Computer Network
Assignment # 1

Assignment# 1 (TCP/IP Short Problems)

Problem 1

A process on host 1 has been assigned port p, and a process on host 2 has been assigned port q. Is it possible for there to be two or more TCP connections between these two ports at the same time?

Problem 2

TCP provides reliable transfer through a mixture of sequence number, receiver buffer, cumulative acknowledgement, and fast retransmission. Answer the following True or False problems. If it's False, explain why.

- a) Host A is sending host B a large file over a TCP connection. Assume host B has no data to send to A. Host B will not send acknowledgements to host A because host B cannot piggyback the acknowledgement on data.
- b) The size of the TCP advertised window (RcvWindow) never changes throughout the duration of the connection.
- c) Suppose host A is sending host B a large file over a TCP connection. The number of unacknowledged bytes that A sends cannot exceed the size of the receiver's buffer.
- d) Suppose host A is sending host B a large file over a TCP connection. If the sequence number for a segment of this connection is *m*, then the sequence number for the subsequent segment will necessarily be *m+1*.
- e) Suppose host A sends host B one segment with sequence number 38 and 4 bytes of data. Then in the same segment the acknowledgement number is necessarily 42.
- f) Suppose that the last sample RTT in a TCP connection is equal to 1 second. Then timeout for the connection will necessarily be set to a value >= 1 second.
- g) With the selective repeat protocol, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
- h) With the Go-Back-N, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.

Problem 3

TCP provides congestion control through slow start and AIMD (additive increase and multiplicative decrease). Answer the following True or False problems. If it's False, explain why.

- a) Consider congestion control in TCP. When a timer expires at the sender, the threshold is set to one half of its previous value.

- b) The slow start is really slow, which is one of the overhead introduced by congestion control.

Problem 4

- Consider the effect of using slow start on a line with a 10-msec round-trip time and no congestion. The receive window is 24KB and the maximum segment size is 2KB.
  How long does it take before the first full window can be sent?

- Suppose the TCP congestion window is set to 18KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful? Assume that the maximum segment size is 1KB.