Computer Networks Lab

Assignment 1

Note:

I. Unless stated otherwise in the question, use the following URL to access the relevant network utility tools.
Network Utility Tools URL: http://ping.eu

II. Feel free to use online resources such as Wikipedia to answer the questions.

III. Answers to all questions which aren't objective in nature should be concisely written in 2 sentences or less.

IV. The usage of the term "IP address" in this assignment corresponds to the IPv4 address. You will be taught about IPv6 in future theory classes.

Questions

Q1. What is the IP of the machine you are using? Compare it with the IP of your neighbors. Are the IPs of your neighbors same? Why or Why not?

Q2. What are proxy servers? Why are they used (mention 2 points)?

Q3. "Ping" is a tool used to determine if a server is responding and to estimate the round trip time of a message sent to that server. Use the ping command for the following URLs and record the success or failure statistics along with the average round trip time.
a) google.com
b) facebook.com
c) 208.67.222.222 (Open DNS server)
d) 10.3.100.207 (IIT Kharagpur Load Balancer Proxy Server)

Q4. What is a DNS server? Why do you think that the average round trip time recorded in Q3.c would always be less than the average round trip time recorded in Q3.a?

Q4. Trace the route that is taken when you try to access:
a) google.com
b) facebook.com
c) 8.8.8.8

Record the number of hops required for accessing each of the URLs. Also provide an ordered list of the geographical locations corresponding to the machines through which the packets travelled in each case. You may use http://countrycode.org to map ISO codes to country name.

Q5. What is a network firewall? What is its major utility? Retry the ping request in Q1.d. Why do you think it fails everytime?

Q6. Retry the ping request in Q1.d from the “Terminal” program on your workstation. Why do you think the request succeeds when issued from terminal?
Issue the ping command from your machine terminal to the IIT Kharagpur load balancing proxy server (10.3.100.207) with different packet sizes - (64KB, 128KB, 256KB, 512KB, 1024KB, 2048KB, 4096KB). Send 20 ping packets for every packet size, and find out the average round trip time. Analyze the output and report your observations. [Note: Check the manual for ping command to find out how to change the packet size.]

Hint for Q5 & Q6: The ping.eu server executes all commands with respect to their machine which is external to the IIT Kharagpur network.

Q7. Issue DNS lookup requests for:
a) google.com
b) facebook.com

Mention one IP address result for each lookup. Open your browser and type the IP that you received in the address bar to verify that the IP address indeed corresponds to the service that you looked up.
For example - If the DNS lookup for facebook.com gave you the IP address “a.b.c.d”. Type “a.b.c.d” in your browser’s address bar and verify that it takes you to facebook.com

Q8. What is a network port? What are the standard ports used for HTTP requests, secure shell access (SSH) and HTTPS request?

Q9. Test if ports 80, 443, 22 and 8080 are open on iitkgp.ac.in

Q10. What is the major difference between HTTP and HTTPS?

Q11. Pull up the “registrant email” for the domain “iitkgp.ac.in”
Hint: Use the WHOIS lookup tool to fetch details of a registrant corresponding to a domain or IP address.

Q12. What is special about the IP address 127.0.0.1?