National University of Computer and Emerging Sciences, Lahore Campus

Course Name:	Computer Networks	Course Code:	CS307
Program:	BS(CS)	Semester:	Fall 2019
Duration:	1-hour	Total Marks:	30 (29)
Paper Date:	7-11-2019	Weight	15
Sections:	B,C,E,F	Page(s):	4 + 1
Exam Type:	Mid-2		

Student Name: Rimsha Chaudhry Roll No. L16 4021 Section: G

Instruction/Notes: Attempt questions on this paper. You may use rough sheet but it should NOT be attached to this paper as it will not be marked. Blotting this paper will result in negative marking. You may use simple calculators. Sharing of any resources is prohibited.

10/10

Question 01: MCQs: Select only ONE correct answer and fill the table given below. Answers outside the table will not be considered. **(10)**

1	A ✓	6	B ✓
2	D ✓	7	C ✓
3	A ✓	8	A ✓
4	D ✓	9	A
5	D ✓	10	B ✓

1. In TCP, sending and receiving data is done as
   a. Stream of bytes
   b. Sequence of characters
   c. Lines of data
   d. Packets

2. Which of the following protocols uses UDP to retrieve emails from server
   a. SMTP
   b. POP3
   c. IMAP
   d. None of the above

3. Communication offered by TCP is
   a. Full-duplex
   b. Half-duplex
   c. Semi-duplex
   d. Byte by byte

4. Which of the following protocols are stateless?
   a. TCP
   b. HTTP
   c. UDP
   d. Both b and c

1/5

5. Which of the following is NOT a pipelining protocol?
   a. TCP
   b. GBN (Go-back-N)
   c. Selective Repeat
   d. Stop-and-wait

6. In TCP specification, how are out-of-order segments handled at receiver
   a. TCP specs uses sequence numbers to reorder segments
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7. The value of acknowledgment field in a segment defines
   a. Number of previous bytes to receive
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8. In segment header, sequence number and acknowledgment number field refers to
   a. Byte number
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9. The receiver of the data controls the amount of data that are to be sent by the sender is referred as
   a. Flow control
   b. Error control
   c. Congestion control
   d. Error detection

10. Size of source, and destination port address of TCP header respectively are _____
   a. 16-bits and 32-bits
   b. 16-bits and 16-bits
   c. 32-bits and 16-bits
   d. 32-bits and 32-bits

IP → 4 bytes.

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Question 02: Consider the messages sent between Host A and B as shown in *figure 1*. Assuming all segments sent between the hosts to be of equal size (in bytes), populate the table 1 for the two protocols i.e. TCP and GBN. The data for *Packet-1/Segment-1* is already given as a sample. 9/ (6+4)

a)

Table 1

	TCP			GBN		
	Seq	**Acks**	**Buffer contents**	**Seq**	**Acks**	**Buffer contents**
Pkt 1	Seq= 90	Ack= 98	Buffer= -	Seq= 90	Ack= 98	Buffer= -
Pkt 2	Seq= 98	Ack= –	Buffer= –	Seq= 98	Ack= -	Buffer= Pkt 2
Pkt 3	Seq= 106	Ack= –	Buffer= –	Seq= 106	Ack= -	Buffer= Pkt 2,3
Pkt 4	Seq= 114	Ack= 98	Buffer= Pkt3, Pkt4	Seq= 114	Ack= 98	Buffer= 2,3,4
Pkt 5	Seq= 122	Ack= 98	Buffer= Pkt4, Pkt5	Seq= 122	Ack= 98	Buffer= 2,3,4,5
Pkt 6	Seq= 130	Ack= 98	Buffer= Pkt 4,5,6,	Seq= 130	Ack= 98	Buffer= 2,3,4,5,6
Pkt 7	Seq = 98	Ack= 106	Buffer= Pkt, 5,7	Seq= 138	Ack= 98	Buffer= 2,3,4,5,6,7.

5/6

Assuming different reciever's side to store out of order packets 1,2,4,5,6,

Assuming taking the buffer at sender's side, to maintain record of any dropped packets

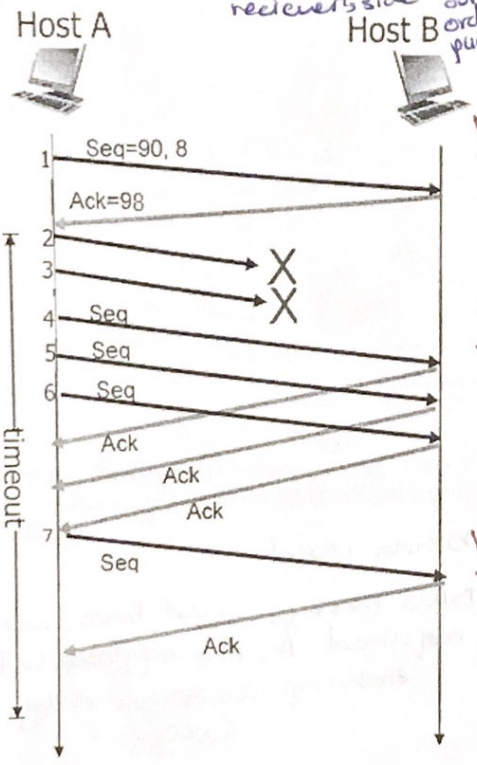


Figure 01

b) What will be the action taken by GBN sender when acknowledgement because of segment 6 is received?

GBN would transmit the next sequenced numbered packet. It will not consider the ack number till the time outs.

c) What will be the action taken by TCP sender when acknowledgement because of segment 6 is received?

In TCP, when segment 6 th acknowledgement is recieved, it is the same number as the last 3 acknowledgement numbers, case of triple duplicates, hence for fast retransmission, TCP would send the packet 2, i.e. smallest seq number unacked packet.

d) What will be the action taken by GBN sender when timeout occurs as shown in fig.1?

As timeout occurs, it will resend all the packets i.e 2, 3, 4, 5, 6 and 7. That is sending all the packets since after last acknowledge with starting with oldest unacked packet.

e) What will be the action taken by TCP sender when timeout occurs as shown in fig.1?

when timeout occurs, packet 3 will be resend i.e the smallest sequence number unacked packet. In return reciever would send cumulative ack telling the sender that he has recieved all packets till 7.

3/5

10/10

Question 03. *Figure 2* demonstrates an end system in FAST-NU labs attempting to resolve a hostn DNS. Note that this particular DNS resolution required an exchange of 8 DNS messages across the internet.

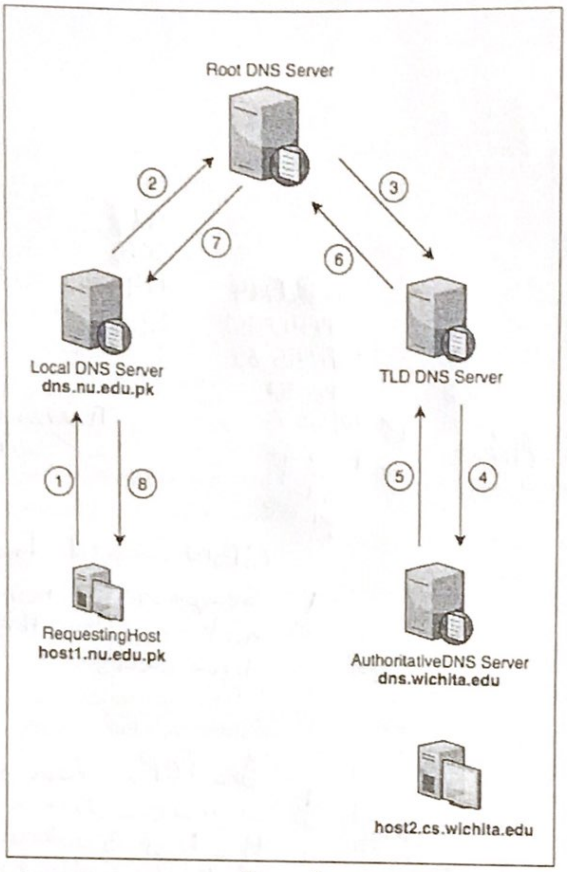
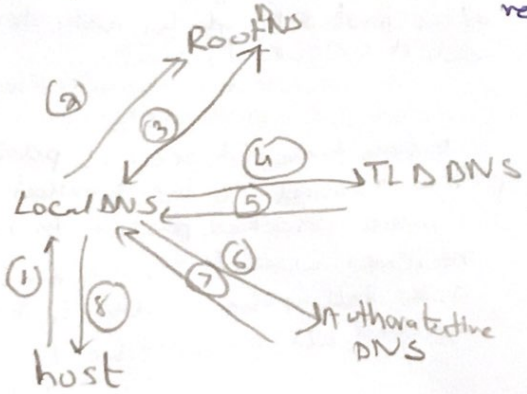


Figure 2

a) What type of DNS query is used in making the above request; *recursive* OR *iterative*? How many DNS messages would be required if the requesting host were to deploy the other approach? (2+2 points)

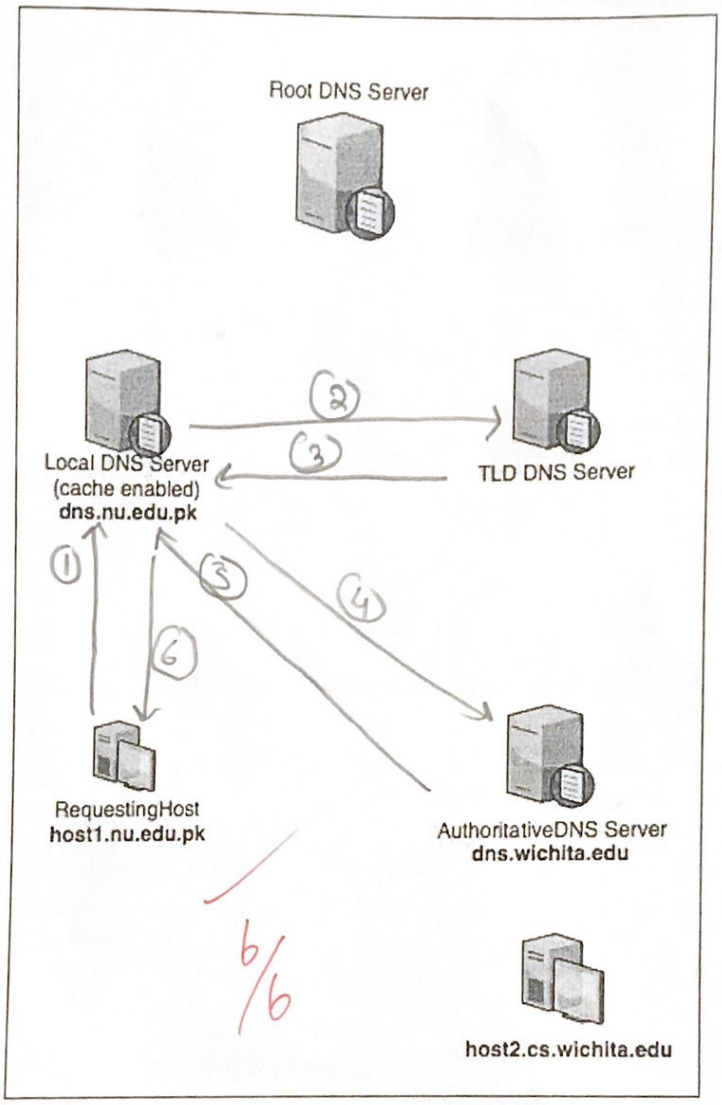
Recursive query is being used.
If iterative then, 8 DNS message would have been required. ~~As the approach to exchange messages only changes~~.



4/4 → how iterative query works.

4/5

b) The local DNS server has caching enabled. Using an *iterative query* and assuming that the local cache already has an A-record with TLD DNS server's IP address, draw the step-by-step path that the DNS query will take. (6 points)



6/6

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Student Name: Abdul Rehman. Roll No. 16-4297 Section: E

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6/10

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1	d ✗	6	a ✗
2	a ✓	7	c ✓
3	a ✓	8	c ✗
4	c ✗	9	a ✓
5	d ✓	10	b ✓

1. In TCP, sending and receiving data is done as
   a. Stream of bytes
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2. Which of the following protocols uses UDP to retrieve emails from server
   a. SMTP
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   (a.) Full-duplex
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1/5

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a)

Table 1

	TCP			GBN		
	Seq	Acks	Buffer contents	Seq	Acks	Buffer contents
Pkt 1	Seq= 90	Ack= 98	Buffer= -	Seq= 90	Ack= 98	Buffer= -
Pkt 2	Seq= 98	Ack=	Buffer=	Seq= 98	Ack=	Buffer= [illegible]
Pkt 3	Seq= 106	Ack=	Buffer=	Seq= [illegible]/106	Ack=	Buffer= [illegible]
Pkt 4	Seq= 114	Ack= 98	Buffer= 114	Seq= [illegible]114	Ack= [illegible]122	Buffer= 114
Pkt 5	Seq= 122	Ack= 98	Buffer= 114,122	Seq= 122	Ack= 130	Buffer= 114,122
Pkt 6	Seq= 130	Ack= 98	Buffer= 114,122,130	Seq= 130	Ack= 138	Buffer= 114,122,130
Pkt 7	Seq =138	Ack= 106	Buffer= 114,122,130[illegible]	Seq= 138	Ack= 146	Buffer= 114,122,130,146

4/6

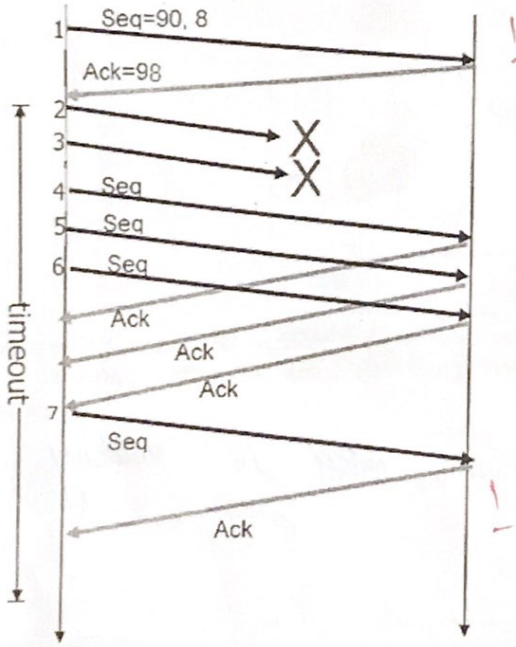


Figure 01

b) What will be the action taken by GBN sender when acknowledgement because of segment 6 is received?

It will send seq 7.

c) What will be the action taken by TCP sender when acknowledgement because of segment 6 is received?

It will resent seq 2.

d) What will be the action taken by GBN sender when timeout occurs as shown in fig.1?

when time out occurs, GBN resends (retransmit) all packets from N to present state, where N = earliest smallest undelivered packet.

e) What will be the action taken by TCP sender when timeout occurs as shown in fig.1?

It will send (retransmit) those whose ack hasn't received.

3/5

5/10

Question 03. *Figure 2* demonstrates an end system in FAST-NU labs attempting to resolve a hostnam DNS. Note that this particular DNS resolution required an exchange of 8 DNS messages across the internet.

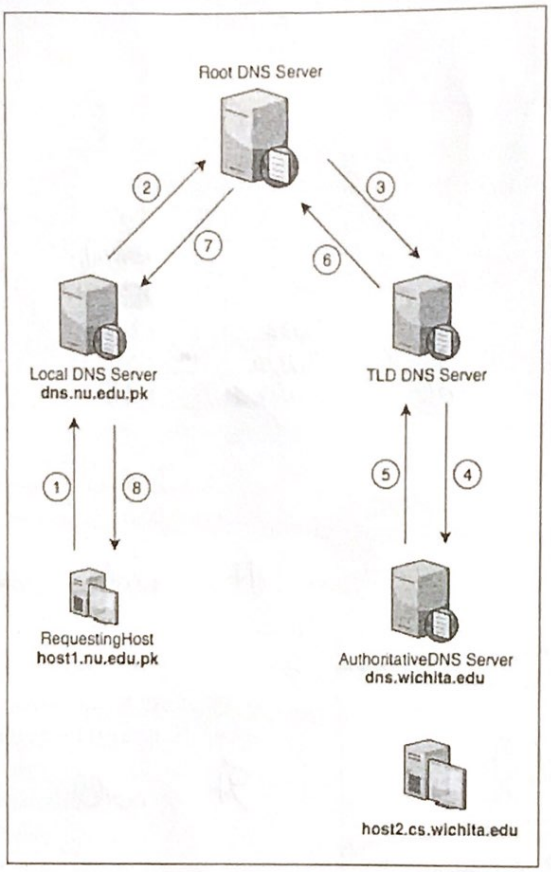


Figure 2

a) What type of DNS query is used in making the above request; *recursive* OR *iterative*? How many DNS messages would be required if the requesting host were to deploy the other approach?

(2+2 points)

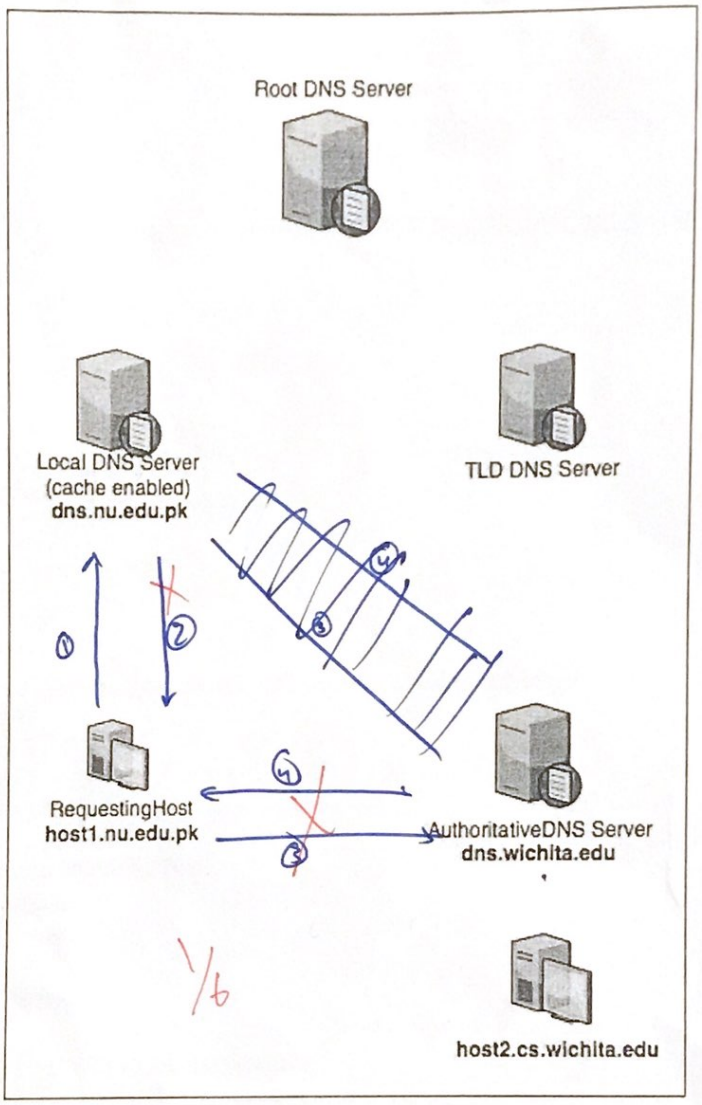
(a) Recursive approach is used in making the above request.

(b) No. of steps would be 8 (same as above)

4/4

4/5

b) The local DNS server has caching enabled. Using an *iterative query* and assuming that the local cache already has an A-record with TLD DNS server's IP address, draw the step-by-step path that the DNS query will take. (6 points)



1/6

If local DNS server has a A-record with TLD DNS server's IP address, then the local server would directly contact with Authoritative DNS server and would not contact with Root & TLD servers.

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Student Name: Muhammad Hamza Roll No. 16L-6308 Section: E

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Pkt 4	Seq=	Ack=	Buffer=	Seq= 107	Ack=	Buffer=
Pkt 5	Seq=	Ack=	Buffer=	Seq= 126	Ack=	Buffer=
Pkt 6	Seq=	Ack=	Buffer=	Seq= 135	Ack=	Buffer=
Pkt 7	Seq =	Ack=	Buffer=	Seq= 144	Ack=	Buffer=

0.1/6

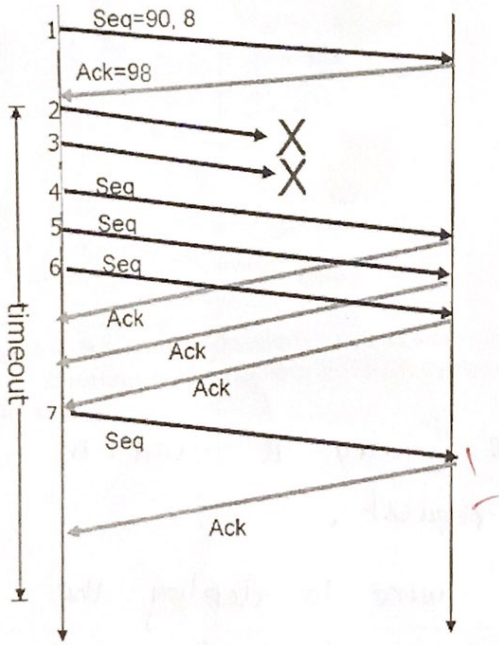

Figure 01

b) What will be the action taken by GBN sender when acknowledgement because of segment 6 is received?

c) What will be the action taken by TCP sender when acknowledgement because of segment 6 is received?

d) What will be the action taken by GBN sender when timeout occurs as shown in fig.1?

GBN Sender resend all packet include 2 and after 2 packets.

e) What will be the action taken by TCP sender when timeout occurs as shown in fig.1?

TCP sender resend only those packects. whose timeout occure

0.5

3/5

3/10

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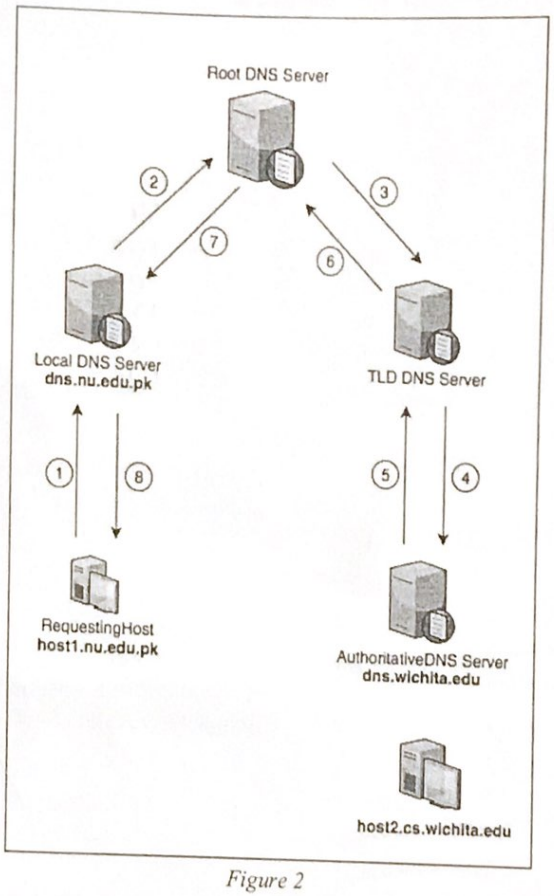


Figure 2

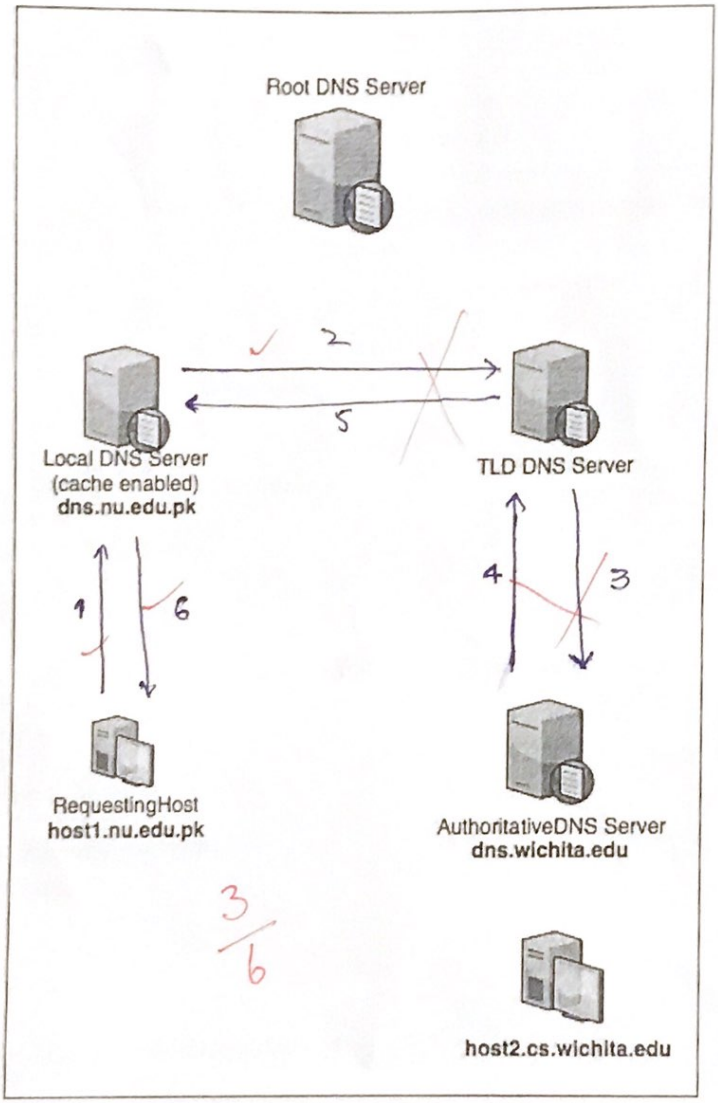
a) What type of DNS query is used in making the above request; *recursive* OR *iterative*? How many DNS messages would be required if the requesting host were to deploy the other approach?

(2+2 points)

- Iterative X Type of DNS query is used in making the above request..
- if requesting host were to deploy the other approach. it mean local DNS server has cache has TLD DNS server IP Address then it will make 6 DNS Messages. X

2.5/4

b) The local DNS server has caching enabled. Using an *iterative query* and assuming that the local cache already has an A-record with TLD DNS server's IP address, draw the step-by-step path that the DNS query will take. (6 points)



3/6