Name : Vipul Verma
Roll N0.2022577
Assignment_1

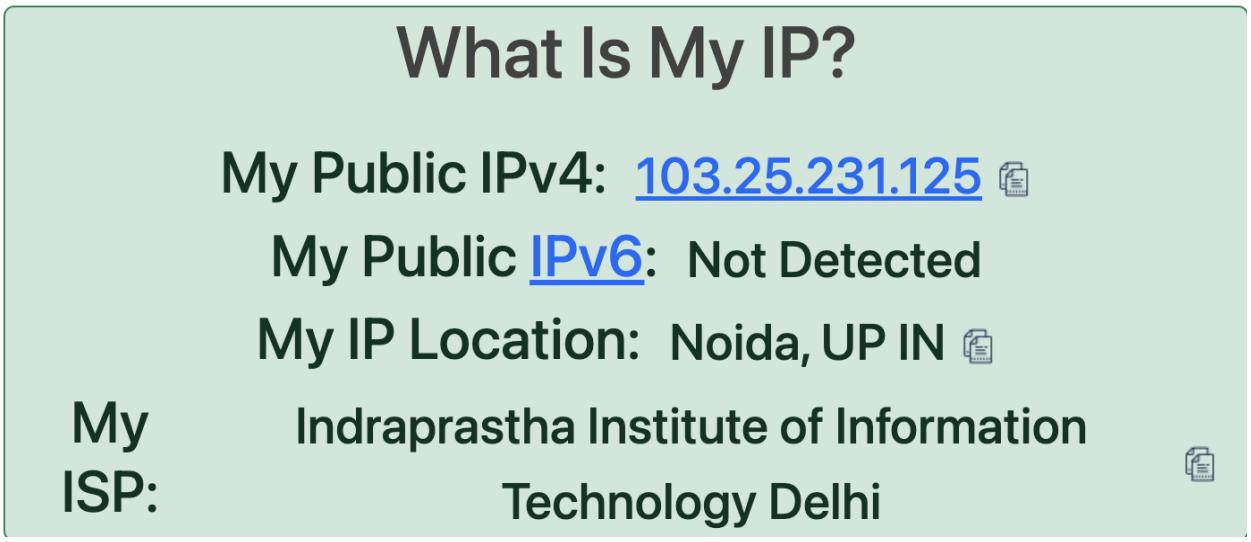
Question_1.

a) Screenshot of IP address of network interface.

Note: On most MacBooks, en0 is reserved for the primary network interface, which is usually the built-in Wi-Fi. If the system doesn't have an active Ethernet connection, en0 will default to Wi-Fi.

```
vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.43.46 netmask 0xffffe000 broadcast 192.168.63.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
```

b) IP Address via command line: **192.168.43.46**



The difference between the IP address shown on whatismyip.com and the one displayed in the terminal is different due to the difference between a local IP address and a public IP address.

b.1) When we check IP addresses via terminal using the Ifconfig command we are typically seeing local IP addresses. This is the IP address assigned to our device by our router within the local network.This address is used for communication within the local network, like between computer and printer or other devices connected to the same router.

b.2) When we visit such websites like whatismyip.com , they show a public **IP address**. This is the IP address assigned to the router by Internet Service Provider (ISP). It's the address used when your device communicates with servers on the internet. All devices on your local network share this public IP address when accessing the internet.This address is used for all online activities, like browsing websites, sending emails, or streaming content.

Question_2.

Now, We can see that the IP address is set to 192.168.34.45 and after this we can revert this change by using the following command:

```
vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig en0 inet 192.168.34.45 netmask 0xffffe000

Password:
vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.34.45 netmask 0xffffe000 broadcast 192.168.63.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig en0 down
sudo ifconfig en0 up

vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet 192.168.34.45 netmask 0xffffe000 broadcast 192.168.63.255
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.43.46 netmask 0xffffe000 broadcast 192.168.63.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
```

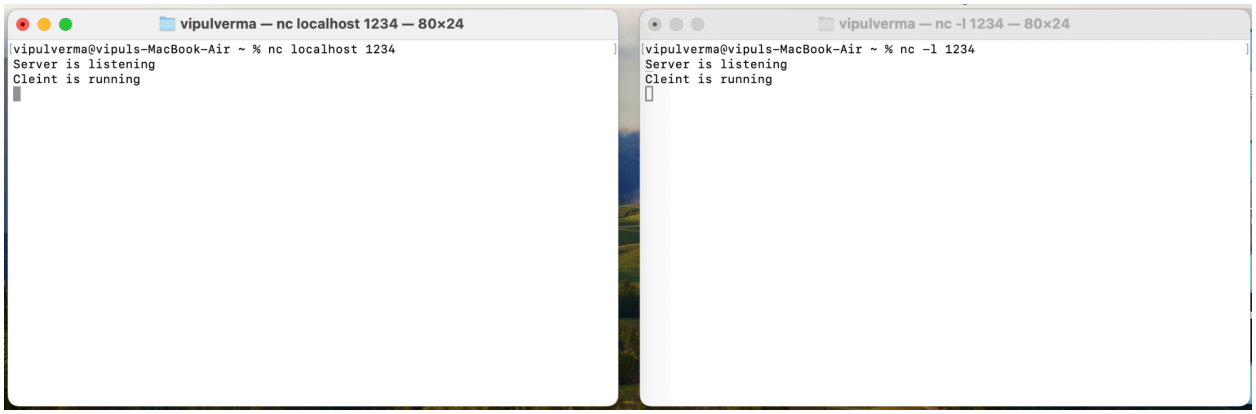
Revert ip address is showing here :

```
[vipulverma@vipuls-MacBook-Air ~ % ifconfig en0 192.168.53.48
 ifconfig: ioctl (SIOCDIFADDR): permission denied
[vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig en0 192.168.53.49
[Password:
[vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
 en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.43.46 netmask 0xfffffe000 broadcast 192.168.63.255
        inet 192.168.53.49 netmask 0xffffff00 broadcast 192.168.53.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
[vipulverma@vipuls-MacBook-Air ~ % ip addr show
 zsh: command not found: ip
[vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig en0 192.168.43.46
[vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
 en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.53.49 netmask 0xffffff00 broadcast 192.168.53.255
        inet 192.168.43.46 netmask 0xffffff00 broadcast 192.168.43.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
```

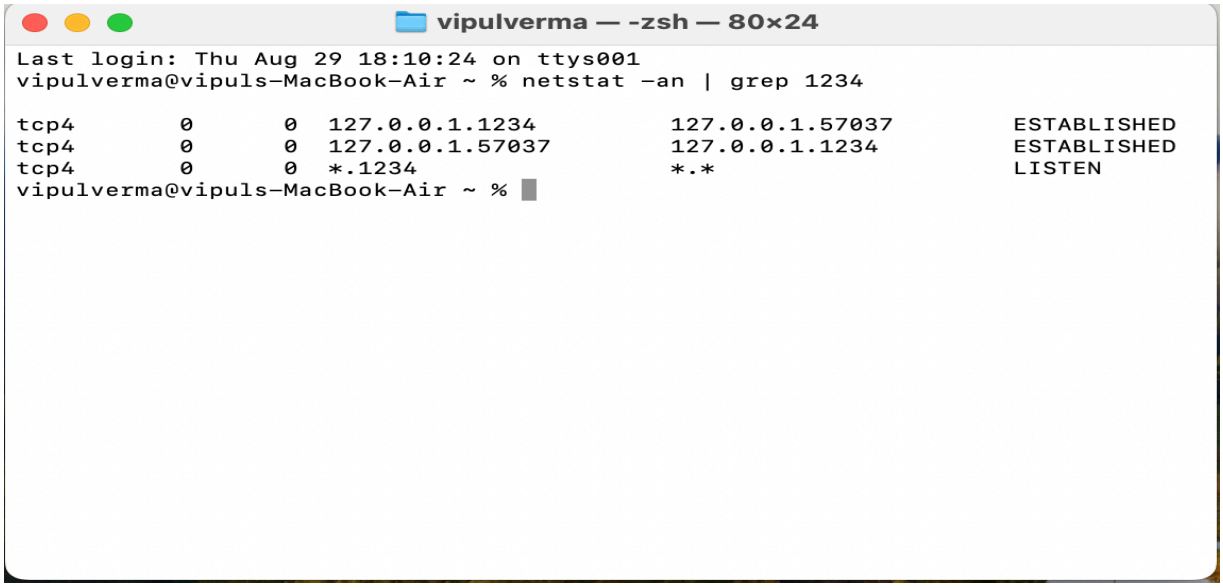
```
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet 192.168.34.45 netmask 0xffffe000 broadcast 192.168.63.255
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopei
        inet 192.168.43.46 netmask 0xffffe000 broadcast 192.168.63.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
```

Question_3:

a) There are two terminals, one running the server and the other running the client. The server terminal uses the command **nc -l 1234**, where **1234** is the port number, to listen for incoming connections. The client terminal connects to the server by executing **nc localhost 1234.**



Once the connection is established, it can see that the connection between these two terminals is successfully established.



b) Tcp4 0 0 127.0.0.1.57037 127.0.0.1.1234 ESTABLISHED

- This is the reverse of the first line:
  - 127.0.0.1.57037: Local address of the client.
  - 127.0.0.1.1234: Remote address of the server.
  - ESTABLISHED: Confirms that the client is also actively communicating with the server.

Question_4:

a)Authoritative result for “google.in” using nslookup.

```
vipulverma@vipuls-MacBook-Air ~ % nslookup
> set type=ns
> google.in
Server:         192.168.1.7
Address:        192.168.1.7#53

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

Authoritative answers can be found from:
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  has AAAA address 2001:4860:4802:38::a
ns3.google.com  internet address = 216.239.36.10
ns1.google.com  internet address = 216.239.32.10
ns2.google.com  internet address = 216.239.34.10
>
```

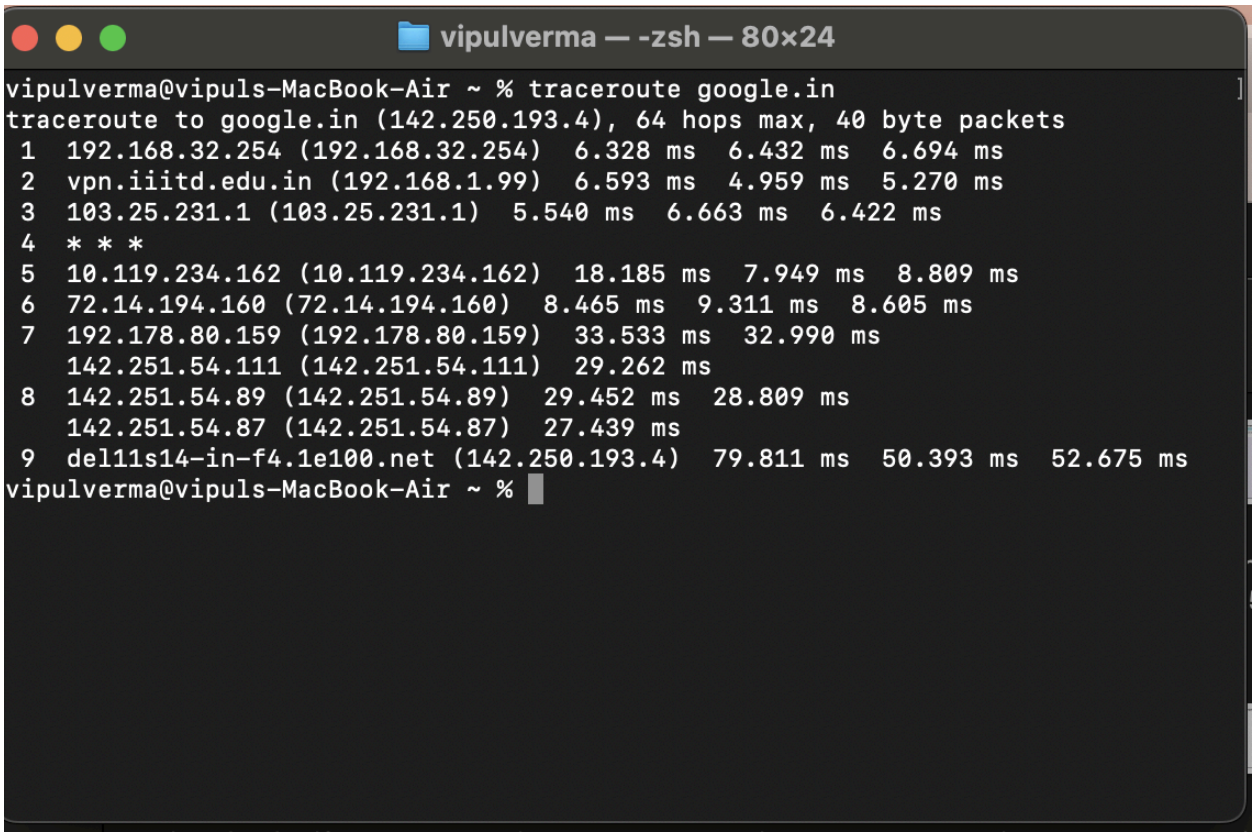
b)And time to live for any website on the local DNS.

```
vipulverma — -zsh — 80×24
------------
Non-authoritative answer:
Name:   google.com
Address: 142.250.206.174

vipulverma@vipuls-MacBook-Air ~ % nslookup -debug google.in
Server:         192.168.1.7
Address:        192.168.1.7#53

------------
    QUESTIONS:
        google.in, type = A, class = IN
    ANSWERS:
    ->  google.in
        internet address = 142.250.193.4
        ttl = 290
    AUTHORITY RECORDS:
    ADDITIONAL RECORDS:
------------
Non-authoritative answer:
Name:   google.in
Address: 142.250.193.4

vipulverma@vipuls-MacBook-Air ~ %
```

TTL (Time to Live): We can find in the ANSWER SECTION of output, showing how long the DNS record is cached.
Expiration Time: TTL value of 290 means the record is valid for 290 seconds before needing a refresh.

Question_5:

a)



Here, there are eight intermediate hosts in the traceroute output.

Average latency for each intermediate host:

1. **192.168.32.254**: (6.328 + 6.432 + 6.694) / 3 = 6.485 ms
2. **192.168.1.99**: (6.593 + 4.959 + 5.270) / 3 = 5.607 ms
3. **103.25.231.1**: (5.540 + 6.663 + 6.422) / 3 = 6.208 ms
4. **10.119.234.162**: (18.185 + 7.949 + 8.809) / 3 = 11.981 ms
5. **72.14.194.160**: (8.465 + 9.311 + 8.605) / 3 = 8.793 ms
6. **192.178.80.159** and **142.251.54.111**: Average of (33.533 + 32.990) / 2 = 33.262 ms and (29.262) = 29.262 ms
7. **142.251.54.89** and **142.251.54.87**: Average of (29.452 + 28.809) / 2 = 29.131 ms and (27.439) = 27.439 ms
8. **142.250.193.4**: (79.811 + 50.393 + 52.675) / 3 = 60.626 ms

b) **Average latency is 37.799ms.**

```
64 bytes from 142.250.193.4: icmp_seq=4 ttl=56 time=30.375 ms
64 bytes from 142.250.193.4: icmp_seq=5 ttl=56 time=30.472 ms
64 bytes from 142.250.193.4: icmp_seq=6 ttl=56 time=30.927 ms
64 bytes from 142.250.193.4: icmp_seq=7 ttl=56 time=29.969 ms
64 bytes from 142.250.193.4: icmp_seq=8 ttl=56 time=46.171 ms
64 bytes from 142.250.193.4: icmp_seq=9 ttl=56 time=31.659 ms
64 bytes from 142.250.193.4: icmp_seq=10 ttl=56 time=59.474 ms
64 bytes from 142.250.193.4: icmp_seq=11 ttl=56 time=32.202 ms
64 bytes from 142.250.193.4: icmp_seq=12 ttl=56 time=32.837 ms
64 bytes from 142.250.193.4: icmp_seq=13 ttl=56 time=36.703 ms
64 bytes from 142.250.193.4: icmp_seq=14 ttl=56 time=57.075 ms
64 bytes from 142.250.193.4: icmp_seq=15 ttl=56 time=53.935 ms
64 bytes from 142.250.193.4: icmp_seq=16 ttl=56 time=38.281 ms
64 bytes from 142.250.193.4: icmp_seq=17 ttl=56 time=33.112 ms
64 bytes from 142.250.193.4: icmp_seq=18 ttl=56 time=32.278 ms
64 bytes from 142.250.193.4: icmp_seq=19 ttl=56 time=37.468 ms
64 bytes from 142.250.193.4: icmp_seq=20 ttl=56 time=42.394 ms
64 bytes from 142.250.193.4: icmp_seq=21 ttl=56 time=40.104 ms
64 bytes from 142.250.193.4: icmp_seq=22 ttl=56 time=33.727 ms
64 bytes from 142.250.193.4: icmp_seq=23 ttl=56 time=33.145 ms
64 bytes from 142.250.193.4: icmp_seq=24 ttl=56 time=39.655 ms
64 bytes from 142.250.193.4: icmp_seq=25 ttl=56 time=43.301 ms
64 bytes from 142.250.193.4: icmp_seq=26 ttl=56 time=38.621 ms
64 bytes from 142.250.193.4: icmp_seq=27 ttl=56 time=32.258 ms
64 bytes from 142.250.193.4: icmp_seq=28 ttl=56 time=33.020 ms
64 bytes from 142.250.193.4: icmp_seq=29 ttl=56 time=30.337 ms
64 bytes from 142.250.193.4: icmp_seq=30 ttl=56 time=53.577 ms
64 bytes from 142.250.193.4: icmp_seq=31 ttl=56 time=39.548 ms
64 bytes from 142.250.193.4: icmp_seq=32 ttl=56 time=34.981 ms
64 bytes from 142.250.193.4: icmp_seq=33 ttl=56 time=34.405 ms
64 bytes from 142.250.193.4: icmp_seq=34 ttl=56 time=70.276 ms
64 bytes from 142.250.193.4: icmp_seq=35 ttl=56 time=48.821 ms
64 bytes from 142.250.193.4: icmp_seq=36 ttl=56 time=39.740 ms
64 bytes from 142.250.193.4: icmp_seq=37 ttl=56 time=30.444 ms
64 bytes from 142.250.193.4: icmp_seq=38 ttl=56 time=31.706 ms
64 bytes from 142.250.193.4: icmp_seq=39 ttl=56 time=38.604 ms
64 bytes from 142.250.193.4: icmp_seq=40 ttl=56 time=33.984 ms
64 bytes from 142.250.193.4: icmp_seq=41 ttl=56 time=30.933 ms
64 bytes from 142.250.193.4: icmp_seq=42 ttl=56 time=38.001 ms
64 bytes from 142.250.193.4: icmp_seq=43 ttl=56 time=33.453 ms
64 bytes from 142.250.193.4: icmp_seq=44 ttl=56 time=38.716 ms
64 bytes from 142.250.193.4: icmp_seq=45 ttl=56 time=39.432 ms
64 bytes from 142.250.193.4: icmp_seq=46 ttl=56 time=31.180 ms
64 bytes from 142.250.193.4: icmp_seq=47 ttl=56 time=39.008 ms
64 bytes from 142.250.193.4: icmp_seq=48 ttl=56 time=31.334 ms
64 bytes from 142.250.193.4: icmp_seq=49 ttl=56 time=34.489 ms

--- google.in ping statistics ---
50 packets transmitted, 50 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 29.969/37.799/70.276/8.414 ms
vipulverma@vipuls-MacBook-Air ~ %
```

c)

Total latency of all intermediate hosts:

6.485 + 5.607 + 6.208 + 11.648 + 8.794 + 33.262 + 29.262 + 29.131 + 27.439 = 157.836 ms

And average latency as shown above is 37.799 which is different from total latency of intermediate hosts.

Reason: The total latency of intermediate hops is not directly additive to the final average latency. Latencies can vary due to network conditions, routing changes, and congestion.

d)

Maximum latency among the intermediate hosts is **60.626 ms** (from 142.250.193.4).It is different with the average latency because latency values for individual hops, each representing the round-trip time between the machine and that specific hop.The latency measured by ping represents the end-to-end round-trip time to the final destination(google.in).

e)

When we see multiple entries for a single hop while using the traceroute command, it usually means that the network path for that particular hop has multiple routes or paths, or there is load balancing taking place.

f)

```
vipulverma@vipuls-MacBook-Air ~ % ping -c 50 stanford.edu
PING stanford.edu (171.67.215.200): 56 data bytes
64 bytes from 171.67.215.200: icmp_seq=0 ttl=242 time=359.476 ms
64 bytes from 171.67.215.200: icmp_seq=1 ttl=242 time=321.614 ms
64 bytes from 171.67.215.200: icmp_seq=2 ttl=242 time=397.882 ms
64 bytes from 171.67.215.200: icmp_seq=3 ttl=242 time=295.757 ms
64 bytes from 171.67.215.200: icmp_seq=4 ttl=242 time=420.772 ms
64 bytes from 171.67.215.200: icmp_seq=5 ttl=242 time=336.795 ms
64 bytes from 171.67.215.200: icmp_seq=6 ttl=242 time=367.552 ms
64 bytes from 171.67.215.200: icmp_seq=7 ttl=242 time=384.502 ms
64 bytes from 171.67.215.200: icmp_seq=8 ttl=242 time=422.948 ms
64 bytes from 171.67.215.200: icmp_seq=9 ttl=242 time=309.049 ms
64 bytes from 171.67.215.200: icmp_seq=10 ttl=242 time=336.507 ms
64 bytes from 171.67.215.200: icmp_seq=11 ttl=242 time=352.901 ms
64 bytes from 171.67.215.200: icmp_seq=12 ttl=242 time=377.065 ms
64 bytes from 171.67.215.200: icmp_seq=13 ttl=242 time=309.953 ms
64 bytes from 171.67.215.200: icmp_seq=14 ttl=242 time=328.368 ms
64 bytes from 171.67.215.200: icmp_seq=15 ttl=242 time=331.465 ms
64 bytes from 171.67.215.200: icmp_seq=16 ttl=242 time=349.566 ms
64 bytes from 171.67.215.200: icmp_seq=17 ttl=242 time=496.700 ms
64 bytes from 171.67.215.200: icmp_seq=18 ttl=242 time=388.381 ms
64 bytes from 171.67.215.200: icmp_seq=19 ttl=242 time=398.893 ms
64 bytes from 171.67.215.200: icmp_seq=20 ttl=242 time=330.544 ms
64 bytes from 171.67.215.200: icmp_seq=21 ttl=242 time=333.838 ms
64 bytes from 171.67.215.200: icmp_seq=22 ttl=242 time=290.464 ms
64 bytes from 171.67.215.200: icmp_seq=23 ttl=242 time=298.081 ms
64 bytes from 171.67.215.200: icmp_seq=24 ttl=242 time=393.842 ms
64 bytes from 171.67.215.200: icmp_seq=25 ttl=242 time=423.969 ms
64 bytes from 171.67.215.200: icmp_seq=26 ttl=242 time=312.612 ms
64 bytes from 171.67.215.200: icmp_seq=27 ttl=242 time=290.287 ms
64 bytes from 171.67.215.200: icmp_seq=28 ttl=242 time=388.743 ms
64 bytes from 171.67.215.200: icmp_seq=29 ttl=242 time=396.001 ms
64 bytes from 171.67.215.200: icmp_seq=30 ttl=242 time=333.112 ms
64 bytes from 171.67.215.200: icmp_seq=31 ttl=242 time=330.756 ms
64 bytes from 171.67.215.200: icmp_seq=32 ttl=242 time=298.320 ms
64 bytes from 171.67.215.200: icmp_seq=33 ttl=242 time=296.678 ms
64 bytes from 171.67.215.200: icmp_seq=34 ttl=242 time=393.156 ms
64 bytes from 171.67.215.200: icmp_seq=35 ttl=242 time=308.987 ms
64 bytes from 171.67.215.200: icmp_seq=36 ttl=242 time=332.010 ms
64 bytes from 171.67.215.200: icmp_seq=37 ttl=242 time=345.895 ms
64 bytes from 171.67.215.200: icmp_seq=38 ttl=242 time=368.338 ms
64 bytes from 171.67.215.200: icmp_seq=39 ttl=242 time=295.707 ms
64 bytes from 171.67.215.200: icmp_seq=40 ttl=242 time=400.662 ms
64 bytes from 171.67.215.200: icmp_seq=41 ttl=242 time=290.233 ms
64 bytes from 171.67.215.200: icmp_seq=42 ttl=242 time=352.681 ms
64 bytes from 171.67.215.200: icmp_seq=43 ttl=242 time=371.442 ms
64 bytes from 171.67.215.200: icmp_seq=44 ttl=242 time=400.197 ms
64 bytes from 171.67.215.200: icmp_seq=45 ttl=242 time=312.591 ms
64 bytes from 171.67.215.200: icmp_seq=46 ttl=242 time=294.397 ms
64 bytes from 171.67.215.200: icmp_seq=47 ttl=242 time=358.638 ms
64 bytes from 171.67.215.200: icmp_seq=48 ttl=242 time=298.128 ms
64 bytes from 171.67.215.200: icmp_seq=49 ttl=242 time=292.778 ms

--- stanford.edu ping statistics ---
50 packets transmitted, 50 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 290.233/348.385/496.700/45.662 ms
vipulverma@vipuls-MacBook-Air ~ %
```

Average latency is 348.385ms.

g)

```
[vipulverma@vipuls-MacBook-Air ~ % traceroute stanford.edu
 traceroute to stanford.edu (171.67.215.200), 64 hops max, 40 byte packets
  1  192.168.32.254 (192.168.32.254)  37.751 ms  25.906 ms  30.075 ms
  2  auth.iiitd.edu.in (192.168.1.99)  5.327 ms  4.686 ms  4.836 ms
  3  103.25.231.1 (103.25.231.1)  5.342 ms  5.289 ms  9.144 ms
  4  10.1.209.201 (10.1.209.201)  33.391 ms  30.884 ms  35.504 ms
  5  10.1.200.137 (10.1.200.137)  36.957 ms  37.865 ms  37.852 ms
  6  10.255.238.122 (10.255.238.122)  35.905 ms
     10.255.238.254 (10.255.238.254)  28.974 ms  30.218 ms
  7  180.149.48.18 (180.149.48.18)  29.352 ms  28.606 ms  29.413 ms
  8  * * *
  9  * * *
 10  * * *
 11  * * *
 12  * * *
 13  * * *
 14  * * *
 15  * * *
 16  * * *
 17  * * *
 18  * * *
 19  * * *
 20  * * *
 21  * * *
 22  * * *
 23  campus-ial-nets-a-vl1020.sunet (171.64.255.232)  346.289 ms
     campus-east-rtr-vl1120.sunet (171.66.255.232)  406.151 ms *
 24  campus-east-rtr-vl1120.sunet (171.66.255.232)  434.219 ms  351.754 ms
     campus-nw-rtr-vl1004.sunet (171.64.255.200)  350.183 ms
 25  web.stanford.edu (171.67.215.200)  346.763 ms  342.446 ms  352.253 ms
 vipulverma@vipuls-MacBook-Air ~ %
```

Here, there are ten intermediate exclude the source destination and hidden links hosts in the traceroute output of stanford.edu whereas in google.in there were eight intermediate hosts in the traceroute output.

h) Reason for the latency difference between google.in and stanford.edu:

1) Geographical Distance
2) Network Routing
3) Server Load and Response Time.

Question_6)

```
vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.53.49 netmask 0xffffff00 broadcast 192.168.53.255
        inet 192.168.43.46 netmask 0xffffff00 broadcast 192.168.43.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig lo0 down

vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.53.49 netmask 0xffffff00 broadcast 192.168.53.255
        inet 192.168.43.46 netmask 0xffffff00 broadcast 192.168.43.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
vipulverma@vipuls-MacBook-Air ~ % sudo ifconfig lo0 down

vipulverma@vipuls-MacBook-Air ~ % ifconfig en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether a4:c6:f0:07:2b:69
        inet6 fe80::1065:7f0e:86be:f87e%en0 prefixlen 64 secured scopeid 0xc
        inet 192.168.53.49 netmask 0xffffff00 broadcast 192.168.53.255
        inet 192.168.43.46 netmask 0xffffff00 broadcast 192.168.43.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
vipulverma@vipuls-MacBook-Air ~ % ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1): 56 data bytes
ping: sendto: Can't assign requested address
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 0
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 1
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 2
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 3
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 4
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 5
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 6
ping: sendto: Can't assign requested address
Request timeout for icmp_seq 7
^C
--- 127.0.0.1 ping statistics ---
9 packets transmitted, 0 packets received, 100.0% packet loss
vipulverma@vipuls-MacBook-Air ~ %
```

Explanation:

Loopback Interface (**`lo0`**) is used for network communication within the same host. Disabling it means the system can no longer communicate with itself via the loopback address 127.0.0.1.Since the loopback interface is down, the system cannot route packets to 127.0.0.1, leading to the error ping: sendto: Can't assign requested address and 100% packet loss.