

CSE421 / EEE465 : Computer Networks

Answer all the following 3 questions. (Pages: 2)

Figures in the right margin indicate marks.

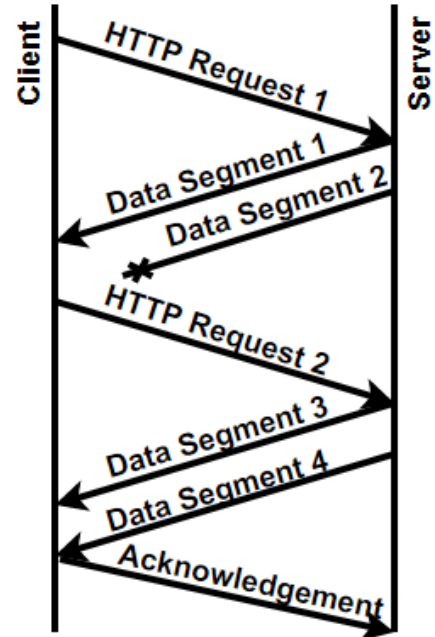
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- Q 1. a)** Web pages have dedicated servers for storing cookie data to enhance the user experience even for those who do not log-in to the website. Even if your computer is formatted, it's not an issue because the web server has everything saved. **Explain** if you agree with the statement or not. 5
- CO1**
- b) I.** You are to download a torrent of size **1.5GB** ( $1GB = 1024MB$ ). Given that each chunk size is **1MB**. There are three peers, each having **512** chunks. Also, all of their chunks are mutually exclusive from each other. **Interpret** if a new peer can download the file successfully when only two of the three peers are **ON**. 3
- II.** MKBHD recently started uploading their video at 4k (2160p) resolution on YouTube. To watch it without buffering, you need to have an internet speed connection of at least **25Mbps**. However, you notice that the video doesn't buffer even though you have an Internet speed of **10Mbps**. **Indicate** how this is possible. 2
- c)** On the **16th July 2022 at 13:01:22**, **PC A** visited the website **whatanexam.com**. To access the website, the local DNS server replied to **PC A's DNS request** with (**whatanexam.com**, **100.3.40.56**, **A**, **48**), where TTL is given in **hours**. The local DNS server used **iterative DNS lookup**, with an RTT of **55 ms** each, to retrieve the IP address for **PC A**. Next, on the **19th of July at 11:01:23**, **PC A** visited the same website. 2
- I.** **Determine** the total RTT for **PC A** to fetch the IP address on 19th of July. +
- After fetching the IP address, **PC A** sends the request to the website server (which takes **35ms** to be sent) to open a **persistent** HTTP connection with the server. and request **21 objects**, including the base HTML page, each requiring **125ms** to be downloaded. 4
- II.** **Calculate** the total RTT required to fetch all the objects after retrieving the IP address +
- III.** **Calculate** the total time **PC A** takes to load the webpage. 4
- Q 2. a)** Rafiq opens Microsoft Outlook to access his Gmail account to send an email to his friend's email address of **shabbirhuq@yahoo.com**. **List** the number and the type of the source and destination port addresses that are being used in the email sent 4
- CO2**
- b) I.** In the TCP sliding window process, the variables **Sf** and **Sn** hold the values of **100** and **151** respectively and has a **window size of 100** bytes. **Interpret** how much data bytes has been sent and how much can be sent. 3
- II.** Suppose a server sends an acknowledgment after receiving some data from the client. But that acknowledgement gets lost on the way. **Explain** what will happen here? 3
- c)** In a **go-back-n** TCP connection, client & server have the following values (next page): 4
- I.** **Calculate** the **sequence** and **acknowledgment** number of the server's **Data Segment** +

1 sent to the client.

- II. The 2nd data segment was lost on its way to the client, and the client processed the 1st data segment as soon as it had received the first segment. Calculate the sequence number and rwnd of the acknowledgment segment that the client sends to the server after it receives the 4th segment.

	Client	Server
ISN (At the start of TCP handshake)	9666	5549
Segments sent	HTTP Request 1: (Also the third segment of the 3 way handshake): 569 bytes	Data Segment 1: 568 bytes Data Segment 2: 650 bytes
	HTTP Request 2: 999 bytes	Data Segment 3: 266 bytes Data Segment 4: 123 bytes
rwnd	8000	7000



Q 3. a)  
CO3

- I. Alice is sending data to Bob. Bob needs to re-arrange the following steps in the correct order so that the data can be read by him. Help Bob traverse as per the OSI model.

- 1. The data is transmitted over the medium and received.
- 2. Identifies the process of delivering the message.
- 3. Decrypts data.
- 4. Controls sessions.
- 5. Bob reads the message.
- 6. Identifies that this is indeed the correct host.
- 7. Identifies the correct hop address

- II. Identify the addresses that change at each hop during data transmission.

- b) In the “Traceroute” application, the originator sends the first packet with TTL=1 and continuously increments it and resends the ICMP packet. Explain why the TTL is incremented each time and how the originator knows that the packet has reached the destination.

- c) Given, a data of size 21739 bytes is to be fragmented where the network has a MTU of 2038. Also, the header of the packets consumes 46 bytes. Assume data starts from 0 byte number.

- I. How many packets are required to transfer the whole datagram?
- II. What’s the MF of the last packet?
- III. What’s the size of the last packet?
- IV. What’s the offset value of the 3rd last packet?

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END OF QUESTION PAPER

