Computer Communication and Networks

Chapter 3 Problems

Problem 1

a) The segments sent from A to S
→ Source port = 1467
→ Destination port = 23

b) The segments sent from B to S
→ Source Port = 1513
→ Destination Port = 23

c) The segments sent from S to A
→ Source Port = 23
→ Destination Port = 1467

d) The segments sent from S to B
→ Source Port = 23
→ Destination Port = 1513

e) Ans: YES
Yes, it is possible that the source port number in the segments from A to S is the same as that from B to S. This is because there is no relationship between port numbers on different hosts.

f) Ans: NO
NO, it is not possible if they are the same host.

problems:

P4) a) 2 bytes:

01011100
01100101

Sum = 11 00 0001

1's comp = 00 11 1110

b) 1 1 1 0 1 1 0 1 0
01100101

Sum = 1 00 1 1 1 1 1 1

1's comp = 011000000

c) For the bytes in part (a):
if one bit is flipped in each of the 2 bytes, then also 1's complement should not change.

This meets with following adjustment:

First Byte: 0 1 0 1 [0] 1 0 0

2nd Byte: 0 1 1 0 [1] 1 0 1

Sum = 1 1 0 0 0 0 0 1 (same as (a))

1's complement = 00 11 1110 (same as (a))

Hence, It didn't change

P14). In the given question, Negative acknowledgements are referred as NAK, and acknowledgements are referred as ACK.

In a NAK only Protocol, the loss of packet x is only detected by the receiver when packet x+1 is received. That is, the receiver receive's x-1 and x+1, only when x+1 received does the receiver realize that x was missed. If there is a long delay between the transmission of x and the transmission of x+1, then it will be a long time until x can be recovered, under a NAK only Protocol.

On the other hand, if data is being sent often, then recovery under a NAK only scheme could happen quickly. Moreover, if errors are infrequent then NAK's are only occasionally sent and ACK are never sent - a significant reduction in feedback in the NAK-only case over the ACK-only case.

P37.

(a) A Sends 9 Segments 1 2 3 4 5 2 3 4 5

1st Sent segments are 1,2,3,4,5 and after that Re-sent segments are 2,3,4,5

Now

B Sends 8 ACKs : 1 1 1 1 2 3 4 5

They are 4 ACKs with Sequence number '1' and 4 ACKs with Sequence number 2,3,4,5

Selective Repeat :

Now A Sends 6 segments : 1 2 3 4 5 2

1st Sent segments are 1,2,3,4,5 and after that re-sent Segments are 2

then B Sends 5 ACKs : 1 3 4 5 2

They are 4 ACKs with Sequence number 1,3,4,5 and One ACKs with Sequence number 2.

TCP:

Here A sends 6 segments : 1 2 3 4 5 2

1st Sent segments are 1,2,3,4,5 and after that re-sent segments are 2.

Here B sends 5 ACKs : 2 2 2 2 6

They are 4 ACKs with Sequence number 2 and one ACKs with Sequence number 6.

(b) TCP can successfully deliver all 5 data segments in shortest time interval because it uses fast retransmit without waiting time.

Problem #2.

If TCP were a stop-and-wait Protocol then the doubling of time out interval would suffice as congestion control Mechanism. However, TCP uses the Pipelining (and is not stop-and-wait protocol), which allows the Sender to have multiple outstanding unacknowledged segments the doubling of the time out interval does not Prevent a TCP Sender from Sending a large Number of first time transmitted Packets into network, even when end-to-end Path is highly Congested. Therefore a Congestion Control Mechanism is needed to stem the flow of data from application above when there are signs of network congestion.

Group 7:
Ramakanth Ayalasomayajula
Akhilesh Reddy Pinnapureddy
Anvesh Raju Vishwaraju
Asritha Cherukuri
Lakshmi Pooja Devarapu