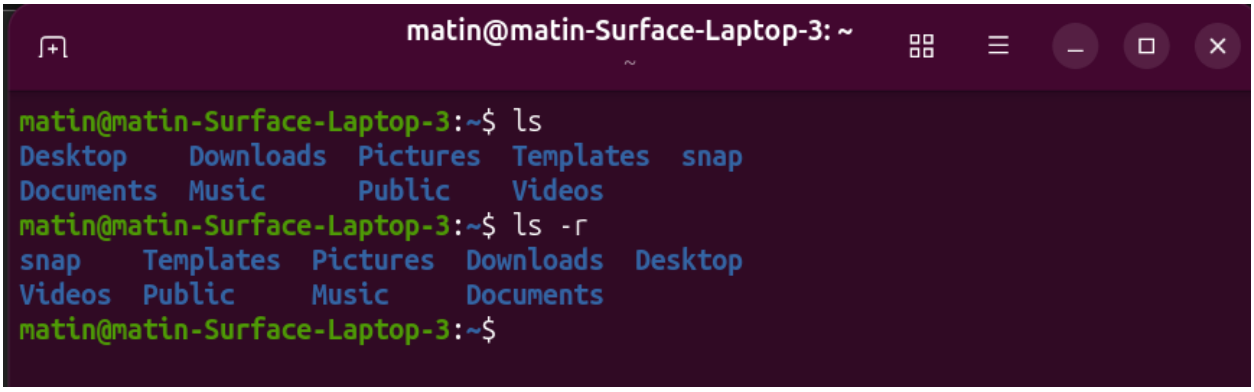
Linux Terminal Questions

1.How to list files in reverse order?



2.How to list files in latest modified order?

3.How to list files in latest modified order?

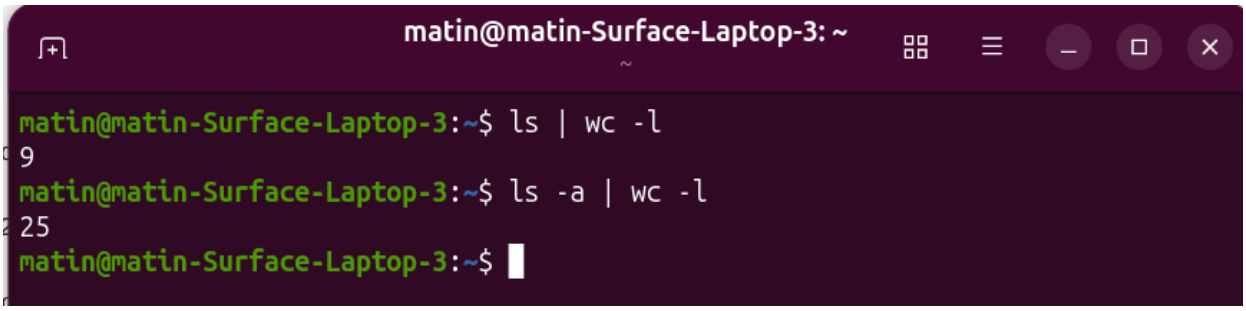
For hiding files and directories we should put a dot (.) at the beginning of the file name and directory in case that linux recognize it as a hidden file.

For creating a hidden file we use “Touch” command as we want to create a new file but this time for naming we put dot at the beginning of the file name

For changing a file to a hidden file we just rename it with “mv” command in case that we put a dot at the beginning of the file name

For showing all files including hidden ones we use ls –a means listing all

4. How do we show the number of files inside a directory?



Ls as we used before is for showing all the files and folders in this directory. “ | ” character is used for getting one command output and giving it to the next one. “wc” is shortened of word count and “-l” means counting the lines because each file name is in one line. We can use ls –a to count all the files including hidden ones.

5. Pipe and combination with grep

As I said in the last question Pipe is a command used in a sequence of commands (pipeline) and when you want to give the output of one command to the input of next command.

Grep is used for search (regexish) and finds the lines that have specific words or patterns

For example :

grep + word + file

(finding the lines that have that word in that file)

Ls | grep txt

(in the list of files show me the ones that have txt)

6.Sudo explanation

Sudo stand for Super User Do.

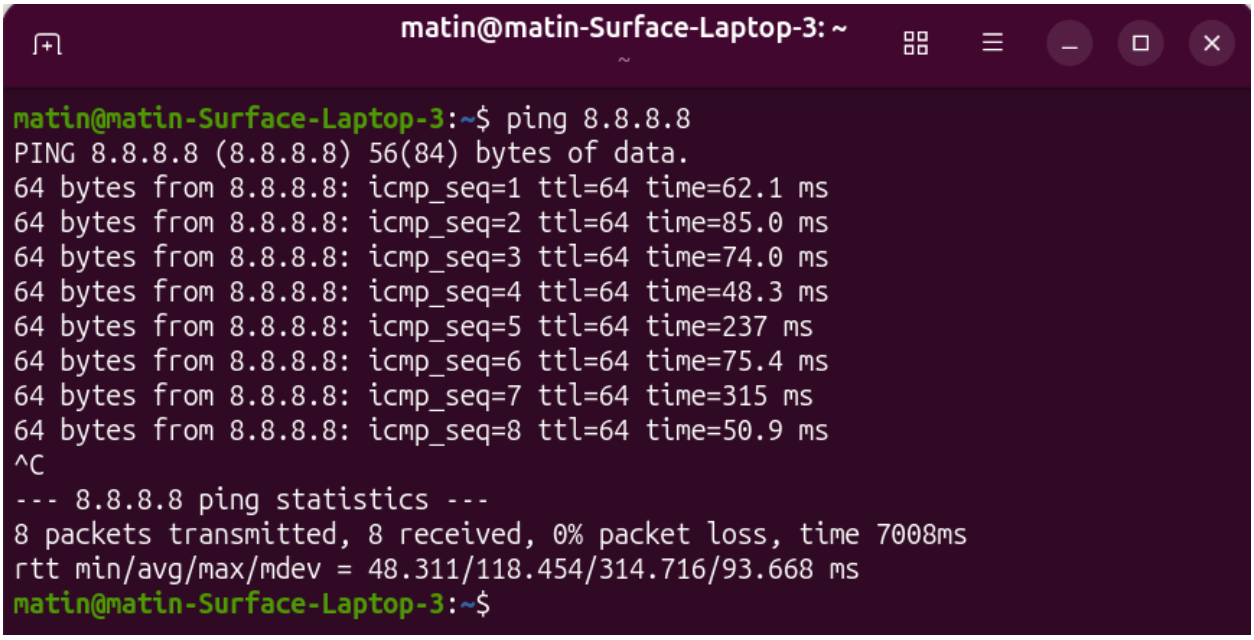
Linux protection doesn’t allow normal users do dangerous tasks like installing apps or deleting them or updating system and etc and for these kind of tasks requires special permission which is sudo that access to the root user which has full power. Sudo gives the root power for the command you enter after that. When you run a sudo command, Linux asks for your

password and If password is correct, you get temporary admin power. Linux runs only that ONE command as root. After a few minutes the permission expires and this protects your system.

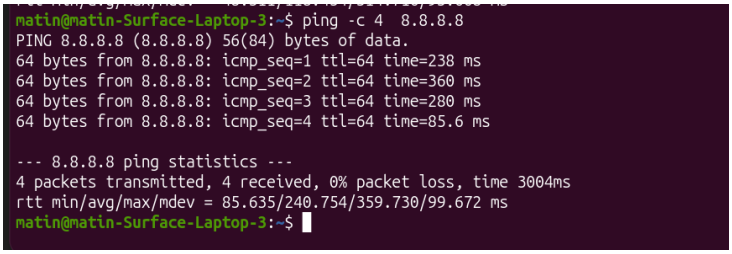
Network Questions

1.ping

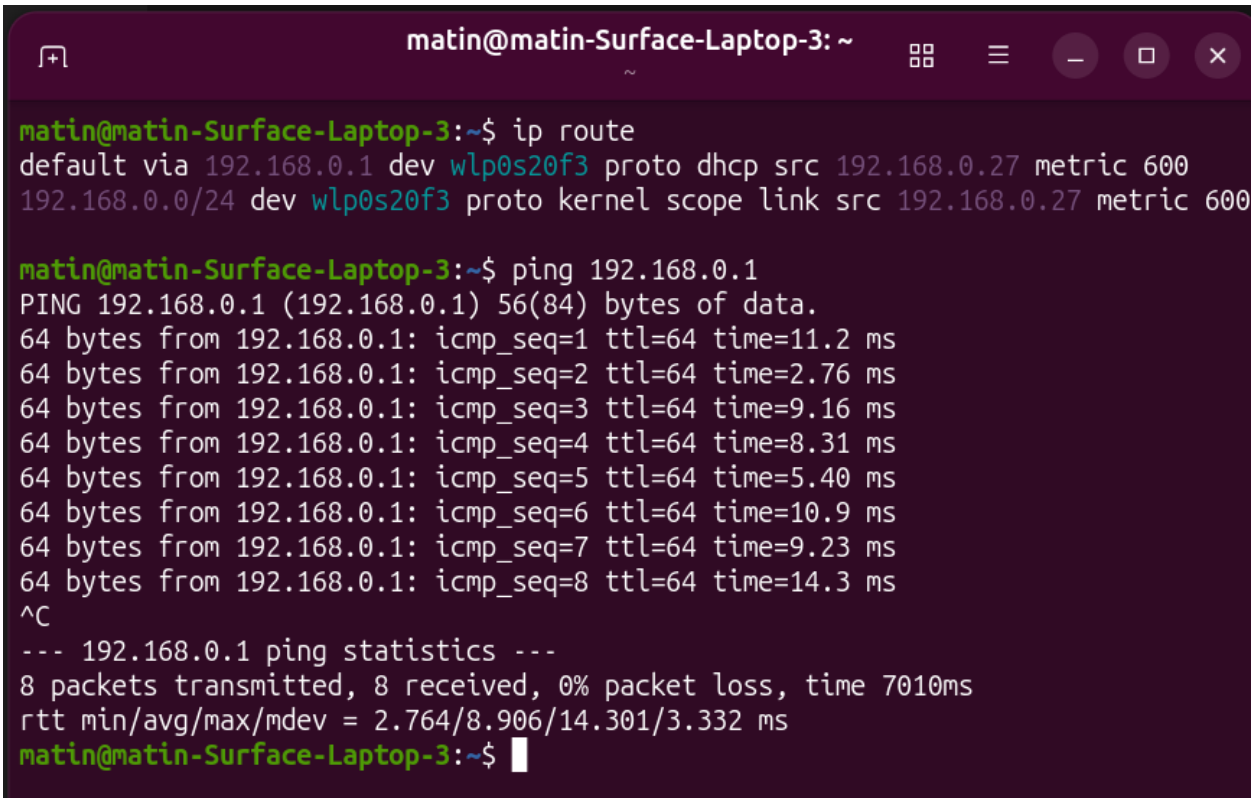
c)



b) 4 packets only



a)

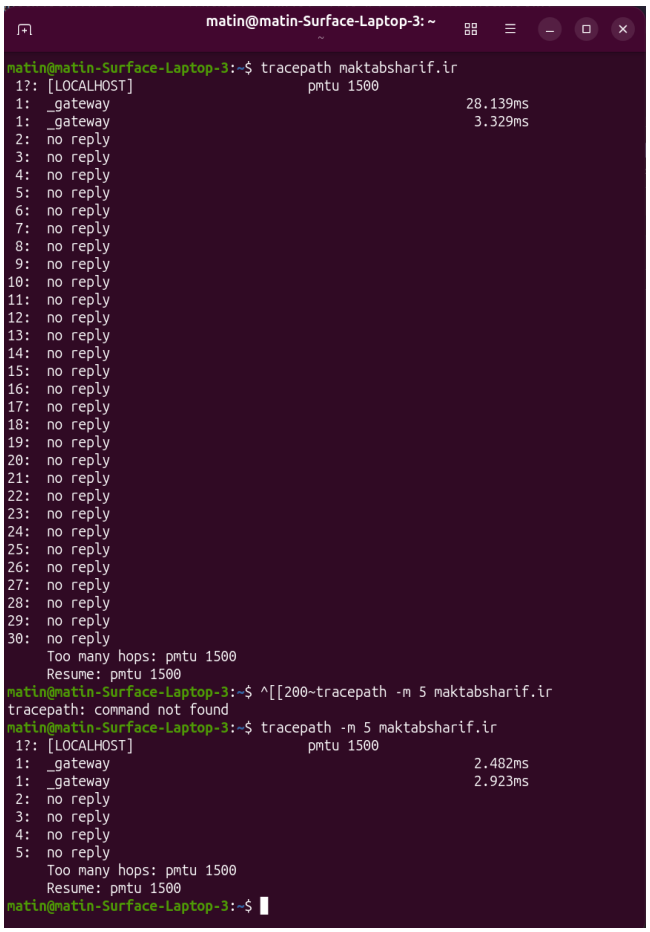

matin@matin-Surface-Laptop-3: ~
matin@matin-Surface-Laptop-3:~$ ip route
default via 192.168.0.1 dev wlp0s20f3 proto dhcp src 192.168.0.27 metric 600
192.168.0.0/24 dev wlp0s20f3 proto kernel scope link src 192.168.0.27 metric 600
matin@matin-Surface-Laptop-3:~$ ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=11.2 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=64 time=2.76 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=64 time=9.16 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=64 time=8.31 ms
64 bytes from 192.168.0.1: icmp_seq=5 ttl=64 time=5.40 ms
64 bytes from 192.168.0.1: icmp_seq=6 ttl=64 time=10.9 ms
64 bytes from 192.168.0.1: icmp_seq=7 ttl=64 time=9.23 ms
64 bytes from 192.168.0.1: icmp_seq=8 ttl=64 time=14.3 ms
^C
--- 192.168.0.1 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7010ms
rtt min/avg/max/mdev = 2.764/8.906/14.301/3.332 ms
matin@matin-Surface-Laptop-3:~$

2.Traceroute / Tracepath

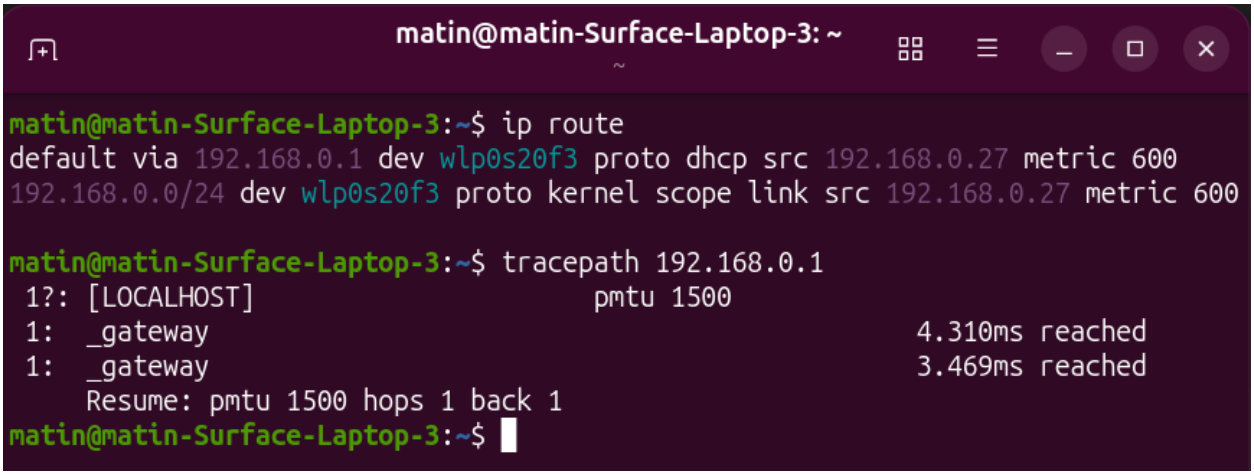
When you open a website, your data doesn't go straight there.

It goes through many routers on the way. Traceroute shows Every router (hop) your packet passes, their IP addresses, how long each hop takes. So instead of telling you *"connected"*, it shows the full path the packet travels.

A, b)

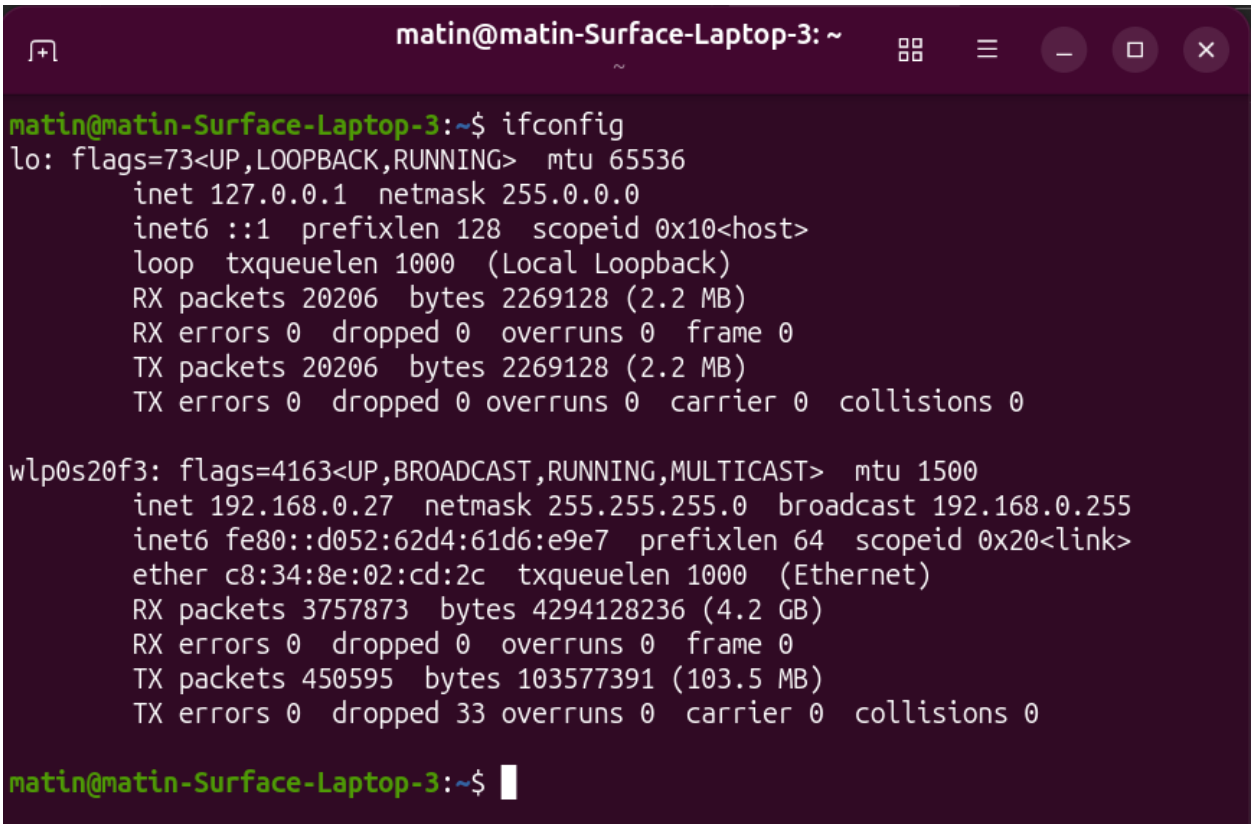

matin@matin-Surface-Laptop-3: ~
matin@matin-Surface-Laptop-3:~$ tracepath maktabsharif.ir
 1?: [LOCALHOST]   pmtu 1500
 1: _gateway   28.139ms
 1: _gateway   3.329ms
 2: no reply
 3: no reply
 4: no reply
 5: no reply
 6: no reply
 7: no reply
 8: no reply
 9: no reply
10: no reply
11: no reply
12: no reply
13: no reply
14: no reply
15: no reply
16: no reply
17: no reply
18: no reply
19: no reply
20: no reply
21: no reply
22: no reply
23: no reply
24: no reply
25: no reply
26: no reply
27: no reply
28: no reply
29: no reply
30: no reply
     Too many hops: pmtu 1500
     Resume: pmtu 1500
matin@matin-Surface-Laptop-3:~$ ^[[200~tracepath -m 5 maktabsharif.ir
tracepath: command not found
matin@matin-Surface-Laptop-3:~$ tracepath -m 5 maktabsharif.ir
 1?: [LOCALHOST]   pmtu 1500
 1: _gateway   2.482ms
 1: _gateway   2.923ms
 2: no reply
 3: no reply
 4: no reply
 5: no reply
     Too many hops: pmtu 1500
     Resume: pmtu 1500
matin@matin-Surface-Laptop-3:~$

c)



3.Ipconfig / Ifconfig

a)



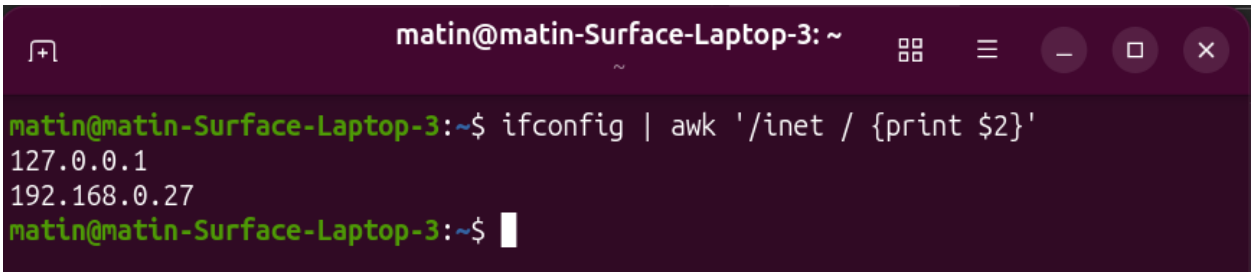
IP Address: 192.168.0.27

Subnet Mask: 255.255.255.0

Broadcast Address: 192.168.0.255

Ip route : Default Gateway: 192.168.0.1

b)


matin@matin-Surface-Laptop-3: ~
matin@matin-Surface-Laptop-3:~$ ifconfig | awk '/inet / {print $2}'
127.0.0.1
192.168.0.27
matin@matin-Surface-Laptop-3:~$

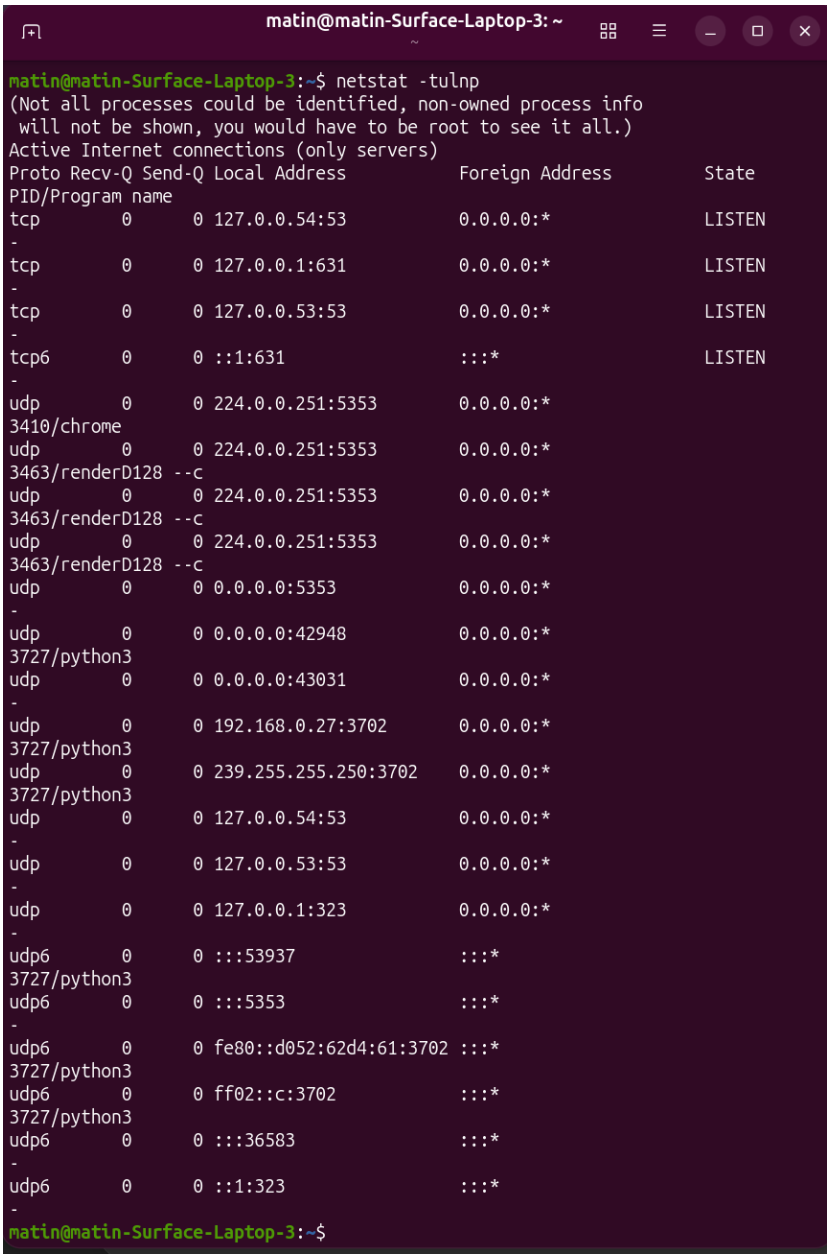
c)

```
matin@matin-Surface-Laptop-3:~$ ifconfig | awk '/inet / {print $2}'
127.0.0.1
192.168.0.27
matin@matin-Surface-Laptop-3:~$ sudo dhclient -r
[sudo: authenticate] Password:
sudo-rs: 'dhclient': command not found
matin@matin-Surface-Laptop-3:~$ sudo apt install isc-dhcp-client
The following package was automatically installed and is no longer required:
  grub-pc-bin
Use 'sudo apt autoremove' to remove it.

Installing:
  isc-dhcp-client

Installing dependencies:
  isc-dhcp-common

Suggested packages:
  avahi-autoipd  isc-dhcp-client-ddns

Summary:
  Upgrading: 0, Installing: 2, Removing: 0, Not Upgrading: 2
  Download size: 375 kB
  Space needed: 1,011 kB / 33.1 GB available

Continue? [Y/n]
Get:1 http://archive.ubuntu.com/ubuntu questing/universe amd64 isc-dhcp-client a
md64 4.4.3-P1-4ubuntu2 [329 kB]
Get:2 http://archive.ubuntu.com/ubuntu questing/universe amd64 isc-dhcp-common a
md64 4.4.3-P1-4ubuntu2 [45.8 kB]
Fetched 375 kB in 2s (160 kB/s)
Selecting previously unselected package isc-dhcp-client.
(Reading database ... 198893 files and directories currently installed.)
Preparing to unpack .../isc-dhcp-client_4.4.3-P1-4ubuntu2_amd64.deb ...
Unpacking isc-dhcp-client (4.4.3-P1-4ubuntu2) ...
Selecting previously unselected package isc-dhcp-common.
Preparing to unpack .../isc-dhcp-common_4.4.3-P1-4ubuntu2_amd64.deb ...
Unpacking isc-dhcp-common (4.4.3-P1-4ubuntu2) ...
Setting up isc-dhcp-client (4.4.3-P1-4ubuntu2) ...
Setting up isc-dhcp-common (4.4.3-P1-4ubuntu2) ...
Processing triggers for man-db (2.13.1-1) ...
matin@matin-Surface-Laptop-3:~$ sudo dhclient -r
matin@matin-Surface-Laptop-3:~$ ifconfig | awk '/inet / {print $2}'
127.0.0.1
```

```
matin@matin-Surface-Laptop-3:~$ sudo nmcli device disconnect wlp0s20f3
Device 'wlp0s20f3' successfully disconnected.
matin@matin-Surface-Laptop-3:~$ ifconfig wlp0s20f3
wlp0s20f3: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether c8:34:8e:02:cd:2c  txqueuelen 1000  (Ethernet)
        RX packets 3785097  bytes 4312856962 (4.3 GB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 469662  bytes 112644342 (112.6 MB)
        TX errors 0  dropped 42 overruns 0  carrier 0  collisions 0

matin@matin-Surface-Laptop-3:~$ sudo nmcli device connect wlp0s20f3
Device 'wlp0s20f3' successfully activated with '9e6a4ae7-2fbe-40f0-95a5-4de3d738
be15'.
matin@matin-Surface-Laptop-3:~$ ifconfig wlp0s20f3 | grep 'inet '
        inet 192.168.0.27  netmask 255.255.255.0  broadcast 192.168.0.255
matin@matin-Surface-Laptop-3:~$
```

4.Netstat

a)


matin@matin-Surface-Laptop-3: ~
matin@matin-Surface-Laptop-3:~$ netstat -tulnp
(Not all processes could be identified, non-owned process info
will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
PID/Program name
tcp 0 0 127.0.0.54:53 0.0.0.0:* LISTEN
-
tcp 0 0 127.0.0.1:631 0.0.0.0:* LISTEN
-
tcp 0 0 127.0.0.53:53 0.0.0.0:* LISTEN
-
tcp6 0 0 ::1:631 :::* LISTEN
-
udp 0 0 224.0.0.251:5353 0.0.0.0:*
3410/chrome
udp 0 0 224.0.0.251:5353 0.0.0.0:*
3463/renderD128 --c
udp 0 0 224.0.0.251:5353 0.0.0.0:*
3463/renderD128 --c
udp 0 0 224.0.0.251:5353 0.0.0.0:*
3463/renderD128 --c
udp 0 0 0.0.0.0:5353 0.0.0.0:*
-
udp 0 0 0.0.0.0:42948 0.0.0.0:*
3727/python3
udp 0 0 0.0.0.0:43031 0.0.0.0:*
-
udp 0 0 192.168.0.27:3702 0.0.0.0:*
3727/python3
udp 0 0 239.255.255.250:3702 0.0.0.0:*
3727/python3
udp 0 0 127.0.0.54:53 0.0.0.0:*
-
udp 0 0 127.0.0.53:53 0.0.0.0:*
-
udp 0 0 127.0.0.1:323 0.0.0.0:*
-
udp6 0 0 :::53937 :::*
3727/python3
udp6 0 0 :::5353 :::*
-
udp6 0 0 fe80::d052:62d4:61:3702 :::*
3727/python3
udp6 0 0 ff02::c:3702 :::*
3727/python3
udp6 0 0 :::36583 :::*
-
udp6 0 0 ::1:323 :::*
-
matin@matin-Surface-Laptop-3:~$

b)

```
matin@matin-Surface-Laptop-3:~$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 matin-Surface-Lap:42706 52.108.78.30:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:58838 fra24s08-in-f10.1:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:56968 sd-in-f95.1e100.n:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:56974 sd-in-f95.1e100.n:https ESTABLISHED
tcp        0     28 matin-Surface-Lap:58046 172.64.148.235:https    ESTABLISHED
tcp        0      0 matin-Surface-Lap:56466 wb-in-f84.1e100.n:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:48694 104.18.32.47:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:48706 104.18.32.47:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:48728 104.18.32.47:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:48742 104.18.32.47:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:56096 fra24s04-in-f14.1:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:33812 fra24s11-in-f10.1:https TIME_WAIT
tcp      130      0 matin-Surface-Lap:33828 fra24s11-in-f10.1:https CLOSE_WAIT
tcp        0      0 matin-Surface-Lap:58354 104.18.32.47:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:54752 fra24s11-in-f14.1:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:54760 fra24s11-in-f14.1:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:43220 a95-101-111-184.d:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:34716 104.18.35.23:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:36996 fra24s12-in-f3.1e:https TIME_WAIT
tcp        0      0 matin-Surface-Lap:45280 wo-in-f188.1e100.n:5228 ESTABLISHED
tcp        0      0 matin-Surface-Lap:45294 wo-in-f188.1e100.n:5228 ESTABLISHED
tcp        0      0 matin-Surface-Lap:45308 wo-in-f188.1e100.n:5228 ESTABLISHED
tcp        0      0 matin-Surface-Lap:46778 sm-in-f94.1e100.n:https ESTABLISHED
tcp       73      0 matin-Surface-Lap:46792 sm-in-f94.1e100.n:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:47090 android-87eeee2f02:8009 ESTABLISHED
tcp        0      0 matin-Surface-Lap:57184 fra16s52-in-f3.1e:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:57210 fra16s52-in-f3.1e:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:37252 server-18-239-36-:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:54210 darkbowser.canoni:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:34136 52.108.68.26:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:49392 ec2-52-57-79-4.eu:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:45864 52.108.8.12:https       ESTABLISHED
tcp        0      0 matin-Surface-Lap:47606 2.189.68.126:https      ESTABLISHED
tcp        0      0 matin-Surface-Lap:48078 52.108.44.3:https       ESTABLISHED
tcp        0      0 matin-Surface-Lap:56904 104.208.16.95:https     ESTABLISHED
tcp        0   4964 matin-Surface-Lap:37680 52.111.243.77:https     ESTABLISHED
tcp        0      0 matin-Surface-Lap:41388 server-13-35-182-:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:41404 server-13-35-182-:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:37084 sd-in-f95.1e100.n:https ESTABLISHED
tcp        0      0 matin-Surface-Lap:58916 dashboard.snapcra:https TIME_WAIT
tcp        0      0 matin-Surface-Lap:41910 172.64.155.209:https    ESTABLISHED
matin@matin-Surface-Laptop-3:~$
```

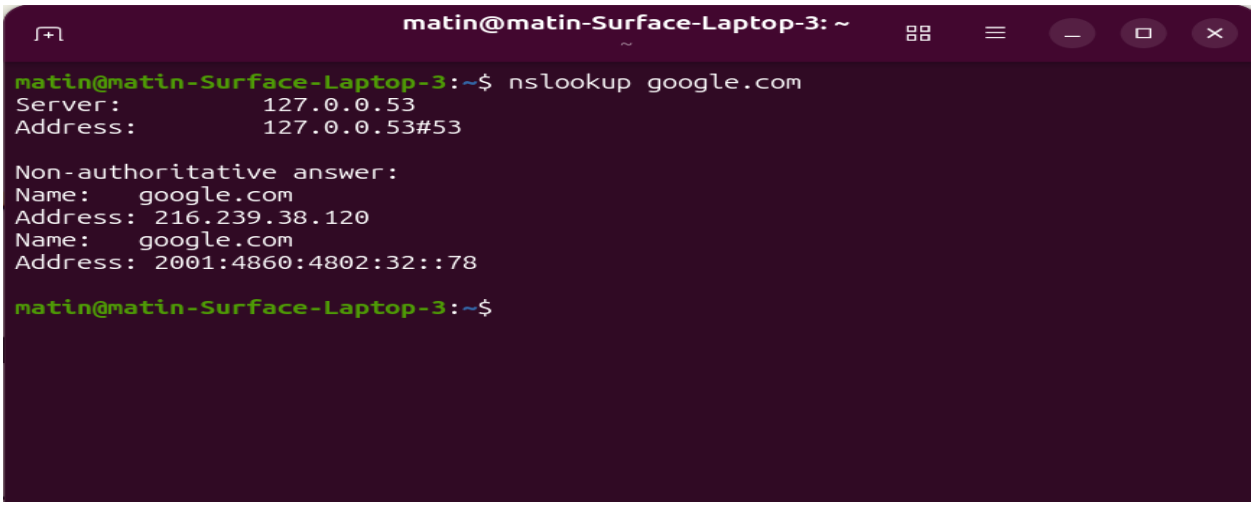
```
matin@matin-Surface-Laptop-3:~$ netstat -u
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 matin-Surface-La:bootpc _gateway:bootps         ESTABLISHED
matin@matin-Surface-Laptop-3:~$
```

c)

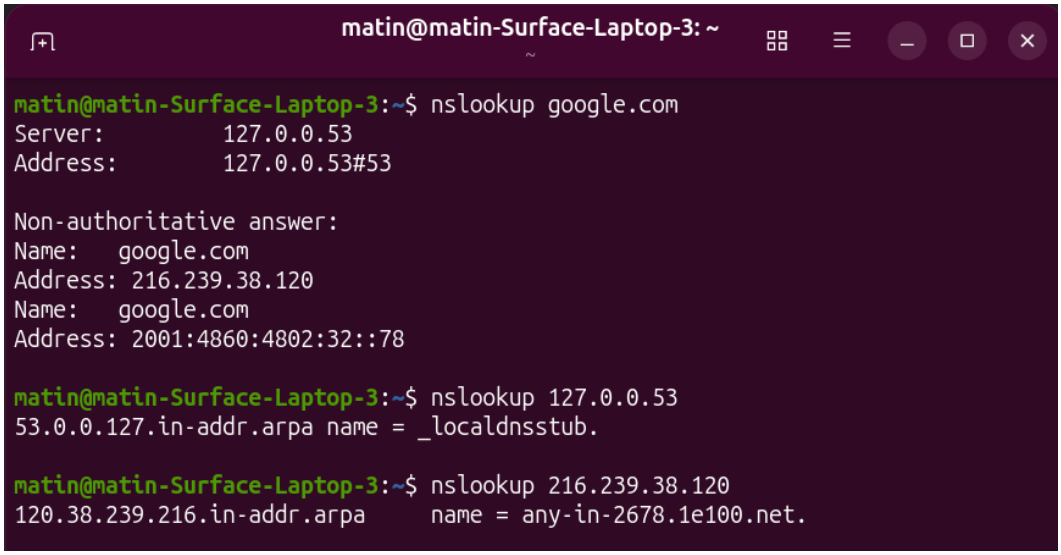
```
matin@matin-Surface-Laptop-3:~$ netstat -s
Ip:
    Forwarding: 2
    1957906 total packets received
    46 with invalid addresses
    0 forwarded
    0 incoming packets discarded
    1957846 incoming packets delivered
    502155 requests sent out
    1316 dropped because of missing route
    OutTransmits: 502155
Icmp:
    2199 ICMP messages received
    4 input ICMP message failed
    ICMP input histogram:
        destination unreachable: 2160
        timeout in transit: 19
        echo replies: 20
    2205 ICMP messages sent
    0 ICMP messages failed
    ICMP output histogram:
        destination unreachable: 2165
        echo requests: 40
IcmpMsg:
        InType0: 20
        InType3: 2160
        InType11: 19
        OutType3: 2165
        OutType8: 40
Tcp:
    4267 active connection openings
    0 passive connection openings
    170 failed connection attempts
    434 connection resets received
    30 connections established
    534499 segments received
    372321 segments sent out
    3955 segments retransmitted
    456 bad segments received
    1610 resets sent
Udp:
    1423867 packets received
    2134 packets to unknown port received
    0 packet receive errors
    147378 packets sent
    0 receive buffer errors
    0 send buffer errors
    IgnoredMulti: 1896
UdpLite:
TcpExt:
    2 ICMP packets dropped because they were out-of-window
    2219 TCP sockets finished time wait in fast timer
```

5. Nslookup

a)



b)



c)

6.HTTP

a)

Get is to get data from the server

Post send new data to the server

Put update existing data

Delete removes data

b)

C = Create ⟶ POST

R = Read ⟶ GET

U = Update ⟶ PUT

D = Delete ⟶ DELETE

GET /posts – returns a list of all blog posts (Read)

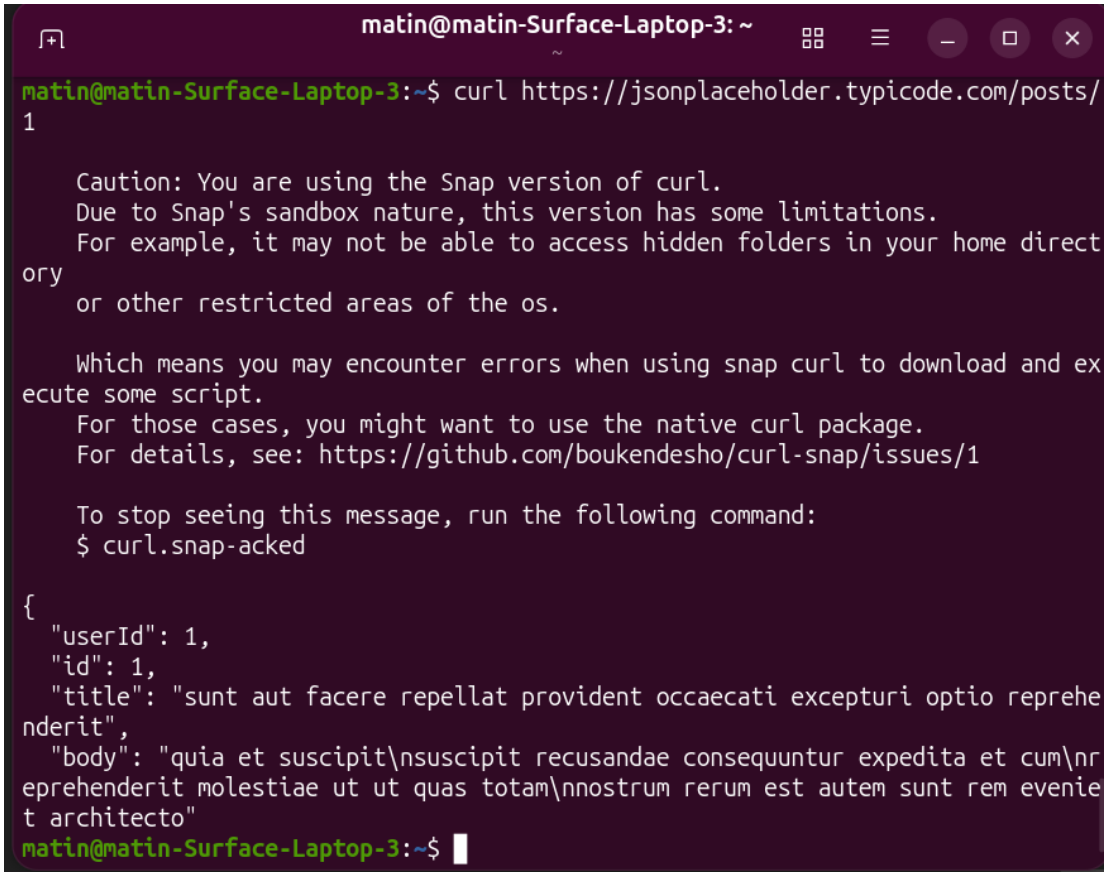
GET /posts/{id} – returns a single blog post by its id (Read)

POST /posts – creates a new blog post using the data sent in the request body (Create)

PUT /posts/{id} – updates an existing blog post with new data (Update)

DELETE /posts/{id} – deletes the blog post with the given id (Delete)

c)


matin@matin-Surface-Laptop-3: ~
matin@matin-Surface-Laptop-3:~$ curl https://jsonplaceholder.typicode.com/posts/1
Caution: You are using the Snap version of curl.
Due to Snap's sandbox nature, this version has some limitations.
For example, it may not be able to access hidden folders in your home directory
or other restricted areas of the os.
Which means you may encounter errors when using snap curl to download and execute some script.
For those cases, you might want to use the native curl package.
For details, see: https://github.com/boukendesho/curl-snap/issues/1
To stop seeing this message, run the following command:
$ curl.snap-acked
{
"userId": 1,
"id": 1,
"title": "sunt aut facere repellat provident occaecati excepturi optio reprehenderit",
"body": "quia et suscipit\nsuscipit recusandae consequuntur expedita et cum\nreprehenderit molestiae ut ut quas totam\nnostrum rerum est autem sunt rem evenient architecto"
matin@matin-Surface-Laptop-3:~$


matin@matin-Surface-Laptop-3:~$ curl -X POST https://jsonplaceholder.typicode.com/posts -d "title=hello"
Caution: You are using the Snap version of curl.
Due to Snap's sandbox nature, this version has some limitations.
For example, it may not be able to access hidden folders in your home directory
or other restricted areas of the os.
Which means you may encounter errors when using snap curl to download and execute some script.
For those cases, you might want to use the native curl package.
For details, see: https://github.com/boukendesho/curl-snap/issues/1
To stop seeing this message, run the following command:
$ curl.snap-acked
{
"title": "hello",
"id": 101
}matin@matin-Surface-Laptop-3:~$

```
}matin@matin-Surface-Laptop-3:~$curl -X PUT https://jsonplaceholder.typicode.com
/posts/1 -d "title=updated"

    Caution: You are using the Snap version of curl.
    Due to Snap's sandbox nature, this version has some limitations.
    For example, it may not be able to access hidden folders in your home direct
ory
    or other restricted areas of the os.

    Which means you may encounter errors when using snap curl to download and ex
ecute some script.
    For those cases, you might want to use the native curl package.
    For details, see: https://github.com/boukendesho/curl-snap/issues/1

    To stop seeing this message, run the following command:
    $ curl.snap-acked

{
  "title": "updated",
  "id": 1
}matin@matin-Surface-Laptop-3:~$
```

```
}matin@matin-Surface-Laptop-3:~$curl -X DELETE https://jsonplaceholder.typicode.
com/posts/11

    Caution: You are using the Snap version of curl.
    Due to Snap's sandbox nature, this version has some limitations.
    For example, it may not be able to access hidden folders in your home direct
ory
    or other restricted areas of the os.

    Which means you may encounter errors when using snap curl to download and ex
ecute some script.
    For those cases, you might want to use the native curl package.
    For details, see: https://github.com/boukendesho/curl-snap/issues/1

    To stop seeing this message, run the following command:
    $ curl.snap-acked

{}matin@matin-Surface-Laptop-3:~$
```

7.TCP/IP

a)

IP = the *address system* (city, street, house number)

TCP = the *delivery method* that makes sure the package arrives safely and in order

Ip:

Works at the addressing + routing level

Each device gets an IP address (like 192.168.1.10)

IP's job:

Decide where to send data (to which IP)

Decide how to route it through routers (path)

It does not guarantee safe delivery. Just tries to send.

TCP:

Works on top of IP

Its job:

Make sure data arrives without errors

Make sure data arrives in the correct order

Resend data if something is lost

It creates a connection between two devices (like a phone call)

So:

IP = where to send

TCP = how to send reliably

Together they form TCP/IP, the main protocol suite of the internet.

b)

The first 3 parts of ip is the network address and turn the last part to 0

Broadcast = last IP in that network (all hosts bits = 1)

(keep first 3 parts, last part becomes 255)

For example:

Network address: 192.168.1.0

Broadcast address: 192.168.1.255

Valid host range: 192.168.1.1 – 192.168.1.254

c)

Routers connect different networks together (e.g., home network to the Internet).Each router has at least two IP addresses, one for each network it connects. The router's LAN IP is usually the default gateway for devices (example: 192.168.1.1).

Switches connect multiple devices inside the same network. They do not change IP addresses and do not route between networks. All devices connected to a switch usually share the same network (same subnet). Each device in the network has its own unique IP address inside the subnet (e.g. 192.168.1.10). Devices talk to each other if they are in the same network/subnet. If a device wants to communicate outside its network, it sends data to the router's IP (gateway).

8.DNS

DNS = Domain Name System

It works like the phonebook of the Internet.

Humans use names like google.com

Computers need IP addresses like 142.250.190.78

DNS translates the name into the IP.

When you type google.com in your browser:

1. Your computer asks a DNS server:

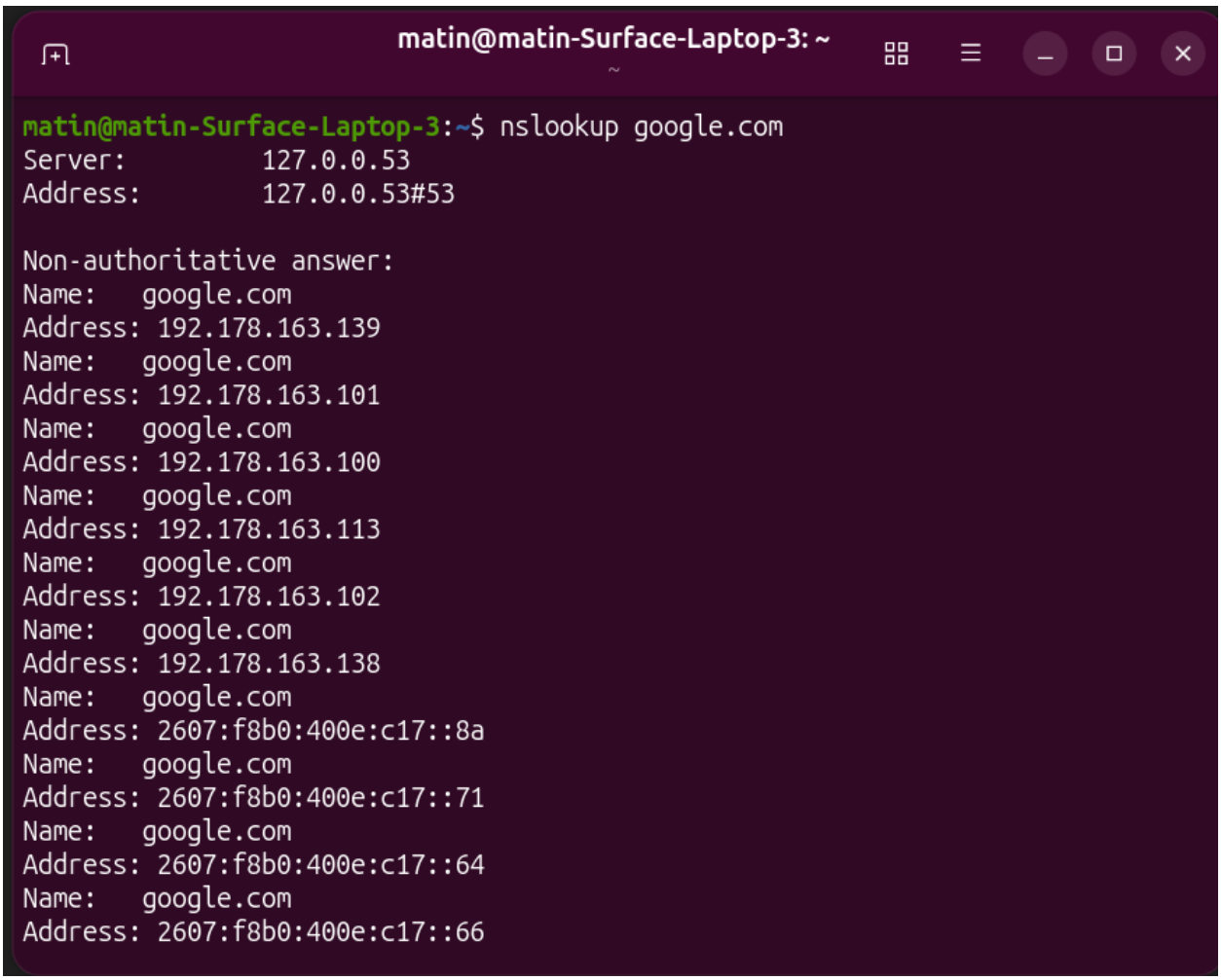
“What is the IP of google.com?”

2. DNS server looks it up

3. DNS server replies with the correct IP address

4. Your computer connects to that IP

b)



Server ⟶ the DNS server your computer asked

Name ⟶ the domain name

Address ⟶ the returned IP

Non-authoritative ⟶ this DNS server asked someone else

c)

sudo nano /etc/hosts

192.168.0.27 my-local-site.test

ping my-local-site.test