Department of Computer Science and Engineering
Motilal Nehru National Institute of Technology
Midterm Exam, Computer Networks BTech (IT) V Semester
Time: 1.5 Hour, MM:20

***Note: There are four questions. Attempt all.***

1. Answer following questions briefly. Not more than 5 sentences.
   (a) Suppose all of the network sources send data at a constant bit rate. Would packet-switching or circuit-switching be more desirable in this case? Why? Now suppose that all of the network sources are bursty - that they only occasionally have data to send. Would packet-switching or circuit switching be more desirable in this case? Why?
   (b) Suppose a web server has 1000 ongoing TCP connections. How many server-side sockets are used? How many server-side port numbers are used? Briefly (two sentences at most each) explain your answer.
   (c) Describe the use of the "If-Modified-Since" header in the HTTP protocol.
   (d) Consider a TCP session and a UDP session that must share a link's bandwidth. Of course, both sessions would ideally like to send as fast as they can. Long term, what will be the relative throughput achieved by these two sessions.
   (e) While sending HTTP request, the TCP SYN message and the HTTP GET message will be directed to the same socket at the server. (True or False with reason)
   (f) Does the Internet checksum always detect errors in the transmitted segment? Explain your answer in a sentence or two.
2. Refer to Figure.1(a) and 1(b) to answer following questions.

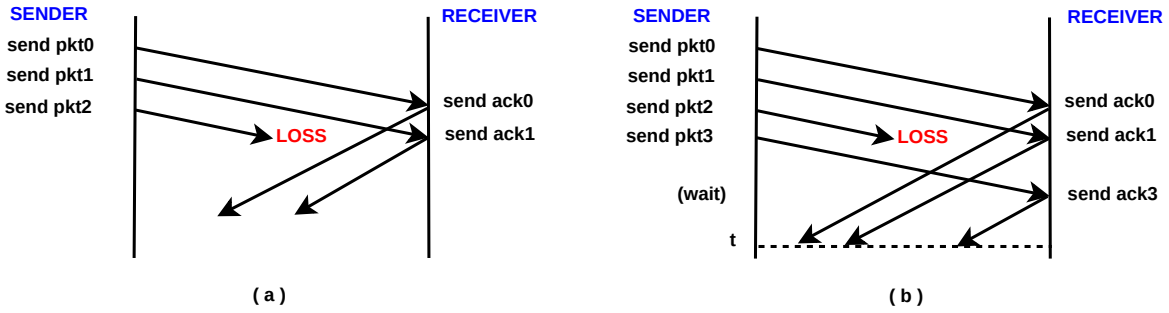


Figure 1: Figures for Question.2

   (a) Consider the sliding window protocol in Figure.1(a). Does this figure indicate that Go-Back-N is being used, Selective Repeat is being used, or there is not enough information to tell? Explain your answer briefly. Similarly, what about sliding window of Figure.1(b)?
   (b) Consider Figure. 1(b) again. Suppose the sender and receiver windows are of size N = 4 and suppose the sequence number space goes from 0 to 15. Show the position of the sender and receiver windows over this sequence number space at time t (the horizontal dashed line).
   (c) Give a list of all possible future events at the sender resulting from the ACKs currently propagating from receiver to sender at time t (Figure.1(b)). For each of these events, indicate the action take at the sender (only).
   (d) Suppose that it take 1 ms to send a packet, with a 10 ms one-way propagation delay between the sender and receiver. The sliding windows size is again N = 4. What is the channel/link utilization?

3. In this question you have to describe that how source host learns about Source IP, Destination IP, Source Port, Destination Port, Source MAC and Destination MAC in the following situations:
   (a) When both source and destination hosts are in same subnet and want to establish a telnet session.
   (b) When both source and destination hosts are in different subnet and want to establish a telnet session.
   (c) Suppose a host A is in the private network behind NAT/proxy and want to access www.google.com web page.

4. As discussed in class, suppose an organization is having one authoritative DNS server namely dns1.mayank.com. Also, it is having its website namely www.mayank.com on a webserver installed in the organization only. Answer the following questions.
   (a) What is the utlity of having our own authoritative DNS server? One can take the services of DNS server from any ISP.
   (b) Suppose any student residing in London usniversity wants to access www.mayank.com. Describe step by step process of getting IP address of the web server running www.mayank.com.
   (c) During the resolution process you have described above, give the Resource Records which are entered in different DNS servers encountered. You only have to mention the Type and Value fields of Resource Records.
   (d) Iterative or recursive DNS query, which is better and why?