Computer Networks Lab

Lab - 1

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1 Questions

1.1 Question 1

(a) Here I used www.iitdh.ac.in , google.com and youtube.com . Here first one failed and other two succeeded which is evident from the screenshots. The second last line of the output shows the statistics for the number of packets transmitted, packets received, the percentage of packet loss, and the total time taken by the process. The last line of output is about RTT statistics.

Failure We get 100 % packet-loss when we Ping to IIT Dharwad network.

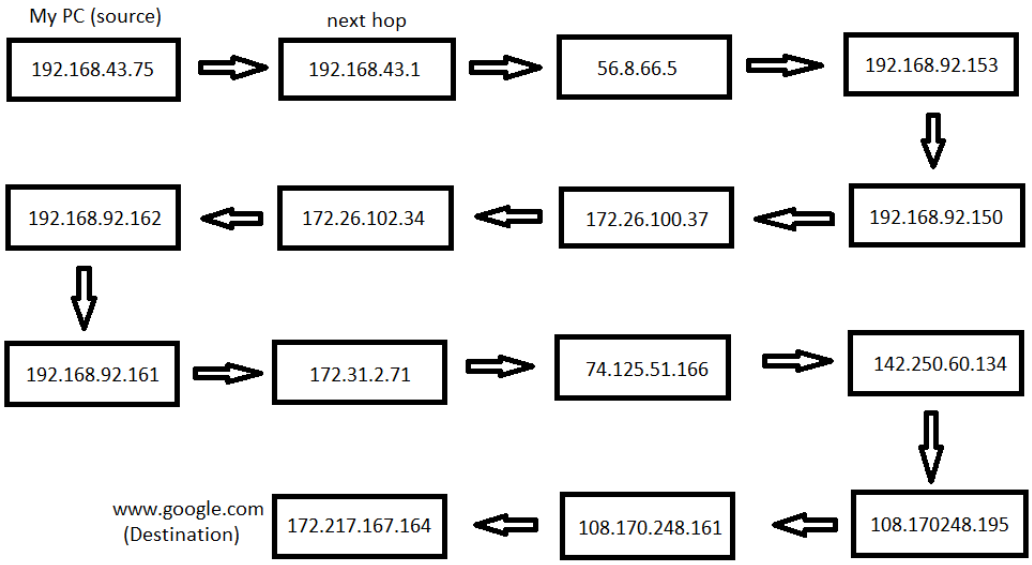
Success When pinged to google.com or youtube.com we get 0% packet-loss.

(b) RTT is the time delay between transmitting a packet to a server and receiving a reply packet sent by the server.
Factors Influencing RTT
Number of network hops – Intermediate routers or servers take time to process a signal, increasing RTT. The more hops a signal has to travel through, the higher the RTT.
Traffic levels – RTT typically increases when a network is congested with high levels of traffic. It is evident from the values I got in both the cases.

1.2 Question 2

(a) For www.google.com, www.youtube.com and www.iitdh.ac.in we can see that IP address in the last row is equal to that of in the first row i.e. the destination IP address and thus, we can say that the packet successfully reached the destination server. Each row displays the hop number, IP address and the RTTs for the three separate packets sent to the IP address shown in the row. As we can see, some rows have asterisks in them. They are encountered when a router does not respond within a timeout. If failed, in case, traceroute exhausts the maximum number of allowed hops but still

won't be able to display a row with the destination IP address.
The network map for the traceroute of google.com is as follows:



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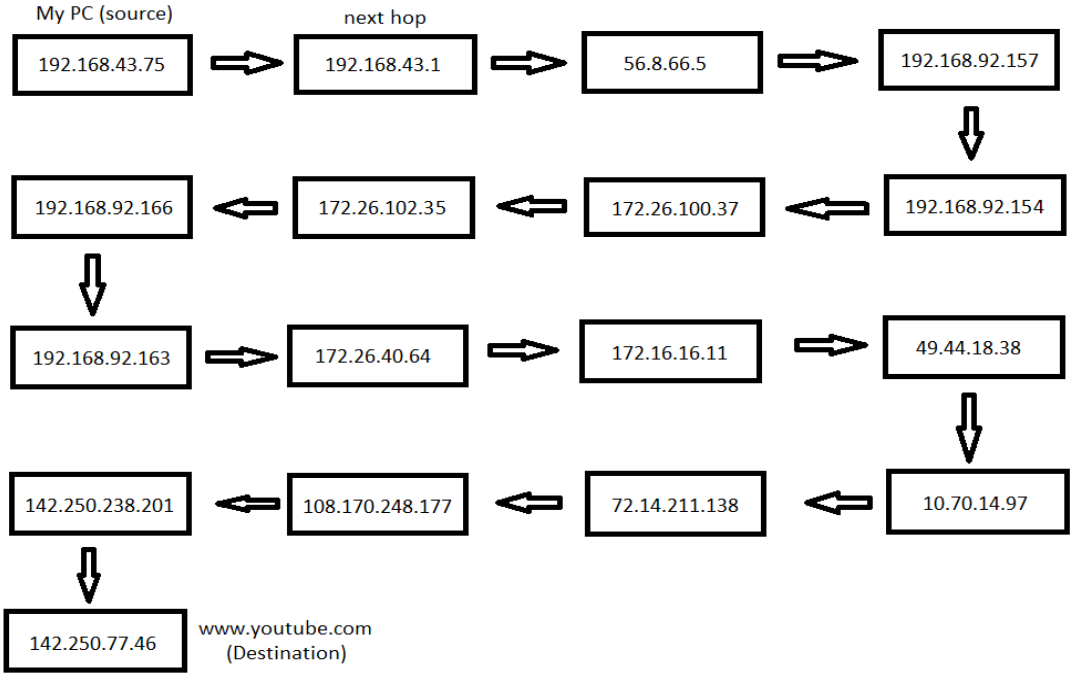

(b) We can use the command traceroute -mn where n is new maximum hop number to change it. Also using the command traceroute –max-hops=n it is possible.

(c) Traceroute sends out three packets per TTL increment. Each column corresponds to the time it took to get one packet back (round-trip-time). These three timestamps can be used to observe the consistency in the route.

(d) The Time-to-Live (TTL) field of the IP header is defined to be a timer limiting the lifetime of a data-gram. When a router forwards a packet, it must reduce the TTL by at least one. If it holds a packet for more than one second, it may decrements the TTL by one for each second. This is the use of TTL field in Internet Control Message Protocol packets.

1.3 Question 3

(a) Using the command cat /etc/hostname (or) hostname.
My device's hostname is pranav.
Using the command hostname -I (or) ip addr.
My device's IP address is 192.168.43.75

(b) Here we need to use the command arp -a.
Next hop's IP address is 192.168.43.75
Next hop's MAC address is cc:61:e5:ba:61:4d

(c) Using the command cat /etc/resolve.conf
The local DNS server's IP address is 127.0.0.53

(d) The number represents the IP protocol numbers which are maintained by Internet Assigned Numbers Authority (IANA) for different protocol. Protocol numbers identify the protocol in the layer above IP.

(e) The file /etc/services contains the port numbers for the applications. The port numbers are as follows :

   (a) ssh - 22
   (b) ftp - 21
   (c) nfs - 2049
   (d) smtp - 25