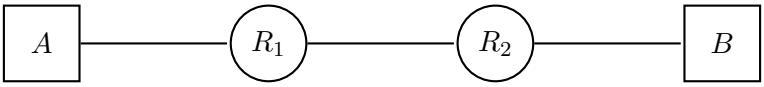
ASSIGNMENT-2
COMPUTER NETWORK

Q1. Hosts A and B are each connected via two routers R_1 and R_2 and a with 10^8 bits per second links. Each link has a propagation delay of 120 microseconds. Processing delay at router is 500 microseconds .



If message size is 10 KB.Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and 8 packets of same size are used

ii. If packet switching technique is used and 32 packets of same size are used

iii. If packet switching technique is used and 64 packets of same size are used

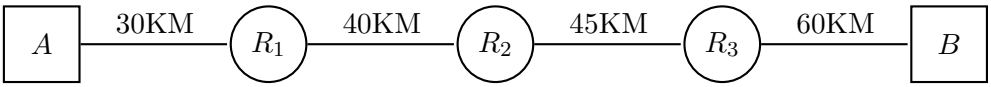
(c) Assume packet header size is 200 bits

i. If packet switching technique is used and 8 packets of same size are used

ii. If packet switching technique is used and 32 packets of same size are used

iii. If packet switching technique is used and 64 packets of same size are used

Q2. Hosts A and B are each connected via three routers R_1 , R_2 and R_3 and a with 5MBps links. Each link has a propagation delay of 500 millisecond/KM. Processing delay at router is 500 microseconds .



If message size is 8192 bits .Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and 4 packets of same size are used

ii. If packet switching technique is used and 16 packets of same size are used

iii. If packet switching technique is used and 32 packets of same size are used

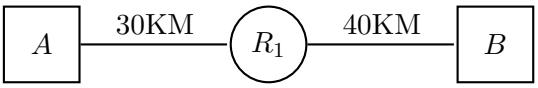
(c) Assume packet header size is 100 bits

i. If packet switching technique is used and 4 packets of same size are used

ii. If packet switching technique is used and 16 packets of same size are used

iii. If packet switching technique is used and 64 packets of same size are used

Q3. Hosts A and B are each connected via router R_1 and a with 5MBps links. Each link has a propagation delay of 5 milliseconds/KM. Processing delay at router is 400 milliseconds .



If message size is 100KB .Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and 4 packets of same size are used

ii. If packet switching technique is used and 64 packets of same size are used

iii. If packet switching technique is used and 128 packets of same size are used(if possible)

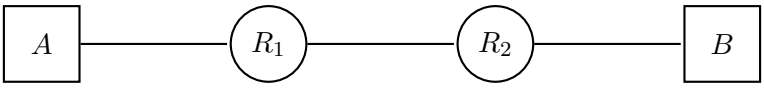
(c) Assume packet header size is 400 bits

i. If packet switching technique is used and 4 packets of same size are used

ii. If packet switching technique is used and 64 packets of same size are used

iii. If packet switching technique is used and 128 packets of same size are used(if possible)

Q4. Hosts A and B are each connected via two routers R_1 and R_2 and a with 10MBPS links. Each link has a propagation delay of 220 microseconds. Processing delay at router is 600 microseconds .



If message size is 10 KB.Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and Packet size is 1500 bits

ii. If packet switching technique is used and Packet size is 1000 bits

iii. If packet switching technique is used and Packet size is 2500 bits

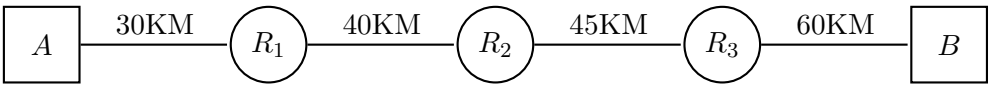
(c) Assume packet header size is 200 bits

i. If packet switching technique is used and Packet size is 1500 bits

ii. If packet switching technique is used and Packet size is 1000 bits

iii. If packet switching technique is used and Packet size is 2500 bits

Q5. Hosts A and B are each connected via three routers R_1 , R_2 and R_3 and a with 5MBps links. Each link has a propagation delay of 500 millisecond/KM. Processing delay at router is 500 microseconds .



If message size is 100KB .Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and Packet size is 1000 bits

ii. If packet switching technique is used and Packet size is 2000 bits

iii. If packet switching technique is used and Packet size is 3000 bits

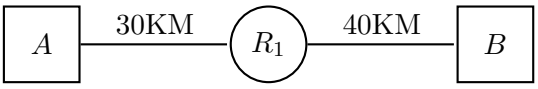
(c) Assume packet header size is 200 bits

i. If packet switching technique is used and Packet size is 1000 bits

ii. If packet switching technique is used and Packet size is 2000 bits

iii. If packet switching technique is used and Packet size is 3000 bits

Q6. Hosts A and B are each connected via router R_1 and a with 5MBps links. Each link has a propagation delay of 5 milliseconds/KM. Processing delay at router is 400 milliseconds .



If message size is 100KB .Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) If message switching technique is used.

(b) Assume packet header size is negligible

i. If packet switching technique is used and Packet size is 100 bits

ii. If packet switching technique is used and Packet size is 800 bits

iii. If packet switching technique is used and Packet size is 2200 bits

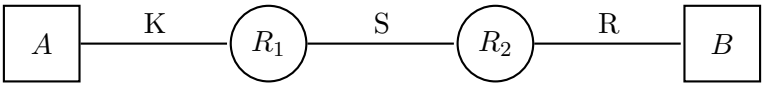
(c) Assume packet header size is 200 bits

i. If packet switching technique is used and Packet size is 800 bits

ii. If packet switching technique is used and Packet size is 1200 bits

iii. If packet switching technique is used and Packet size is 2400 bits

Q7. Hosts A and B are each connected via two routers R_1 and R_2. Each link has a propagation delay of 220 microseconds. Processing delay at router is 600 microseconds . Bandwidth of each link is denoted by K , S and R in following diagram



If message size is 100 KB.Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) if value of K,S and R is 10Mbps, 20Mbps , 30Mbps respectively

i. If message switching technique is used.

ii. Assume packet header size is negligible

A. If packet switching technique is used and Packet size is 8000 bits

B. If packet switching technique is used and Packet size is 12000 bits

iii. Assume packet header size is 800 bits

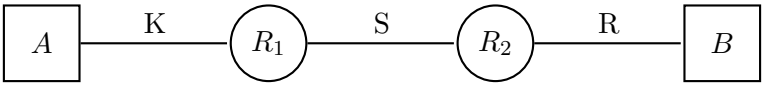
A. If packet switching technique is used and Packet size is 8000 bits

B. If packet switching technique is used and Packet size is 12000 bits

(b) if value of K,S and R is 30Mbps, 20Mbps , 10Mbps respectively
   i. If message switching technique is used.
   ii. Assume packet header size is negligible
      A. If packet switching technique is used and Packet size is 8000 bits
      B. If packet switching technique is used and Packet size is 12000 bits
   iii. Assume packet header size is 800 bits
      A. If packet switching technique is used and Packet size is 8000 bits
      B. If packet switching technique is used and Packet size is 12000 bits

(c) if value of K,S and R is 20Mbps, 10Mbps , 30Mbps respectively
   i. If message switching technique is used.
   ii. Assume packet header size is negligible
      A. If packet switching technique is used and Packet size is 8000 bits
      B. If packet switching technique is used and Packet size is 12000 bits
   iii. Assume packet header size is 800 bits
      A. If packet switching technique is used and Packet size is 8000 bits
      B. If packet switching technique is used and Packet size is 12000 bits

Q8. Hosts A and B are each connected via two routers R_1 and R_2. Each link has a propagation delay of 620 microseconds. Processing delay at router is 400 microseconds . Bandwidth of each link is denoted by K , S and R in following diagram



If message size is 120 KB.Calculate the time elapsed between the transmission of the first bit of data and the reception of the last bit of the data in the following cases :

(a) if value of K,S and R is 5Mbps, 10Mbps , 15Mbps respectively
   i. If message switching technique is used.
   ii. Assume packet header size is negligible
      A. If packet switching technique is used and Packet size is 5000 bits
      B. If packet switching technique is used and Packet size is 7000 bits
   iii. Assume packet header size is 800 bits
      A. If packet switching technique is used and Packet size is 5000 bits
      B. If packet switching technique is used and Packet size is 7000 bits

(b) if value of K,S and R is 10Mbps, 5Mbps , 15Mbps respectively
   i. If message switching technique is used.
   ii. Assume packet header size is negligible
      A. If packet switching technique is used and Packet size is 5000 bits
      B. If packet switching technique is used and Packet size is 7000 bits
   iii. Assume packet header size is 800 bits
      A. If packet switching technique is used and Packet size is 5000 bits
      B. If packet switching technique is used and Packet size is 7000 bits

(c) if value of K,S and R is 15Mbps, 10Mbps , 5Mbps respectively
   i. If message switching technique is used.
   ii. Assume packet header size is negligible

A. If packet switching technique is used and Packet size is 5000 bits

B. If packet switching technique is used and Packet size is 7000 bits

iii. Assume packet header size is 800 bits

A. If packet switching technique is used and Packet size is 5000 bits

B. If packet switching technique is used and Packet size is 7000 bits

Q9. In a network , two Host A and B tries to send the data and in case of collision, random amount of time is being calculated by binary back-off algorithm.Assume following operations are being carried out in sequence

- Data sent by A and B collides for 3 times in sequence
- A successfully send the data
- Data sent by A and B collides for 2 times in sequence
- B successfully send the data
- Data sent by A and B collides for 2 times in sequence

Answer the Followings

(a) What is the probability of collision

(b) What is the probability that A win the backoff race

(c) What is the probability that B win the backoff race

Q10. In a network , two Host A and B tries to send the data and in case of collision, random amount of time is being calculated by binary back-off algorithm.Assume following operations are being carried out in sequence

- Data sent by A and B collides for 4 times in sequence
- A successfully send the data
- Data sent by A and B collides for 1 times in sequence
- B successfully send the data
- Data sent by A and B collides for 2 times in sequence
- B successfully send the data
- Data sent by A and B collides for 2 times in sequence

Answer the Followings

(a) What is the probability of collision

(b) What is the probability that A win the backoff race

(c) What is the probability that B win the backoff race

Q11. In a network , two Host A and B tries to send the data and in case of collision, random amount of time is being calculated by binary back-off algorithm.Assume following operations are being carried out in sequence

- Data sent by A and B collides for 3 times in sequence
- A successfully send the data
- Data sent by A and B collides for 2 times in sequence
- B successfully send the data
- Data sent by A and B collides for 4 times in sequence

- B successfully send the data
- Data sent by A and B collides for 1 times in sequence

Answer the Followings

(a) What is the probability of collision

(b) What is the probability that A win the backoff race

(c) What is the probability that B win the backoff race

Q12. In a network , two Host A and B tries to send the data and in case of collision, random amount of time is being calculated by binary back-off algorithm.Assume following operations are being carried out in sequence

- Data sent by A and B collides for 3 times in sequence
- A successfully send the data
- Data sent by A and B collides for 2 times in sequence
- B successfully send the data
- Data sent by A and B collides for 3 times in sequence
- B successfully send the data
- Data sent by A and B collides for 1 times in sequence

Answer the Followings

(a) What is the probability of collision

(b) What is the probability that A win the backoff race

(c) What is the probability that B win the backoff race

Group:A Maaz, Shivam , Nafees, Jakir,Lasme (Attempt odd numbered Questions only)
GroupB:Usama , Israr, Shrukh , Mariyam (Attempt even numbered Questions only)