CSE421 Assignment 03 [MSMA | 2024 Fall]

Total points 80/100

Answer all the questions in this form. PDF submission is optional for the math problems/short answer questions. **You can submit only once even if you submit by mistake. Make sure that your answers are put correctly by refreshing the page. Deadline: November 19, 2024 (Tuesday) 11:59:59pm**

✓ **Q1. Which of the followings are true? *** 5/5

- [ ] TCP is faster than UDP as we can see websites get loaded within seconds
- [x] DNS uses both TCP and UDP as transport layer protocol ✓
- [ ] Both TCP and UDP initiates the connection through 3 way handshaking
- [x] Reassembling the segments are done by both TCP and UDP ✓
- [ ] None of the above

Answer Q2 to Q3 based on the following scenario.

I have opened two tabs in my browser and requested to visit the same webpage. Then the server responded with the webpage.

✓ **Q2. Source port address of the server's response can be from (Select all possible answers evaluating different scenarios)** *5/5

- [ ] Dynamic
- [x] Registered ✓
- [x] Well known ✓
- [x] 1024 to 49151 ✓
- [ ] 49152 to 65535
- [x] 0 to 1023 ✓

✓ **Q3. Destination port address of the server's response can be from *** 5/5

- [x] Dynamic ✓
- [ ] Registered
- [ ] Well known
- [ ] 1024 to 49151
- [x] 49152 to 65535 ✓
- [ ] 0 to 1023

Answer Q4 to Q5 based on the following scenario.
There are 4 computers that are requesting to a server's process. Among these computers, PC1 opens 4 connection, PC2 opens 9 connections, PC3 opens 5 connections and PC4 opens 2 connections with the server.

✓ **Q4. If the protocol used is UDP, how many sockets will be created at the server side to send the message to application layer?** *5/5

1 ✓

✓ **Q5. If the protocol used is TCP, how many sockets will be created at the server side to send the message to application layer?** *5/5

20 ✓

Answer Q6 to Q9 based on the following scenario.

A segment sent by the client has size of 500 Bytes including 48 Bytes of header. The sequence number is 3002 and acknowledgement number is 5550. The urgent flag is 1 and there are 200 Bytes of non-urgent data.

✓ **Q6. What will be placed on HLEN field of the header? (in Binary) *** 5/5

1100 ✓

✓ **Q7. What will be the value of the urgent pointer? (in Decimal) *** 5/5

251 ✓

Feedback

urgent data = 500 - 48 - 200 = 252

urgent data = last urgent byte - seq + 1
last urgent byte - seq = urgent data - 1
urgent pointer = 252 -1 = 251

✓ **Q8. What will be the value of the first non urgent byte number? (in Decimal)** *5/5

3254 ✓

Feedback

urg flag = 1 so, there is urgent data.
last urgent byte = 3002+251
first non urgent = 3002+251+1 = 3254

✓ **Q9. Which of the followings are True? *** 5/5

- [ ] The client has received 3002 Bytes of Data
- [ ] The client has received till Byte Number 3002
- [ ] The client has received till Byte Number 5550
- [ ] The client has received 5550 Bytes of Data
- [x] None of the above ✓

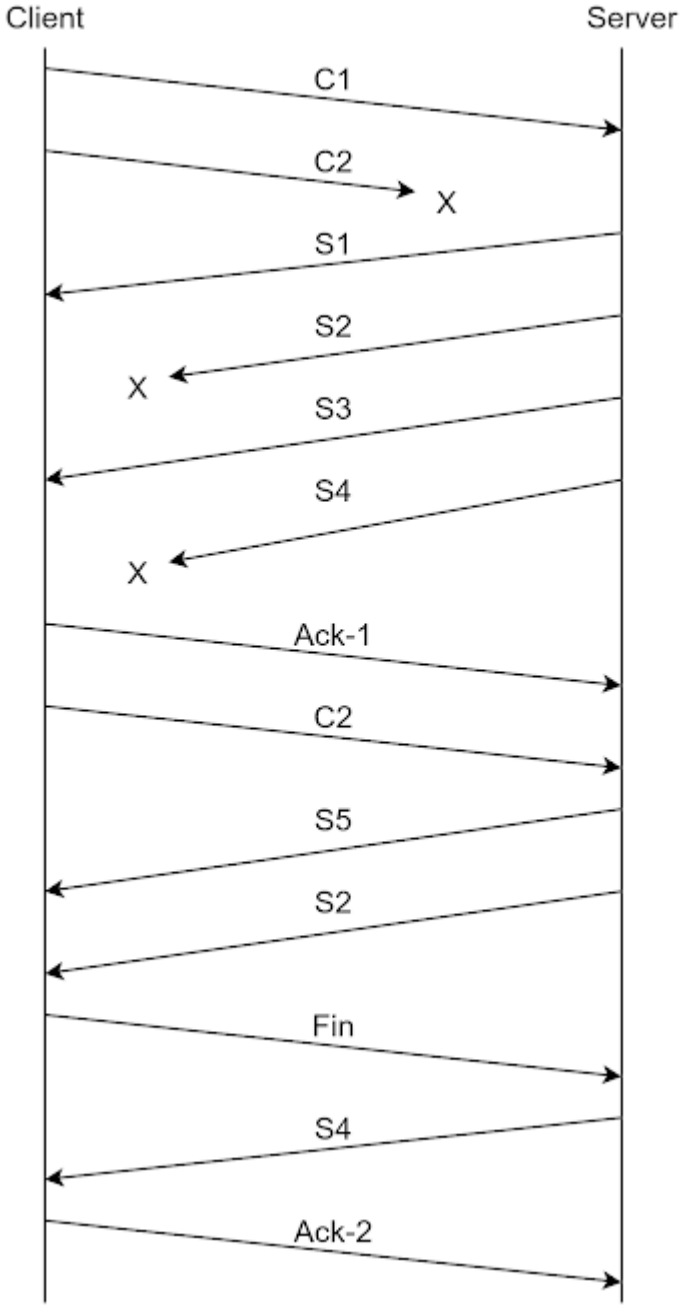
✗ **Q10. Suppose the client has received only one in order segment. What will the client do?** *0/5

- [ ] Wait till it's timer is finished before sending ack
- [ ] Wait till the server's timer is finished before sending ack
- [ ] Wait for another segments to arrive since it has received only one segment and then send ack
- [x] immediately send an ack ✗

Correct answer

- [x] Wait till it's timer is finished before sending ack
- [x] Wait for another segments to arrive since it has received only one segment and then send ack

At a given moment, the client has sent the **Ack-1** segment with the sequence number **1910** and the acknowledgement number **1532**. The RWND of the client is **8000 bytes** and the RWND of the server is **10000 bytes** before the **C1** segment got transmitted. The size of the segments **C1**, **C2**, **S1**, **S2**, **S3**, **S4**, and **S5** are **421**, **320**, **221**, **423**, **370**, **110**, and **437** bytes respectively.



✓ **Q11. Find out which sliding window protocol has been used here. *** 5/5

- (●) Selective Repeat ✓
- ( ) Go-Back-N

Feedback

only the missing segments were resent

✗ **Q12. Determine the sequence number of the segment labeled as 'C1'. *** ···/5

1489 ✗

Correct answer

1169

Feedback

seq of C1 = x
ack-1 is sent after C1 and C2,
x + 421+320=1910
x = 1169

✓ **Q13. Determine the acknowledgement number of the segment labeled as 'C1'.** *5/5

1311 ✓

Feedback

let, ack of C1 = y
then, ack of C2 = seq of S1 = y
in ack-1, the client will request for the S2 segment.
so, ack of Ack-1 = seq of S2 = y + 221 (data sent in S1)
y + 221 = 1532
y = 1311

✓ **Q14. Determine the sequence number of the second/sent 'S4' segment.** * 5/5

2325 ✓

Feedback

from previous, seq of C1 = 1169, seq of S1 = 1311
S4 is after S1, S2 and S3,
so, seq of S4 = 1311 + 221+423+370=2325

✗ **Q15. Determine the acknowledgment number of the second/sent 'S4' segment.** *···/5

2231 ✗

Correct answer

1911

Feedback

from previous, seq of C1 = 1169, seq of S1 = 1311
received upto c1, c2, fin segment fully before sending the second S4,
ack of second S4 = 1169+421+320+1=1911

✓ **Q16. Determine the acknowledgment number of the segment labeled as 'ACK-2'.** *5/5

2872 ✓

Feedback

from previous, seq of C1 = 1169, seq of S1 = 1311

received and stored s1, s3, s5, s2, s4 segments before sending ack-2. so all segments till s5 are received.
ack will be after s5,
1311+221+423+370+110+437=2872

✓ **Q17. Determine the value of Sf for the server's sending window before receiving the Fin segment.** *5/5

1532 ✓

Feedback

Sf = last acknowledgement got from the receiver
so, acknowledgment of received C2 is Sf
ack of received C2 = ack of Ack-1 = 1532

✓ **Q18. Determine the value of Sn for the server's sending window before receiving the Fin segment.** *5/5

2872 ✓

Feedback

Server has already sent upto S5. so, new data will be after S5.
1311+221+423+370+110+437=2872

✓ **Q19. Calculate the window size of the server after receiving the 'Fin' segment if it could process 156 bytes of data.** *5/5

9415 ✓

Feedback

Received C1, C2 and Fin after declaring rwnd as 10000. but fin/syn segment is not stored in the buffer
10000-421-320+156=9415

Q20. Calculate the window size of the client just before it sent the 'Fin' segment if it could process 'S1'. *···/5

6770

Correct answer

6150

Feedback

Received and stored S1, S2, S3, S5 after declaring rwnd as 8000
8000-221-423-370-437+221=6770

[This is optional] Submit your workings through a pdf file. Naming Format: ID_Name

Add file