2e année Informatique et Réseaux
13/03/2020 – duration 1 hour
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Q1 (4 points). Consider the wireless network in Fig. 1 where nodes use the MACA protocol and the Binary Exponential Backoff for accessing the channel. Describe a scenario in which one of the two connections, S_1 or S_2, would be able to send a series of packets while the other connection no one. Assume that B_1 and B_2 always have packets to transmit.

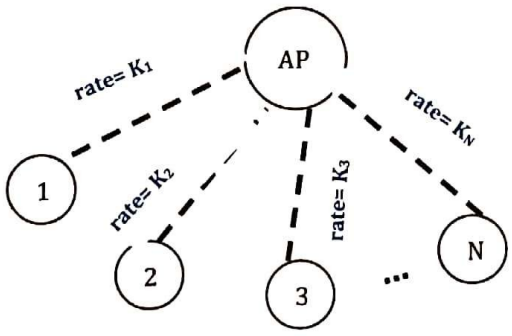
Figure 1

Q2 (4 points). Wi-Fi (IEEE 802.11) adapted the binary exponential backoff (BEB) algorithm from Ethernet (IEEE 802.3). Do you see any issues with this choice? How would you address them? Justify your answers.

Q3 (4 points). What are they key differences between WiFi and Bluetooth? What are the reasons behind these differences?

Q4 (4 points). Illustrate with a simple example OLSR's multipoint relay. Give the example of a network with at least 10 nodes in which multipoint relays bring no improvement in terms of the number of link state updates transmitted.

Q5 (6 points). Rate control
Consider the network illustrated below, consisting of N IEEE 802.11 clients associated to a single AP. All clients are in each other's range and are transmitting as fast as possible packets of size M bits to the access points. The access point itself has no packets to send. A particular client i transmits to the access point at K_i bits per second and the rate never changes.



1. Give an expression of the average throughput of the system, i.e., the average bits per second arriving at the AP, as function of K_i and **N**. Ignore all overhead, including channel access time, ACK, RTS/CTS, etc.
2. Adapt the expression computed above assuming all nodes are using the Opportunistic Auto-Rate algorithm.