

EXERCISE 1

1. IP address of gaia.cs.umass.edu: 128.119.245.12
Dest Port: 80
IP address used by the client computer (source): 192.168.1.102
Src Port: 1161
2. Sequence number: 1
- 3.

Sequence	Sequence Number	Time Sent (s)	Time ACK Received (s)	RTT (s)	Estimated RTT
1	1	0.026477	0.053937	0.02746	0.02746
2	566	0.041737	0.077294	0.035557	0.028472125
3	2026	0.054026	0.124085	0.073659	0.034120484
4	3486	0.054690	0.169118	0.114428	0.044158924
5	4946	0.077405	0.217299	0.139894	0.056125808
6	6406	0.078157	0.267802	0.189645	0.072815707

4.

Sequence	Length
1	565
2	1460
3	1460
4	1460
5	1460
6	1460

5. Min buffer: 5840
No, receiver buffer doesn't throttle the sender (receiver steadily grows until max of 62780)
6. No retransmitted segments. To answer this question, check for segments with the same sequence number, implying that a previously sent segment is being resent as segments are identified by their sequence number.
7. Typically, receiver acknowledges 1460 bytes in an ACK most likely because MSS = 1460 bytes. There are cases that occur where the receiver acks every other segment and the amount of data is doubled.
8. To workout bytes transferred/time unit we need:
 1. Workout number of bytes sent
 2. Total transmission time

Total bytes sent = ACK number of last segment - sequence number of the first segment = 164091-1
= 164090 bytes

Total transmission time = time at last segment - time at first segment = 5.455830-0.026477
= 5.429353 s

Throughput = total number of bytes/total transmission time = 164090/5.429353
=30222.7539819 bytes/seconds

EXERCISE 2

1. Sequence number: 2818463618
2. Sequence Number: 1247095790
Acknowledgement field value: 2818463619
The server determines this value by adding 1 to the sequence number of the SYN segment. 1 is added because the SYN is 1 byte.
Determines value by adding 1 to seq number of the SYN segment since SYN byte is 1.
3. Sequence Number: 2818463619
Acknowledgement field value: 1247095791
The segment does not contain data.
4. Client has done the active close (determined by the client being the source of the first FIN/ACK)

The 3 Segment closure has been performed.

5. Total Bytes = ACK sequence number of last ACK – sequence number of first segment = 2818463653 – 2818463618
= 35 Bytes

The relationship between total number of bytes sent with the initial sequence and the final ack received is:

Total number of bytes sent = ACK number from final ACK – initial sequence number