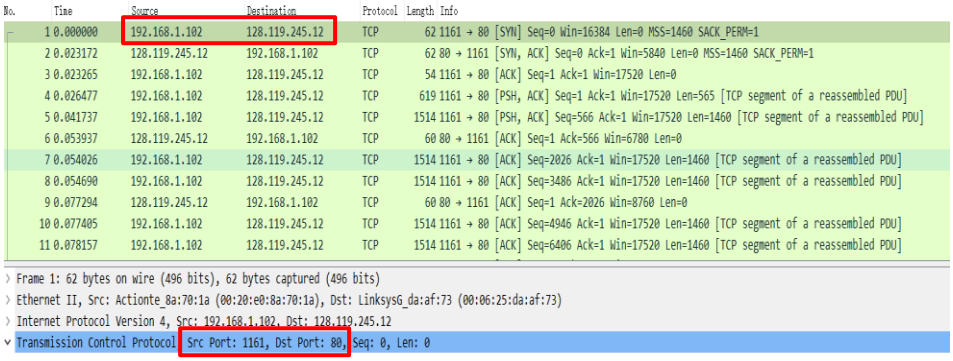
Exercise 1

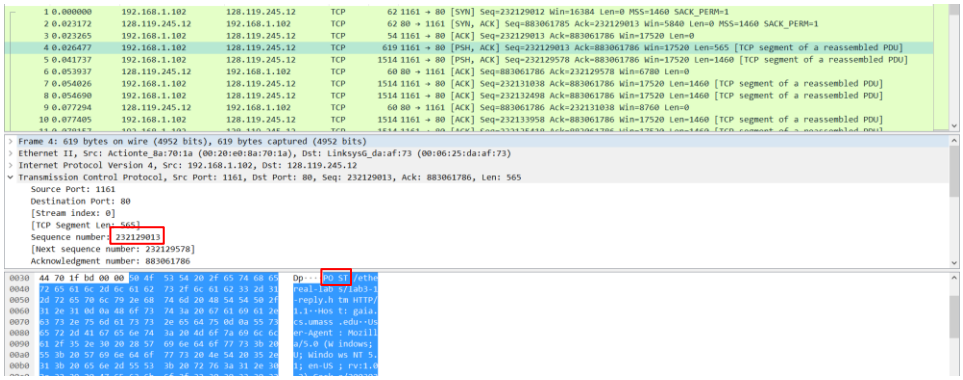
Question 1:

1) the IP address of gaia.cs.umass.edu is : 128.119.245.12
   port number: 80
2) the IP address of client computer is: 192.168.1.102
   port number: 1161



Question 2:

the sequence number of the TCP segment is: 232129013



Question 3:

NO.	Seg1	Seg2	Seg3	Seg4	Seg5	Seg6
Sequence Number	232129013	232129578	232131038	232132498	232133958	232135418
Time sent	0.026477 sec	0.041737 sec	0.054026 sec	0.054690 sec	0.077405 sec	0.078157 sec
Time ACK received	0.053937 sec	0.077294 sec	0.124085 sec	0.169118 sec	0.217299 sec	0.267802 sec
Sample RTT	0.02746 sec	0.035557 sec	0.070059 sec	0.11443 sec	0.13989 sec	0.18964 sec
Estimated RTT	0.02746 sec	0.028472 sec	0.03367 sec	0.043765 sec	0.055781 sec	0.072514 sec

Question 4:

Seg 1 = 565 bytes
Seg 2 = 1460 bytes
Seg 3 = 1460 bytes
Seg 4 = 1460 bytes
Seg 5 = 1460 bytes
Seg 6 = 1460 bytes

Question 5:

1) Min buffer: 5840 bytes
2) No, it doesn't throttle the sender.

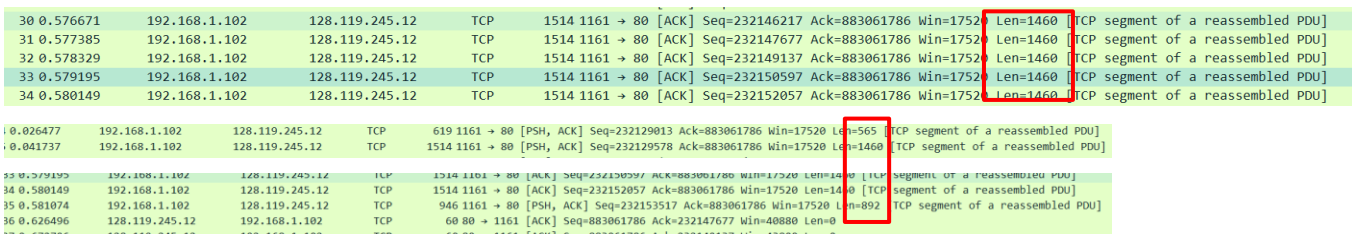
Question 6:

There is no retransmitted segment in the trace file.

As all sequence numbers of the TCP segments are increasing with the time. If there is a retransmitted segment, the sequence number will be smaller than previous segments sequence number.

Question 7:

the receiver typically acknowledges 565, 1460, 892 bytes of data in an ACK



Question 8:

Total data transmitted

= acknowledgement seq number of last seg – seq number of first segment

= 232,293,103 – 232,129,013 bytes

=164,090 bytes

Transmission time = 5.455830 – 0.026477 = 5.429353 sec

Throughput = 164,090 bytes / 5.429353 sec = 30223 bps

Exercise 2

Question 1:

The sequence number of the TCP SYN segment is: 2818463618.

Question 2:

1) the sequence Number of SYNACK Segment: 1247095790.
2) The value is : 2818463619.
3) The server adds 1 on the initial serial number sent by the client.

Question 3:

1) The sequence number is: 2818463619.
2) The value is: 1247095791.
3) This segment contains 2818463652-2818463619=33bytes data.

Question 4:

It is the simultaneous close. Both client and server did the active close. From no. 304 & 305 the seq and ack did not increase.

Question 5:

Client to server:

Data = 2818463653 (ISN) - 2818463618 (Final ACK) - 1(SYN) - 1(FIN) = 33 Bytes

Server to client:

Data = 1247095832 (ISN) - 1247095790 (Final ACK) - 1(SYN) - 1(FIN) = 40 Bytes