Q1. Server was started on port _____.

50000

Q2. Client's TCP Source port_____

51120

Q3. TCP Sequence numbers don't always start at 0 because …

Initial sequence number of a packet is not zero and assigned random value for the purpose security, preventing spoofing or hacking or conflicting with other data bytes transmitted over the TCP
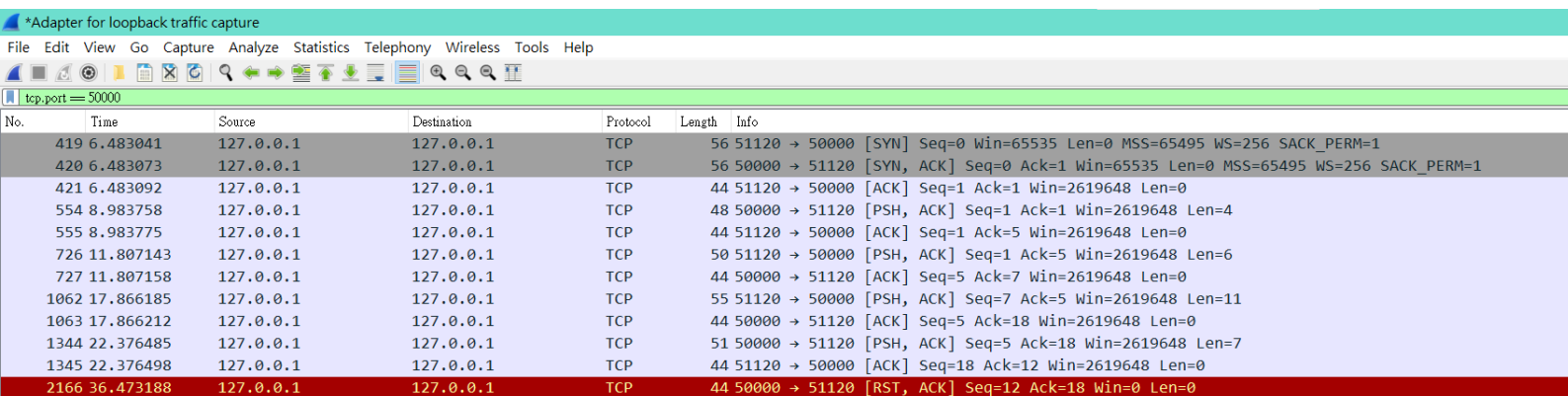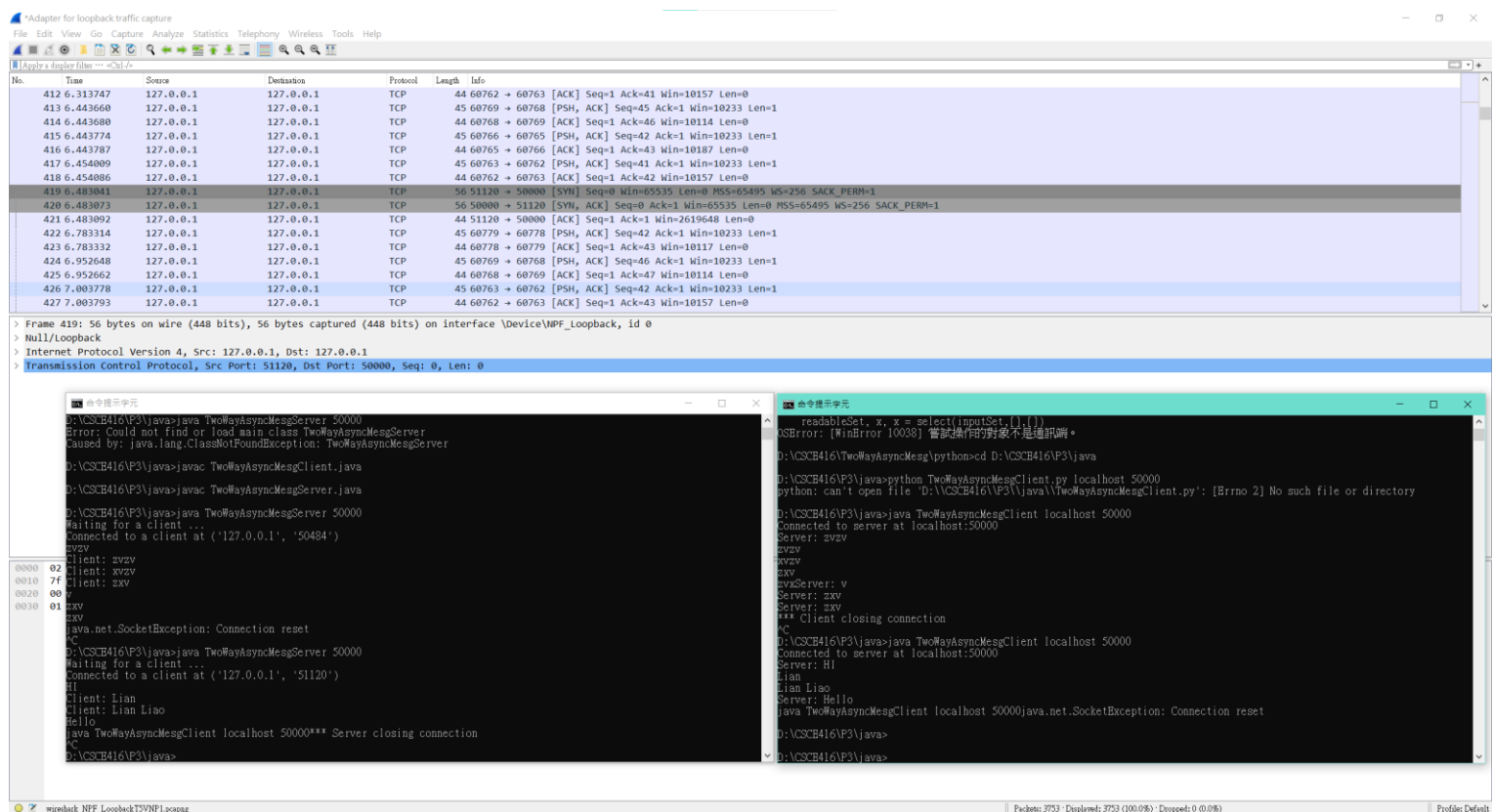
Q4. The Window Scale Factor is for .....

the TCP Window Scale Factor option is an extension to the TCP protocol that improves performance over large bandwidth paths by allowing larger blocks of data to be sent and received. It is based on RFC 1323. The TCP header uses a 16-bit window field to report the size of the receive window to the sender.

Screenshot 1

Screenshot 2

Screenshot 3

```
> Frame 1062: 55 bytes on wire (440 bits), 55 bytes captured (440 bits) on interface \Device\NPF_Loopback, id 0
> Null/Loopback
> Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
> Transmission Control Protocol, Src Port: 51120, Dst Port: 50000, Seq: 7, Ack: 5, Len: 11
> Data (11 bytes)
```

```
0000   02 00 00 00 45 00 00 33  da 55 40 00 80 06 00 00   ····E··3 ·U@·····
0010   7f 00 00 01 7f 00 00 01  c7 b0 c3 50 c5 46 0c 34   ········ ···P·F·4
0020   78 42 5a 92 50 18 27 f9  a9 e2 00 00 4c 69 61 6e   xBZ·P·'· ····Lian
0030   20 4c 69 61 6f 0d 0a                                Liao··
```

Screenshot 4

```
> Frame 419: 56 bytes on wire (448 bits), 56 bytes captured (448 bits) on interface \Device\NPF_Loopback, id 0
> Null/Loopback
> Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
v Transmission Control Protocol, Src Port: 51120, Dst Port: 50000, Seq: 0, Len: 0
      Source Port: 51120
      Destination Port: 50000
      [Stream index: 6]
      [Conversation completeness: Complete, WITH_DATA (47)]
      [TCP Segment Len: 0]
      Sequence Number: 0      (relative sequence number)
      Sequence Number (raw): 3309702189
      [Next Sequence Number: 1      (relative sequence number)]
      Acknowledgment Number: 0
      Acknowledgment number (raw): 0
      1000 .... = Header Length: 32 bytes (8)
```

Screenshot 5

```
∨ Options: (12 bytes), Maximum segment size, No-Operation (NOP), Window scale, No-Operation (NOP), No-Operation (NOP), SACK permitted
    > TCP Option - Maximum segment size: 65495 bytes
    > TCP Option - No-Operation (NOP)
    ∨ TCP Option - Window scale: 8 (multiply by 256)
        Kind: Window Scale (3)
        Length: 3
        Shift count: 8
        [Multiplier: 256]
    > TCP Option - No-Operation (NOP)
    > TCP Option - No-Operation (NOP)
    > TCP Option - SACK permitted
```