INP ENSEEIHT

1er année Informatique et Réseaux
Introduction aux réseaux
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Q1. What is a MAC protocol and why is it necessary in many computer networks? What are the different methods of channel access used by the MAC protocols?

Q2. What is an error-control (reliability) method for data transmission and why is it necessary in computer networks? What is the difference between Stop-and-Wait and the sliding window method?

Q3. Does Aloha use carrier sensing and why?

Q4. Does Ethernet suffer from collisions and why? Does the length of an Ethernet network impact the collision probability?

Q5. What is the hidden terminal problem and how does WiFi address it?

Q6. What is the role of the contention window in WiFi's backoff algorithm? How does WiFi select the right value for the contention window?

Q7. What are the key differences between Ethernet and Token Ring? Which technology do you think is better and why?

Exercise 1. Stations A and B are connected by satellite and are 72000 km apart. Station A transmits packets of 1000 bits to B which B acknowledges using an ACK of 100 bits. A transmits at 200 Kbps and the signal propagates at the speed of light.
1. What is the channel utilization rate if A uses Stop-and-Wait?
2. Compute the optimal window size for the case in which A transmits using a sliding window. What is the channel utilization rate in this case?

Exercise 2. Compute how long it will take Station A to transmit 5 packets to station B under the following conditions:
- Station A uses selective repeat with cumulative ack and an optimal window size.
- Packet transmission time (Te) = 3 ms, Acknowledgment transmission time (Tack) = 2ms, propagation delay (Tp) =2ms.
- There is a single error in the transmission of the first data packet.