

BSE-6A

Computer Networks (CN) Done =  
21k-3881  
Assignment = 2 TAMIA JAWAD

Q1) (?)

Transport layer in networking acts as role a mediator in b/w application processes, ensuring that they can communicate regardless of physical network complexities. Here is how it achieves logical communication

i) End to End Communication :- The transport layer takes data from one application, sends its across the network and ensures, it gets to other application intact, it's like a delivery service for your data.

ii) TCP and UDP :- Both are dif types of delivery methods. TCP ensures data arrives securely and in order, while UDP is faster but does not guarantee delivery.

( ii )

UDP is preferred over TCP where speed, simplicity and reduced overhead are prioritized over reliability.

Examples:-

- i) DNS (Domain Name System): UDP is primary protocol used for DNS queries. DNS lookup involves small, lightweight requests and responses, making UDP suitable choice for quick resolutions of domain name to IP address.
- ii) IoT (Internet of Things): IoT devices often rely on UDP for their communication needs due to its simplicity and lower overhead to TCP.
- iii) Online Gaming: Many online multiplayer games use UDP for its low-latency characterization.

iv) Streaming Media: UDP is commonly used for streaming video and audio content, such as online video streaming services and IPTV (Internet Protocol Television).

( 000 )  
 ( 111 )

RDT protocols  $\text{rdt\_recv}()$ <sup>function</sup> and  $\text{rdt\_send}()$  function play roles in ensuring reliable communication b/w server and receiver, while abstracting away the complexities of underlying transport mechanisms.

i)  $\text{rdt\_recv}()$  Function:

Role =  $\text{rdt\_recv}()$  function is responsible for receiving data on receiver side of communication channel. Its primary role is to handle incoming packets, perform error checking and deliver the received data to higher layer of protocol stack.

## (ii) rdt\_send() function:

Role= It performs on send side and is responsible for transmitting data to receiver while ensuring reliability.

## Differences :-

Direction of Operation = rdt\_recv()  
Operates on receiver side , handling incoming data , while rdt\_send()  
Operates on server side managing outgoing data.

Responsibilities = rdt\_recv() is responsible for receiving error checking and delivering data while rdt-send() is responsible for sending data packets.

(iv)

The udt-send() function reliable data transfer (RDT) protocol is responsible for sending data packets over underlying unreliable communication channel, such as network socket or physical medium like Ethernet. Its purpose is to provide a reliable abstraction layer on top of unreliable abstraction layer by ensuring data packets are transmitted.

Sending Data Packets = The purpose of udt-send() function is to send data packets from sender to receiver. It takes data as input encapsulates it into packets and transmitted these packets over the network to designated receiver.

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(Q2)

→ 1st 2 iterations

$$\begin{array}{r} 0111001010110011 \\ + 101100111010101000 \\ \hline 100010011001011011 \\ \leftarrow \\ + \end{array}$$

add + 10111011100110101  
3rd iteration | 110000011001001  
+ 000111100110110  
Sum 11111111111111

Q2

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(Q3)

Student ID = 21K-3881

$x = 3 \quad y = 8 \quad z = 8$

So,

0008	0080	0000	0001	0000
0000	3FF0	0006	0003	FFFF
0, 00	0000	0010	0000	

i) Source Port:-

$(0008)_{16}$

0 0 0 8

$16^3 \quad 16^2 \quad 16^1 \quad 16^0$

$(16^3 \times 0) + (16^2 \times 0) + (16^1 \times 0) + (16^0 \times 8)$

0 + 0 + 0 + 8

$(8)_{10}$

R

ii) Destination Port:-

$(0080)_{16}$

0 0 8 0

$16^3 \quad 16^2 \quad 16^1 \quad 16^0$

$(16^3 \times 0) + (16^2 \times 0) + (16^1 \times 8) + (16^0 \times 0)$

0 + 0 + (128) + 0

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$$(128)_{10} \text{ Ans}$$

③ Sequence Number:-

$$(0000 \quad 0001)_{16}$$

$$\begin{array}{ccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 16^7 & 16^6 & 16^5 & 16^4 & 16^3 & 16^2 & 16^1 & 16^0 \\ 0 + 0 + 0 + 0 & + 0 + 0 + 0 + 1 \end{array}$$

$$(1)_{10}$$

Ans

④ Acknowledgement Number:-

$$(0000 \quad 0000)_{16}$$

$$\begin{array}{ccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 16^7 & 16^6 & 16^5 & 16^4 & 16^3 & 16^2 & 16^1 & 16^0 \\ 0 + 0 + 0 + 0 & + 0 + 0 + 0 + 0 \end{array}$$

$$(0)_{10}$$

A

⑤ TCP Header Length:-

$$3 (3)_{16}$$

$$16^0 \Rightarrow (16^0 \times 3) = 3$$

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$$3 \times 4 = 12 \quad \text{A}$$

⑥ ACK bit:-

1

A

⑦ FIN bit:-

0

A

⑧ SYN bit:-

0

A

⑨ Window size:-

(0 0 0 0)<sub>16</sub>

(0)<sub>10</sub>

A

⑩ Check sum:-

(0 0 0 3)

0 0 0 3

$16^3 \quad 16^2 \quad 16^1 \quad 16^0$

$$(16^3 \times 0) + (16^2 \times 0) + (16^1 \times 0) + (16^0 \times 3) = 3$$

(3)<sub>10</sub> A

(Q4) IP = 202.28.33.21

0019D36A001C001C

(a) Source Port Number :-

$(0019)_{16}$

0 0 9

$16^3 \quad 16^2 \quad 16^1 \quad 16^0$

$$(16^3 \times 0) + (16^2 \times 0) + (16^1 \times 1) + (16^0 \times 9)$$

$$0 + 0 + 16 + 9$$

$(25)_{10}$

Ans

(b) Socket Address :-

202.28.33.21: ~~25~~ 25

(c) Total length of User datagrams :-

$(001C)_{16}$

0 0 1 C

$16^3 \quad 16^2 \quad 16^1 \quad 16^0$

$$(16^3 \times 0) + (16^2 \times 0) + (16^1 \times 1) + (16^0 \times 12)$$

$$0 + 0 + 16 + 12$$

28  
f

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(d) Length of Data -

UDP Header = 8 bytes

$$28 - 8 = 20 \text{ bytes of data}$$

f

(e)

Ans = The direction is server to client  
since port 25 is used by  
SMTP protocol.

f