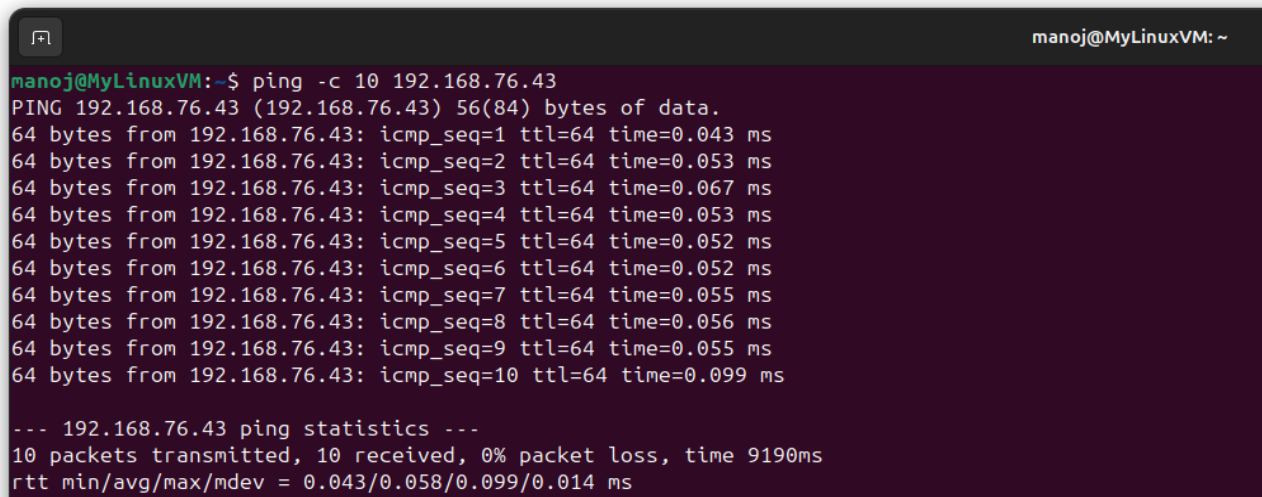## Question-4:

Understand linux utility commands like ping,arp (understand each param from ifconfig output)

1. Using Ping command in linux

The command is a networking tool used to ensure the internet connection. Ping uses ICMP(Internet Control Message Protocol) to send an ICMP echo message to the specified host if that host is available then it sends an ICMP reply message.

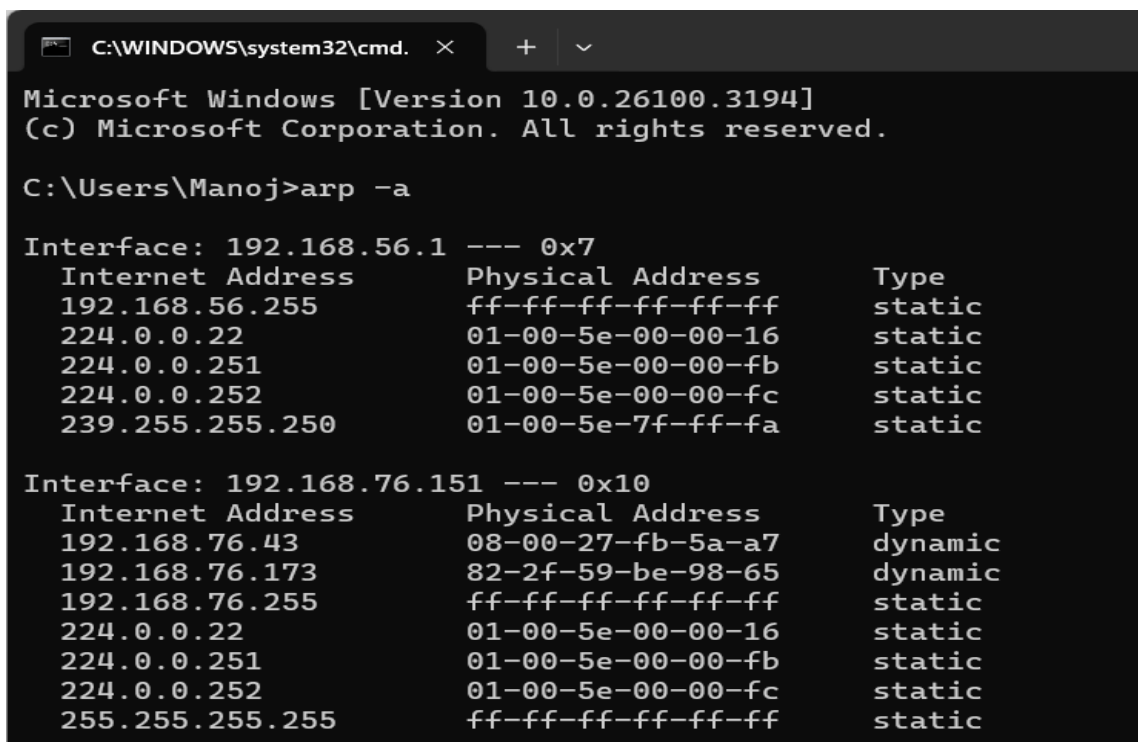manoj@MyLinuxVM:~$ ping -c 10 192.168.76.43 (sends and receives 10 data packets)

```
manoj@MyLinuxVM:~$ ping -c 10 192.168.76.43
PING 192.168.76.43 (192.168.76.43) 56(84) bytes of data.
64 bytes from 192.168.76.43: icmp_seq=1 ttl=64 time=0.043 ms
64 bytes from 192.168.76.43: icmp_seq=2 ttl=64 time=0.053 ms
64 bytes from 192.168.76.43: icmp_seq=3 ttl=64 time=0.067 ms
64 bytes from 192.168.76.43: icmp_seq=4 ttl=64 time=0.053 ms
64 bytes from 192.168.76.43: icmp_seq=5 ttl=64 time=0.052 ms
64 bytes from 192.168.76.43: icmp_seq=6 ttl=64 time=0.052 ms
64 bytes from 192.168.76.43: icmp_seq=7 ttl=64 time=0.055 ms
64 bytes from 192.168.76.43: icmp_seq=8 ttl=64 time=0.056 ms
64 bytes from 192.168.76.43: icmp_seq=9 ttl=64 time=0.055 ms
64 bytes from 192.168.76.43: icmp_seq=10 ttl=64 time=0.099 ms

--- 192.168.76.43 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9190ms
rtt min/avg/max/mdev = 0.043/0.058/0.099/0.014 ms
```

2. arp command

It's a network protocol that translates an IP address (logical address) into a physical MAC address, allowing devices on a local network to communicate with each other by finding the hardware address associated with a given IP address.
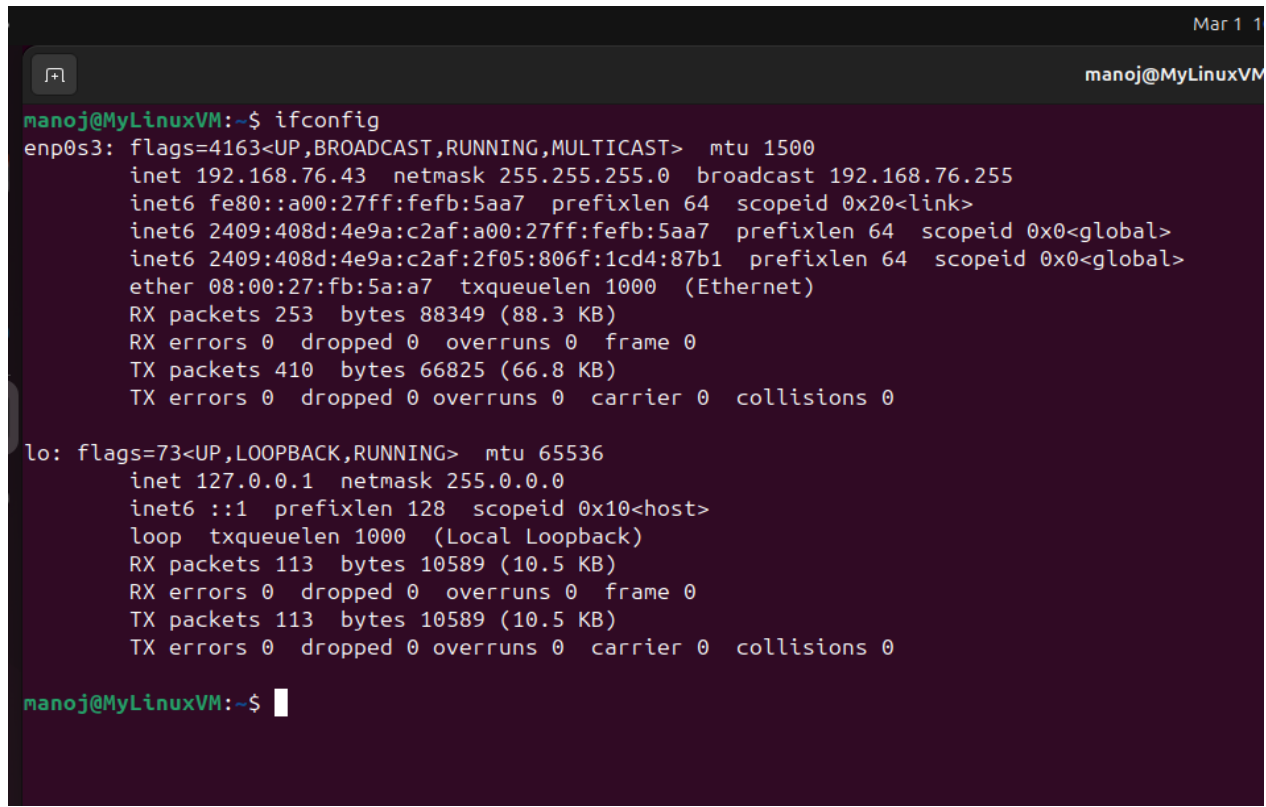
```
C:\WINDOWS\system32\cmd.    ×    +    ∨

Microsoft Windows [Version 10.0.26100.3194]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Manoj>arp -a

Interface: 192.168.56.1 --- 0x7
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 192.168.76.151 --- 0x10
  Internet Address      Physical Address      Type
  192.168.76.43         08-00-27-fb-5a-a7     dynamic
  192.168.76.173        82-2f-59-be-98-65     dynamic
  192.168.76.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

3. ifconfig command in linux

```
manoj@MyLinuxVM:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.76.43  netmask 255.255.255.0  broadcast 192.168.76.255
        inet6 fe80::a00:27ff:fefb:5aa7  prefixlen 64  scopeid 0x20<link>
        inet6 2409:408d:4e9a:c2af:a00:27ff:fefb:5aa7  prefixlen 64  scopeid 0x0<global>
        inet6 2409:408d:4e9a:c2af:2f05:806f:1cd4:87b1  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:fb:5a:a7  txqueuelen 1000  (Ethernet)
        RX packets 253  bytes 88349 (88.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 410  bytes 66825 (66.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 113  bytes 10589 (10.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 113  bytes 10589 (10.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

manoj@MyLinuxVM:~$
```

1. enp0s3 (Ethernet Interface)

This represents a network interface, typically associated with a wired Ethernet connection.

- flags=4163<UP, BROADCAST, RUNNING, MULTICAST>

2. inet 192.168.76.43 netmask 255.255.255.0 broadcast 192.168.76.255

- inet 192.168.76.43: The IPv4 address assigned to the interface.
- netmask 255.255.255.0: Defines the subnet mask.
- broadcast 192.168.76.255: The broadcast address for sending messages to all hosts in the network

3. lo (Loopback Interface)

This is the virtual network interface for internal communication within the system.