Task A – Explore Network Configurations (8 * 5 = 40 Points)
{{{{{{{{{Connect your VM in the NAT mode}}}}}}}}}

1. Use the correct ifconfig command to display the current network configuration. Highlight your IP address, MAC address, and the network mask.

```
giancarlo@giancarlo-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::fe45:5eed:f615:72a0  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:58:6b:7e  txqueuelen 1000  (Ethernet)
        RX packets 357  bytes 344559 (344.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 260  bytes 43244 (43.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

IP Address & Network Mask

```
giancarlo@giancarlo-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::fe45:5eed:f615:72a0  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:58:6b:7e  txqueuelen 1000  (Ethernet)
        RX packets 357  bytes 344559 (344.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 260  bytes 43244 (43.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

MAC Address

2. Use the correct route command to display the current routing table.

```
giancarlo@giancarlo-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
```

3. Use the netstat command to list current TCP connections.

```
giancarlo@giancarlo-VirtualBox:~$ netstat -ta
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
```

4. Use the ping command to determine if the ubuntu.com system is accessible via the network. (Use the correct option to send 10 ping requests only.)

```
giancarlo@giancarlo-VirtualBox:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.29) 56(84) bytes of data.
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_s
eq=1 ttl=63 time=121 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_s
eq=2 ttl=63 time=116 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_s
eq=10 ttl=63 time=112 ms

--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9000ms
rtt min/avg/max/mdev = 103.632/118.417/184.746/22.539 ms
```

5. Use the host command to perform a DNS query on www.odu.edu

```
giancarlo@giancarlo-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
```

6. Use the cat command to display the contents of the file that contains the system's hostname.

```
giancarlo@giancarlo-VirtualBox:~$ cat /etc/hostname
giancarlo-VirtualBox
```

7. Use the cat command to display the contents of the file that contains the DNS servers for this system.

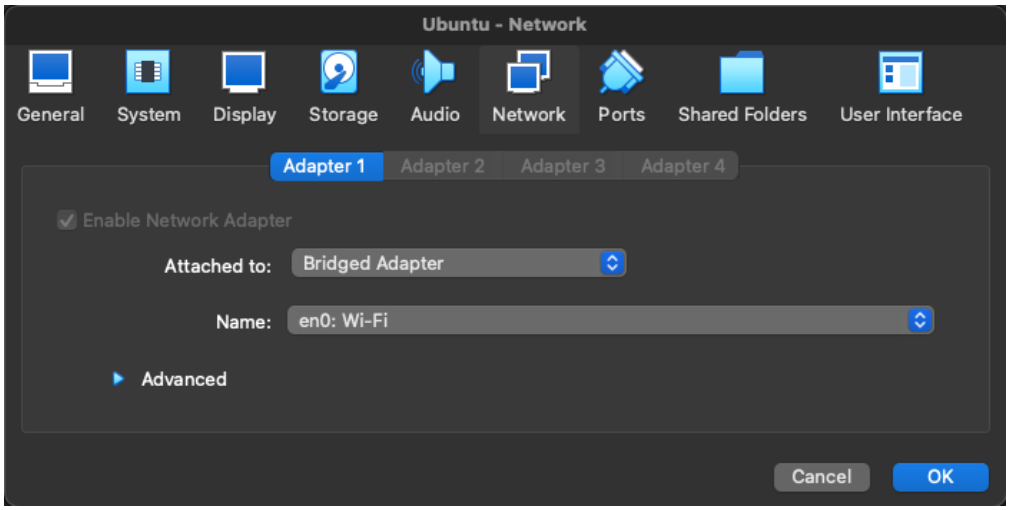
```
giancarlo@giancarlo-VirtualBox:~$ cat /etc/resolv.conf
nameserver 127.0.0.53
options edns0 trust-ad
search lan
```

8. Edit the same file you display in the previous step, set the system's hostname to your MIDAS ID permanently. Reboot system and repeat step 6.

```
giancarlo@goble001:~$ cat /etc/hostname
goble001
```

Task B – A Different Network Setting (3 * 20 = 60 Points)

1. Change the VM network connection from NAT to the bridge mode (you will lose your Internet connection if you are connected to the ODU campus Wi-Fi network, but it is okay)



2. Reboot your system, then repeat Steps 1 – 7 in Task A.

Step 1.

1. Different ipv4 address
2. Different RX packets
3. Different TX packets and bytes

```
giancarlo@goble001:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.86.41  netmask 255.255.255.0  broadcast 192.168.86.255
        inet6 fe80::fe45:5eed:f615:72a0  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:58:6b:7e  txqueuelen 1000  (Ethernet)
        RX packets 2118  bytes 1099417 (1.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 167  bytes 25436 (25.4 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Step 2.

```
giancarlo@goble001:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
192.168.86.0    0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
```

Step 3.

```
giancarlo@goble001:~$ netstat -ta
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
```

Step 4.

```
giancarlo@goble001:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.21) 56(84) bytes of data.
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_s
eq=1 ttl=54 time=109 ms
```

```
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9009ms
rtt min/avg/max/mdev = 100.992/111.090/120.964/5.774 ms
```

Step 5.

```
giancarlo@goble001:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
```

Step 6.

```
giancarlo@goble001:~$ cat /etc/hostname
goble001
```

Step 7.

```
giancarlo@goble001:~$ cat /etc/resolv.conf
# This is /run/systemd/resolve/stub-resolv.conf managed by man:systemd-resolved(
8).
```

```
nameserver 127.0.0.53
options edns0 trust-ad
search lan
```

3. Highlight the differences at the end of each step and discuss what you find.
The only step that was different was Step 1 where the IP Address, RX, and TX were all different. Step 2 was contributing to the fact that the ip address had an impact on the route command. Steps 3-7 showed similar outputs to when the VM network connection was in NAT mode.