# Lab exercise 4

## Exercise 1

Question 1

- Ip address: 128.119.245.12
- Port 80
- IP address: 192.168.1.102
- Port 1161

Question 2

- Sequence: 232129013

Question 3

| Seq No | Sent time | Ack recv. Time | RTT | Estimated RTT (ms) |
|---|---|---|---|---|
| 232129013 | 0.026477 | 0.053937 | 0.02746 | 0.02746 |
| 232129578 | 0.041737 | 0.077294 | 0.035557 | 0.02847213 |
| 232131038 | 0.054026 | 0.124085 | 0.070059 | 0.03367048 |
| 232132498 | 0.054690 | 0.169118 | 0.114428 | 0.04376517 |
| 232133958 | 0.077405 | 0.217299 | 0.139894 | 0.05578128 |
| 232135418 | 0.078157 | 0.267802 | 0.189645 | 0.07251424 |

For estimatedRTT = (1-a)*EstimatedRTT+ a*(Sample RTT)

Question 4

- Segment 1: 565 bytes
- Segment 2: 1460 bytes
- Segment 3: 1460 bytes
- Segment 4: 1460 bytes
- Segment 5: 1460 bytes
- Segment 6: 1460 bytes

Question 5

- Minimum buffer size is 5840
- Yes because the next segment shows that the window size becomes larger. Then the client is able to send 5 packets at once

Question 6

- No
- You can check using *tcp.analysis.retransmission* in the filter

Question 7

- Typically ack's 1460 bytes of data

- It acks for every package receives. There is no identified cases where it is acking every other segment because there are no retransmission of that segment before timeout

Question 8
Start time: 0.026477
End time: 5.455830

Start seq: 232129012
End seq3: 232293103

Total data transmitted = 232293103-232129012 = 164091 bytes

Transmission time: 5.429353 seconds

Throughput = 165091/5.429353 = 30,407.12 bytes per sec

## Exercise 2

Question 1
- Initiates at 2818463618

Question 2
- Sequence number: 1247095790
- Acknowledgement: 2818463619
- Determined by sequence number sent by client as seq than ack is calculated as the sequence + 1. It is acknowledging it has received everything up till byte 2818463618 now waiting for byte 2818463619

Question 3
- Sequence number: 2818463619
- Acknowledgement: 1247095791
- No it doesn't contain any data

Question 4
- The client does active close. The client's ip is 10.0.16.201 who sends the FIN segment first
- It performs a  four segment close

Question 5
- Client to server: 2818463653– 2818463618-1 = 33
- Server to client:  1247095831-1247095790 -1 = 40
- The final Ack – initial seq – 2 is the total of bytes sent over the connection. Final ack is the last acknowledged byte in the stream