Exercise 1

Question1: The IP address of gaia.cs.umass.edu is 128.119.245.12, it is sending and receiving TCP segments on port 80. The IP address and TCP port number of the source is 192.168.1.102 and 1161.

Question2: The sequence number of the TCP segment containing POST command is 883061786.

Question3:
six segments in the TCP connection:

4th packet – 232129013, sent time(0.026477) , ACK received(0.053937) , RTT (0.053937-0.026477 = 0.02746) , eRTT(0.02746)

5th packet – 232129578, sent time(0.041737) , ACK received(0.077294) , RTT (0.035557) , eRTT(0.0285)

7th packet – 232131038, sent time(0.054026) , ACK received(0.124085) , RTT (0.070059) , eRTT(0.0337)

8th packet – 232132498, sent time(0.054690) , ACK received(0.169118) , RTT (0.11443) , eRTT(0.0438)

10th packet – 232133958, sent time(0.077405) , ACK received(0.2172799) , RTT (0.13989) , eRTT(0.0558)

11th packet – 232135418, sent time(0.078157) , ACK received(0.267802) , RTT (0.18964) , eRTT(0.0725)

Question4: The 4th TCP segment length is 565, all other segments length are 1460.

Question5: The minimum window size value is 5840. No, there is no throttle in the trace file.

Question6: There is no retransmitted segment in the trace file. We can check the sequence number of the TCP segment in the trace file.

Question7: From the received-sent packet pair, we can derive that the receiver typically acknowledges 1460 bytes data. For example, from the 59th to the 60th , acking number seems increasing too much (from 232164061 to 232166981, data is 2917 bytes, nearly twice bigger than the normal 1460 bytes data), so it can be seen that the receiver is acking other received segments also.

Question8:

4th packet sequence number - 202nd ACK number = 164090 bytes

5.455830 – 0.26477 = 5.4294 s

From the fourth packet to the 202nd packet from the trace file, the total data is 164090 bytes and the total transmission time is 5.4294s, so the throughput is 164090 / 5.4294 = 30222bytes.

Exercise 2

Question1: The sequence number of the TCP SYN segment is 2818463618.

Question2: Sequence number is 1247095790. ACK is 2818463619. Sequence number of the TCP SYN segment plus 1: 2818463618 + 1 = 2818463619.
Question3: Sequence number is 2818463619, ack is 1247095791. It doesn’t contain any data in it.

Question4: Client and server both have done the active close simultaneously. Who sent the FIN bit first will usually be the one done the active close, however in this case, it is a simultaneously close. Simultaneous closure has been performed.

Question5:

Data bytes transferred from the client to the server: 33 bytes
Data bytes transferred from the server to the client: 40 bytes

data transferred length = AckNumber – initial sequence number