

Lab Assignment-1

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1. Ping: The ping command is used to verify the computer to communicate over the network with other devices. It uses ICMP and sends some packets to the target network, by using the responses of the packets it gives the information.

Different options available :

- A. Ping -t : To ping a particular target continuously.
- B. Ping -a : To resolve the IP address of hostname.
- C. Ping -n : Control the number of echo request to send
- D. Ping -l : To set the size of buffer

Output with Various targets:

- litrpr.ac.in:

C:\Users\Pankaj>ping iitrpr.ac.in

Pinging iitrpr.ac.in [172.30.4.14] with 32 bytes of data:

Reply from 172.30.4.14: bytes=32 time=3ms TTL=63

Reply from 172.30.4.14: bytes=32 time=13ms TTL=63

Reply from 172.30.4.14: bytes=32 time=32ms TTL=63

Reply from 172.30.4.14: bytes=32 time=3ms TTL=63

Ping statistics for 172.30.4.14:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 3ms, Maximum = 32ms, Average = 12ms

C:\Users\Pankaj>ping -a iitrpr.ac.in

Pinging iitrpr.ac.in [172.30.4.14] with 32 bytes of data:

Reply from 172.30.4.14: bytes=32 time=48ms TTL=63

Reply from 172.30.4.14: bytes=32 time=3ms TTL=63

Reply from 172.30.4.14: bytes=32 time=2ms TTL=63

Reply from 172.30.4.14: bytes=32 time=4ms TTL=63

Ping statistics for 172.30.4.14:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 48ms, Average = 14ms

C:\Users\Pankaj>ping -t iitrpr.ac.in

Pinging iitrpr.ac.in [172.30.4.14] with 32 bytes of data:

Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=4ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=12ms TTL=63
Reply from 172.30.4.14: bytes=32 time=29ms TTL=63
Reply from 172.30.4.14: bytes=32 time=47ms TTL=63
Reply from 172.30.4.14: bytes=32 time=6ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=4ms TTL=63
Reply from 172.30.4.14: bytes=32 time=20ms TTL=63
Reply from 172.30.4.14: bytes=32 time=37ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=9ms TTL=63
Reply from 172.30.4.14: bytes=32 time=10ms TTL=63
Reply from 172.30.4.14: bytes=32 time=29ms TTL=63

Ping statistics for 172.30.4.14:

Packets: Sent = 17, Received = 17, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 47ms, Average = 13ms

Control-C

^C

C:\Users\Pankaj>ping -n 101 iitrpr.ac.in

Pinging iitrpr.ac.in [172.30.4.14] with 32 bytes of data:
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=14ms TTL=63
Reply from 172.30.4.14: bytes=32 time=35ms TTL=63
Reply from 172.30.4.14: bytes=32 time=49ms TTL=63
Reply from 172.30.4.14: bytes=32 time=1ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=6ms TTL=63
Reply from 172.30.4.14: bytes=32 time=27ms TTL=63
Reply from 172.30.4.14: bytes=32 time=46ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=1ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63
Reply from 172.30.4.14: bytes=32 time=23ms TTL=63
Reply from 172.30.4.14: bytes=32 time=44ms TTL=63
Reply from 172.30.4.14: bytes=32 time=1ms TTL=63
Reply from 172.30.4.14: bytes=32 time=3ms TTL=63

Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=17ms TTL=63
Reply from 172.30.4.14: bytes=32 time=38ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=2ms TTL=63
Reply from 172.30.4.14: bytes=32 time=12ms TTL=63
Reply from 172.30.4.14: bytes=32 time=31ms TTL=63

Ping statistics for 172.30.4.14:

Packets: Sent = 24, Received = 24, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 49ms, Average = 15ms

Control-C

^C

C:\Users\Pankaj>ping -l 64 iitrpr.ac.in

Pinging iitrpr.ac.in [172.30.4.14] with 64 bytes of data:

Reply from 172.30.4.14: bytes=64 time=3ms TTL=63
Reply from 172.30.4.14: bytes=64 time=12ms TTL=63
Reply from 172.30.4.14: bytes=64 time=32ms TTL=63
Reply from 172.30.4.14: bytes=64 time=4ms TTL=63

Ping statistics for 172.30.4.14:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 3ms, Maximum = 32ms, Average = 12ms

- google.com

C:\Users\Pankaj>ping google.com

Pinging google.com [216.239.34.117] with 32 bytes of data:

Reply from 216.239.34.117: bytes=32 time=93ms TTL=56
Reply from 216.239.34.117: bytes=32 time=60ms TTL=56
Reply from 216.239.34.117: bytes=32 time=83ms TTL=56
Reply from 216.239.34.117: bytes=32 time=52ms TTL=56

Ping statistics for 216.239.34.117:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 52ms, Maximum = 93ms, Average = 72ms

- google.co.in

C:\Users\Pankaj>ping google.co.in

Pinging google.co.in [172.217.166.163] with 32 bytes of data:
Reply from 172.217.166.163: bytes=32 time=70ms TTL=56
Reply from 172.217.166.163: bytes=32 time=90ms TTL=56
Reply from 172.217.166.163: bytes=32 time=53ms TTL=56
Reply from 172.217.166.163: bytes=32 time=76ms TTL=56

Ping statistics for 172.217.166.163:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 53ms, Maximum = 90ms, Average = 72ms

- gmail.com

C:\Users\Pankaj>ping gmail.com

Pinging gmail.com [216.58.203.37] with 32 bytes of data:
Reply from 216.58.203.37: bytes=32 time=64ms TTL=56
Reply from 216.58.203.37: bytes=32 time=81ms TTL=56
Reply from 216.58.203.37: bytes=32 time=45ms TTL=56
Reply from 216.58.203.37: bytes=32 time=63ms TTL=56

Ping statistics for 216.58.203.37:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 45ms, Maximum = 81ms, Average = 63ms

- facebook.com

C:\Users\Pankaj>ping facebook.com

Pinging facebook.com [31.13.79.35] with 32 bytes of data:
Reply from 31.13.79.35: bytes=32 time=41ms TTL=57
Reply from 31.13.79.35: bytes=32 time=47ms TTL=57
Reply from 31.13.79.35: bytes=32 time=66ms TTL=57
Reply from 31.13.79.35: bytes=32 time=83ms TTL=57

Ping statistics for 31.13.79.35:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 41ms, Maximum = 83ms, Average = 59ms

- wikipedia.org

C:\Users\Pankaj>ping wikipedia.org

Pinging wikipedia.org [103.102.166.224] with 32 bytes of data:
Reply from 103.102.166.224: bytes=32 time=98ms TTL=56
Reply from 103.102.166.224: bytes=32 time=110ms TTL=56
Reply from 103.102.166.224: bytes=32 time=129ms TTL=56

Reply from 103.102.166.224: bytes=32 time=150ms TTL=56

Ping statistics for 103.102.166.224:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 98ms, Maximum = 150ms, Average = 121ms

- india.gov.in

C:\Users\Pankaj>ping india.gov.in

Pinging india.gov.in [164.100.61.151] with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

Ping statistics for 164.100.61.151:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

- nationalgeographic.com

C:\Users\Pankaj>ping nationalgeographic.com

Pinging nationalgeographic.com [23.59.28.130] with 32 bytes of data:

Reply from 23.59.28.130: bytes=32 time=89ms TTL=58

Reply from 23.59.28.130: bytes=32 time=51ms TTL=58

Reply from 23.59.28.130: bytes=32 time=72ms TTL=58

Reply from 23.59.28.130: bytes=32 time=47ms TTL=58

Ping statistics for 23.59.28.130:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 47ms, Maximum = 89ms, Average = 64ms

- nkn.gov.in

C:\Users\Pankaj>ping nkn.gov.in

Pinging nkn.gov.in [180.149.57.82] with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

Ping statistics for 180.149.57.82:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

- irctc.co.in

C:\Users\Pankaj>ping irctc.co.in

Pinging irctc.co.in [103.252.142.18] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 103.252.142.18:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

2. Traceroute: This command traces the path from one network to another. It allows us to diagnose the source of many problems.

Different options available:

- A. -d : Do not resolve addresses to hostnames.
- B. -h maximum_hops: Maximum number of hops to search for target.
- C. -j host-list: Loose source route along host-list (IPv4-only).
- D. -w timeout: Wait timeout milliseconds for each reply.
- E. -R: Trace round-trip path (IPv6-only).
- F. -S srcaddr : Source address to use (IPv6-only).
- G. -4: Force using IPv4.
- H. -6: Force using IPv6.

Output with various targets:

- iitrpr.ac.in

C:\Users\Pankaj>tracert iitrpr.ac.in

Tracing route to iitrpr.ac.in [172.30.4.14]
over a maximum of 30 hops:

1	41 ms	2 ms	2 ms	172.21.12.2
2	7 ms	3 ms	1 ms	172.30.4.14

Trace complete.

C:\Users\Pankaj>tracert -d iitrpr.ac.in

Tracing route to iitrpr.ac.in [172.30.4.14]
over a maximum of 30 hops:

1	2 ms	2 ms	3 ms	172.21.12.2
2	7 ms	2 ms	3 ms	172.30.4.14

Trace complete.

C:\Users\Pankaj>tracert -h 14 iitrpr.ac.in

Tracing route to iitrpr.ac.in [172.30.4.14]
over a maximum of 14 hops:

1	3 ms	3 ms	4 ms	172.21.12.2
2	2 ms	4 ms	3 ms	172.30.4.14

Trace complete.

C:\Users\Pankaj>tracert -j iitrpr.ac.in

Tracing route to iitrpr.ac.in [172.30.4.14]
over a maximum of 30 hops:

1	3 ms	3 ms	2 ms	172.21.12.2
2	*	*	*	Request timed out.
3	*	*	*	Request timed out.
4	*	*	*	Request timed out.

- google.com

C:\Users\Pankaj>tracert google.com

Tracing route to google.com [172.217.174.238]
over a maximum of 30 hops:

1	5 ms	2 ms	2 ms	172.21.12.2
2	4 ms	3 ms	4 ms	103.118.50.3
3	12 ms	3 ms	3 ms	117.242.132.26
4	*	*	*	Request timed out.
5	51 ms	56 ms	44 ms	74.125.48.138
6	63 ms	56 ms	45 ms	209.85.247.203
7	68 ms	47 ms	53 ms	142.250.60.135
8	70 ms	47 ms	50 ms	bom12s03-in-f14.1e100.net [172.217.174.238]

Trace complete.

- google.co.in

C:\Users\Pankaj>tracert google.co.in

Tracing route to google.co.in [172.217.166.163]
over a maximum of 30 hops:

1	2 ms	4 ms	2 ms	172.21.12.3
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2	5 ms	2 ms	3 ms	103.118.50.3
3	9 ms	2 ms	4 ms	117.242.132.26
4	*	75 ms	66 ms	218.248.181.22
5	85 ms	46 ms	51 ms	74.125.48.138
6	73 ms	46 ms	50 ms	209.85.247.65
7	74 ms	48 ms	49 ms	74.125.253.107
8	67 ms	48 ms	49 ms	bom07s20-in-f3.1e100.net [172.217.166.163]

Trace complete.

- gmail.com
C:\Users\Pankaj>tracert gmail.com

Tracing route to gmail.com [172.217.167.165]
over a maximum of 30 hops:

1	36 ms	3 ms	2 ms	172.21.12.3
2	9 ms	4 ms	2 ms	103.118.50.3
3	9 ms	3 ms	4 ms	117.242.132.26
4	*	58 ms	*	218.248.181.22
5	52 ms	44 ms	54 ms	74.125.48.138
6	71 ms	45 ms	52 ms	209.85.246.51
7	70 ms	45 ms	106 ms	108.170.232.205
8	68 ms	58 ms	44 ms	bom12s01-in-f5.1e100.net [172.217.167.165]

Trace complete.

- facebook.com
C:\Users\Pankaj>tracert facebook.com

Tracing route to facebook.com [31.13.79.35]
over a maximum of 30 hops:

1	3 ms	2 ms	2 ms	172.21.12.3
2	28 ms	2 ms	2 ms	103.118.50.3
3	5 ms	5 ms	5 ms	117.242.132.26
4	*	*	*	Request timed out.
5	54 ms	56 ms	39 ms	ae35.pr02.bom1.tfbnw.net [157.240.67.136]
6	56 ms	66 ms	34 ms	po102.psw01.bom1.tfbnw.net [157.240.32.185]
7	62 ms	67 ms	100 ms	157.240.39.45
8	50 ms	57 ms	42 ms	edge-star-mini-shv-02-bom1.facebook.com

[31.13.79.35]

Trace complete.

- wikipedia.org

C:\Users\Pankaj>tracert wikipedia.org

Tracing route to wikipedia.org [103.102.166.224]
over a maximum of 30 hops:

1	2 ms	3 ms	4 ms	172.21.12.2
2	8 ms	4 ms	3 ms	103.118.50.3
3	9 ms	3 ms	2 ms	117.242.132.26
4	*	*	*	Request timed out.
5	53 ms	46 ms	51 ms	115.113.165.93.static-mumbai.vsnl.net.in
[115.113.165.93]				
6	*	*	*	Request timed out.
7	*	*	*	Request timed out.
8	148 ms	101 ms	99 ms	115.114.85.222
9	214 ms	202 ms	*	115.114.85.241
10	202 ms	202 ms	195 ms	if-ae-34-2.tcore1.svq-singapore.as6453.net
[180.87.36.41]				
11	198 ms	188 ms	191 ms	if-ae-6-2.thar1.40b-singapore.as6453.net
[120.29.215.34]				
12	95 ms	95 ms	96 ms	180.87.164.62
13	121 ms	99 ms	99 ms	text-lb.eqsin.wikimedia.org [103.102.166.224]

Trace complete.

- india.gov.in

C:\Users\Pankaj>tracert india.gov.in

Tracing route to india.gov.in [164.100.61.151]
over a maximum of 30 hops:

1	2 ms	4 ms	47 ms	172.21.12.3
2	4 ms	2 ms	3 ms	103.118.50.3
3	26 ms	6 ms	3 ms	117.242.132.26
4	*	*	77 ms	218.248.181.22
5	*	*	*	Request timed out.
6	*	*	*	Request timed out.
7	*	*	*	Request timed out.
8	*	*	*	Request timed out.
9	*	*	*	Request timed out.
10	*	*	*	Request timed out.
11	*	*	*	Request timed out.

```

12      *      *      *      Request timed out.
13      *      *      *      Request timed out.
14      *      *      *      Request timed out.
15      *      *      *      Request timed out.
16      *      *      *      Request timed out.
17      *      *      *      Request timed out.
18      *      *      *      Request timed out.
19 ^C

```

- nationalgeographic.com

C:\Users\Pankaj>tracert nationalgeographic.com

Tracing route to nationalgeographic.com [23.57.12.105]
over a maximum of 30 hops:

```

 1      1 ms   2 ms   1 ms  172.21.12.3
 2      2 ms   2 ms   2 ms  103.118.50.3
 3      2 ms   2 ms   3 ms  117.242.132.26
 4      *      *      *      Request timed out.
 5     64 ms  36 ms  61 ms  61.246.195.185
 6     82 ms  37 ms  60 ms  182.79.211.35
 7     77 ms  36 ms  63 ms

```

a23-57-12-105.deploy.static.akamaitechnologies.com [23.57.12.105]

Trace complete.

- nkn.gov.in

C:\Users\Pankaj>tracert nkn.gov.in

Tracing route to nkn.gov.in [180.149.57.82]
over a maximum of 30 hops:

```

 1     48 ms  3 ms   1 ms  172.21.12.2
 2      5 ms  3 ms   2 ms  103.118.50.3
 3     14 ms  2 ms   3 ms  117.242.132.26
 4      *      *      *      Request timed out.
 5      *      *      *      Request timed out.
 6     41 ms  63 ms  38 ms  static.ill.210.212.64.182/24.bsnl.in [210.212.64.182]
 7     37 ms  47 ms  40 ms  10.255.223.229
 8      *      *      *      Request timed out.
 9      *      *      *      Request timed out.
10      *      *      *      Request timed out.
11      *      *      *      Request timed out.
12      *      *      *      Request timed out.

```

13	*	*	*	Request timed out.
14	*	*	*	Request timed out.
15	*	*	*	Request timed out.
16	*	*	*	Request timed out.
17	*	*	*	Request timed out.
18	*	*	*	Request timed out.
19	*	*	*	Request timed out.
20	*	*	*	Request timed out.
21	*	^C		

- irctc.co.in

C:\Users\Pankaj>tracert irctc.co.in

Tracing route to irctc.co.in [103.252.142.18]
over a maximum of 30 hops:

1	43 ms	2 ms	3 ms	172.21.12.2
2	28 ms	3 ms	2 ms	103.118.50.3
3	26 ms	20 ms	4 ms	117.242.132.26
4	*	*	36 ms	218.248.181.22
5	*	*	*	Request timed out.
6	*	*	*	Request timed out.
7	*	*	*	Request timed out.
8	*	*	*	Request timed out.
9	*	*	*	Request timed out.
10	*	*	*	Request timed out.
11	*	*	*	Request timed out.
12	*	*	*	Request timed out.
13	*	*	*	Request timed out.
14	*	*	*	Request timed out.
15	*	*	*	Request timed out.
16	*	*	*	Request timed out.
17	*	*	*	Request timed out.
18	*	*	*	Request timed out.
19	*	*	*	Request timed out.
20	*	*	*	Request timed out.
21	*	*	*	Request timed out.
22	*	*	*	Request timed out.
23	*	*	*	Request timed out.
24	*	*	*	Request timed out.
25	*	*	*	Request timed out.
26	*	*	*	Request timed out.
27	*	*	*	Request timed out.

```
28 * * * Request timed out.  
29 * ^C
```

3. NSlookup:nslookup is a network administration command-line tool available in many computer operating systems for querying the Domain Name System (DNS) to obtain domain name or IP address mapping, or other DNS records. The name "nslookup" means "name server lookup". -Wikipedia

Output in command line:

C:\Users\Pankaj>NSlookup

Default Server: UnKnown

Address: 172.30.4.14

> google.com

Server: UnKnown

Address: 172.30.4.14

Non-authoritative answer:

Name: google.com

Addresses: 2404:6800:4009:801::200e
172.217.174.238

> iitrpr.ac.in

Server: UnKnown

Address: 172.30.4.14

Name: iitrpr.ac.in

Addresses: ::1
172.30.4.14

> google.co.in

Server: UnKnown

Address: 172.30.4.14

Non-authoritative answer:

Name: google.co.in

Addresses: 2404:6800:4009:80e::2003
172.217.166.163

> gmail.com

Server: UnKnown

Address: 172.30.4.14

Non-authoritative answer:

Name: gmail.com
Addresses: 2404:6800:4009:80f::2005
216.58.203.37

> facebook.com

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:
Name: facebook.com
Addresses: 2a03:2880:f12f:183:face:b00c:0:25de
31.13.79.35

> wikipedia.org

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:
Name: wikipedia.org
Addresses: 2001:df2:e500:ed1a::1
103.102.166.224

> india.gov.in

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:
Name: india.gov.in
Address: 164.100.61.151

> nationalgeographic.com

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:
Name: nationalgeographic.com
Address: 104.108.213.98

> nkn.gov.in

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:

Name: nkn.gov.in
Addresses: 2001:4408:5200::b495:3952
180.149.57.82

> irctc.co.in

Server: UnKnown
Address: 172.30.4.14

Non-authoritative answer:

Name: irctc.co.in
Addresses: 103.252.142.19
103.252.142.21
103.252.142.18

4. NetStat: This command provides basic statistics on all network activities and informs users on which ports and addresses the corresponding connections (TCP, UDP) are running and which ports are open for tasks.

Various options available:

- A. -a: Display all active ports
- B. -b: Displays the executable file of a connection or listening port
- C. -e: Shows statistics about your network connection
- D. -f: Displays the fully qualified domain name (FQDN) of remote addresses

Output in command line:

C:\Users\Pankaj>netstat

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:49716	DESKTOP-TAF3AQQ:49717	ESTABLISHED
TCP	127.0.0.1:49717	DESKTOP-TAF3AQQ:49716	ESTABLISHED
TCP	127.0.0.1:49720	DESKTOP-TAF3AQQ:49721	ESTABLISHED
TCP	127.0.0.1:49721	DESKTOP-TAF3AQQ:49720	ESTABLISHED
TCP	127.0.0.1:49726	DESKTOP-TAF3AQQ:49727	ESTABLISHED
TCP	127.0.0.1:49727	DESKTOP-TAF3AQQ:49726	ESTABLISHED
TCP	127.0.0.1:49740	DESKTOP-TAF3AQQ:49741	ESTABLISHED
TCP	127.0.0.1:49741	DESKTOP-TAF3AQQ:49740	ESTABLISHED
TCP	127.0.0.1:49742	DESKTOP-TAF3AQQ:49743	ESTABLISHED
TCP	127.0.0.1:49743	DESKTOP-TAF3AQQ:49742	ESTABLISHED
TCP	127.0.0.1:49744	DESKTOP-TAF3AQQ:49745	ESTABLISHED
TCP	127.0.0.1:49745	DESKTOP-TAF3AQQ:49744	ESTABLISHED
TCP	127.0.0.1:49746	DESKTOP-TAF3AQQ:49747	ESTABLISHED
TCP	127.0.0.1:49747	DESKTOP-TAF3AQQ:49746	ESTABLISHED
TCP	127.0.0.1:49748	DESKTOP-TAF3AQQ:49749	ESTABLISHED

TCP	127.0.0.1:49749	DESKTOP-TAF3AQQ:49748	ESTABLISHED
TCP	127.0.0.1:49750	DESKTOP-TAF3AQQ:49751	ESTABLISHED
TCP	127.0.0.1:49751	DESKTOP-TAF3AQQ:49750	ESTABLISHED
TCP	127.0.0.1:49752	DESKTOP-TAF3AQQ:49753	ESTABLISHED
TCP	127.0.0.1:49753	DESKTOP-TAF3AQQ:49752	ESTABLISHED
TCP	127.0.0.1:49854	DESKTOP-TAF3AQQ:49855	ESTABLISHED
TCP	127.0.0.1:49855	DESKTOP-TAF3AQQ:49854	ESTABLISHED
TCP	127.0.0.1:49935	DESKTOP-TAF3AQQ:49936	ESTABLISHED
TCP	127.0.0.1:49936	DESKTOP-TAF3AQQ:49935	ESTABLISHED
TCP	127.0.0.1:49938	DESKTOP-TAF3AQQ:49939	ESTABLISHED
TCP	127.0.0.1:49939	DESKTOP-TAF3AQQ:49938	ESTABLISHED
TCP	127.0.0.1:49940	DESKTOP-TAF3AQQ:49941	ESTABLISHED
TCP	127.0.0.1:49941	DESKTOP-TAF3AQQ:49940	ESTABLISHED
TCP	127.0.0.1:63543	DESKTOP-TAF3AQQ:65001	ESTABLISHED
TCP	127.0.0.1:65001	DESKTOP-TAF3AQQ:63543	ESTABLISHED
TCP	172.21.15.43:7680	172.23.13.34:51209	TIME_WAIT
TCP	172.21.15.43:61719	a104-108-158-16:https	CLOSE_WAIT
TCP	172.21.15.43:63183	52.139.250.253:https	ESTABLISHED
TCP	172.21.15.43:63372	a23-60-172-16:https	CLOSE_WAIT
TCP	172.21.15.43:63374	a23-55-47-139:https	CLOSE_WAIT
TCP	172.21.15.43:63375	a23-55-47-139:https	CLOSE_WAIT
TCP	172.21.15.43:63376	a23-55-47-139:https	CLOSE_WAIT
TCP	172.21.15.43:63384	pr-bh-ing:https	CLOSE_WAIT
TCP	172.21.15.43:63553	ec2-52-42-195-146:https	ESTABLISHED
TCP	172.21.15.43:63560	40.119.211.203:https	ESTABLISHED
TCP	172.21.15.43:63565	13.68.168.63:https	ESTABLISHED
TCP	172.21.15.43:64403	74.125.24.189:https	ESTABLISHED
TCP	172.21.15.43:64406	bom07s20-in-f14:https	ESTABLISHED
TCP	172.21.15.43:64419	bom07s20-in-f3:https	ESTABLISHED
TCP	172.21.15.43:64457	40.81.26.225:https	ESTABLISHED
TCP	172.21.15.43:64526	ec2-54-175-208-102:https	ESTABLISHED
TCP	172.21.15.43:64571	bom05s11-in-f14:https	ESTABLISHED
TCP	172.21.15.43:64574	bom05s12-in-f10:https	TIME_WAIT
TCP	172.21.15.43:64579	bom12s01-in-f10:https	TIME_WAIT
TCP	172.21.15.43:64583	52.139.233.255:https	TIME_WAIT
TCP	172.21.15.43:64584	199.193.207.210:https	ESTABLISHED
TCP	172.21.15.43:64585	199.193.207.210:https	TIME_WAIT
TCP	172.21.15.43:64586	bom05s09-in-f10:https	ESTABLISHED
TCP	172.21.15.43:64587	199.193.207.210:https	TIME_WAIT
TCP	172.21.15.43:64588	199.193.207.210:https	ESTABLISHED
TCP	172.21.15.43:64591	server-13-227-143-60:https	TIME_WAIT
TCP	172.21.15.43:64595	ec2-52-10-71-117:https	TIME_WAIT
TCP	172.21.15.43:64596	ec2-52-10-71-117:https	TIME_WAIT

```
TCP 172.21.15.43:64597 ec2-52-10-71-117:https TIME_WAIT
TCP 172.21.15.43:64601 216.239.36.117:https ESTABLISHED
TCP 172.21.15.43:64602 216.239.36.117:https ESTABLISHED
TCP 172.21.15.43:64603 bom07s11-in-f3:https ESTABLISHED
TCP 172.21.15.43:64604 bom05s11-in-f1:https ESTABLISHED
TCP 172.21.15.43:64605 bom12s05-in-f14:https ESTABLISHED
TCP 172.21.15.43:64607 bom07s15-in-f14:https ESTABLISHED
TCP 172.21.15.43:64608 bom12s01-in-f14:https ESTABLISHED
TCP 172.21.15.43:64612 text-lb:https ESTABLISHED
TCP 172.21.15.43:64613 upload-lb:https ESTABLISHED
```

^C

5. Ipconfig/Iifconfig: The ipconfig command is a fast way of determining your computer's IP address and other information, such as the address of its default gateway—useful if you want to know the IP address of your router's web interface.

Output on Command Prompt:

C:\Users\Pankaj>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
```

Ethernet adapter Ethernet 5:

```
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . : fe80::e588:9a7a:c3a3:19ce%21
IPv4 Address. . . . . : 192.168.56.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
```

Wireless LAN adapter Local Area Connection* 1:

```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
```

Wireless LAN adapter Local Area Connection* 4:

```
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . : fe80::6d8a:c05c:3256:651b%9
```


IPv4 Address. : 192.168.137.1
Subnet Mask : 255.255.255.0
Default Gateway :

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . :
Link-local IPv6 Address : fe80::fd22:2077:102d:bd43%17
IPv4 Address. : 172.21.15.43
Subnet Mask : 255.255.252.0
Default Gateway : 172.21.12.1

Ethernet adapter Bluetooth Network Connection:

Media State : Media disconnected
Connection-specific DNS Suffix . :

6. Hostname: This command displays the host name portion of the full computer name of the computer.

Output on command Prompt:

C:\Users\Pankaj>hostname
DESKTOP-TAF3AQQ

Questions asked in the assignment :

- a) Already Shown in above examples
- b) Already shown in above examples
- c) The default ping size is 32bit data.

Changing the ping packet size to 100:

C:\Users\Pankaj>ping -l 100 google.com

Pinging google.com [172.217.174.238] with 100 bytes of data:

Reply from 172.217.174.238: bytes=68 (sent 100) time=90ms TTL=56
Reply from 172.217.174.238: bytes=68 (sent 100) time=66ms TTL=56
Reply from 172.217.174.238: bytes=68 (sent 100) time=137ms TTL=56
Reply from 172.217.174.238: bytes=68 (sent 100) time=48ms TTL=56

Ping statistics for 172.217.174.238:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 48ms, Maximum = 137ms, Average = 85ms

- d) When we run the command to `$tracert google.com` the data packets hops from one node to another until it reaches the destination server/system. The command traces the default gateways of these nodes. The first few nodes are common in every case as these belong to the WIFI router we are connected to and to the server of IIT Ropar and then the server of our Internet Provider.

Example, The first few addresses belongs to

Wireless LAN adapter Wi-Fi: 172.21.12.2

IIT Ropar Server: 103.118.50.3

Indian Bharat Sanchar Nigam: 117.242.132.26 or Vodafone: 118.185.199.190

Coding Question:

1. All the parts are done in the files `server.py` and `client.py`

For executing the server and client files type:

`python "filename".py`

2. Same as part-1

3. Same as part-1

Ping with the connected computer we got

Pinging 172.21.15.117 with 20000 bytes of data:

Reply from 172.21.15.117: bytes=20000 time=14ms TTL=128

Reply from 172.21.15.117: bytes=20000 time=18ms TTL=128

Reply from 172.21.15.117: bytes=20000 time=19ms TTL=128

Reply from 172.21.15.117: bytes=20000 time=15ms TTL=128

Ping statistics for 172.21.15.117:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 14ms, Maximum = 19ms, Average = 16ms

Total data send and receive=(20000*8*8)=320000b

Avg time taken=16ms

Speed =(320000/16) Kbps=20000Kbps

=> Bandwidth =20 Mbps

4. For this part first execute `serverX.py` where $X=\{1,2,3\}$,then execute `attendanceserver.py` `mainserver.py` and at last `client1.py`

References Used:

1: <https://docs.python.org/3/howto/sockets.html>

2: https://www.tutorialspoint.com/python/python_while_loop.htm

3: <https://www.geeksforgeeks.org/multithreading-in-python-set-2-synchronization/>

4: https://www.tutorialspoint.com/python/python_networking.htm