CSE 232: Programming Assignment 1
Using command-line utilities for network debugging

Due date: Aug 30, 2024

Total: 30 points

Read the following instructions carefully

- For all the observations and explanations, create a single report.
- Attach screenshots in the report.
- Naming Convention: <Roll_No>-Assignment1.zip
- Create a public git repository for the course, and add your report and code (if applicable).

Q1. [1 + 1]

a) Learn to use the ifconfig command, and figure out the IP address of your network interface. Put a screenshot.

b) Go to the webpage https://www.whatismyip.com and find out what IP is shown for your machine. Are they identical or different? Why?

Q.2. [1+1+1]

a) Change the IP address of your network interface using the command line. Put a screenshot that shows the change. Revert to the original IP address.

Q.3. [4]

a) Use "netcat" to set up a TCP client/server connection between your VM and host machine. If you are not using a VM, you can set up the connection with *localhost*. Put a screenshot. [1+1]

b) Determine the state of this TCP connection(s) at the client node. Put a screenshot. [1+1]

Q.4. nslookup ([2+1] + [1+1])

a) Get an authoritative result for "google.in" using nslookup. Put a screenshot. Explain how you did it.

b) Find out the time to live for any website on the local DNS. Put a screenshot. Explain in words (with unit) after how much time this entry would expire from the local DNS server.

Q.5. [13]

a) Run the command, *traceroute google.in.* How many intermediate hosts do you see? What are the IP addresses? Compute the average latency to each intermediate host. Put a screenshot. [1+2+1]
Note that some of the intermediate hosts might not be visible; their IP addresses will come as "", ignore those hosts for this assignment.***

b) Send 50 ping messages to google.in, Determine the average latency. Put a screenshot. [1]

c) Add up the ping latency of all the intermediate hosts obtained in (a) and compare with (b). Are they matching, explain? [1+1]

d) Take the maximum ping latency amongst the intermediate hosts (in (a)) and compare it with (b). Are they matching, explain? [1+1]
e) You may see multiple entries for a single hop while using the traceroute command. What do these entries mean? [1]
f) Send 50 ping messages to stanford.edu, Determine the average latency. Put a screenshot. [1]
g) Run the command, *traceroute stanford.edu*. Compare the number of hops between google.in and stanford.edu (between the traceroute result of google.in and stanford.edu). [1]
h) Can you explain the reason for the latency difference between google.in and stanford.edu (see (b) & (f))? [1]

Q.6.. [2+1] Make your ping command fail for 127.0.0.1 (with 100% packet loss). Explain how you do it. Put a screenshot that it failed.