

TITLE
NETWORK SETTING IN VIRTUAL MACHINE (VM)

LECTURER'S NAME
TS. DR. MOHD AMIN BIN MOHD YUNUS

STUDENT'S NAME	**MATRIC NUMBER**
TUAN KHALIDAH SYAZWANA BINTI TUAN MOHD KASMAWI	AI220118
TUAN NUR RIFAQIAH BINTI TUAN HANIZI	AI220040

DATE SUBMISSION: 28th OCTOBER 2023

UTHM Universiti Tun Hussein Onn Malaysia ***FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY***	Course Code	**BIC20803**	Item	**ASSIGNMENT 1**
	Course	**OPERATING SYSTEM**	Date Release	**OCT 2023**
Title	**Network Setting in Virtual Machine (VM)**			
Objectives	At the end of this task, student should be able to: i. Understand the configuration of virtual machine. ii. Apply the concept of operating system structures. iii. Demonstrate key skills for virtual machine services.			
Method	• VM installation and configuration • Observation • Books/Journals; Internet			
Mode	□ Group (2 persons only)			
Submission	• Report Week 4 (29/10/2023 – 02/11/2023) • Author - Group Activities tab			

TASK 1: Choose and install one of the following **hypervisors / virtual machine monitors (VMM)** in the host machine (Host OS)

- VMware Workstation Player /Oracle VirtualBox / Xvisor / Lguest or others

TASK 2: Install ONE virtual machine (Guest OS) in the installed hypervisor / virtual machine monitor (VMM)

- Using Linux Distro (e.g., CentOS, Ubuntu, Debian, Fedora)

TASK 3 (REPORT-WEEK 3):
Prepare a report containing the following information:

a. **CHAPTER 1: Network configuration**
   i. Explain **ALL** types of network connection in the VM.

There are five types of network connections that we can use for our Virtual Machine (VM) (Heddings, A., 2020). One of them is Network Address Translation (NAT). NAT enables the virtual machine to share the IP address of the host computer. This helps the virtual machine (VM) to connect to the internet by using the host's network connection. It frequently serves as VMs' default option.

Next, NAT Network. Every virtual machine in NAT Network mode has an internal router configuration unique to it. One virtual machine (VM) cannot access services on another VM with this configuration. Since everything is ultimately translated, each virtual machine (VM) might really have the same private IP address. While NAT Network operates on the same idea as NAT, it employs a single network for every virtual machine that is set on the same NAT Network. Similar to how a computer connected to one of your router's many Ethernet ports may talk with other devices on the network, this enables guest-to-guest communication via a virtual switch.

Other than that, Bridged mode is another network option in VMs. It does not isolate virtual machines like other modes do. When in bridged mode, virtual machines (VMs) use the host's network interface to connect directly with outside services. Because of this, even though virtual machines (VMs) are still linked to the same computer, they appear to your router as different IP addresses. With bridged mode, you have a great deal of freedom in hosting services on virtual machines (VMs) and accessing them locally on your network by using an address and port number. It's especially helpful if your server has several physical interfaces and Ethernet ports since it lets you operate virtual machines (VMs) on different networks depending on your actual wiring.

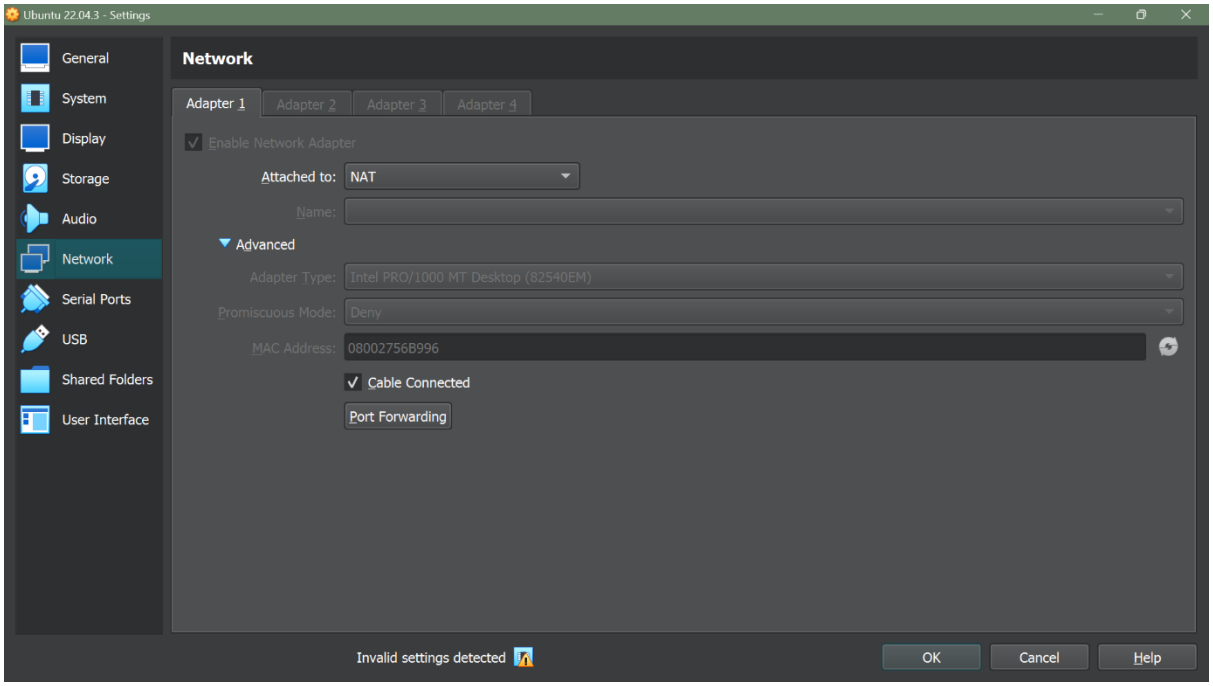
Apart from that, the fourth VM network option is Host-Only Adapter. Virtual machines are cut off from the internet in this mode, but they are still able to communicate with each other and with the host. Guests are usually assigned IP addresses by DHCP servers, which facilitates easy communication amongst guests. When considerable two-way communication between the host and guest is needed but the host does not have internet connection, the Host-Only mode is the best option. Bridged mode, which offers complete network access, may be used to accomplish both two-way communication and external access.

Last but not least, the Internal Network is a network option used to mimic real networks. It is by default closed off from the outside world, enabling communication amongst guests on the network but not with the host or the internet. This helps to simulate completely isolated networks, but it may also be set up to provide the private computers

access to the internet. Internal Network is a good option if you need the freedom to set up everything on your own or if you want to mimic or imitate a virtual network. Because it allows users to establish their network without requiring real gear, it's extremely helpful for training.

ii. Which connection should you use to enable the Internet connection in the Guest OS? Provide screenshot of the connection setup.

I believe by using the NAT (Network Address Translation) connection will enable the internet access for the Guest OS in a VM (Virtual Machine). That was because this option allows the VM to share the host's network connection, enabling it to access the internet.

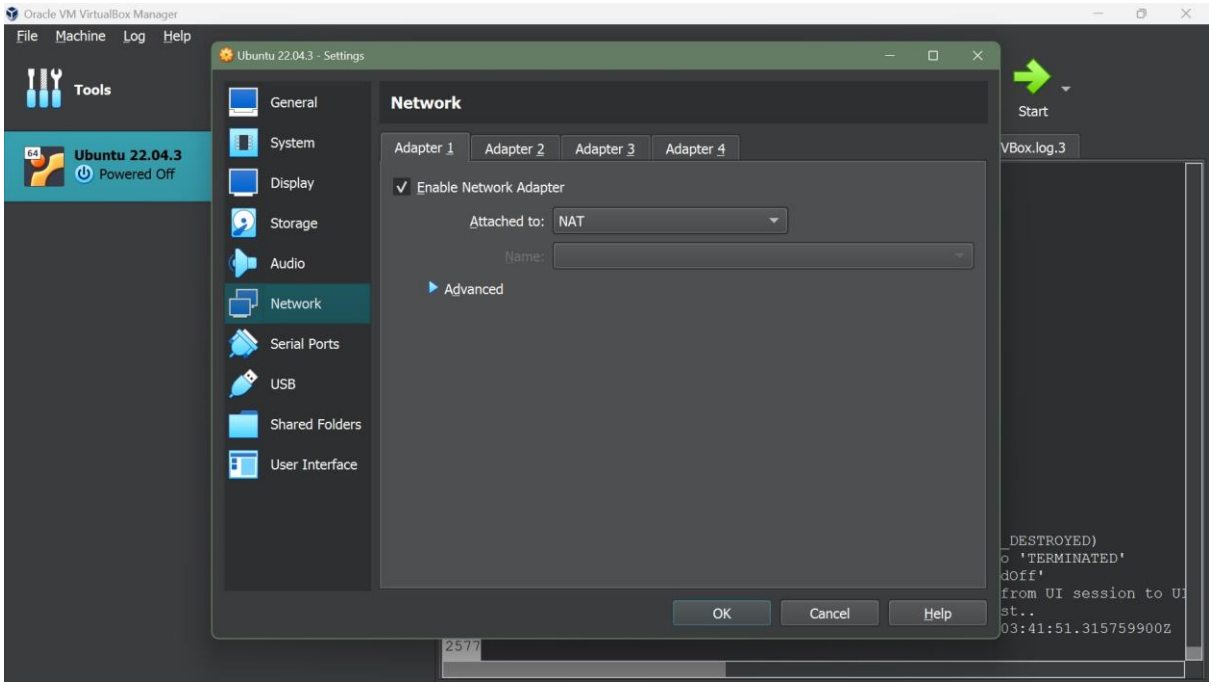


b. **CHAPTER 2: Experiment Observation & Explanation**

i. Setup network using the following experiment:

1. **Experiment 1: NAT**

a. Provide screenshot of the network setup (Network Setting for the specific experiment).



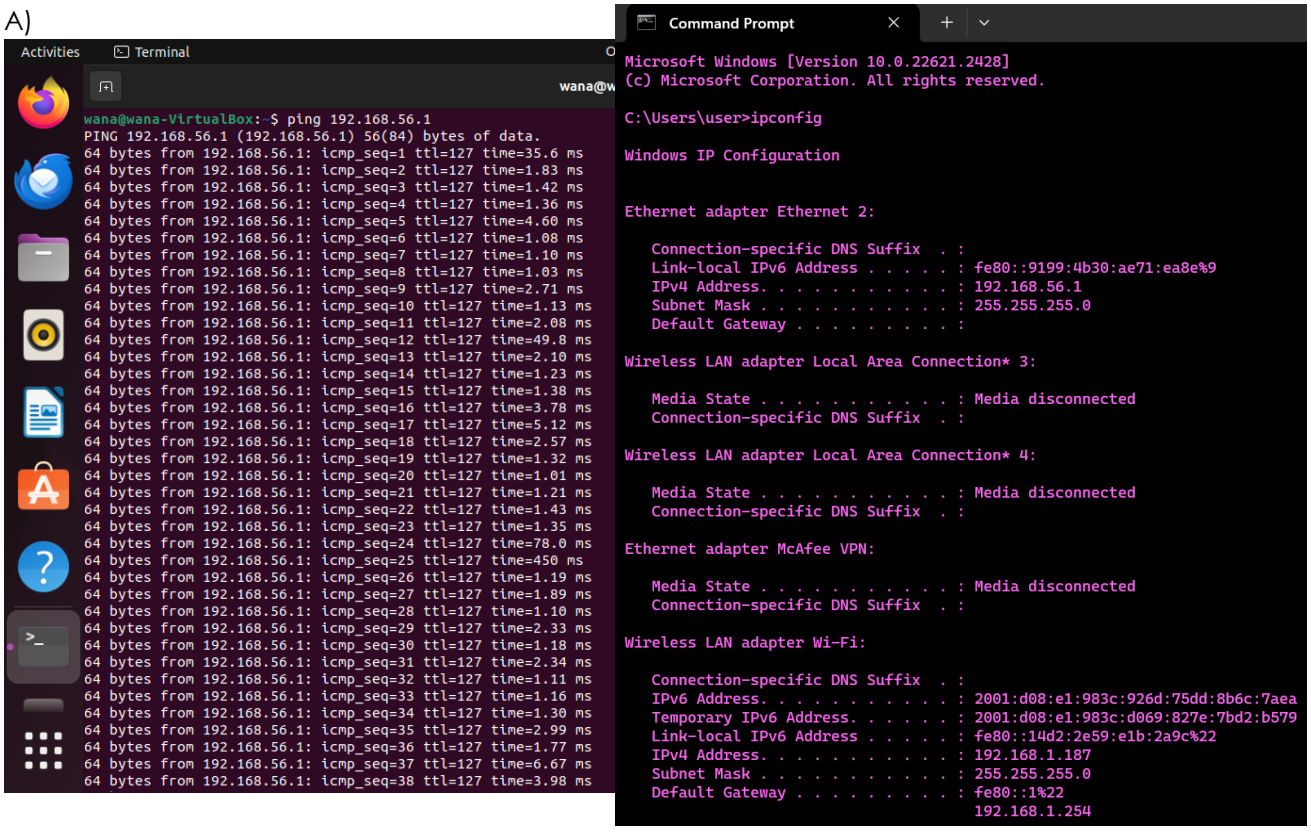
b. Execute experiment for each question in the following table and state the result.

c. Provide the result screenshot for each of the question in the table.

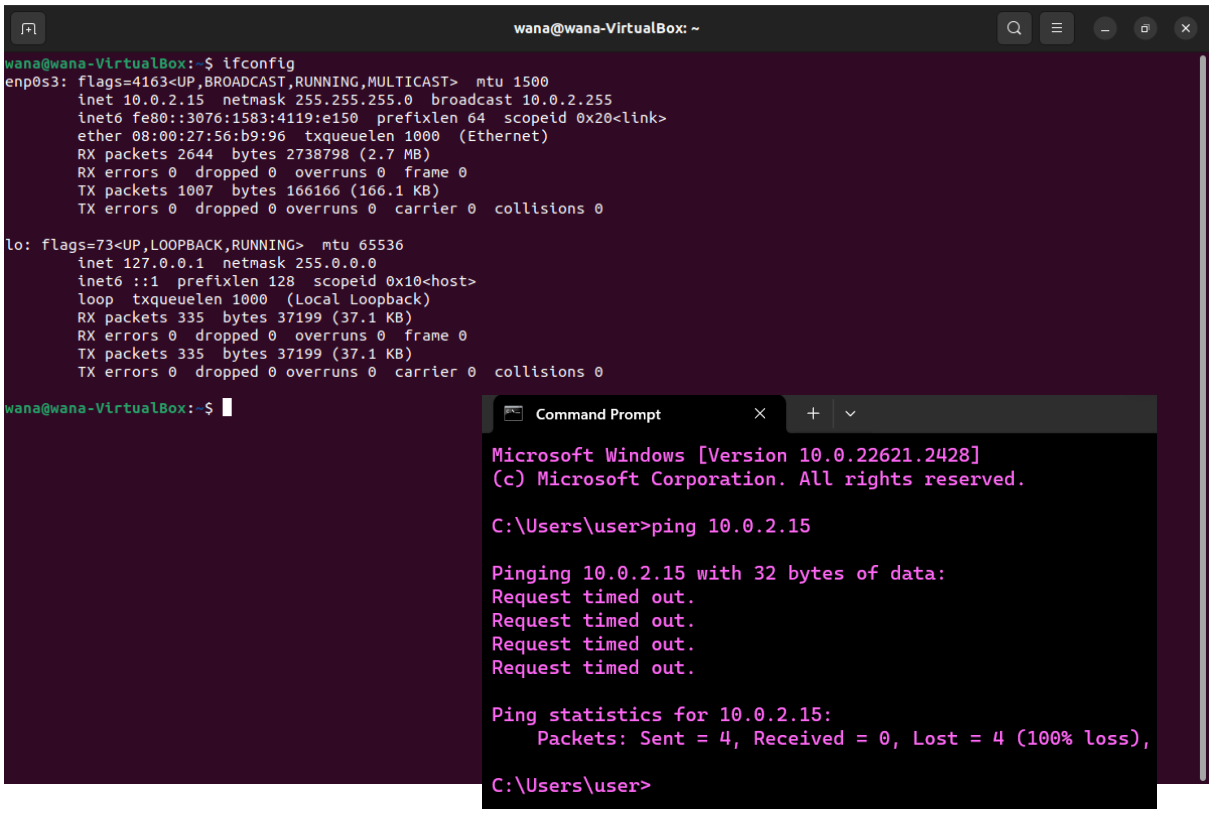
Network Setting: NAT	
Questions	**Result (Yes/No)**
A. Can VM ping to host?	Yes
B. Can host ping to VM?	No
C. Can VM access to external network? E.g., Browse the Internet or ping www.google.com	Yes
D. Can another computer on the same host network ping to VM?	Yes

EXPERIMENT RESULT

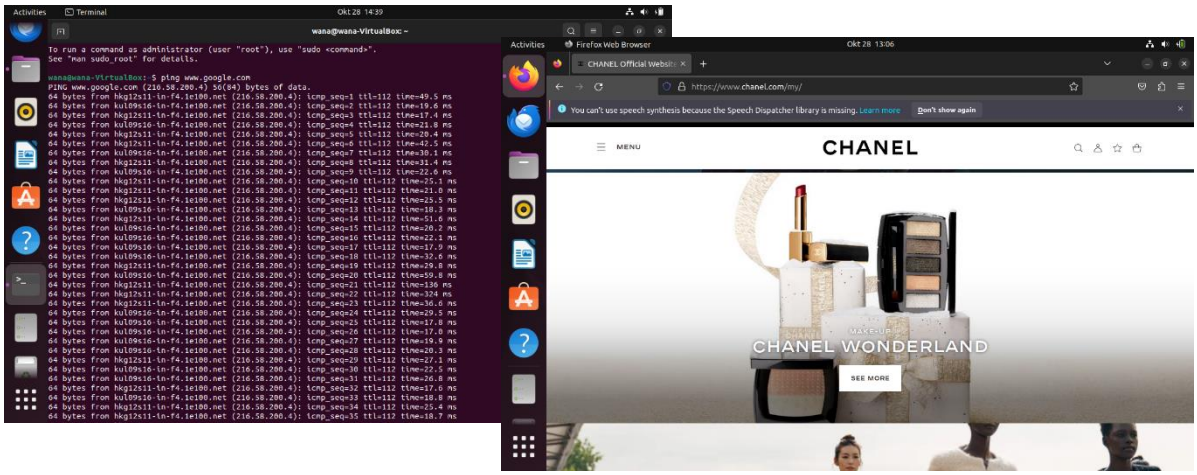
A)



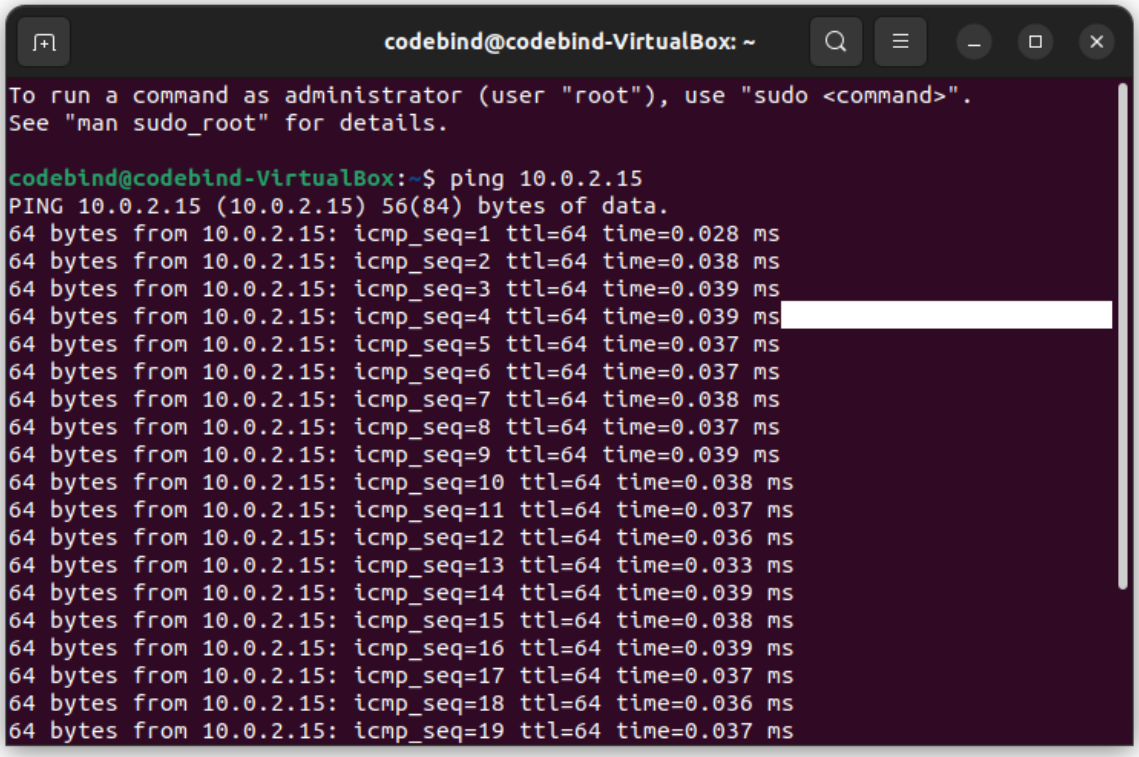
B)



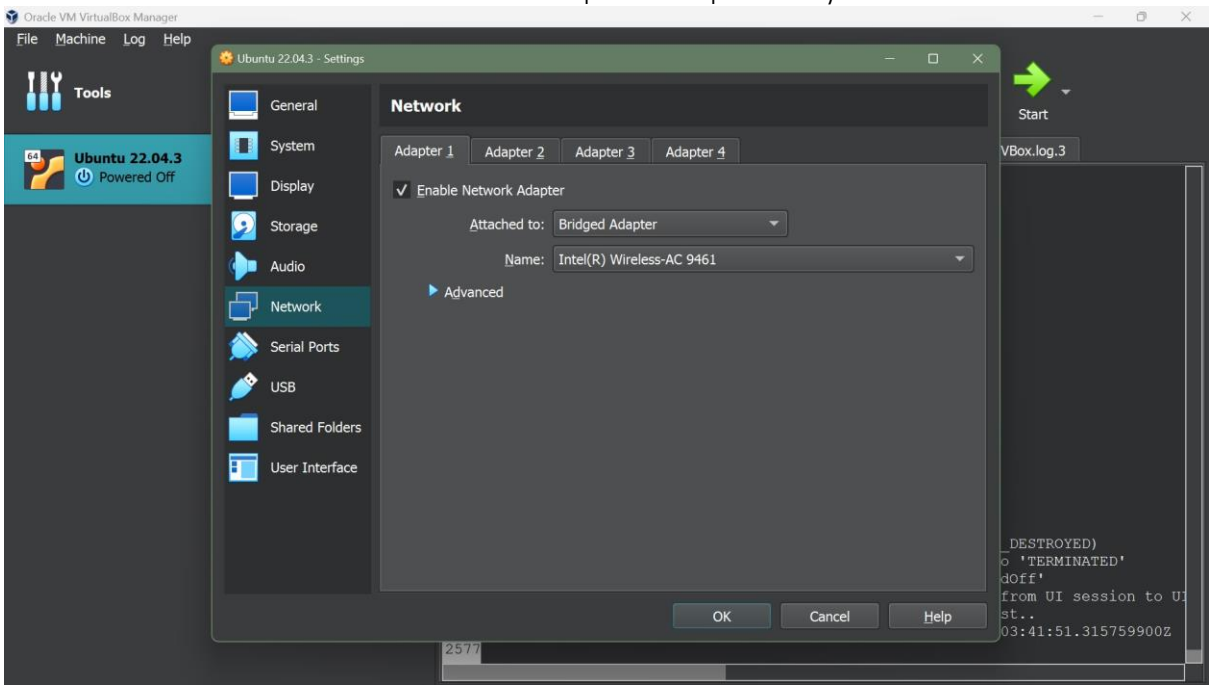
C)


CHANEL
CHANEL WONDERLAND
SEE MORE

D)


codebind@codebind-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
codebind@codebind-VirtualBox:~$ ping 10.0.2.15
PING 10.0.2.15 (10.0.2.15) 56(84) bytes of data.
64 bytes from 10.0.2.15: icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from 10.0.2.15: icmp_seq=2 ttl=64 time=0.038 ms
64 bytes from 10.0.2.15: icmp_seq=3 ttl=64 time=0.039 ms
64 bytes from 10.0.2.15: icmp_seq=4 ttl=64 time=0.039 ms
64 bytes from 10.0.2.15: icmp_seq=5 ttl=64 time=0.037 ms
64 bytes from 10.0.2.15: icmp_seq=6 ttl=64 time=0.037 ms
64 bytes from 10.0.2.15: icmp_seq=7 ttl=64 time=0.038 ms
64 bytes from 10.0.2.15: icmp_seq=8 ttl=64 time=0.037 ms
64 bytes from 10.0.2.15: icmp_seq=9 ttl=64 time=0.039 ms
64 bytes from 10.0.2.15: icmp_seq=10 ttl=64 time=0.038 ms
64 bytes from 10.0.2.15: icmp_seq=11 ttl=64 time=0.037 ms
64 bytes from 10.0.2.15: icmp_seq=12 ttl=64 time=0.036 ms
64 bytes from 10.0.2.15: icmp_seq=13 ttl=64 time=0.033 ms
64 bytes from 10.0.2.15: icmp_seq=14 ttl=64 time=0.039 ms
64 bytes from 10.0.2.15: icmp_seq=15 ttl=64 time=0.038 ms
64 bytes from 10.0.2.15: icmp_seq=16 ttl=64 time=0.039 ms
64 bytes from 10.0.2.15: icmp_seq=17 ttl=64 time=0.037 ms
64 bytes from 10.0.2.15: icmp_seq=18 ttl=64 time=0.036 ms
64 bytes from 10.0.2.15: icmp_seq=19 ttl=64 time=0.037 ms

2. **Experiment 2: Bridge Adapter**
   a. Provide screenshot of the network setup (Network Setting for the specific experiment).

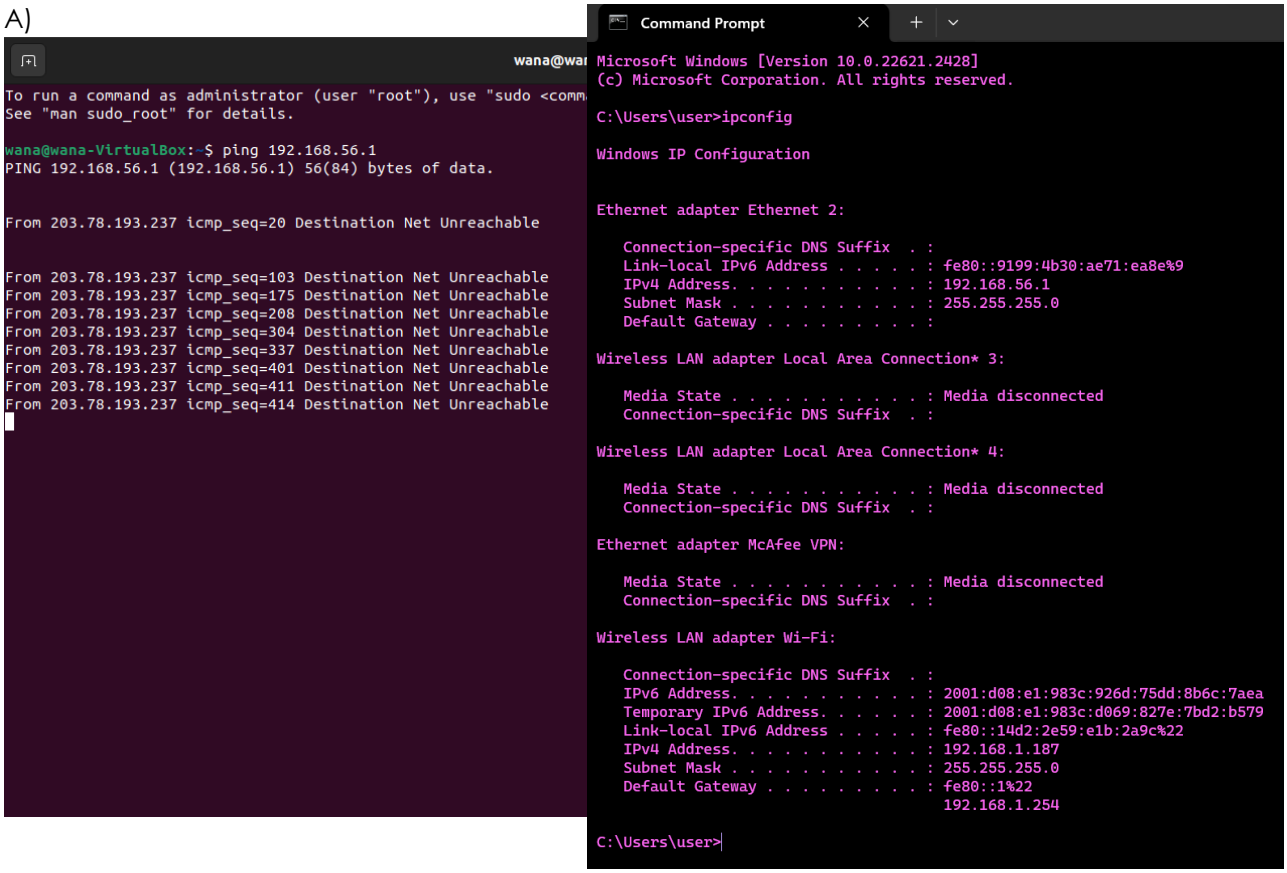


   b. Execute experiment for each question in the following table and state the result.
   c. Provide the result screenshot for each of the question in the table.

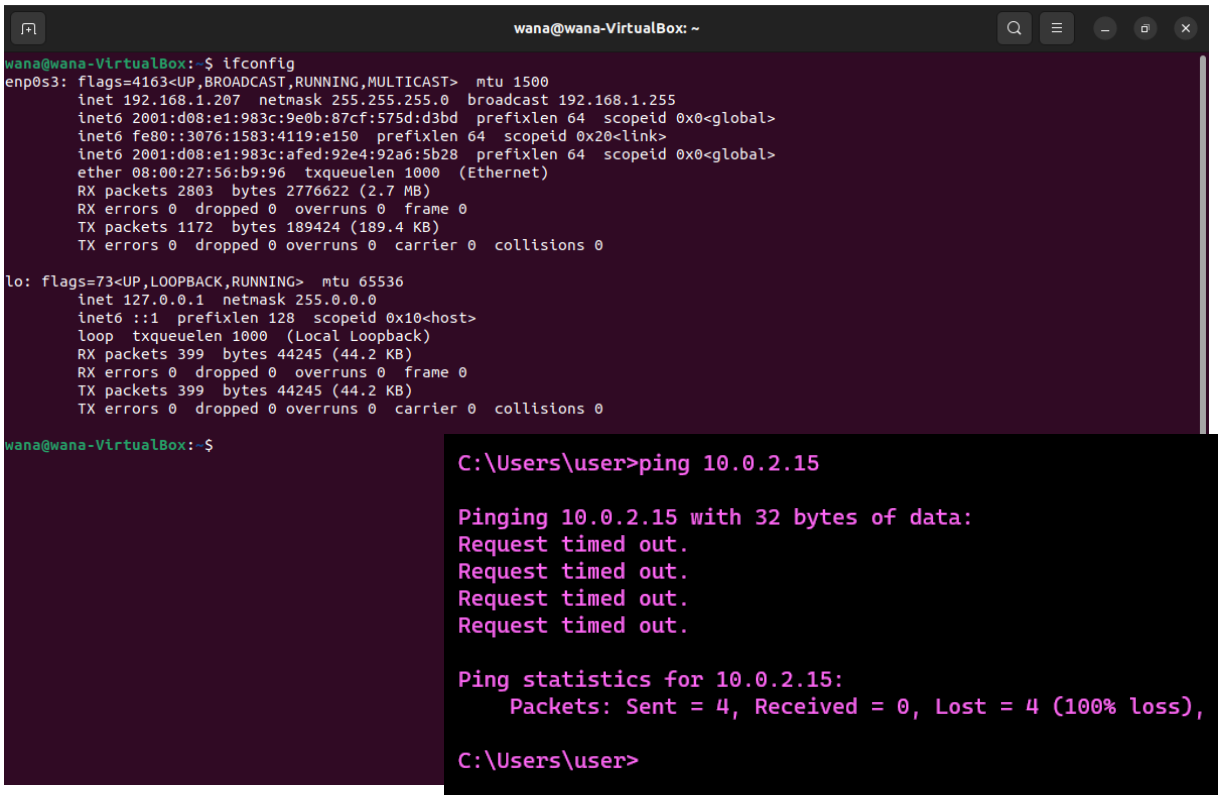
Network Setting: Bridge Adapter	
Questions	**Result (Yes/No)**
A. Can VM ping to host?	No
B. Can host ping to VM?	No
C. Can VM access to external network? E.g., Browse the Internet or ping www.google.com	Yes
D. Can another computer on the same host network ping to VM?	No

EXPERIMENT RESULT

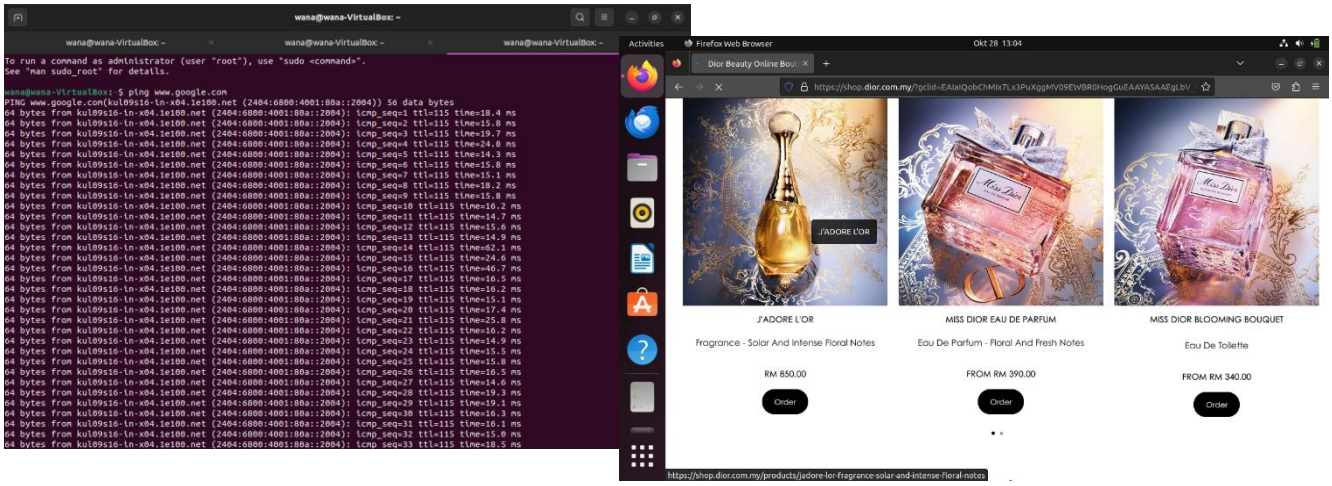
A)



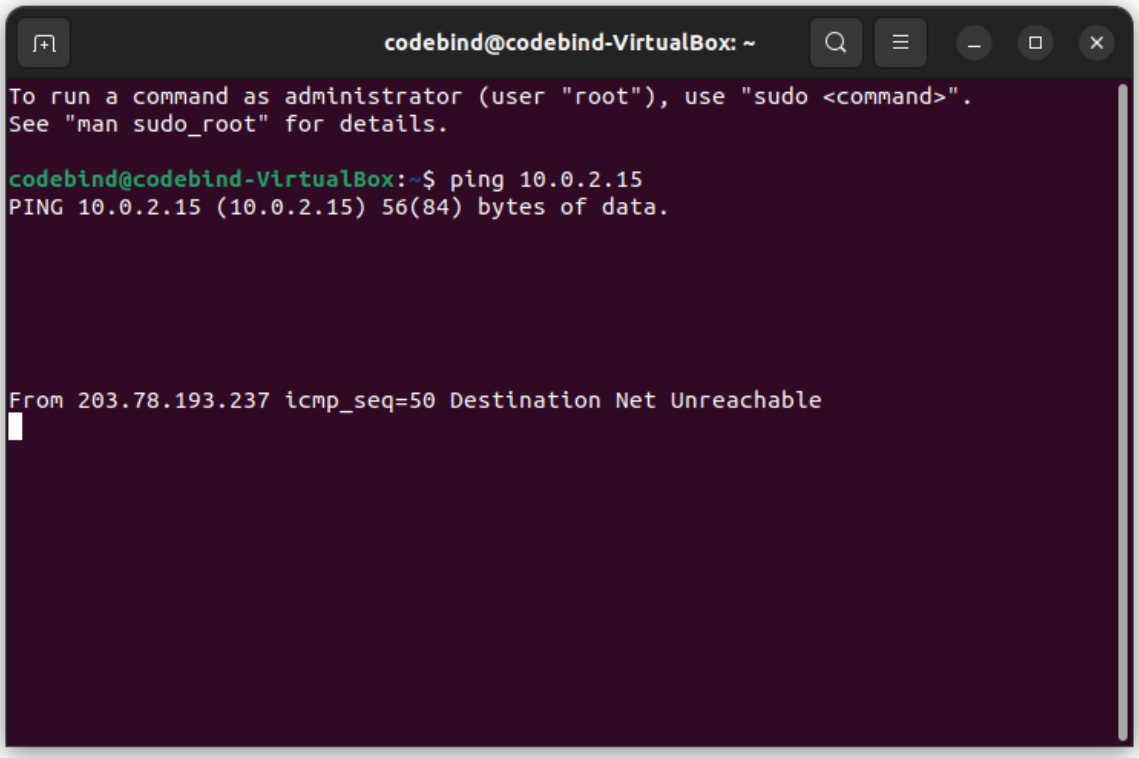
B)



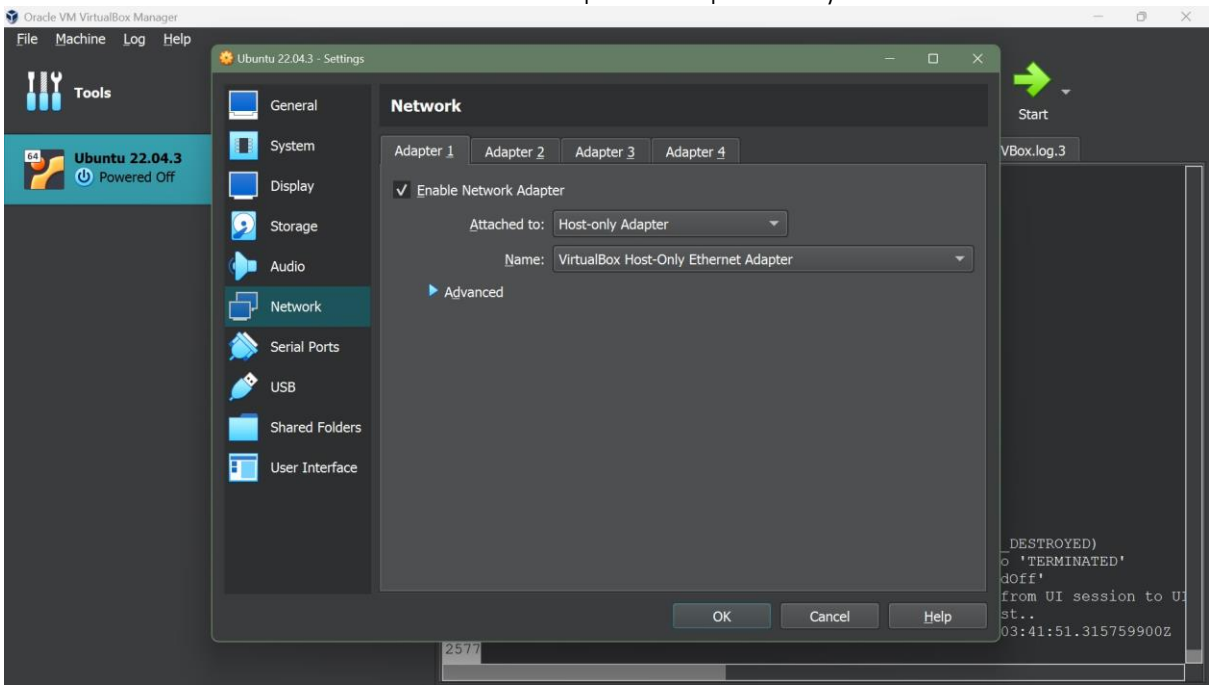
C)


wana@wana-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
wana@wana-VirtualBox: $ ping www.google.com
Activities
Firefox Web Browser
Okt 28 13:04
Dior Beauty Online Bou
https://shop.dior.com.my/?gclid=EAIaIQobChMIx7Lx3PuXggMV09EWBRHogGuEAAYASAAEgLbV
J'ADORE L'OR
J'ADORE L'OR
Fragrance - Solar And Intense Floral Notes
RM 850.00
Order
MISS DIOR EAU DE PARFUM
Eau De Parfum - Floral And Fresh Notes
FROM RM 390.00
Order
MISS DIOR BLOOMING BOUQUET
Eau De Toilette
FROM RM 340.00
Order
https://shop.dior.com.my/products/jadore-lor-fragrance-solar-and-intense-floral-notes

D)


codebind@codebind-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
codebind@codebind-VirtualBox:~$ ping 10.0.2.15
PING 10.0.2.15 (10.0.2.15) 56(84) bytes of data.
From 203.78.193.237 icmp_seq=50 Destination Net Unreachable

3. **Experiment 3: Host-only Adapter**
    a. Provide screenshot of the network setup (Network Setting for the specific experiment).

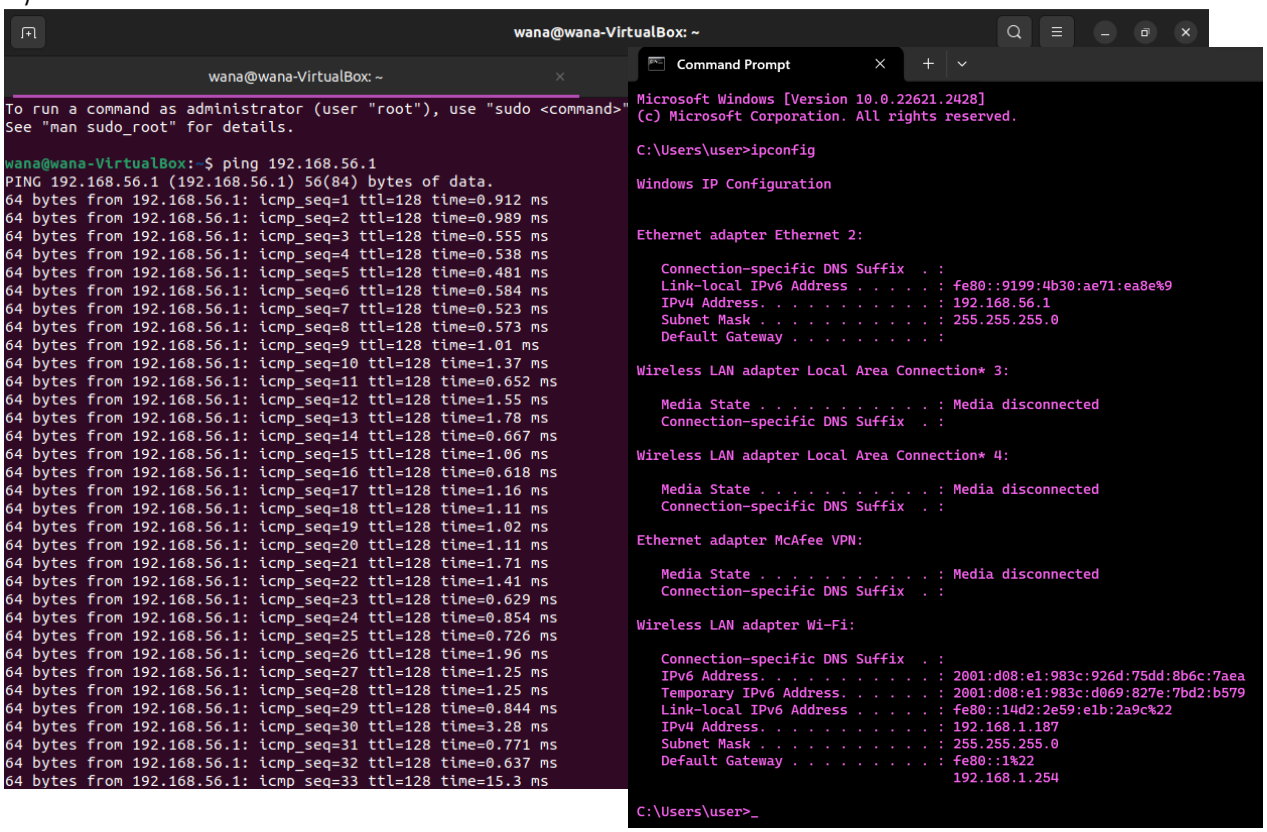


    b. Execute experiment for each question in the following table and state the result.
    c. Provide the result screenshot for each of the question in the table.

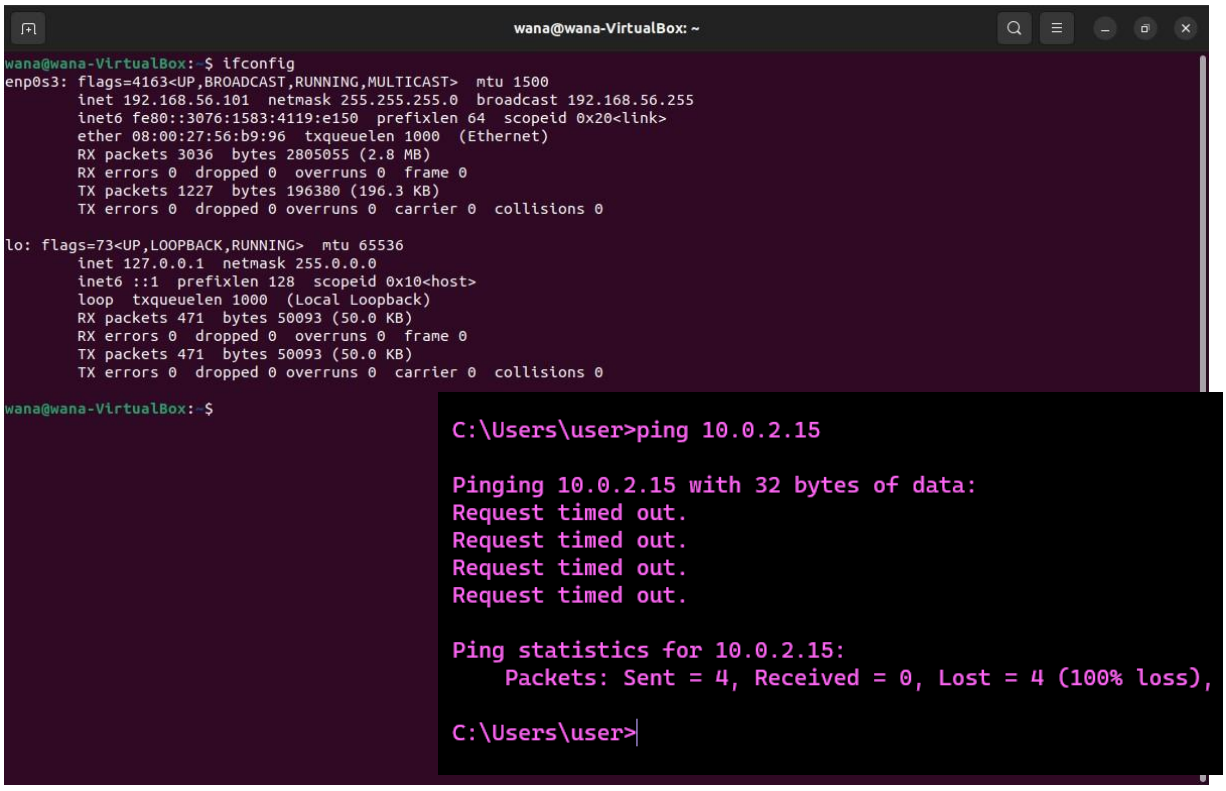
Network Setting: Host-only Adapter	
Questions	**Result (Yes/No)**
A. Can VM ping to host?	Yes
B. Can host ping to VM?	No
C. Can VM access to external network? E.g., Browse the Internet or ping www.google.com	No
D. Can another computer on the same host network ping to VM?	No

EXPERIMENT RESULT

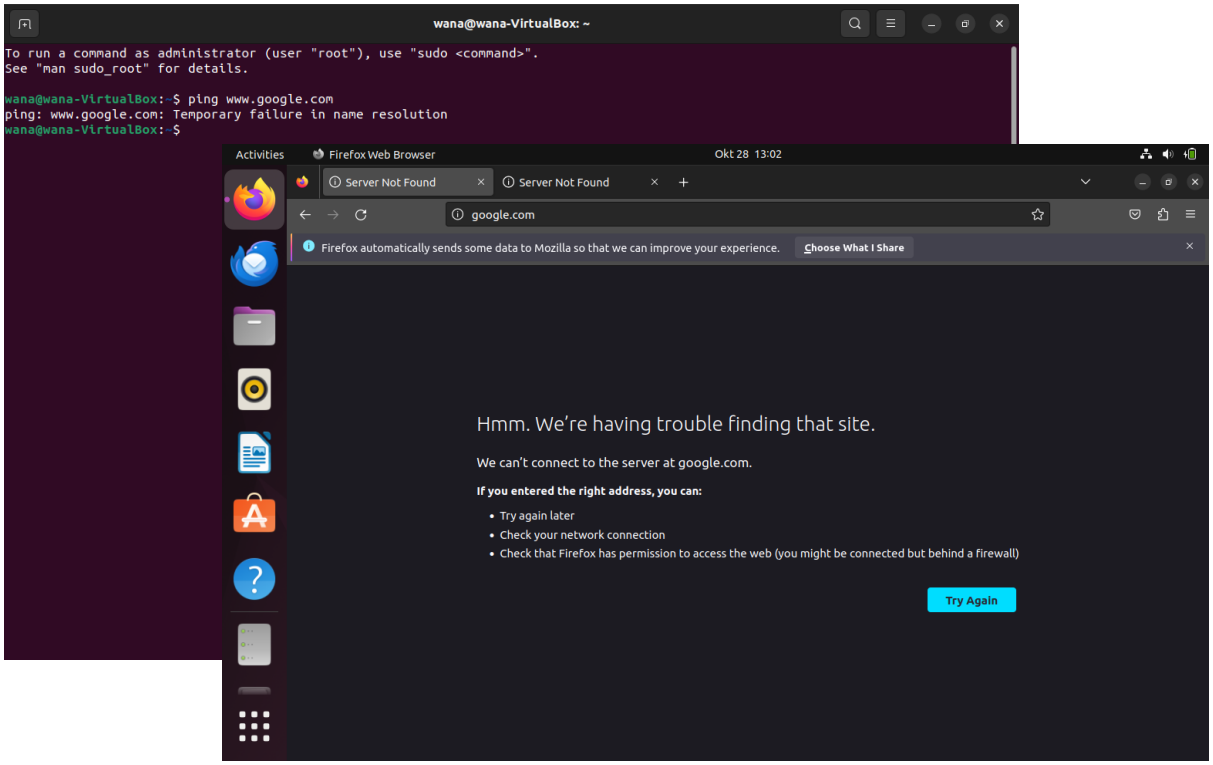
A)



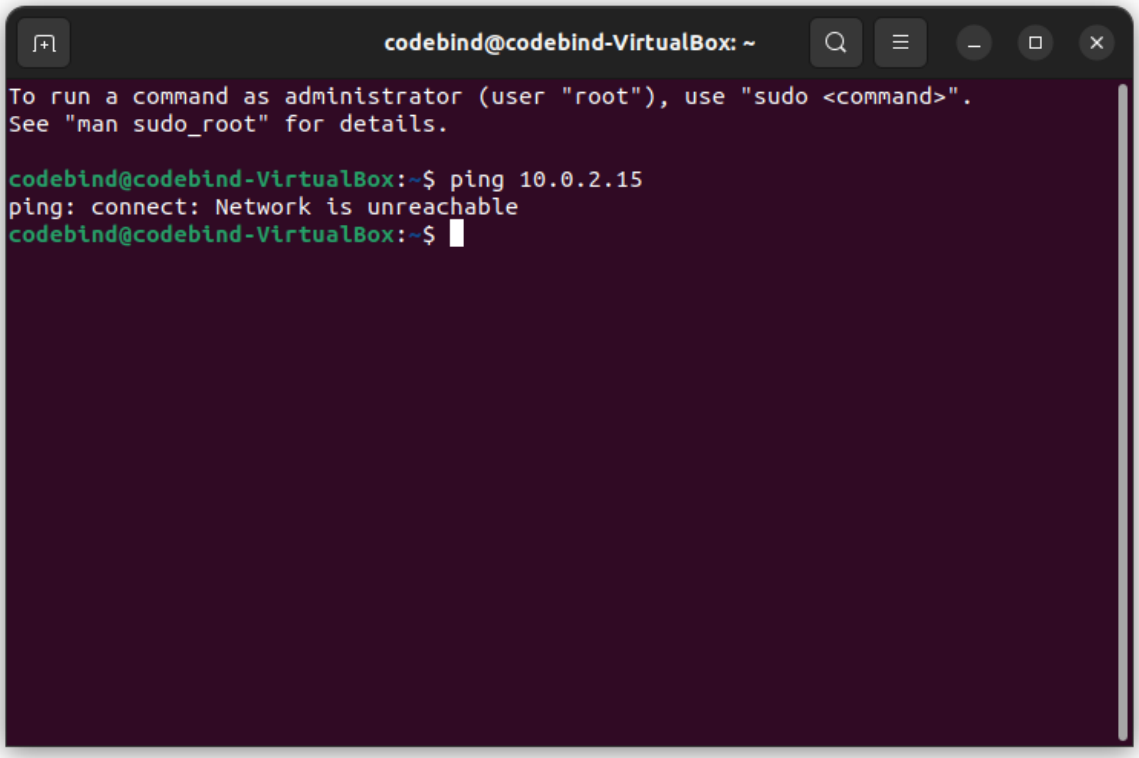
B)



C)


wana@wana-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
wana@wana-VirtualBox:~$ ping www.google.com
ping: www.google.com: Temporary failure in name resolution
wana@wana-VirtualBox:~$
Activities
Firefox Web Browser
Okt 28 13:02
Server Not Found
Server Not Found
google.com
Firefox automatically sends some data to Mozilla so that we can improve your experience.
Choose What I Share
Hmm. We're having trouble finding that site.
We can't connect to the server at google.com.
If you entered the right address, you can:
Try again later
Check your network connection
Check that Firefox has permission to access the web (you might be connected but behind a firewall)
Try Again

D)


codebind@codebind-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
codebind@codebind-VirtualBox:~$ ping 10.0.2.15
ping: connect: Network is unreachable
codebind@codebind-VirtualBox:~$

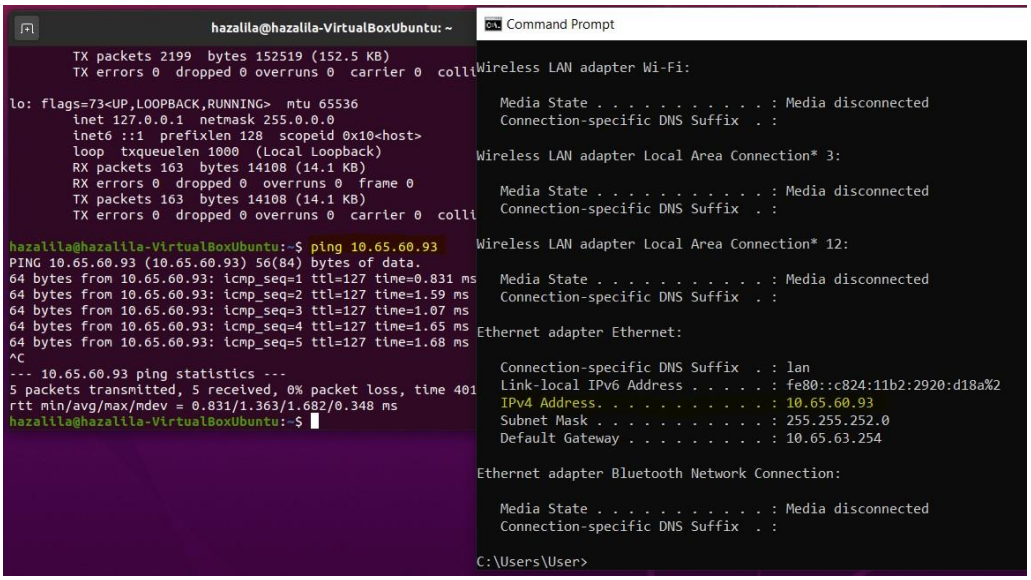
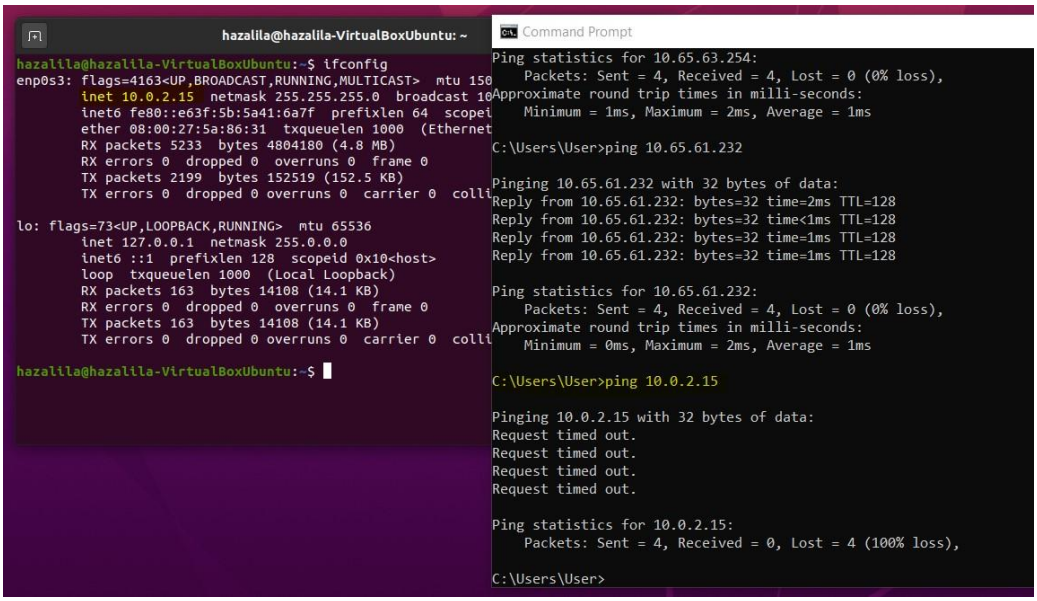
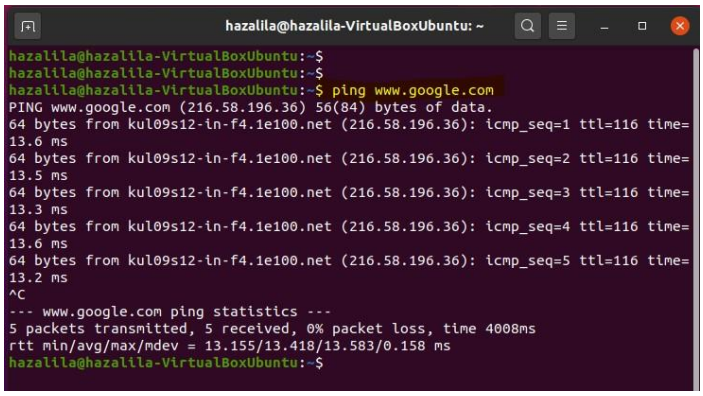
ii. Observe the differences of the above three settings (Experiment 1, 2 & 3). Elaborate your observation and make a short conclusion.

In Experiment 1, the VM may reach the external network via the host, but it may not be immediately available from other machines on the same network unless port forwarding is used. While by using Bridged in Experiment 2, the VM acts as an independent machine on the same network as the host, making it immediately reachable by other machines on the same network. Last but not least, in Experiment 3, the VM can connect with the host and other VMs on the same host-only network but cannot likely access the external network directly.

To conclude, the network configuration, such as NAT, Bridged, or Host-only, is specified by the demands of the computer. NAT is appropriate for the majority of internet-connected contexts, Bridged allows VMs to function as independent machines on the network, and Host-only excludes VMs from the external network while providing connectivity between them and the host.

** **Note:** You may need to execute command '*ipconfig*' in command prompt (if using Windows) and '*ifconfig*' in terminal (if using Linux) to get the IP information for executing the above-mentioned experiments.

REFERENCES

1. Heddings, A. (2020, July 23). Which Type of Networking Should You Use for Your Virtual Machine? How-to Geek. https://www.howtogeek.com/devops/which-type-of-networking-should-you-use-for-your-virtual-machine/

**** Sample of experiment results:**