Name :

Abubaker Attique

Roll no :

P20-0560

Section :

5-A

Lab 09

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Lab Task:

1. **What is the source and destination port numbers?**

Answer :

Source port :60643

Destination port: 80

1	0.000000	192.168.1.122	64.238.147.113	TCP	78 60643 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 TSval=256679793 TSecr=0 SACK_PE

.....

2. **What is the sequence number of the TCP SYN segment that is used to initiate the TCP connection? What is it in the segment that identifies the segment as a SYN segment?**

Answer :

Sequence Number: 0

TCP Segment Len: 0

The value is 0 in this trace. The SYN flag is set to 1 and it indicates that this segment is a SYN,ACK segment.

```
> Frame 1: 78 bytes on wire (624 bits), 78 bytes captured (624 bits)
> Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (0
> Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
v Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 0, Len: 0
    Source Port: 60643
    Destination Port: 80
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 0]
    Sequence Number: 0    (relative sequence number)
    Sequence Number (raw): 2682012317
    [Next Sequence Number: 1    (relative sequence number)]
    Acknowledgment Number: 0
    Acknowledgment number (raw): 0
```

3. What is the sequence number of the SYNACK segment sent by the server to the client computer in reply to the SYN? What is the value of the Acknowledgement field in the SYNACK segment? How did server determine that value? What is it in the segment that identifies the segment as a SYNACK segment?

Answer :

Acknowledgment Number = 1 (relative ack number)

Sequence Number (raw) = 349487776

The server adds 1 to the initial sequence number of SYN segment form the client computer because window size is 1. For this case, the initial sequence number of SYN segment from the client computer is 0, thus the value of the Acknowledgement field in the SYNACK segment is 1.

Window = 5792

4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /si
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 →
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 →
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 →

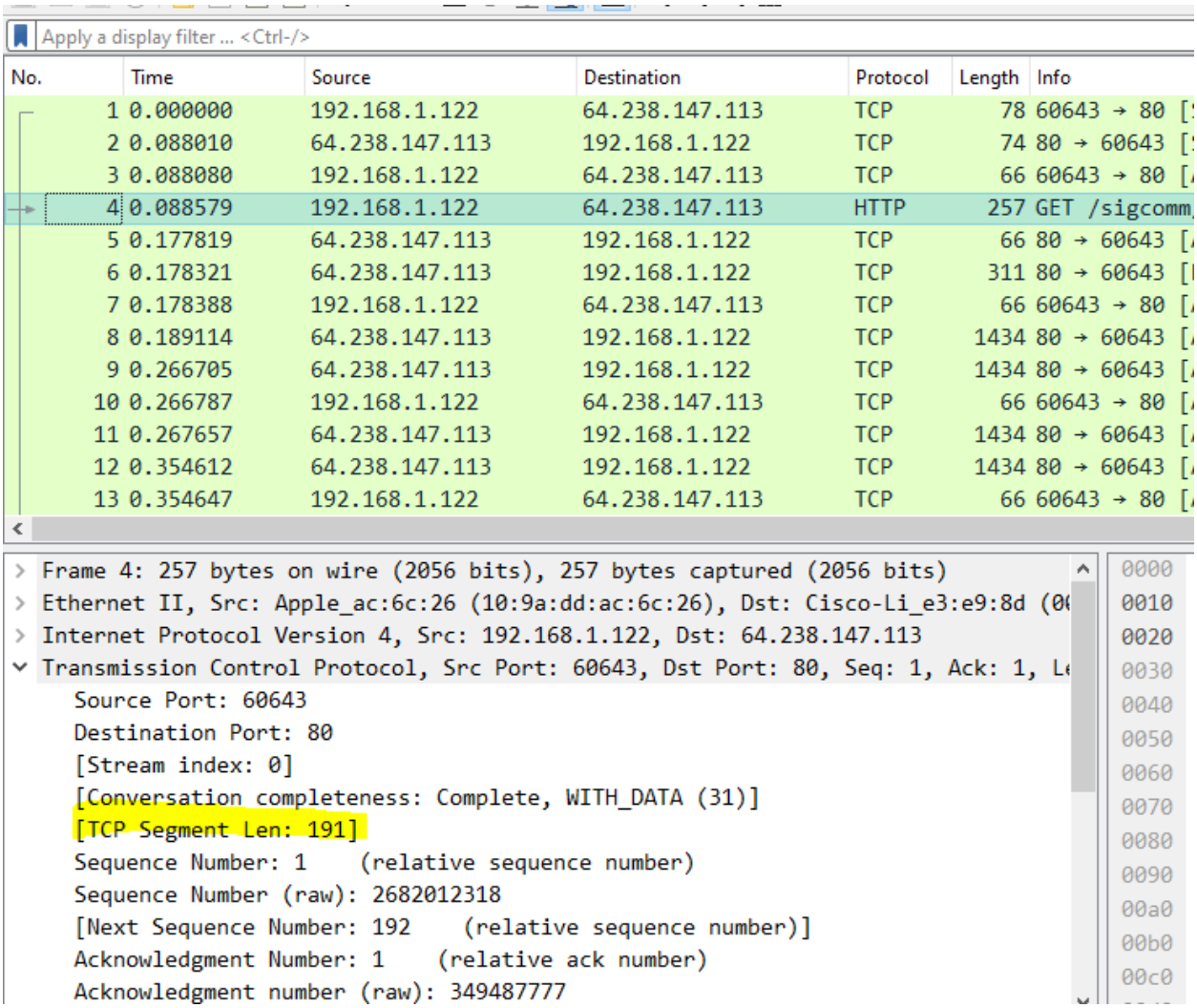
```
[Conversation completeness: Complete, WITH_DATA (31)]
[TCP Segment Len: 0]
Sequence Number: 0    (relative sequence number)
Sequence Number (raw): 349487776
[Next Sequence Number: 1    (relative sequence number)]
Acknowledgment Number: 1    (relative ack number)
Acknowledgment number (raw): 2682012318
1010 .... = Header Length: 40 bytes (10)
Flags: 0x012 (SYN, ACK)
Window: 5792
[Calculated window size: 5792]
Checksum: 0x67d7 [unverified]
[Checksum Status: Unverified]
Urgent Pointer: 0
```

.....

4. **What is the length of each of the first six TCP segments?**

Answer :

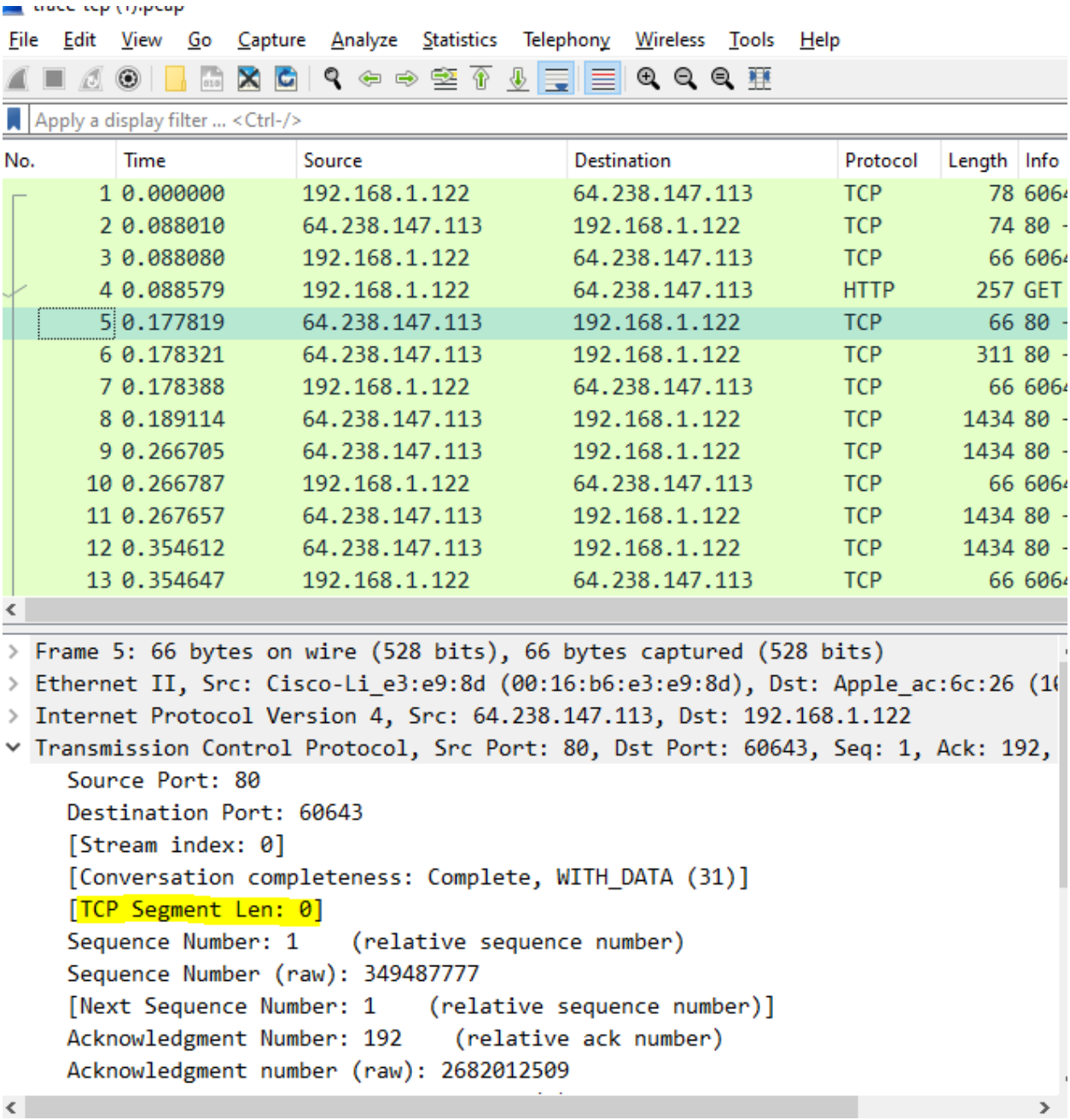
1:



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 → 80 [
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 → 60643 [
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /sigcomm
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60643 [
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60643 [
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60643 [
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 → 80 [

```
> Frame 4: 257 bytes on wire (2056 bits), 257 bytes captured (2056 bits)
> Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d (0
> Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
v Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 1, Ack: 1, L
    Source Port: 60643
    Destination Port: 80
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 191]
    Sequence Number: 1    (relative sequence number)
    Sequence Number (raw): 2682012318
    [Next Sequence Number: 192    (relative sequence number)]
    Acknowledgment Number: 1    (relative ack number)
    Acknowledgment number (raw): 349487777
```

2:



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	6064
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 -
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	6064
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 -
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 -
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	6064
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 -
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 -
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	6064
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 -
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 -
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	6064

```
> Frame 5: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
> Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (1
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
v Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192,
    Source Port: 80
    Destination Port: 60643
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 0]
    Sequence Number: 1    (relative sequence number)
    Sequence Number (raw): 349487777
    [Next Sequence Number: 1    (relative sequence number)]
    Acknowledgment Number: 192    (relative ack number)
    Acknowledgment number (raw): 2682012509
```

3:

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Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643 -
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 → 60
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	60643 -
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /si
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 → 60
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 → 60
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643 -
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643 -
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 → 60
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643 -

```
> Frame 6: 311 bytes on wire (2488 bits), 311 bytes captured (2488 bits)
> Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (16
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
v Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192,
    Source Port: 80
    Destination Port: 60643
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 245]
    Sequence Number: 1    (relative sequence number)
    Sequence Number (raw): 349487777
    [Next Sequence Number: 246    (relative sequence number)]
    Acknowledgment Number: 192    (relative ack number)
    Acknowledgment number (raw): 2682012509
```

4:

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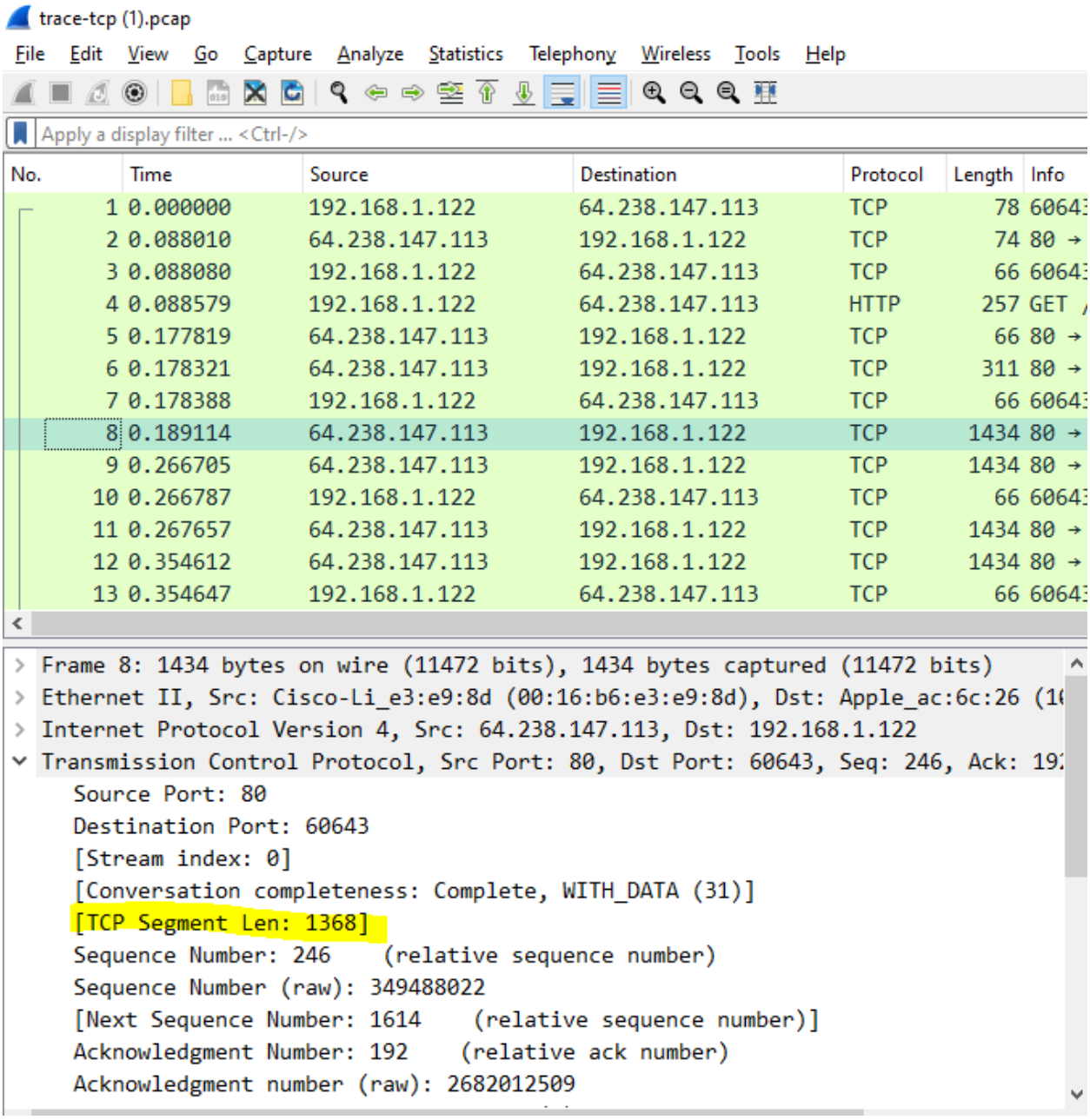
Apply a display filter ... <Ctrl-/>

).	Time	Source	Destination	Protocol	Length
1	0.000000	192.168.1.122	64.238.147.113	TCP	78
2	0.088010	64.238.147.113	192.168.1.122	TCP	74
3	0.088080	192.168.1.122	64.238.147.113	TCP	66
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257
5	0.177819	64.238.147.113	192.168.1.122	TCP	66
6	0.178321	64.238.147.113	192.168.1.122	TCP	311
7	0.178388	192.168.1.122	64.238.147.113	TCP	66
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434
10	0.266787	192.168.1.122	64.238.147.113	TCP	66
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434
13	0.354647	192.168.1.122	64.238.147.113	TCP	66

```
Frame 7: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: Cisco-Li_e3:e9:8d
Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 192, Ack:
    Source Port: 60643
    Destination Port: 80
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 0]
    Sequence Number: 192    (relative sequence number)
    Sequence Number (raw): 2682012509
    [Next Sequence Number: 192    (relative sequence number)]
    Acknowledgment Number: 246    (relative ack number)
    Acknowledgment number (raw): 349488022
```

5:



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	6064
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 →
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	6064
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 →
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 →
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	6064
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 →
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 →
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	6064
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 →
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 →
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	6064

```
> Frame 8: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits)
> Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (1
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
v Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 246, Ack: 19
    Source Port: 80
    Destination Port: 60643
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 1368]
    Sequence Number: 246    (relative sequence number)
    Sequence Number (raw): 349488022
    [Next Sequence Number: 1614    (relative sequence number)]
    Acknowledgment Number: 192    (relative ack number)
    Acknowledgment number (raw): 2682012509
```

6:

trace-tcp (1).pcap

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Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.122	64.238.147.113	TCP	78	60643
2	0.088010	64.238.147.113	192.168.1.122	TCP	74	80 →
3	0.088080	192.168.1.122	64.238.147.113	TCP	66	60643
4	0.088579	192.168.1.122	64.238.147.113	HTTP	257	GET /
5	0.177819	64.238.147.113	192.168.1.122	TCP	66	80 →
6	0.178321	64.238.147.113	192.168.1.122	TCP	311	80 →
7	0.178388	192.168.1.122	64.238.147.113	TCP	66	60643
8	0.189114	64.238.147.113	192.168.1.122	TCP	1434	80 →
9	0.266705	64.238.147.113	192.168.1.122	TCP	1434	80 →
10	0.266787	192.168.1.122	64.238.147.113	TCP	66	60643
11	0.267657	64.238.147.113	192.168.1.122	TCP	1434	80 →
12	0.354612	64.238.147.113	192.168.1.122	TCP	1434	80 →
13	0.354647	192.168.1.122	64.238.147.113	TCP	66	60643

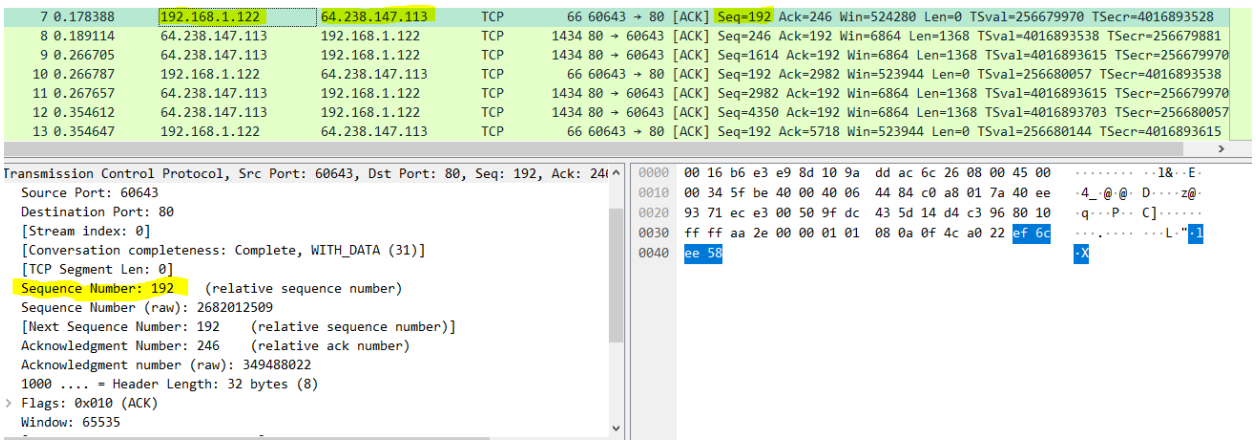
```
> Frame 9: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits)
> Ethernet II, Src: Cisco-Li_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (1
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
v Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1614, Ack: 1
    Source Port: 80
    Destination Port: 60643
    [Stream index: 0]
    [Conversation completeness: Complete, WITH_DATA (31)]
    [TCP Segment Len: 1368]
    Sequence Number: 1614    (relative sequence number)
    Sequence Number (raw): 349489390
    [Next Sequence Number: 2982    (relative sequence number)]
    Acknowledgment Number: 192    (relative ack number)
    Acknowledgment number (raw): 2682012509
```

5. Are there any retransmitted segments in the trace file? What did you check for (in the trace) in order to answer this question?

Answer :

Yes there is retransmitted in packet 7 and packet 10 because the source and destination both are same in packets and the sequence number should also be same.

Packet 7:



Packet 10