Name: Waqar Ahmed

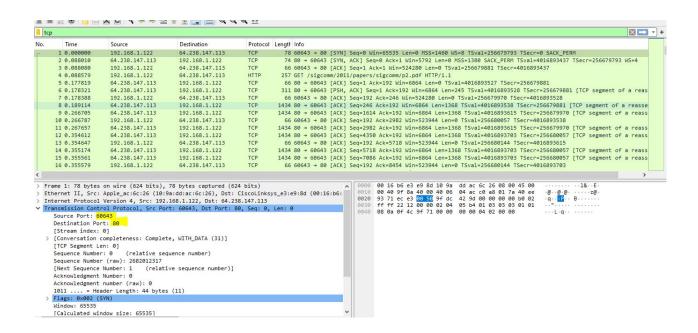
**Roll No: P200750** 

LabTask: 10

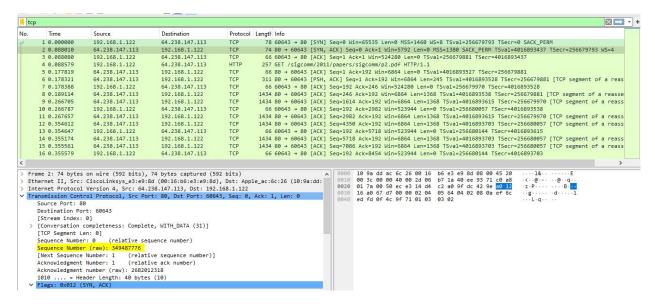
Instructor: Maa'm Hurmat

Task: Inspect the three-way handshake and answer the following questions:

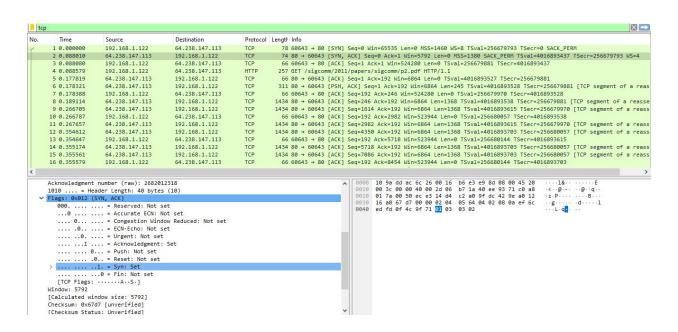
1. What is the source and destination port numbers?



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?

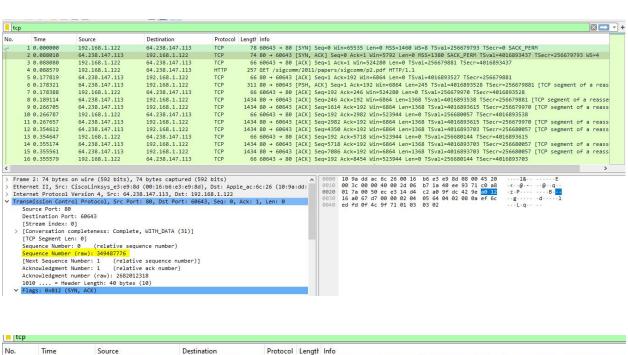


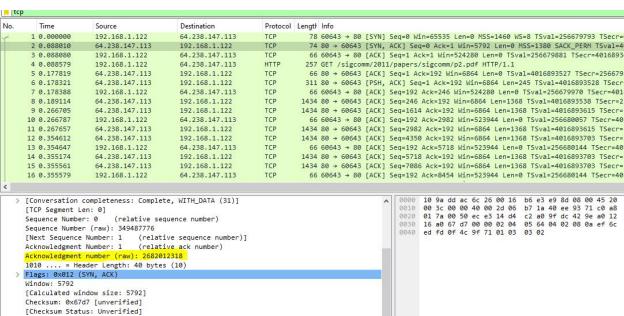
To Identify the segment that is it a SYN Segment check it SYN bit is set to 1 or not. If the SYN bit is set to 1 that means it is a SYN Segment. The segment I am inspecting is SYN because SYN bit is 1.



#### 3. What is the sequence number of the SYNACK segment sent by the server to

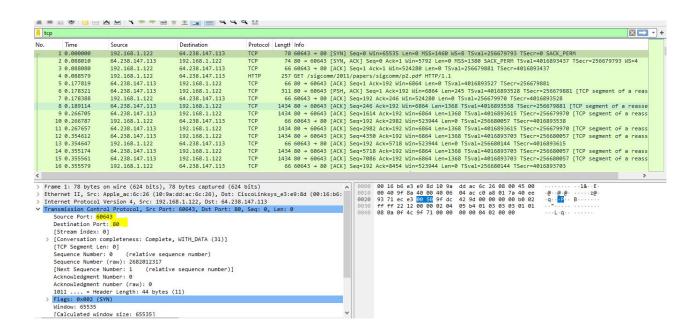
the client computer in reply to the SYN? What is the value of the Acknowledgement field in the SYNACK segment? How did server determine that value? What is it in the segment that identifies the segment as a SYNACK segment?



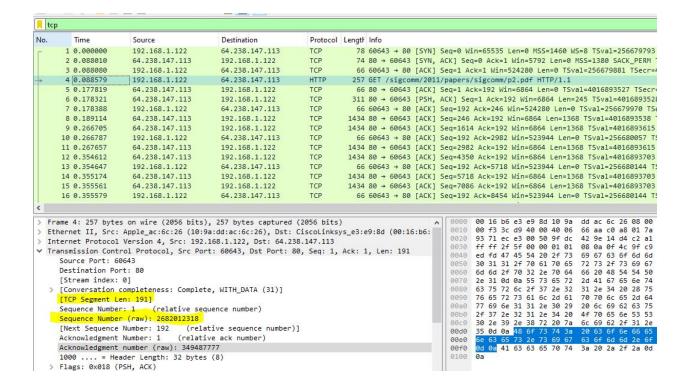


Server determines the value of Acknowledgement field by adding 1 in the previous segment sequence number.

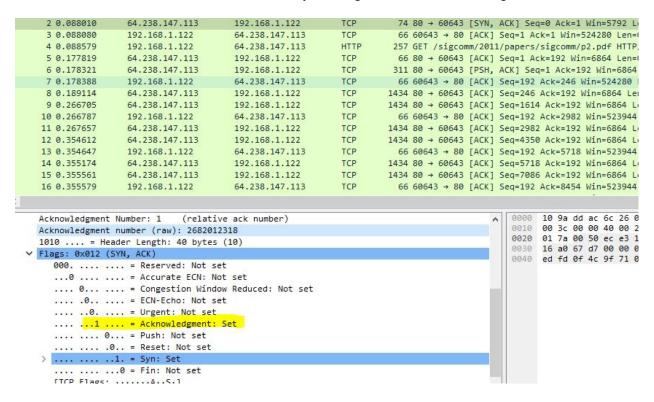
#### Previous segment sequence number:



**Acknowledgement number of the second Segment** 

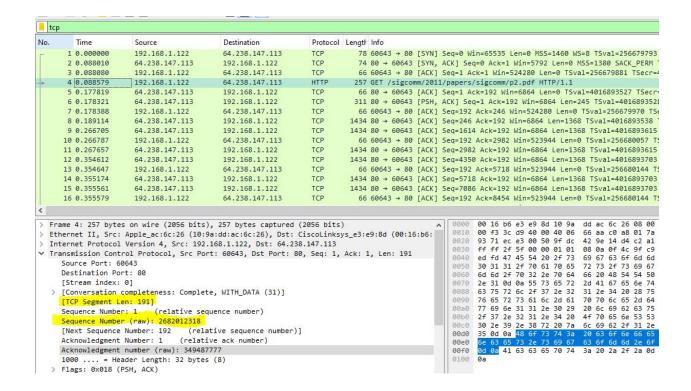


#### The **SYN** and **ACK** bit is set to 1. This identify the segment as **SYNACK** segment.



What is the length of each of the first six TCP segments?

#### After Handshaking first http length:



# **Second Tcp Segment Length:**

```
> Frame 6: 311 bytes on wire (2488 bits), 311 bytes captured (2488 bits)
> Ethernet II, Src: CiscoLinksys_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dc
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1, Ack: 192, Len: 245

     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
     1000 .... = Header Length: 32 bytes (8)
    F1--- 0-010 (DCU ACK)
```

## **Third TCP Segment Length:**

```
> 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: Ciscolinksys_e3:e9:8d (00:16:b6:
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: 246, Len: 0
     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
     1000 .... = Header Length: 32 bytes (8)
```

#### 4th TCP Segment Length:

```
> Frame 8: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits)
> Ethernet II, Src: CiscoLinksys_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac:6c:26 (10:9a:dd:
> Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
▼ Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 246, Ack: 192, Len: 1368
     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
     1000 .... = Header Length: 32 bytes (8)
```

### 5th TCP Segment Length:

```
> Frame 9: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits)
Ethernet II, Src: CiscoLinksys_e3:e9:8d (00:16:b6:e3:e9:8d), Dst: Apple_ac
Internet Protocol Version 4, Src: 64.238.147.113, Dst: 192.168.1.122
Transmission Control Protocol, Src Port: 80, Dst Port: 60643, Seq: 1614, J
     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)
```

## 6th TCP Segment Length:

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

**Ans:** Yes, there are re-transmitted segments in the trace file.

• Segment 7 has the sequence number = **192** (relative sequence number) and it has raw sequence number = **2682012509** source and destination are also same. ACK is also 1.

```
64.238.147.113
                                                            TCP
                                                                      66 80 → 60643 [ACK] Seq=1 Ack=192 Wi
      5 0.177819
                                        192.168.1.122
                   64.238.147.113 192.168.1.122
                                                            TCP
                                                                    311 80 → 60643 [PSH, ACK] Seq=1 Ack=1
      6 0.178321
                 192.168.1.122 64.238.147.113 TCP
      7 0.178388
                                                                  66 60643 → 80 [ACK] Seq=192 Ack=246
                                       192.168.1.122
      8 0.189114
                    64.238.147.113
                                                            TCP
                                                                     1434 80 → 60643 [ACK] Seq=246 Ack=192
     9 0.266705
                 64.238.147.113 192.168.1.122
                                                            TCP
                                                                  1434 80 → 60643 [ACK] Seq=1614 Ack=192
     10 0.266787
                    192.168.1.122
                                         64.238.147.113
                                                            TCP
                                                                       66 60643 → 80 [ACK] Seq=192 Ack=2982
                   64.238.147.113
                                                                     1434 80 → 60643 [ACK] Seq=2982 Ack=192
     11 0.267657
                                        192.168.1.122
                                                            TCP
     12 0.354612
                   64.238.147.113
                                       192.168.1.122
                                                            TCP
                                                                   1434 80 → 60643 [ACK] Seg=4350 Ack=192
     13 0.354647
                   192.168.1.122
                                       64.238.147.113
                                                            TCP
                                                                      66 60643 → 80 [ACK] Seq=192 Ack=5718
                                        192.168.1.122
192.168.1.122
     14 0.355174
                   64.238.147.113
                                                            TCP
                                                                    1434 80 → 60643 [ACK] Seq=5718 Ack=192
     15 0.355561
                    64.238.147.113
                                                            TCP
                                                                    1434 80 → 60643 [ACK] Seq=7086 Ack=192
     16 0.355579
                   192.168.1.122
                                        64.238.147.113
                                                            TCP
                                                                       66 60643 → 80 [ACK] Seq=192 Ack=8454
> Frame 7: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
                                                                                            9899 99 16 bf
                                                                                            0010 00 34 54
> Ethernet II, Src: Apple_ac:6c:26 (10:9a:dd:ac:6c:26), Dst: CiscoLinksys_e3:e9:8d (00:16:b6:
                                                                                            0020 93 71 ec
> Internet Protocol Version 4, Src: 192.168.1.122, Dst: 64.238.147.113
                                                                                            0030 ff ff az
∨ Transmission Control Protocol, Src Port: 60643, Dst Port: 80, Seq: 192, Ack: 246, Len: 0
                                                                                            0040 ee 58
    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)]
                                (relative ack number)
    Acknowledgment Number: 246
    Acknowledgment number (raw): 349488022
    1000 .... = Header Length: 32 bytes (8)
  > Flags: 0x010 (ACK)
    Litedam CEEDE
```

The packet is retransmitted due to these reasons.