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CSC 138-03
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Ex 2

1.
```
    01100110 10011111
+   10101010 11010001
    00010001 01110001
```

Checksum is 11101110 10001110

2.

t	sender state	receiver state	packet type sent	seq. # or ACK # sent
0	Wait ACK0	Wait 0 from below	data	0
1	Wait ACK0	Wait 1 from below	ACK	0
2	Wait ACK1	Wait 1 from below	data	1
3	Wait ACK1	Wait 0 from below	ACK	1
4	Wait ACK1	Wait 0 from below	data	1
5	Wait ACK1	Wait 0 from below	ACK	1
6	Wait ACK1	Wait 0 from below	data	1

At times 1 and 3 the payload was passed up to the higher layer at the receiver.

3.

Sender to Receiver	Time segment sent	Sequence number	Time segment received	ACK value
Segment 1	1	149	8	705
Segment 2	2	705		No ACK
Segment 3	3	1261	10	705
Segment 4	4	1817		No ACK

4.

2	Timeout loss, thresh=1
3	Congestion avoidance
15	3 duplicate ACK
16	Fast Recovery
17	Congestion avoidance
25	Timeout loss, thresh = 9
26	Slow start
30	Timeout loss, thresh = 8
31	Slow start
34	Congestion avoidance

5. RTT's: 270, 230, 290, 210
   first deviation: 29
   a = 0.125
   b = 0.25

   after first estimate:
   estimatedRTT = 0.875*270 + 0.125*230 = 265 msecs
   DevRTT = 0.75*29 + 0.25(abs(230 - 265)) = 30.5 msecs
   TimeoutInterval = 265 + 4*30.5 = 387 msecs

   after second estimate:
   estimatedRTT = 0.875*265 + 0.125*290 = 268.125 msecs
   DevRTT = 0.75*30.5 + 0.25(abs(290 – 268.125)) = 28.34375 msecs
   TimeoutInterval = 268.125 + 4*28.34375 = 381.5 msecs

   after third estimate:
   estimatedRTT = 0.875* 268.125 + 0.125*210 = 260.859375 msecs
   DevRTT = 0.75* 28.34375 + 0.25(abs(210 - 260.859375)) = 33.97265625 msecs
   TimeoutInterval = 260.859375 + 4*33.97265625 = 396.75 msecs