

Exercise 1

1. The IP address of gaia.cs.umass.edu is 128.119.245.12. It was using port 80. The IP address of client computer is 192.168.1.102. The port is 1161.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=0 Len=0
2	0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061786 Win=65535 Len=0
3	0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=883061786 Len=0
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=883061786 Len=565
5	0.041737	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=232129013 Len=0
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232129578 Len=0
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=883061786 Len=0

Frame 4: 619 bytes on wire (4952 bits), 619 bytes captured (4952 bits) on interface 0
 Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
 Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12
 Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 232129013, Ack: 883061786, Len: 565

0020 f5 0c 04 89 00 50 0d d6 01 f5 34 a2 74 1a 50 18P...4.t.P.
 0030 44 70 1f bd 00 00 50 4f 53 54 20 2f 65 74 68 65 Dp...PO ST /ethe
 0040 72 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 33 2d 31 real-lab s/lab3-1
 0050 2d 72 65 70 6c 79 2e 68 74 6d 20 48 54 50 2f -reply.htm HTTP/
 0060 31 2e 31 0d 0a 48 6f 73 74 3a 20 67 61 69 61 2e 1.1. Host: gaia.
 0070 63 73 2e 75 6d 61 73 73 2e 65 64 75 0d 0a 55 73 cs.umass.edu.Us
 0080 65 72 2d 41 67 65 6e 74 3a 20 4d 6f 7a 69 6c 6c er-Agent : Mozill

2. The sequence number is 232129013. "POST" is in the second line in data field.
3. the sequence numbers of the first six segments are 232129013, 232129578, 232121038, 232132498, 232133958 and 2321235418. The segments were sent 0.026447s, 0.041737s, 0.054026s, 0.054690s, 0.077405s and 0.078157s after starting capture. First RTT is 0.02746s. Second RTT is 0.03557s. Third RTT is 0.070059s. Forth RTT is 0.114428s. Fifth RTT is 0.139894s. Sixth RTT is 0.189645s. Estimated RTT are 0.02746s, 0.028472s, 0.033699s, 0.043790s, 0.055803s and 0.072533s.

No.	Time	Source	Destination	Protocol	Length	Info
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=883061786 Len=565
5	0.041737	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=232129013 Len=0
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232129578 Len=0
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=883061786 Len=0
8	0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=883061786 Len=0
9	0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232132498 Len=0
10	0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=883061786 Len=0
11	0.078157	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232135418 Ack=883061786 Len=0
12	0.124085	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232135418 Len=0
13	0.124185	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=232136878 Ack=883061786 Len=1141
14	0.169118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232136878 Len=0
15	0.217299	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232136878 Len=0

First six segments

Time	Source	Destination	Protocol	Length	Info
1 0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384
2 0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=
3 0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=88306
4 0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=
5 0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=
6 0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23212
7 0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=88306
8 0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=88306
9 0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
10 0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=88306
11 0.078157	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232135418 Ack=88306
12 0.124085	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
13 0.124185	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=232136878 Ack=
14 0.169118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
15 0.217299	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
16 0.267802	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
17 0.304807	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213

Forth request and ack

Time	Source	Destination	Protocol	Length	Info
1 0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384
2 0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=
3 0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=88306
4 0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=
5 0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=
6 0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23212
7 0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=88306
8 0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=88306
9 0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
10 0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=88306
11 0.078157	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232135418 Ack=88306
12 0.124085	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
13 0.124185	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=232136878 Ack=
14 0.169118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
15 0.217299	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
16 0.267802	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
17 0.304807	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213

Fifth request and ack

Time	Source	Destination	Protocol	Length	Info
1 0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384
2 0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=
3 0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=88306
4 0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=
5 0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=
6 0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23212
7 0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=88306
8 0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=88306
9 0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
10 0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=88306
11 0.078157	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232135418 Ack=88306
12 0.124085	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
13 0.124185	192.168.1.102	128.119.245.12	TCP	1201	1161 → 80 [PSH, ACK] Seq=232136878 Ack=
14 0.169118	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
15 0.217299	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
16 0.267802	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213
17 0.304807	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=23213

Sixth request and ack

- The length of first TCP segment is 565 bytes. The rest of five TCP segments are 1460 bytes.

Time	Source	Destination	Protocol	Length	Info
1 0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384
2 0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=232129013 Win=5840 Len=0
3 0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=883061786 Win=17520 Len=0
4 0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=883061786 Win=17520 Len=619
5 0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=883061786 Win=17520 Len=1514
6 0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232129578 Win=17520 Len=0

Frame 4: 619 bytes on wire (4952 bits), 619 bytes captured (4952 bits)
 Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
 Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12
 Transmission Control Protocol, Src Port: 1161, Dst Port: 80, Seq: 232129013, Ack: 883061786, Len: 565
 Source Port: 1161
 Destination Port: 80
 [Stream index: 0]
 [TCP Segment Len: 565]
 Sequence Number: 232129013
 [Next Sequence Number: 232129578]
 Acknowledgment Number: 883061786

- The minimum amount of available buffer space is 5840 bytes. While it is minimum buffer space, most of data packet sent from sender is no bigger than 2000 bytes. So it will not affect sender.

Time	Source	Destination	Protocol	Length	Info
1 0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384 Len=0 MSS=1460 SACK_P...
2 0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=232129013 Win=5840 Len=0
3 0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=883061786 Win=17520 Len=0
4 0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=883061786 Win=17520 Len=619
5 0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=883061786 Win=17520 Len=1514
6 0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232129578 Win=17520 Len=0
7 0.054000	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=883061786 Win=17520 Len=1460
8 0.054000	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=883061786 Win=17520 Len=1460
9 0.054000	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232131038 Win=8760 Len=0
10 0.054000	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=883061786 Win=17520 Len=1460
11 0.054000	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232135418 Ack=883061786 Win=17520 Len=1460

Frame 2: 62 bytes on wire (496 bits), 62 bytes captured (496 bits)
 Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:70:1a)
 Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
 Transmission Control Protocol, Src Port: 80, Dst Port: 1161, Seq: 883061785, Ack: 232129013, Len: 0

- No. To find out it, check every ack number of responses sent from port 80 to port 1161. If any of them are same, loss of packets happened.
- The receiver typically acknowledged 1460 bytes in an ACK. Sometimes different numbers of bytes were acknowledged. For example, the receiver acknowledged 565 bytes in sixth segment, whose corresponding segment

is forth segment sending 565 bytes to the receiver. There are cases where the receiver is ACKing every other received segment. For example, segment 59 is the ACK of segment 53, which we can get from highlighting segment 59 and find a tick before segment 53. However, segment 60 is the ACK of segment 55, which means there is no ACK corresponding to segment 54. Therefore ACK 60 correspond to both segment 54 and 55.

No.	Time	Source	Destination	Protocol	Length	Info
52	1.117097	128.119.245.12	192.168.1.102	TCP	62	1161 → 80 [SYN] Seq=232129012 Win=16384 Len=0 MSS=1460 SACK_P...
53	1.117333	192.168.1.102	128.119.245.12	TCP	62	80 → 1161 [SYN, ACK] Seq=883061785 Ack=232129013 Win=5840 Len=...
54	1.118133	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ack=883061786 Win=17520 Len=0
55	1.119029	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=232129013 Ack=883061786 Win=17520 Le...
56	1.119858	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=232129578 Ack=883061786 Win=17520 Le...
57	1.120902	192.168.1.102	128.119.245.12	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232129578 Win=6780 Len=0
58	1.121891	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ack=883061786 Win=17520 Len=146...
59	1.200421	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ack=883061786 Win=17520 Len=146...
60	1.265026	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ack=232131038 Win=8760 Len=0
61	1.362074	128.119.245.12	192.168.1.102	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ack=883061786 Win=17520 Len=146...

No.	Time	Source	Destination	Protocol	Length	Info
52	1.117097	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
53	1.117333	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232162601 Ac
54	1.118133	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232164061 Ac
55	1.119029	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232165521 Ac
56	1.119858	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232166981 Ac
57	1.120902	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232168441 Ac
58	1.121891	192.168.1.102	128.119.245.12	TCP	946	1161 → 80 [PSH, ACK] Seq=2321699
59	1.200421	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
60	1.265026	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
61	1.362074	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac

0101 = Header Length: 20 bytes (5)

Flags: 0x010 (ACK)

Window: 62780

[Calculated window size: 62780]

[Window size scaling factor: -2 (no window scaling used)]

Checksum: 0x3cbc [unverified]

[Checksum Status: Unverified]

ACK 59

No.	Time	Source	Destination	Protocol	Length	Info
52	1.117097	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
53	1.117333	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232162601 Ac
54	1.118133	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232164061 Ac
55	1.119029	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232165521 Ac
56	1.119858	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232166981 Ac
57	1.120902	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232168441 Ac
58	1.121891	192.168.1.102	128.119.245.12	TCP	946	1161 → 80 [PSH, ACK] Seq=2321699
59	1.200421	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
60	1.265026	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
61	1.362074	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac

0101 = Header Length: 20 bytes (5)

Flags: 0x010 (ACK)

Window: 62780

[Calculated window size: 62780]

[Window size scaling factor: -2 (no window scaling used)]

Checksum: 0x3154 [unverified]

[Checksum Status: Unverified]

ACK 60

8. The throughput is 30222 bytes per second. To get the number, use the last ACK number that acknowledging received a TCP packet, which is sent by segment 202, to minus first sequence number, which is sent by forth segment, to get the total transferred data. $232293103 - 232129013 = 164090$ bytes. To calculate time, minus the time of same two segment. $5.455830 - 0.026477 = 5.455830$ s. $164090 / 5.455830 = 30222$ bytes per second.

No.	Time	Source	Destination	Protocol	Length	Info
196	5.201150	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232291321 Ac
197	5.202024	192.168.1.102	128.119.245.12	TCP	326	1161 → 80 [PSH, ACK] Seq=2322927
198	5.297257	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
199	5.297341	192.168.1.102	128.119.245.12	HTTP	104	POST /ethereal-labs/lab3-1-reply
200	5.389471	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
201	5.447887	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
202	5.455830	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
203	5.461175	128.119.245.12	192.168.1.102	HTTP	784	HTTP/1.1 200 OK (text/html)
206	5.651141	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232293103 Ac
213	7.595557	192.168.1.102	199.2.53.206	TCP	62	1162 → 631 [SYN] Seq=234062521 W

0101 = Header Length: 20 bytes (5)
Flags: 0x010 (ACK)
Window: 62780
[Calculated window size: 62780]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x44a8 [unverified]
[Checksum Status: Unverified]

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	128.119.245.12	TCP	62	1161 → 80 [SYN] Seq=232129012 Wi
2	0.023172	128.119.245.12	192.168.1.102	TCP	62	80 → 1161 [SYN, ACK] Seq=8830617
3	0.023265	192.168.1.102	128.119.245.12	TCP	54	1161 → 80 [ACK] Seq=232129013 Ac
4	0.026477	192.168.1.102	128.119.245.12	TCP	619	1161 → 80 [PSH, ACK] Seq=2321290
5	0.041737	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [PSH, ACK] Seq=2321295
6	0.053937	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
7	0.054026	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232131038 Ac
8	0.054690	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232132498 Ac
9	0.077294	128.119.245.12	192.168.1.102	TCP	60	80 → 1161 [ACK] Seq=883061786 Ac
10	0.077405	192.168.1.102	128.119.245.12	TCP	1514	1161 → 80 [ACK] Seq=232133958 Ac

0101 = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
Window: 17520
[Calculated window size: 17520]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0x1fbd [unverified]
[Checksum Status: Unverified]

Exercise 2

1. The sequence number of the TCP SYN segment is 2818463618.
2. the sequence number of the SYNACK segment is 1247095790. The value of the Acknowledgement field in the SYNACK segment is sequence number of SYN segment plus 1, which is 2818463619.
3. the sequence number of the ACK segment sent by the client computer in response to the SYNACK is 2818463619. value of the Acknowledgment field in this ACK segment is 1247095791. It did not contain any data.
4. The client has done the active close. Because the earliest record contained FIN is sent from client. It was a 3 Segment close, since FIN and ACK are send simultaneously in segment 304, 305.
5. 35 bytes have been transferred. It can be told from the difference between

the Initial Sequence Number and the final ACK received from the other side.