Assignment 2

Q1.

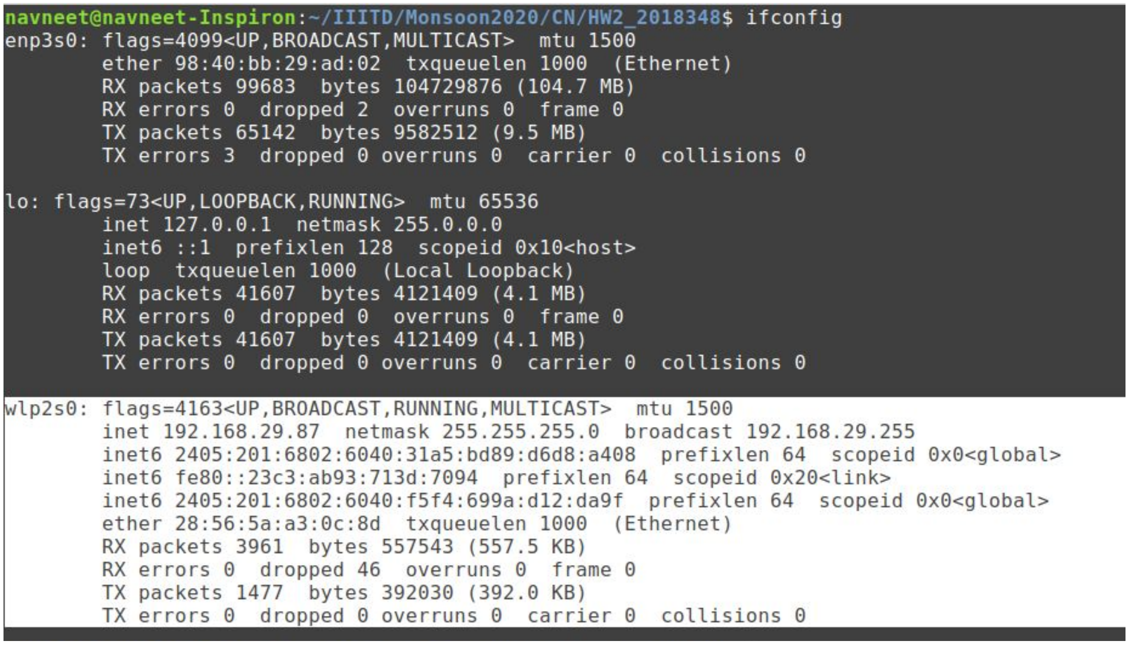
(a)

Command used:

ifconfig : it isused to configure an interface.

This displays all the active interfaces on your system

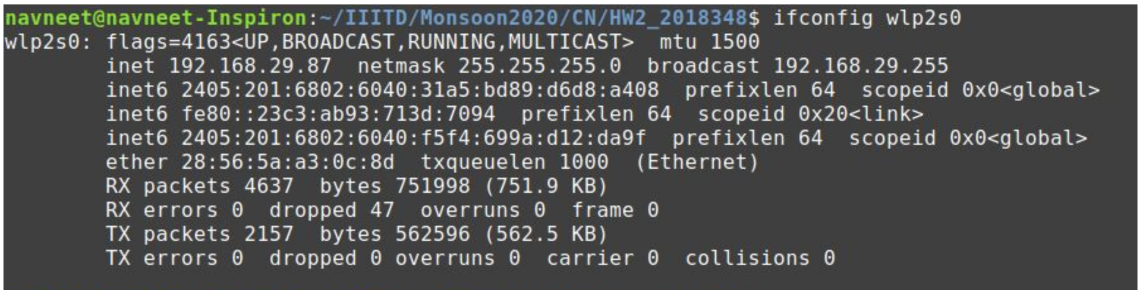
Ihave highlighted the interface(wi-fi) currently used by my system.



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ifconfig
enp3s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 98:40:bb:29:ad:02  txqueuelen 1000  (Ethernet)
        RX packets 99683  bytes 104729876 (104.7 MB)
        RX errors 0  dropped 2  overruns 0  frame 0
        TX packets 65142  bytes 9582512 (9.5 MB)
        TX errors 3  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 41607  bytes 4121409 (4.1 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 41607  bytes 4121409 (4.1 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.87  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 2405:201:6802:6040:31a5:bd89:d6d8:a408  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::23c3:ab93:713d:7094  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:6802:6040:f5f4:699a:d12:da9f  prefixlen 64  scopeid 0x0<global>
        ether 28:56:5a:a3:0c:8d  txqueuelen 1000  (Ethernet)
        RX packets 3961  bytes 557543 (557.5 KB)
        RX errors 0  dropped 46  overruns 0  frame 0
        TX packets 1477  bytes 392030 (392.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

ifconfig wlp2s0

This command will display all the details of my wifi interface.



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ifconfig wlp2s0
wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.87  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 2405:201:6802:6040:31a5:bd89:d6d8:a408  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::23c3:ab93:713d:7094  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:6802:6040:f5f4:699a:d12:da9f  prefixlen 64  scopeid 0x0<global>
        ether 28:56:5a:a3:0c:8d  txqueuelen 1000  (Ethernet)
        RX packets 4637  bytes 751998 (751.9 KB)
        RX errors 0  dropped 47  overruns 0  frame 0
        TX packets 2157  bytes 562596 (562.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

The IPv4 address : **192.168.29.87**

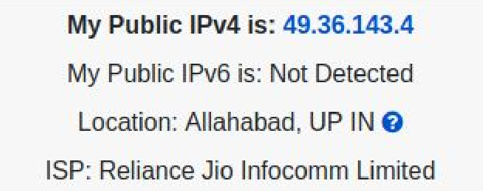
The IPv6 address : **fe80::23c3:ab93:713d:7094** (private)

Two more IPv6 addresses are displayed which are public addresses. These are used to by some systems to protect the mac address of the system from the websites. These global IPv6 change from time to time and increase the level of security.

2405:201:6802:6040:31a5:bd89:d6d8:a408

2405:201:6802:6040:f5f4:699a:d12:da9f

(b)



My Public IPv4 is: 49.36.143.4

My Public IPv6 is: Not Detected

Location: Allahabad, UP IN

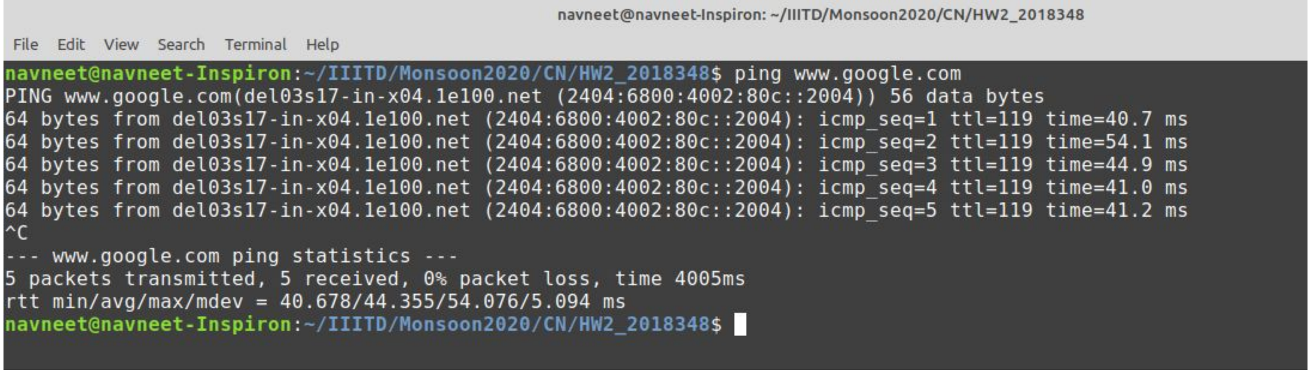
ISP: Reliance Jio Infocomm Limited

They IPv4 address shown here is **different** from the IPv4 address displayed by the ifconfig command, this is because ifconfig displays my **private ip address(**used in local area network**)** while whatismyip.com displays my **public ip address**.

Q2.

a.

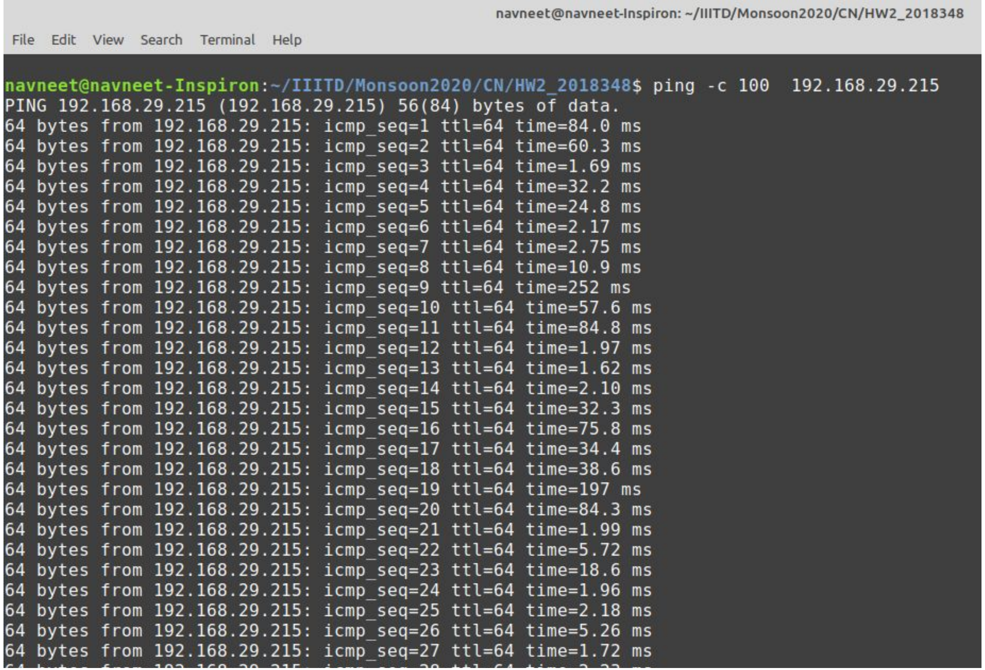
Latency is defined as the **delay** between user's action and web application response to that action and Ping command tells us if we are **connected** to a network and it also tells us about the **latency**. SS below shows the ping command used on www.google.com.


navneet@navneet-Inspiron: ~/IIITD/Monsoon2020/CN/HW2_2018348
File Edit View Search Terminal Help

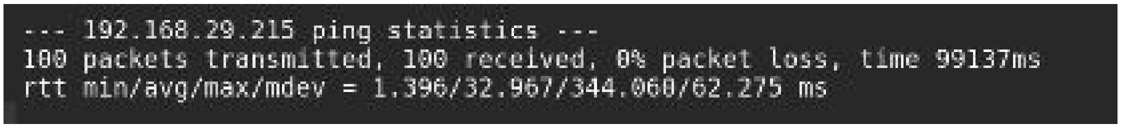
```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping www.google.com
PING www.google.com(del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004)) 56 data bytes
64 bytes from del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004): icmp_seq=1 ttl=119 time=40.7 ms
64 bytes from del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004): icmp_seq=2 ttl=119 time=54.1 ms
64 bytes from del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004): icmp_seq=3 ttl=119 time=44.9 ms
64 bytes from del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004): icmp_seq=4 ttl=119 time=41.0 ms
64 bytes from del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004): icmp_seq=5 ttl=119 time=41.2 ms
^C
--- www.google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 40.678/44.355/54.076/5.094 ms
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ 
```

(b)

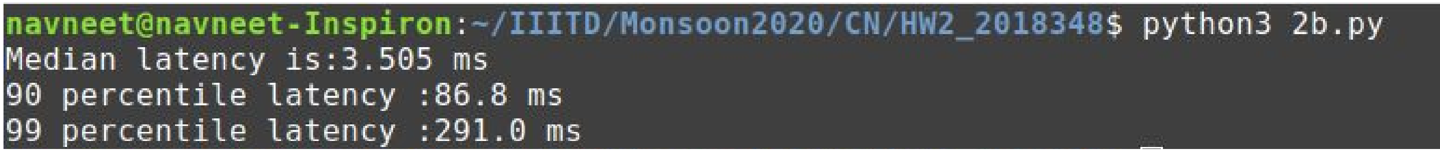
Ip address of my 2nd device on same network **192.168.29.215**
ping -c 100 192.168.29.215


navneet@navneet-Inspiron: ~/IIITD/Monsoon2020/CN/HW2_2018348
File Edit View Search Terminal Help

```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping -c 100  192.168.29.215
PING 192.168.29.215 (192.168.29.215) 56(84) bytes of data.
64 bytes from 192.168.29.215: icmp_seq=1 ttl=64 time=84.0 ms
64 bytes from 192.168.29.215: icmp_seq=2 ttl=64 time=60.3 ms
64 bytes from 192.168.29.215: icmp_seq=3 ttl=64 time=1.69 ms
64 bytes from 192.168.29.215: icmp_seq=4 ttl=64 time=32.2 ms
64 bytes from 192.168.29.215: icmp_seq=5 ttl=64 time=24.8 ms
64 bytes from 192.168.29.215: icmp_seq=6 ttl=64 time=2.17 ms
64 bytes from 192.168.29.215: icmp_seq=7 ttl=64 time=2.75 ms
64 bytes from 192.168.29.215: icmp_seq=8 ttl=64 time=10.9 ms
64 bytes from 192.168.29.215: icmp_seq=9 ttl=64 time=252 ms
64 bytes from 192.168.29.215: icmp_seq=10 ttl=64 time=57.6 ms
64 bytes from 192.168.29.215: icmp_seq=11 ttl=64 time=84.8 ms
64 bytes from 192.168.29.215: icmp_seq=12 ttl=64 time=1.97 ms
64 bytes from 192.168.29.215: icmp_seq=13 ttl=64 time=1.62 ms
64 bytes from 192.168.29.215: icmp_seq=14 ttl=64 time=2.10 ms
64 bytes from 192.168.29.215: icmp_seq=15 ttl=64 time=32.3 ms
64 bytes from 192.168.29.215: icmp_seq=16 ttl=64 time=75.8 ms
64 bytes from 192.168.29.215: icmp_seq=17 ttl=64 time=34.4 ms
64 bytes from 192.168.29.215: icmp_seq=18 ttl=64 time=38.6 ms
64 bytes from 192.168.29.215: icmp_seq=19 ttl=64 time=197 ms
64 bytes from 192.168.29.215: icmp_seq=20 ttl=64 time=84.3 ms
64 bytes from 192.168.29.215: icmp_seq=21 ttl=64 time=1.99 ms
64 bytes from 192.168.29.215: icmp_seq=22 ttl=64 time=5.72 ms
64 bytes from 192.168.29.215: icmp_seq=23 ttl=64 time=18.6 ms
64 bytes from 192.168.29.215: icmp_seq=24 ttl=64 time=1.96 ms
64 bytes from 192.168.29.215: icmp_seq=25 ttl=64 time=2.18 ms
64 bytes from 192.168.29.215: icmp_seq=26 ttl=64 time=5.26 ms
64 bytes from 192.168.29.215: icmp_seq=27 ttl=64 time=1.72 ms
```



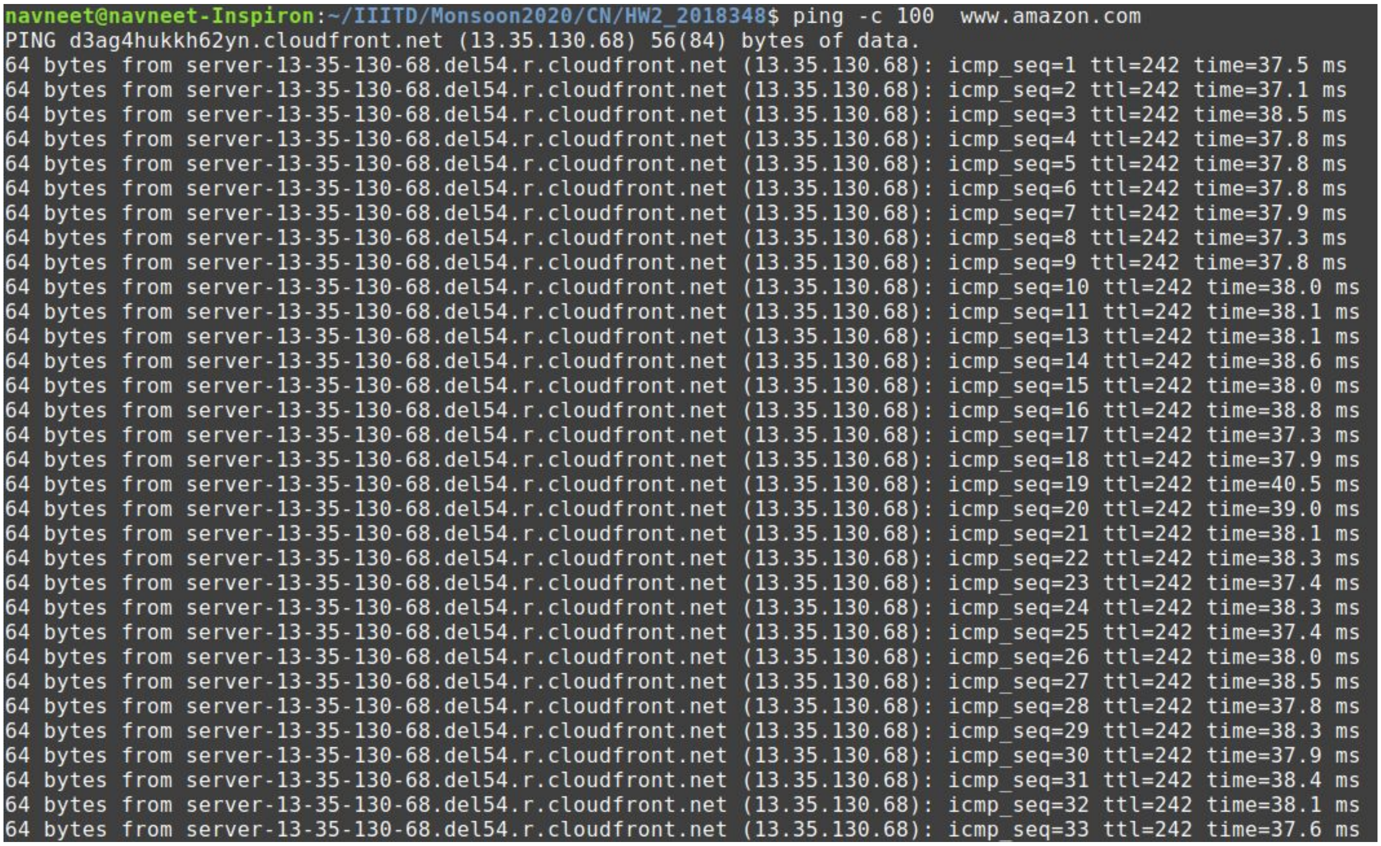
```
--- 192.168.29.215 ping statistics ---
100 packets transmitted, 100 received, 0% packet loss, time 99137ms
rtt min/avg/max/mdev = 1.396/32.967/344.060/62.275 ms
```



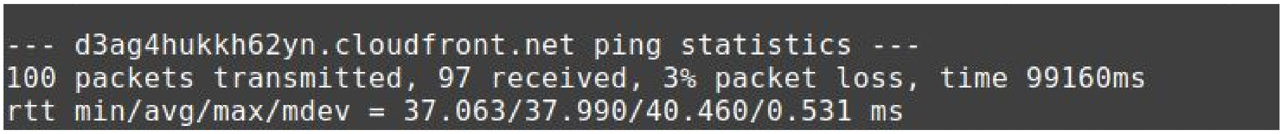
```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ python3 2b.py
Median latency is:3.505 ms
90 percentile latency :86.8 ms
99 percentile latency :291.0 ms
```

(c)

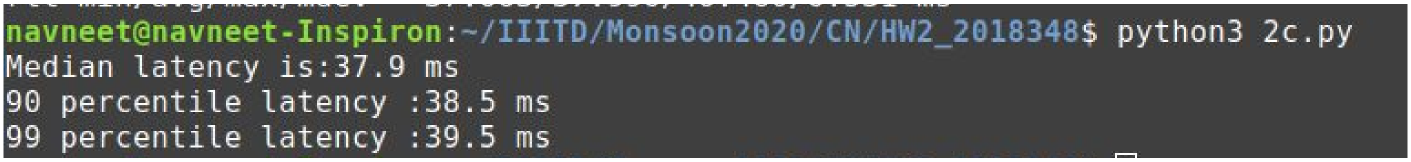
ping -c 100 www.amazon.com



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping -c 100  www.amazon.com
PING d3ag4hukkh62yn.cloudfront.net (13.35.130.68) 56(84) bytes of data.
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=1 ttl=242 time=37.5 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=2 ttl=242 time=37.1 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=3 ttl=242 time=38.5 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=4 ttl=242 time=37.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=5 ttl=242 time=37.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=6 ttl=242 time=37.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=7 ttl=242 time=37.9 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=8 ttl=242 time=37.3 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=9 ttl=242 time=37.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=10 ttl=242 time=38.0 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=11 ttl=242 time=38.1 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=13 ttl=242 time=38.1 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=14 ttl=242 time=38.6 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=15 ttl=242 time=38.0 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=16 ttl=242 time=38.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=17 ttl=242 time=37.3 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=18 ttl=242 time=37.9 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=19 ttl=242 time=40.5 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=20 ttl=242 time=39.0 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=21 ttl=242 time=38.1 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=22 ttl=242 time=38.3 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=23 ttl=242 time=37.4 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=24 ttl=242 time=38.3 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=25 ttl=242 time=37.4 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=26 ttl=242 time=38.0 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=27 ttl=242 time=38.5 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=28 ttl=242 time=37.8 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=29 ttl=242 time=38.3 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=30 ttl=242 time=37.9 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=31 ttl=242 time=38.4 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=32 ttl=242 time=38.1 ms
64 bytes from server-13-35-130-68.del54.r.cloudfront.net (13.35.130.68): icmp_seq=33 ttl=242 time=37.6 ms
```



```
--- d3ag4hukkh62yn.cloudfront.net ping statistics ---
100 packets transmitted, 97 received, 3% packet loss, time 99160ms
rtt min/avg/max/mdev = 37.063/37.990/40.460/0.531 ms
```



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ python3 2c.py
Median latency is:37.9 ms
90 percentile latency :38.5 ms
99 percentile latency :39.5 ms
```

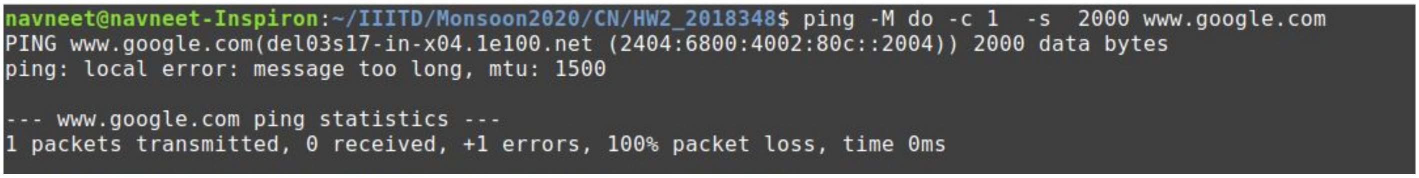
For 2b and 2c all the data was copied to a text file and then a python script was run on them.

d.
The number of packets loss for **2b was 0 while for 2c it was 3.**(Screenshots are attached above)
Pinging to www.amazon.com has higher packet loss than pinging to another system on same network.Since the packets travel through so many routers for the amazon case so it is possible that some packet might be dropped due to network traffic, or full wait queue etc. while on the other hand for pinging to a device on same network we need to travel through less routers and the network traffic is much less as compared to the amazon case.

Observing the average latency reported by ping command and median latency calculated by us we can see that for 2c we had a higher latency rate than 2b. This is because www.amazon.com is far away and to send a packet from my computer to amazon , the packet travels from s**everal routers in between** where each router adds up a delay which increases the latency in this case. When we send packets to a device on same network then the packets travels through few routers thus the latency is low.

Q3.
(a)
ping -M do -c 1 -s 2000 www.google.com

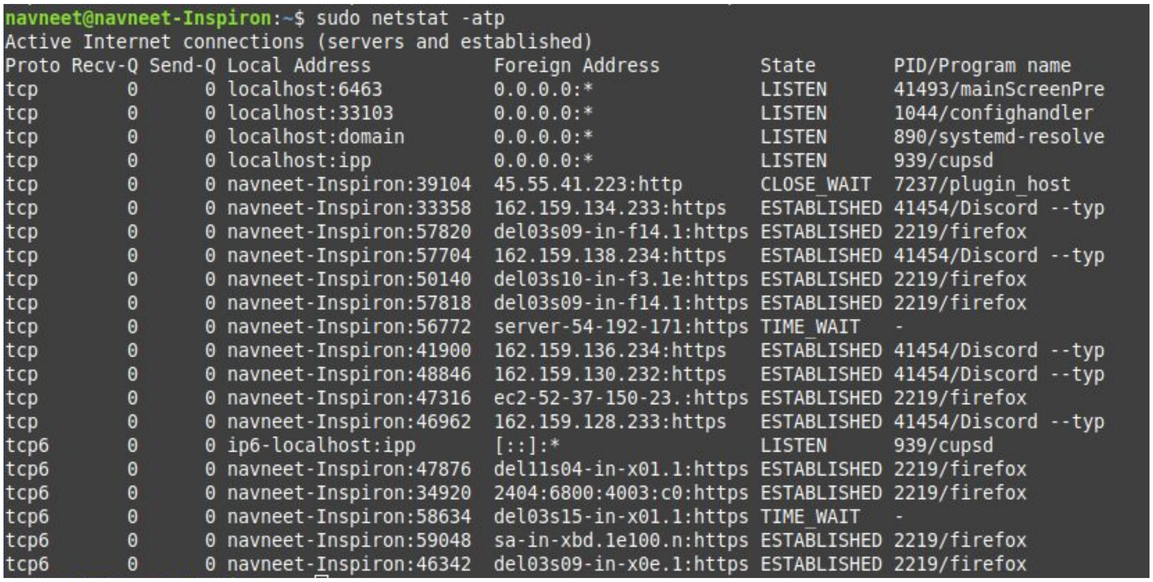
The -c flag ensures the count of packets to be sent for the ping, which was limited to 1.
The -s flag ensures the size of thepacket to be sent which is set to be 2000.
The **-M do flag** ensures taht fragmentation of packets is prohibited.



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping -M do -c 1  -s  2000 www.google.com
PING www.google.com(del03s17-in-x04.1e100.net (2404:6800:4002:80c::2004)) 2000 data bytes
ping: local error: message too long, mtu: 1500

--- www.google.com ping statistics ---
1 packets transmitted, 0 received, +1 errors, 100% packet loss, time 0ms
```

The test command failed. We might have bypassed the mtu limit for sending a packet for the ping command but the network medium still have a limit of mtu 1500 bytes and due to this the data packet does not travel further and gives an error message.

(b)
netstat -atp



```
navneet@navneet-Inspiron:~$ sudo netstat -atp
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 localhost:6463          0.0.0.0:*               LISTEN      41493/mainScreenPre
tcp        0      0 localhost:33103         0.0.0.0:*               LISTEN      1044/confighandler
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN      890/systemd-resolve
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN      939/cupsd
tcp        0      0 navneet-Inspiron:39104  45.55.41.223:http       CLOSE_WAIT  7237/plugin_host
tcp        0      0 navneet-Inspiron:33358  162.159.134.233:https   ESTABLISHED 41454/Discord --typ
tcp        0      0 navneet-Inspiron:57820  del03s09-in-f14.1:https ESTABLISHED 2219/firefox
tcp        0      0 navneet-Inspiron:57704  162.159.138.234:https   ESTABLISHED 41454/Discord --typ
tcp        0      0 navneet-Inspiron:50140  del03s10-in-f3.1e:https ESTABLISHED 2219/firefox
tcp        0      0 navneet-Inspiron:57818  del03s09-in-f14.1:https ESTABLISHED 2219/firefox
tcp        0      0 navneet-Inspiron:56772  server-54-192-171:https TIME_WAIT   -
tcp        0      0 navneet-Inspiron:41900  162.159.136.234:https   ESTABLISHED 41454/Discord --typ
tcp        0      0 navneet-Inspiron:48846  162.159.130.232:https   ESTABLISHED 41454/Discord --typ
tcp        0      0 navneet-Inspiron:47316  ec2-52-37-150-23.:https ESTABLISHED 2219/firefox
tcp        0      0 navneet-Inspiron:46962  162.159.128.233:https   ESTABLISHED 41454/Discord --typ
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN      939/cupsd
tcp6       0      0 navneet-Inspiron:47876  del11s04-in-x01.1:https ESTABLISHED 2219/firefox
tcp6       0      0 navneet-Inspiron:34920  2404:6800:4003:c0:https ESTABLISHED 2219/firefox
tcp6       0      0 navneet-Inspiron:58634  del03s15-in-x01.1:https TIME_WAIT   -
tcp6       0      0 navneet-Inspiron:59048  sa-in-xbd.1e100.n:https ESTABLISHED 2219/firefox
tcp6       0      0 navneet-Inspiron:46342  del03s09-in-x0e.1:https ESTABLISHED 2219/firefox
```

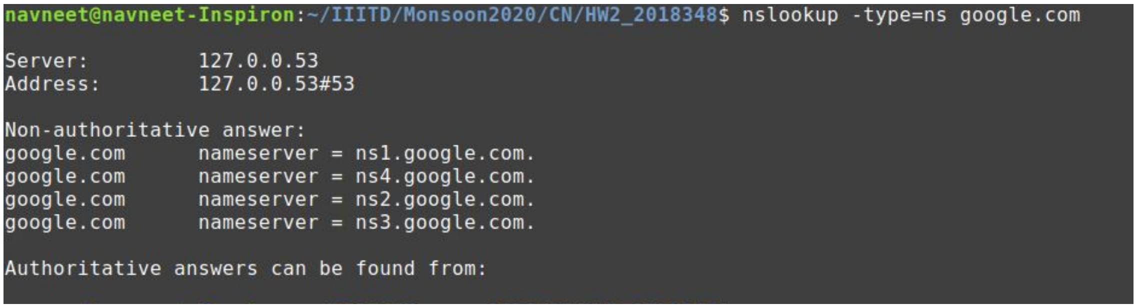
4.

(a).

If we directly try to do **nslookup google.com** then we get a non-authoritative result. This is because dns might be stored in some cache along the path and we get the reply from that.

To get authoritative answer first we run the below command to get the server name for google.com

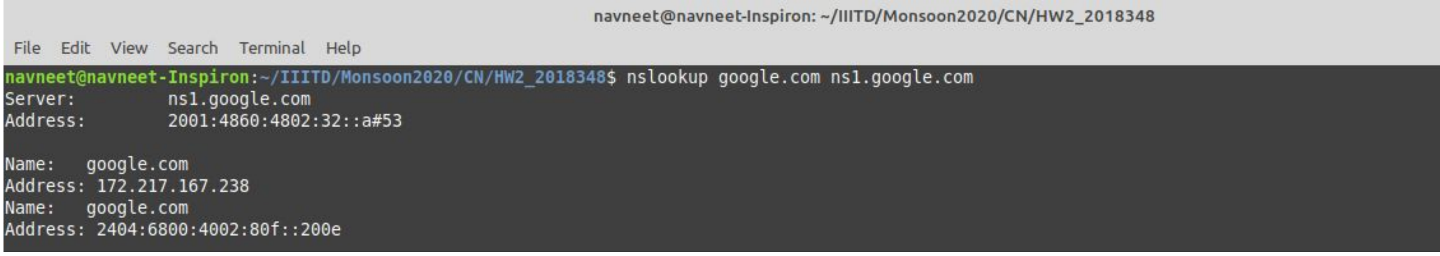
nslookup -type=ns google.com



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ nslookup -type=ns google.com

Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
google.com      nameserver = ns1.google.com.
google.com      nameserver = ns4.google.com.
google.com      nameserver = ns2.google.com.
google.com      nameserver = ns3.google.com.

Authoritative answers can be found from:
```

Once we can set the server name in our nslookup command to one of the above found names.

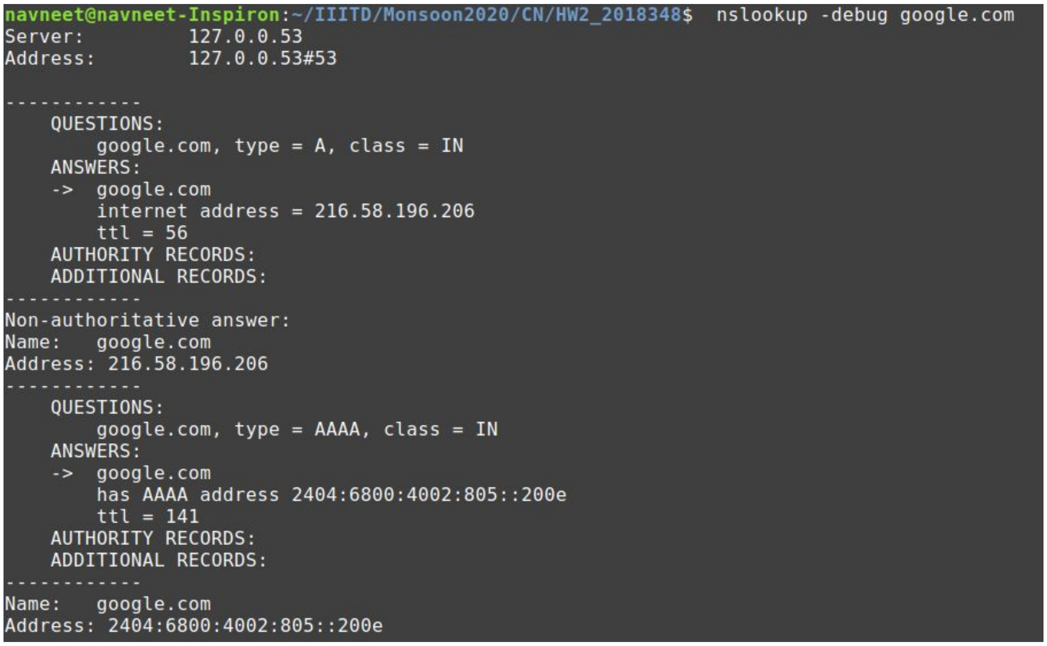
nslookup google.com ns1.google.com


navneet@navneet-Inspiron: ~/IIITD/Monsoon2020/CN/HW2_2018348
File
Edit
View
Search
Terminal
Help

```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ nslookup google.com ns1.google.com
Server:         ns1.google.com
Address:        2001:4860:4802:32::a#53

Name:   google.com
Address: 172.217.167.238
Name:   google.com
Address: 2404:6800:4002:80f::200e
```

This command gives us an authoritative response from google.com (b).

nslookup -debug google.com



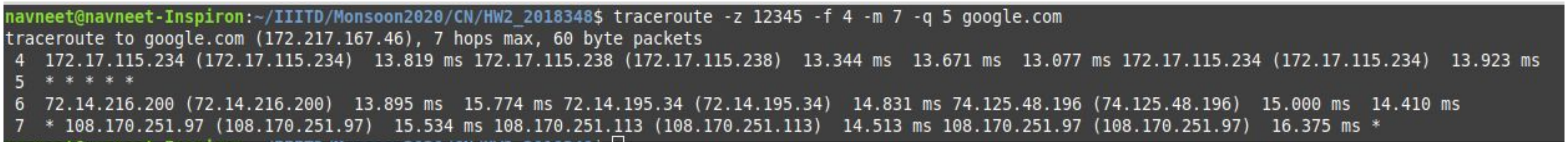
```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$  nslookup -debug google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

------------
    QUESTIONS:
        google.com, type = A, class = IN
    ANSWERS:
    ->  google.com
        internet address = 216.58.196.206
        ttl = 56
    AUTHORITY RECORDS:
    ADDITIONAL RECORDS:
------------
Non-authoritative answer:
Name:   google.com
Address: 216.58.196.206
------------
    QUESTIONS:
        google.com, type = AAAA, class = IN
    ANSWERS:
    ->  google.com
        has AAAA address 2404:6800:4002:805::200e
        ttl = 141
    AUTHORITY RECORDS:
    ADDITIONAL RECORDS:
------------
Name:   google.com
Address: 2404:6800:4002:805::200e
```

Ttl for IPv4 is 56 **seconds** and for IPv6 is 141 **seconds**.

These ttl represent the time for which these domain names are cached locally, after the respective times mentioned if a user requests google.com it will get a authoritative response and it will be stored again in the caches.

5.

traceroute -z 12345 -f 4 -m 7 -q 5 google.com



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ traceroute -z 12345 -f 4 -m 7 -q 5 google.com
traceroute to google.com (172.217.167.46), 7 hops max, 60 byte packets
 4  172.17.115.234 (172.17.115.234)  13.819 ms 172.17.115.238 (172.17.115.238)  13.344 ms  13.671 ms  13.077 ms 172.17.115.234 (172.17.115.234)  13.923 ms
 5  * * * * *
 6  72.14.216.200 (72.14.216.200)  13.895 ms  15.774 ms 72.14.195.34 (72.14.195.34)  14.831 ms 74.125.48.196 (74.125.48.196)  15.000 ms  14.410 ms
 7  * 108.170.251.97 (108.170.251.97)  15.534 ms 108.170.251.113 (108.170.251.113)  14.513 ms 108.170.251.97 (108.170.251.97)  16.375 ms *
```

The -z flag represents the the min. Time interval b/w two probes and it is set to 12345 ms as mentioned in the question.

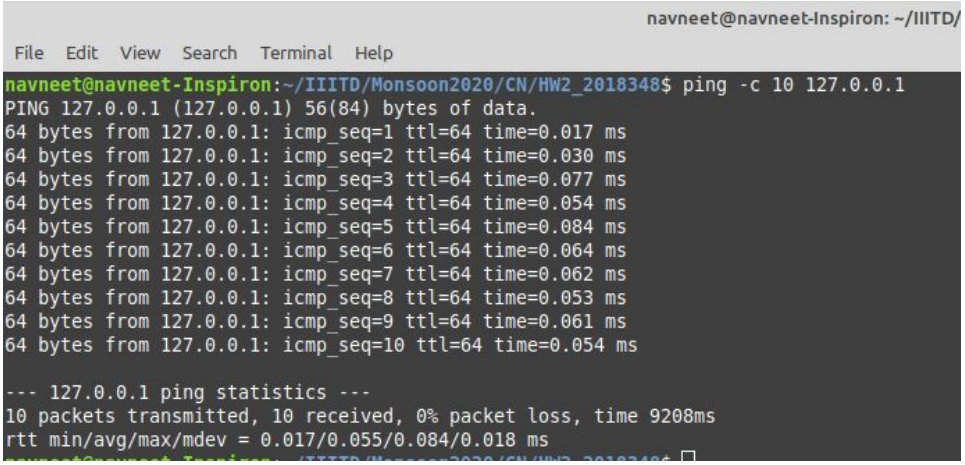
The -f flag is used to specify the Ttl from where to start. Set to 4

The -m flag used to specify the max. Number of hops for this traceroute. Set to 7.

The -q flag is use to specify the no. of probe packets per hop. Set to 5

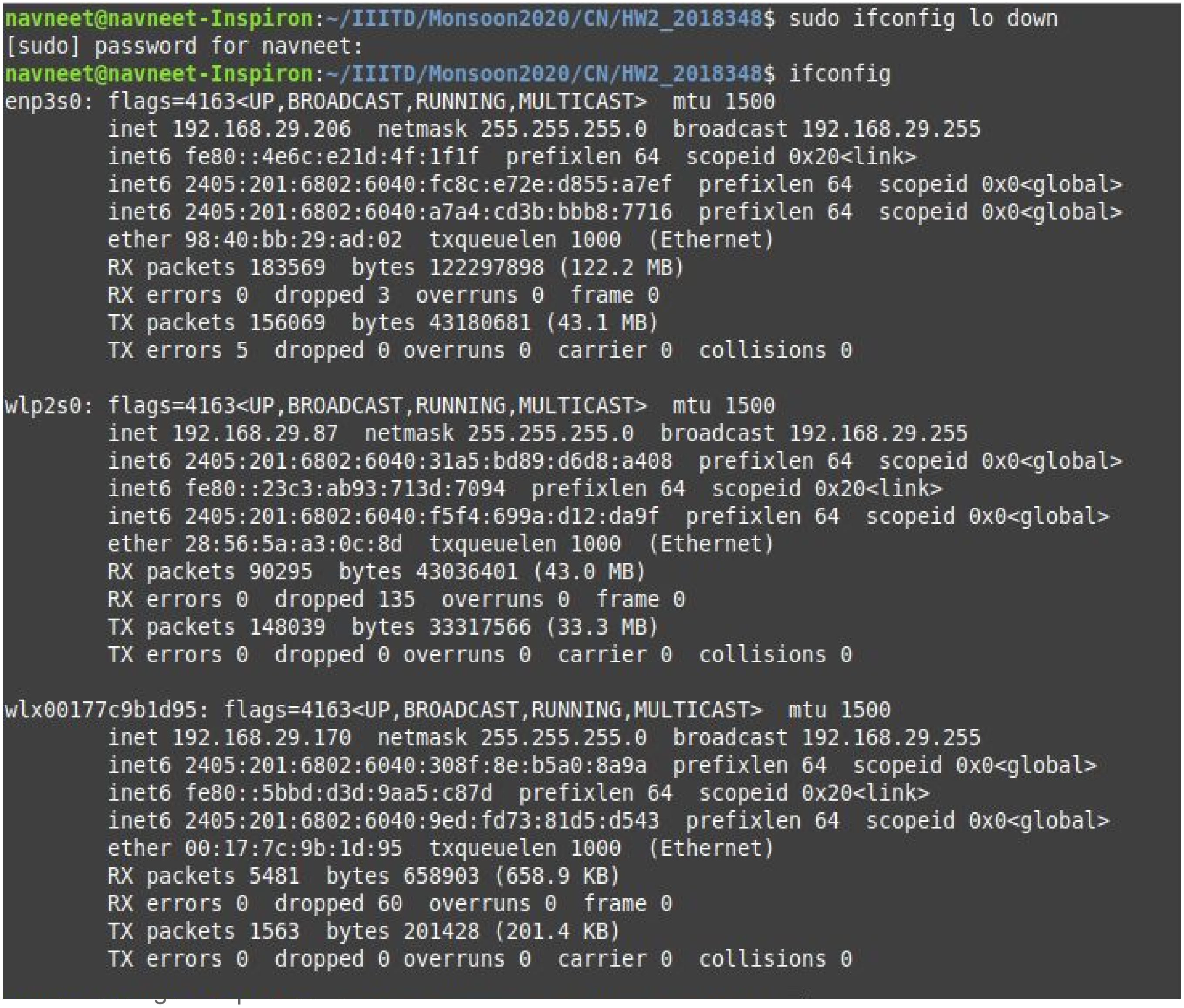
6.

This command is [1]Working at first

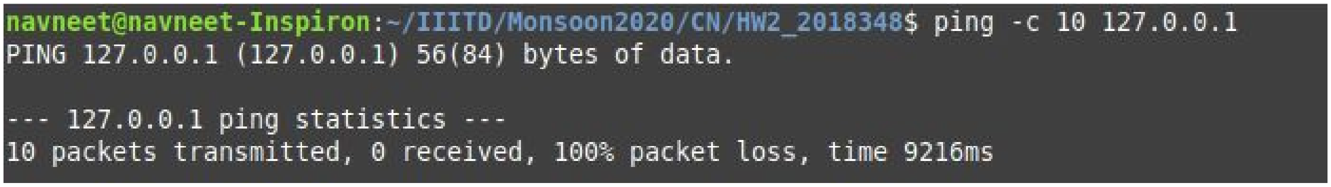

navneet@navneet-Inspiron: ~/IIITD/
File Edit View Search Terminal Help

```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping -c 10 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.017 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.030 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.077 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.054 ms
64 bytes from 127.0.0.1: icmp_seq=5 ttl=64 time=0.084 ms
64 bytes from 127.0.0.1: icmp_seq=6 ttl=64 time=0.064 ms
64 bytes from 127.0.0.1: icmp_seq=7 ttl=64 time=0.062 ms
64 bytes from 127.0.0.1: icmp_seq=8 ttl=64 time=0.053 ms
64 bytes from 127.0.0.1: icmp_seq=9 ttl=64 time=0.061 ms
64 bytes from 127.0.0.1: icmp_seq=10 ttl=64 time=0.054 ms

--- 127.0.0.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9208ms
rtt min/avg/max/mdev = 0.017/0.055/0.084/0.018 ms
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$
```

127.0.0.1 represents the local ip address , so we are actually sending the ping to the same computer we are using which uses the loopback interface, so we can turn down the interface so that the ping command fails.



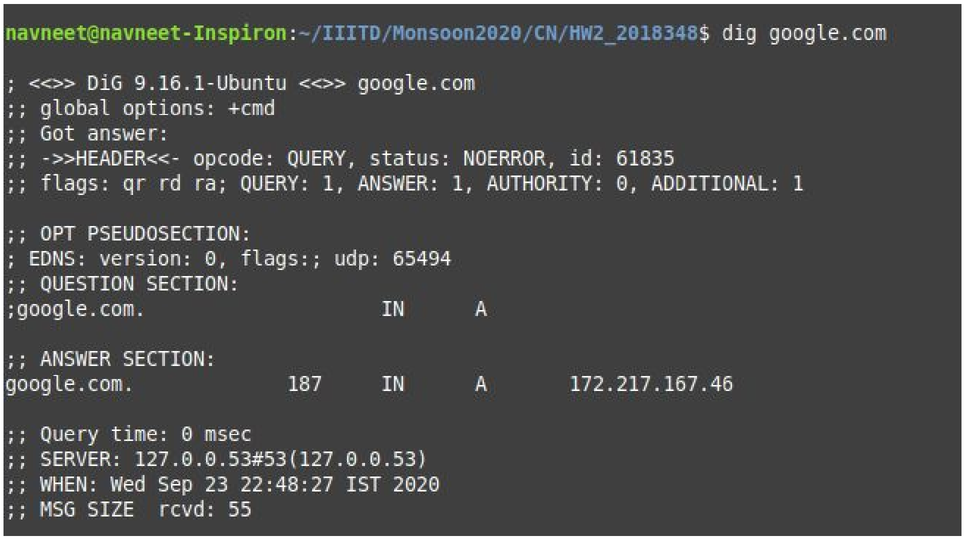
```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ sudo ifconfig lo down
[sudo] password for navneet:
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ifconfig
enp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.206  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 fe80::4e6c:e21d:4f:1f1f  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:6802:6040:fc8c:e72e:d855:a7ef  prefixlen 64  scopeid 0x0<global>
        inet6 2405:201:6802:6040:a7a4:cd3b:bbb8:7716  prefixlen 64  scopeid 0x0<global>
        ether 98:40:bb:29:ad:02  txqueuelen 1000  (Ethernet)
        RX packets 183569  bytes 122297898 (122.2 MB)
        RX errors 0  dropped 3  overruns 0  frame 0
        TX packets 156069  bytes 43180681 (43.1 MB)
        TX errors 5  dropped 0 overruns 0  carrier 0  collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.87  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 2405:201:6802:6040:31a5:bd89:d6d8:a408  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::23c3:ab93:713d:7094  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:6802:6040:f5f4:699a:d12:da9f  prefixlen 64  scopeid 0x0<global>
        ether 28:56:5a:a3:0c:8d  txqueuelen 1000  (Ethernet)
        RX packets 90295  bytes 43036401 (43.0 MB)
        RX errors 0  dropped 135  overruns 0  frame 0
        TX packets 148039  bytes 33317566 (33.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlx00177c9b1d95: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.170  netmask 255.255.255.0  broadcast 192.168.29.255
        inet6 2405:201:6802:6040:308f:8e:b5a0:8a9a  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::5bbd:d3d:9aa5:c87d  prefixlen 64  scopeid 0x20<link>
        inet6 2405:201:6802:6040:9ed:fd73:81d5:d543  prefixlen 64  scopeid 0x0<global>
        ether 00:17:7c:9b:1d:95  txqueuelen 1000  (Ethernet)
        RX packets 5481  bytes 658903 (658.9 KB)
        RX errors 0  dropped 60  overruns 0  frame 0
        TX packets 1563  bytes 201428 (201.4 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ ping -c 10 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.

--- 127.0.0.1 ping statistics ---
10 packets transmitted, 0 received, 100% packet loss, time 9216ms
```

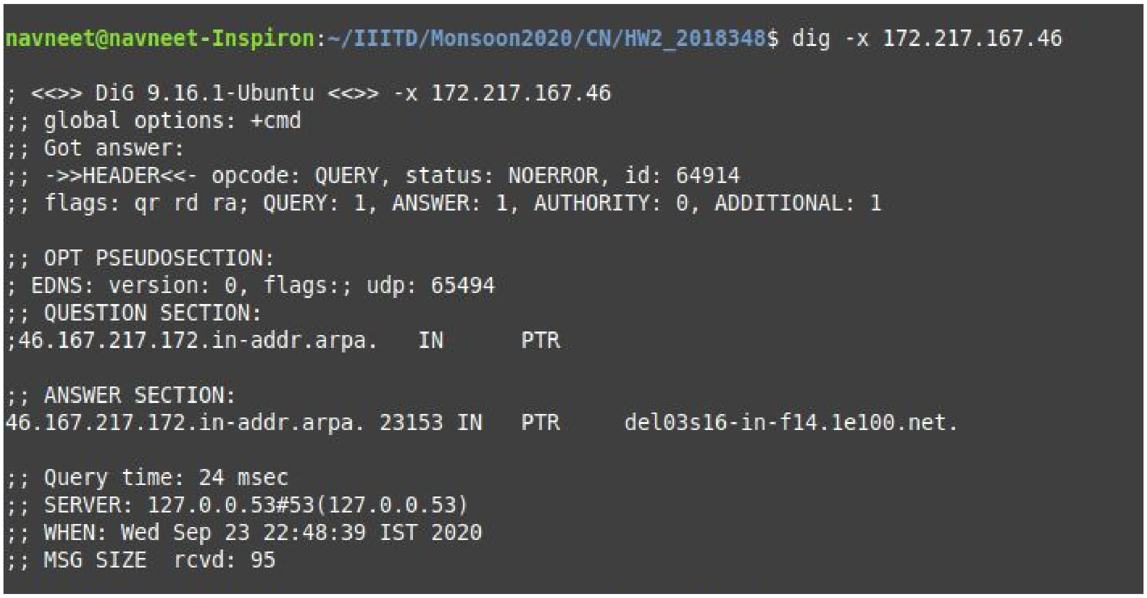
7.

For a reverse lookup we first need the ip address of google.com, we can do it by the following command.



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ dig google.com

; <<>> DiG 9.16.1-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 61835
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             187     IN      A       172.217.167.46

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Wed Sep 23 22:48:27 IST 2020
;; MSG SIZE  rcvd: 55
```

In the above SS we can see the IP address for google .com came out to be 172.217.167.46
Now we can use -x flag with dig command on this ip address for a reverse lookup.



```
navneet@navneet-Inspiron:~/IIITD/Monsoon2020/CN/HW2_2018348$ dig -x 172.217.167.46

; <<>> DiG 9.16.1-Ubuntu <<>> -x 172.217.167.46
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64914
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;46.167.217.172.in-addr.arpa.   IN      PTR

;; ANSWER SECTION:
46.167.217.172.in-addr.arpa. 23153 IN   PTR     del03s16-in-f14.1e100.net.

;; Query time: 24 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Wed Sep 23 22:48:39 IST 2020
;; MSG SIZE  rcvd: 95
```