Name Surname : 30.11.2023

ID :

EE 455 Performance Management of Computer Networks

2022-2023

MIDTERM EXAM

Q1) Please discribe what the term “Keeping the pipe full” means in networking.

Trying to send as much packet aspossible without minimal packet loss.

Q2) How the statistical multiplexing differs from traditional TDMA ?

It does not assign equal durations to the nodes, it assigns durations according to their previous bandwidth usage ststistics.

Q3) Upto which layer does a router open to decide whether to forward a packet or not to?

And Which layer of OSI is responsable from forwarding the packets to their next hops?

Network Layer, Data Link Layer

Q4) Which problem does the interleaving method proposed to solve?

To reevaluate the lost packet from another one even in case of group lost

Q5) In a network with 10 nodes, L= 50 bytes/packet and ack size is 45 bytes, if each node transmits a packet at each 10 seconds on average (not periodically) and if the BER (Bit Error Rate) is 10^{-4} , what is the probability of node 3 not to need a ARQ retransmission within 60 seconds?

1 node transmits 1 packet/ 10 seconds

10 nodes transmit 10 packets/ 10 seconds which corresponds there are 1 packet / second.

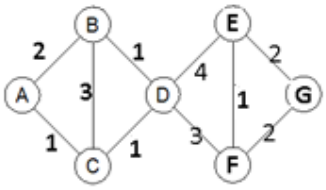
The probability of node 3 not to succesfully send its packet in a second = (Psucc.).

Psucc.= 1x (1/10)1x(1-1/10)9 x (1-(45+55)x8x(10-4))=0.356 = %35.6

Q6) Why should the RTT not be too long or too short ?

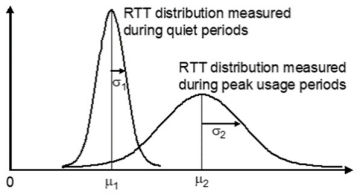
Too long RTT causes extra wastage of time between arrival of a packet and transmission of the next one, too short RTT causes retransmission of an unlost but late packet and wastes bandwidth and time.

Q7) According to given figure below and using distance vector routing algortihm please fill the routing table of “node A” **after 3rd Exchange.**



	A	B	C	D	E	F	G
A	0	2	1	2	6	5	inf

Q8) In Retransmission Time distribution shown below, why the μ (mean) and σ (variance) is less in the higher curve?



Because, in idle networks the mean RTT decreases due to less traffic load and the latency that has an effect on variance has lower value for lower RTT mean cases.

Q9) What is the difference between Flow control and Congestion Control ?

Flow control is concerned with the load of recever window size

Congestion control is concerned with the load of the buffers of intermediate routers.

Q10) What is Flight Size ? Please describe briefly.

The total size of the packets has been sent but not acknowledged yet.

20 Apr 2021

2020 – 2021 SPRING

EE 455 Midterm Exam

1) In a network in which all the nodes share the same medium, assume we have 15 nodes and each of them sends a single packet in a second, if it takes 1/15 seconds to complete the transmission of a single packet, what is the probability of having an unsuccessful transmission when any of the nodes attempts to transmit a packet at any time…

$P_{unseccessfull}=1-(15x(1/15)^{1}x(1/15)^{14})$

2) In which ARQ (Automatic Repeat Request) mechanism do we make retransmission of all the packets which were already transmitted after a lost packet (or lost ack. of it)? Why do we make retransmission of all the packets which were already transmitted?
Go Back N. Because we don't have the ack of others and we have no idea about if they have been sent or not.

3) For what purpose do we apply interleaving in FEC (Forward Error Correction)?
By shuffling, we expect not to lose the compressed copies of the packets in case of group losses

4) Why RTT (Retransmission Timer) must be set to an optimal value in connection oriented packet switched networks?
Because too big RTT value causes wastage of time and decreases the throughput, and too small RTT value causes some of the non-lost but late packets to be assumed as lost which also decreases the throughput

5) Which communication types have less tolerance to jitter (delay variety) than delay?
Non-real time Streaming communications such as IPTV or Youtube

SOLUTIONS

26.11.2018

Name Surname :

Id NUMBER :

EE 455 Midterm Exam

2018-2019

1. Please select 10 of 15 Questions and indicate which are selected in the box below by signing with (x) .
2. SİGN THE BOXES IN FRONT OF THE SELECTED QUESTIONS WITH CROSS SIGN (X)
3. The selections exceeding 10 questions will cancel your exceeding number of CORRECT answers
4. The texts (written as answers) out of the boxes will be ignored
5. No extra paper usage is allowed.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

QUESTIONS

1) Write an example IP address which belongs to Class B.

☐ 130.14.46.72

2) What is a netmask used for in IP networks?

☐ To find Host IP from the net ID

3) In which cases of the network conditions, the Slotted aloha is more preferable?

☐ Higher traffic conditions

4) What is small device called terminator used for in bus tapologies?

☐ to avoid reflection of the signal

5) if the netmask of a network is given as 255.255.255.192 how many IP addresses can be assigned to different computers in the same network?

☐ $2^6 - 2 = 62$

6) For what kind of Lambda values is TDMA most usefull for minimal delay ?

☐ High λ values

7) How does CSMA/CA avoid collussion?

☐ By generating Random time value to transmit

8) What disadvantage can be experiensed if MTU is selected too high?

☐ Processing delay increases and packet queue extends which increases delay

9) What disadvantage can be experiensed if MTU is selected too low?

☐ Message overhead increses

10) In sliding Windows techniques In which cases of the network conditions the selective repeat is less usefull than go back n ?

☐ Low packet losses ...

11) How/why is FEC (forward error correction) a receiver based recovery algorithm?

☐ Because it extracts next packet to have the lost one, at the receiver side

12) What is the most important criterion of service quaility (QoS) from the end user point of view ?

☐ Throughput (Data Rate)

13) Which layer of OSI is responsable for determining the complete packet transmission route ?

☐ Network layer

14) What is the advantage of DAF w.r.t AAF in forwarding the incoming packets ?

☐ Does not amplify the noise of signal

15) In CSMA\CD why a node throws random number before speaking even if it senses that the line is idle?

☐ To avoid second collusion with the same host

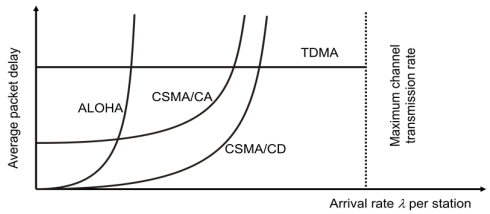
24.11.2017

EE 455

MIDTERM EXAMINATION

Solutions

1) In CSMA\CD what is the most important advantage of Slotted Aloha method ?
   Decreases the possibility of being interrupted after starting a transmission
2) In CSMA\CD why a node throw a dice or coin even if it senses that the line is idle ?
   To avoid simultaneous attempts of more than 1 nodes waiting for an idle line and to avoli collusion
3) In a bus tapology network, 12 computers are connected to eachother and one of them send a packet in any second with the probability of 5 % calculate the probability of successfull transmission in a second.
   (0.05)x(1-0.05)^11
4) According to the graph given below please sort the algorithms such that the best of them for crowded networks is done first.



   TDMA,CSMA/CD,CSMA/CA,ALOHA
5) Write the name of the OSI layer that is responsable for the controls the flow control on the network
   Transport layer
6) What is the name of the field in IpV4 header that counts down one by one, and drops the packet when the value reaches to zero
   TTL (Time to Live)
7) Which IP number class does the IP number 24.23.1.44 belong to ?
   Class A
8) Give an example protocol name that is a protocol for a connectionless service
   UDP
9) Which of the sliding window techniques is usefull for crowded networks ?
   Stop and wait Go back N, and lastly Selective Repeat
10) What does flight size mean ?
    The packets have been transmitted by the transmitter but have not arrived yo the destination