



Inspiring Excellence

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**EEE 465**

**Computer Networks**

**Assignment 01 [MIDTERM]**

**Summer 2024 - Set A**

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### Answer to Question 01

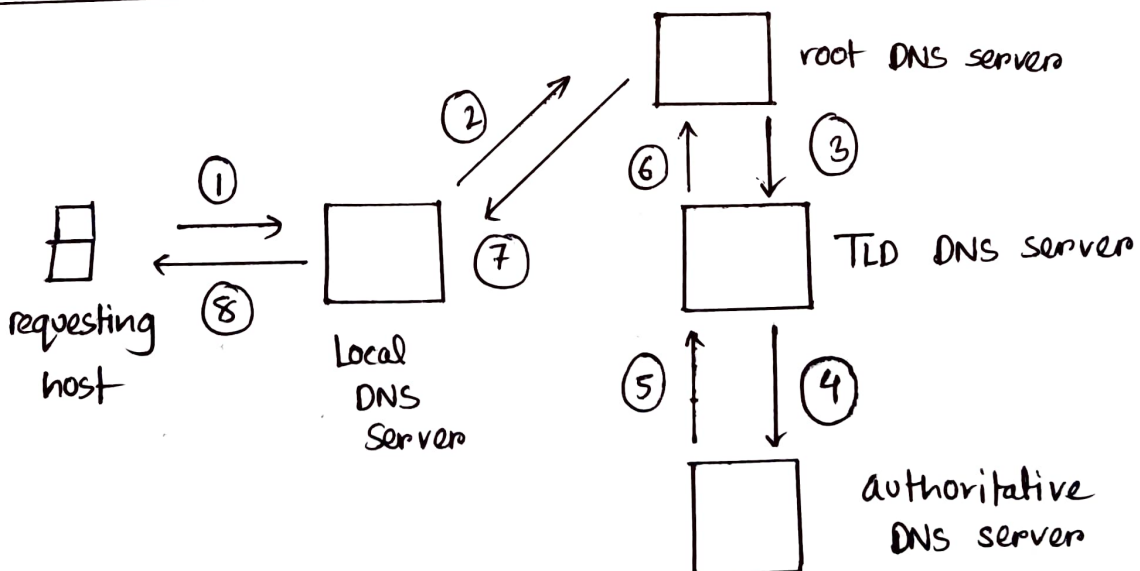
Layers 5, 6, and 7 were combined in the TCP/IP model because their functions are closely related and often handled together by application software. This simplification makes the TCP/IP model more practical and easier to implement.

### Answer to Question 02

On Thursday, the website did not have any stored cookie for that specific user. It then created a unique session ID and stored it in a cookie on the browser.

On Friday, the stored cookie was sent to the server when the user revisited the website. The server then used the session ID in the cookie to retrieve the saved cart items.

### Answer to Question 03



#### Answer to Question 04

POP3 is more useful when the mail server has limited storage capacity. It downloads emails to the local device and deletes them from the server after retrieval. This helps free up server space and prevent mailbox overload.

#### Answer to Question 05

The source port numbers are different because each browser tab creates a separate TCP connection, requiring unique sockets (combination of IP and port number).

Here, the destination port is 80 (a well-known port used for HTTP communication).

The IP number for both tab is the same. Therefore, the port numbers must be different so that the sockets remain unique. This ensures that the server can identify each connection correctly.

### Answer to Question 06

The server does not send the FIN bit if it has already closed its connection before the client's termination request. In this case, the server's FIN flag was sent earlier to indicate it had no more data to send.

When the client later sends its FIN, the server simply responds with an ACK. Thus, no additional FIN is required from the server side. This condition represents a half-closed TCP connection.

### Answer to Question 07

(a) Let the number of objects be  $n$

$$0.007n + \frac{1.5n}{60} = 1.184$$

$$0.032n = 1.184$$

$$n = 37 \text{ objects}$$

$$(b) \text{ Total RTT} = 2 \times 37 \times 34$$

$$= 2516 \text{ ms}$$

$$= 2.516 \text{ s}$$

## Answer to Question 08

S1:

seq: 8742 ack: 4531

data: 532 bytes

C1:

seq: 4531 ack:  $8742 + 532 - 1 + 1 = 9274$

data: 191

S3:

seq: 9274 ack:  $4531 + 191 - 1 + 1 = 4722$

data: 160

Fin

Seq: 4722 ack: 9274

S2:

Seq: 9274 ack: 4723

data: 320

Ack:

seq: 4723 ack:  $9274 + 320 - 1 + 1 = 9594$

Answers:

(i) Seq: 4722  
Ack: 9274

(ii) Seq: 4723  
Ack: 9594

(iii)  $\text{rwnd} = 14000 - 191$   
 $= 13809$