

# Linux Terminal Questions

## 1. How to list files in reverse order?

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ ls  
Desktop  Downloads  Pictures  Templates  snap  
Documents Music      Public    Videos  
matin@matin-Surface-Laptop-3:~$ ls -r  
snap  Templates  Pictures  Downloads  Desktop  
Videos Public    Music     Documents  
matin@matin-Surface-Laptop-3:~$
```

## 2. How to list files in latest modified order?

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ ls  
Desktop  Downloads  Pictures  Templates  snap  
Documents Music      Public    Videos  
matin@matin-Surface-Laptop-3:~$ ls -lt  
total 36  
drwxr-xr-x 2 matin matin 4096 Nov 20 02:51 Downloads  
drwxr-xr-x 3 matin matin 4096 Nov 19 12:11 Documents  
drwxr-xr-x 3 matin matin 4096 Nov 18 18:27 Pictures  
drwx----- 6 matin matin 4096 Nov 18 12:23 snap  
drwxr-xr-x 2 matin matin 4096 Nov 18 00:53 Desktop  
drwxr-xr-x 2 matin matin 4096 Nov 18 00:53 Templates  
drwxr-xr-x 2 matin matin 4096 Nov 18 00:53 Videos  
drwxr-xr-x 2 matin matin 4096 Nov 18 00:53 Music  
drwxr-xr-x 2 matin matin 4096 Nov 18 00:53 Public  
matin@matin-Surface-Laptop-3:~$
```

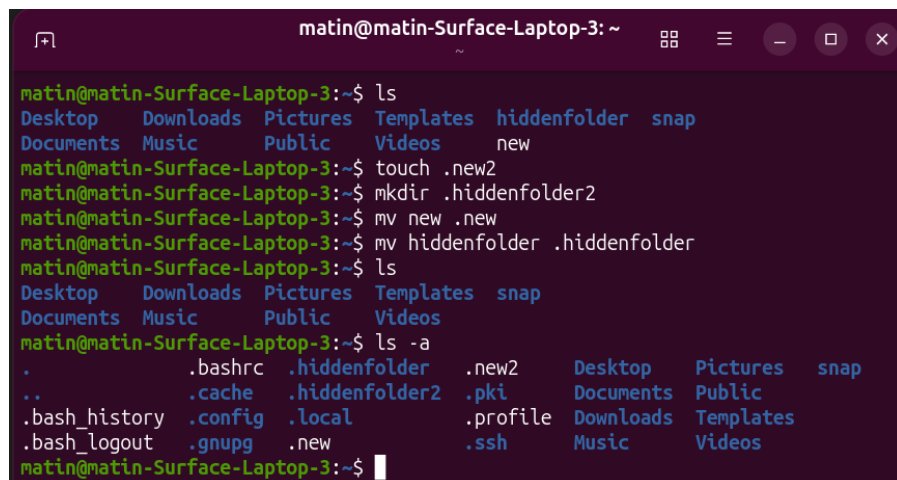
### 3.How to list files in latest modified order?

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

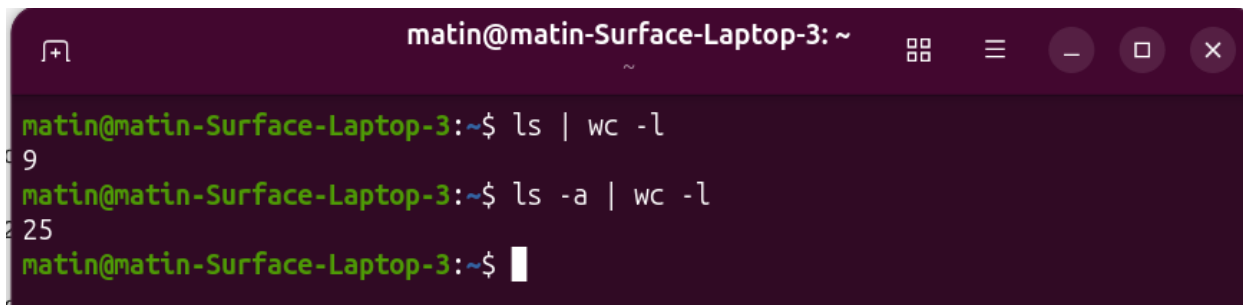
For showing all files including hidden ones we use `ls -a` means listing all

A terminal window titled 'matin@matin-Surface-Laptop-3: ~' with standard window controls. The terminal shows a series of commands and their outputs. First, 'ls' lists visible files. Then, 'touch .new2' creates a hidden file. Next, 'mkdir .hiddenfolder2' creates a hidden directory. Then, 'mv new .new' renames a file to a hidden one. Finally, 'mv hiddenfolder .hiddenfolder' renames a directory to a hidden one. The last command is 'ls -a', which lists all files, including the hidden ones created in the previous steps.

```
matin@matin-Surface-Laptop-3:~$ ls
Desktop  Downloads  Pictures  Templates  hiddenfolder  snap
Documents Music      Public   Videos    new

matin@matin-Surface-Laptop-3:~$ touch .new2
matin@matin-Surface-Laptop-3:~$ mkdir .hiddenfolder2
matin@matin-Surface-Laptop-3:~$ mv new .new
matin@matin-Surface-Laptop-3:~$ mv hiddenfolder .hiddenfolder
matin@matin-Surface-Laptop-3:~$ ls
Desktop  Downloads  Pictures  Templates  snap
Documents Music      Public   Videos
matin@matin-Surface-Laptop-3:~$ ls -a
.          .bashrc   .hiddenfolder  .new2      Desktop  Pictures  snap
..         .cache   .hiddenfolder2 .pki       Documents Public
.bash_history .config  .local        .profile   Downloads Templates
.bash_logout  .gnupg   .new          .ssh       Music    Videos
matin@matin-Surface-Laptop-3:~$
```

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

A terminal window titled "matin@matin-Surface-Laptop-3: ~" with standard window controls. It shows two commands being executed: "ls | wc -l" which outputs "9", and "ls -a | wc -l" which outputs "25". The prompt "matin@matin-Surface-Laptop-3:~\$" is shown at the end of the second command.

```
matin@matin-Surface-Laptop-3:~$ ls | wc -l
9
matin@matin-Surface-Laptop-3:~$ ls -a | wc -l
25
matin@matin-Surface-Laptop-3:~$
```

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)

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ ping 8.8.8.8  
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.  
64 bytes from 8.8.8.8: icmp_seq=1 ttl=64 time=62.1 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=64 time=85.0 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=64 time=74.0 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=64 time=48.3 ms  
64 bytes from 8.8.8.8: icmp_seq=5 ttl=64 time=237 ms  
64 bytes from 8.8.8.8: icmp_seq=6 ttl=64 time=75.4 ms  
64 bytes from 8.8.8.8: icmp_seq=7 ttl=64 time=315 ms  
64 bytes from 8.8.8.8: icmp_seq=8 ttl=64 time=50.9 ms  
^C  
--- 8.8.8.8 ping statistics ---  
8 packets transmitted, 8 received, 0% packet loss, time 7008ms  
rtt min/avg/max/mdev = 48.311/118.454/314.716/93.668 ms  
matin@matin-Surface-Laptop-3:~$
```

b) 4 packets only

```
matin@matin-Surface-Laptop-3:~$ ping -c 4 8.8.8.8  
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.  
64 bytes from 8.8.8.8: icmp_seq=1 ttl=64 time=238 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=64 time=360 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=64 time=280 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=64 time=85.6 ms  
--- 8.8.8.8 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3004ms  
rtt min/avg/max/mdev = 85.635/240.754/359.730/99.672 ms  
matin@matin-Surface-Laptop-3:~$
```

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  
17: [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  
17: [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)

```
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:~$ tracepath 192.168.0.1  
1?: [LOCALHOST] pmtu 1500  
1: _gateway 4.310ms reached  
1: _gateway 3.469ms reached  
Resume: pmtu 1500 hops 1 back 1  
matin@matin-Surface-Laptop-3:~$
```

### 3. Ipconfig / Ifconfig

a)

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ ifconfig  
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 20206 bytes 2269128 (2.2 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 20206 bytes 2269128 (2.2 MB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlp0s20f3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.0.27 netmask 255.255.255.0 broadcast 192.168.0.255  
    inet6 fe80::d052:62d4:61d6:e9e7 prefixlen 64 scopeid 0x20<link>  
    ether c8:34:8e:02:cd:2c txqueuelen 1000 (Ethernet)  
    RX packets 3757873 bytes 4294128236 (4.2 GB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 450595 bytes 103577391 (103.5 MB)  
    TX errors 0 dropped 33 overruns 0 carrier 0 collisions 0  
  
matin@matin-Surface-Laptop-3:~$
```

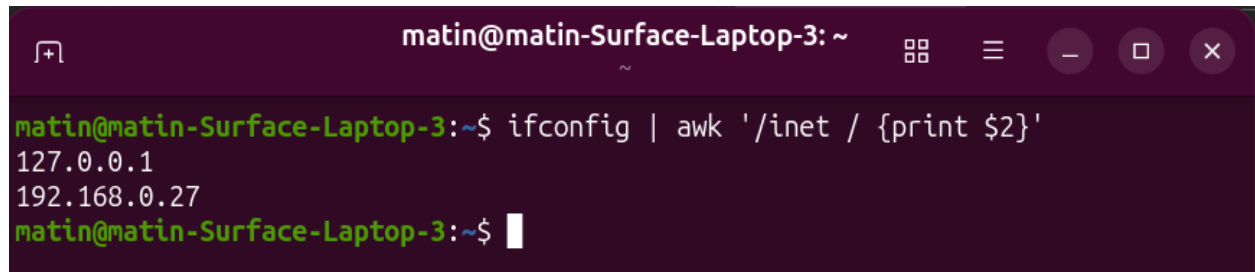
IP Address: 192.168.0.27

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 $2}'  
127.0.0.1  
192.168.0.27  
matin@matin-Surface-Laptop-3:~$
```

A terminal window with a dark purple title bar. The title bar contains the text 'matin@matin-Surface-Laptop-3: ~' and standard window control icons (maximize, close, etc.). The terminal content shows a command being executed: 'ifconfig | awk '/inet / {print \$2}'' which outputs two IP addresses: '127.0.0.1' and '192.168.0.27'. The prompt 'matin@matin-Surface-Laptop-3:~\$' is visible at the end of the output.

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
192.168.0.27
```

```
martin@martin-Surface-Laptop-3:~$ sudo nmcli device disconnect wlp0s20f3
Device 'wlp0s20f3' successfully disconnected.
martin@martin-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

martin@martin-Surface-Laptop-3:~$ sudo nmcli device connect wlp0s20f3
Device 'wlp0s20f3' successfully activated with '9e6a4ae7-2fbe-40f0-95a5-4de3d738be15'.
martin@martin-Surface-Laptop-3:~$ ifconfig wlp0s20f3 | grep 'inet '
    inet 192.168.0.27 netmask 255.255.255.0 broadcast 192.168.0.255
martin@martin-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 darkbrowser.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)

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ nslookup google.com  
Server:      127.0.0.53  
Address:     127.0.0.53#53  
  
Non-authoritative answer:  
Name:   google.com  
Address: 216.239.38.120  
Name:   google.com  
Address: 2001:4860:4802:32::78  
  
matin@matin-Surface-Laptop-3:~$
```

b)

```
matin@matin-Surface-Laptop-3: ~  
matin@matin-Surface-Laptop-3:~$ nslookup google.com  
Server:      127.0.0.53  
Address:     127.0.0.53#53  
  
Non-authoritative answer:  
Name:   google.com  
Address: 216.239.38.120  
Name:   google.com  
Address: 2001:4860:4802:32::78  
  
matin@matin-Surface-Laptop-3:~$ nslookup 127.0.0.53  
53.0.0.127.in-addr.arpa name = _localdnsstub.  
  
matin@matin-Surface-Laptop-3:~$ nslookup 216.239.38.120  
120.38.239.216.in-addr.arpa      name = any-in-2678.1e100.net.
```

c)

```
matin@matin-Surface-Laptop-3:~$ nslookup google.com 8.8.8.8
Server:      8.8.8.8
Address:     8.8.8.8#53

Non-authoritative answer:
Name:   google.com
Address: 172.217.18.14
Name:   google.com
Address: 2a00:1450:4001:830::200e

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

## 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  $\longrightarrow$  POST

R = Read  $\longrightarrow$  GET

U = Update  $\longrightarrow$  PUT

D = Delete  $\longrightarrow$  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 eveniet architecto"  
}
```

```
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  
}
```

```
101
}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 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": "updated",
  "id": 1
}matin@matin-Surface-Laptop-3:~$
```

```
}matin@matin-Surface-Laptop-3:~$curl -X DELETE 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
```

```
{}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:

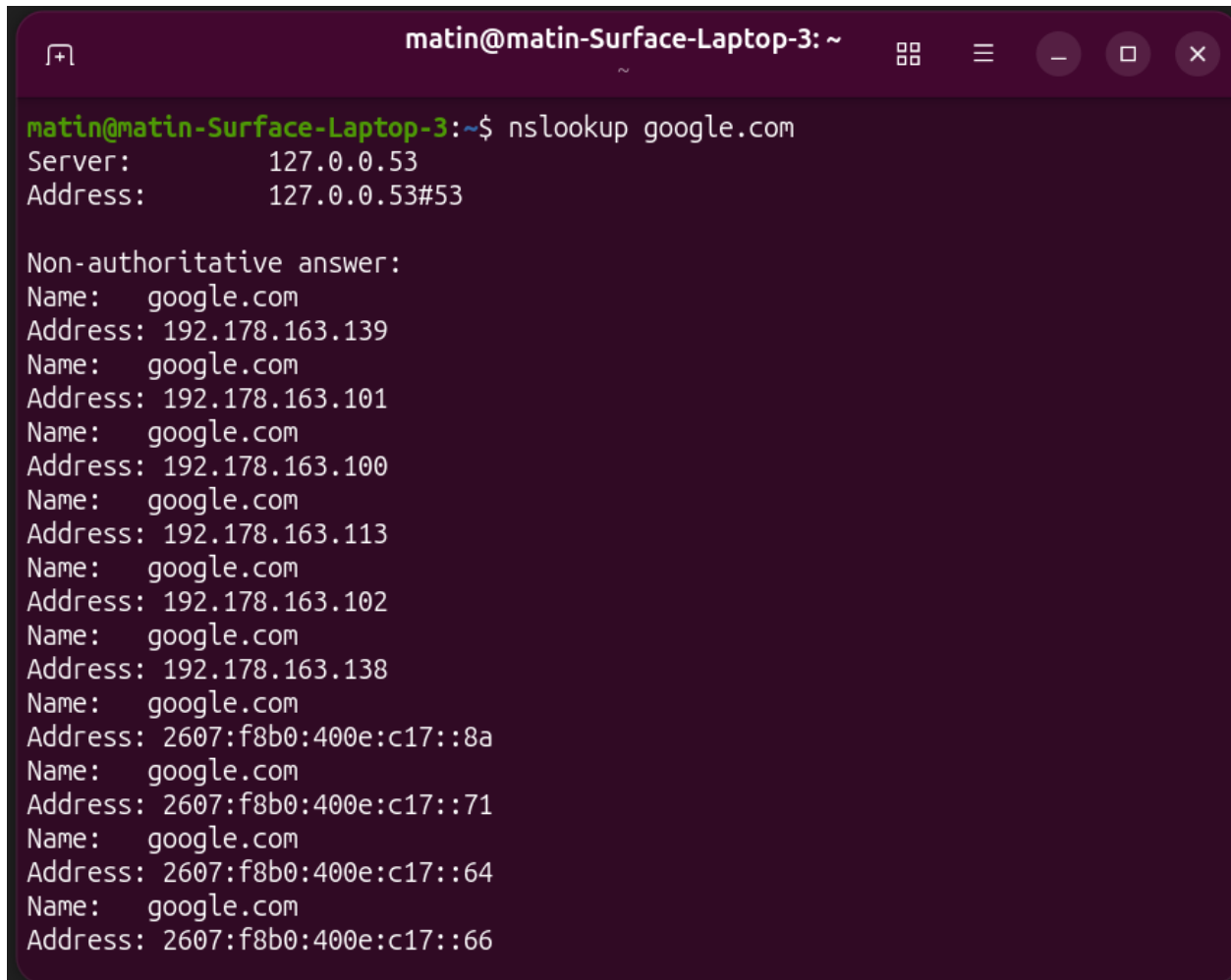
“What is the IP of google.com?”

2. DNS server looks it up

3. DNS server replies with the correct IP address

4. Your computer connects to that IP

b)

A terminal window titled 'matin@matin-Surface-Laptop-3: ~' with standard window controls. The command 'nslookup google.com' has been executed. The output shows the DNS server used (127.0.0.53) and a list of non-authoritative answers for google.com, including both IPv4 and IPv6 addresses.

```
matin@matin-Surface-Laptop-3:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 192.178.163.139
Name:   google.com
Address: 192.178.163.101
Name:   google.com
Address: 192.178.163.100
Name:   google.com
Address: 192.178.163.113
Name:   google.com
Address: 192.178.163.102
Name:   google.com
Address: 192.178.163.138
Name:   google.com
Address: 2607:f8b0:400e:c17::8a
Name:   google.com
Address: 2607:f8b0:400e:c17::71
Name:   google.com
Address: 2607:f8b0:400e:c17::64
Name:   google.com
Address: 2607:f8b0:400e:c17::66
```

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
```