

Subject :	SEHH2238 : Computer Networking
Lab/Tutorial :	Session 5 : MAC_Protocols

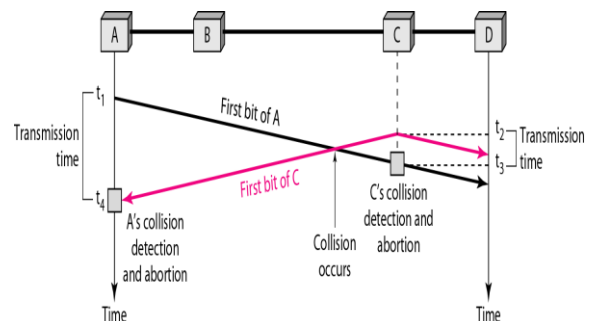
- There are three stations A, B and C in a bus network with the following data packets to be transmitted.

Station	Packet ID	Packet Length	Ready time (at)	Backoff Time
A	1	5 minutes	2:00 pm	5 minutes
B	2	5 minutes	2:03 pm	10 minutes
C	3	7 minutes	2:04 pm	6 minutes
A	4	10 minutes	2:06 pm	5 minutes

Assume the propagation delay is negligible and the source station can receive the acknowledgement from the destination station immediately after the packet transmission. At what time will the packets successfully finish their transmissions in each of the following cases? You should write down **individual finish time** for each packet and **explain** your answer with the aid of timing diagrams.

- The network adopts **1-persistent CSMA** protocol with different constant backoff time for each station (as indicated in the table).
 - The same as (a) but now the network adopts **1-persistent CSMA/CD** protocol. Further assume that the station can detect packet collisions and stop transmission within 2 minutes after the beginning of transmission.
 - The same as (a) but now the network adopts **non-persistent CSMA** protocol.
- In a CSMA/CD network with a data rate of 10 Mbps, the minimum frame size is found to be 512 bits for the correct operation of the collision detection process. What should be the minimum frame size if we increase the data rate to 100 Mbps? To 1 Gbps? To 10 Gbps?

- Referring to the Figure (12.11 where the network should be in a bus topology), the data rate is 10 Mbps, the distance between station A and station C is 2000m, and the propagation speed is 2×10^8 m/s. Station A starts sending a long frame at time $t_1 = 0$; station C starts sending a long frame at time $t_2 = 3 \mu\text{s}$. The size of the frame is long enough to guarantee the detection of collision by both stations. Find:



- The time when station C hears the collision (t_3).
 - The time when station A hears the collision (t_4).
 - The number of bits station A has sent before detecting the collision.
 - The number of bits station C has sent before detecting the collision.
- Repeat Q3 if the data rate is 100 Mbps.