Thalagala B.P. 180631J

In-class assignment 2 : Back-off Algorithm

November 3, 2021

In half duplex mode, a collision occurs when two stations try to transmit packets simultaneously. When a collision is detected, instead of terminating the transmission immediately, transmitter continues to send a set of additional bits called as *collision enforcement bits* or *jam bits* of length`jamSize`. This ensures that the collision is detected by all the transmitting stations on the network. When a transmission attempt has been terminated due to a collision, transmitter retries until either it is successful or a maximum number of attempts(`attemptLimit = 16`) have been made and all have terminated due to collisions.

These retransmissions are scheduled by a randomization process called *truncated binary exponential backoff*. The delay, before attempting a retransmission is an integer multiple of time taken to emits 512 bits, called as slot time(`slotTime`). The number of slot times to delay before the n^{th} retransmission attempt is chosen as a uniformly distributed random integer r in the range $0 \leq r < 2^k$ where $k = min(n, 10)$. After 16 re-tries(`attemptLimit`) this event is reported as an error to the higher layers and interface gives-up the transmission.

Note: In the below diagram Transmission is abbreviated as TX; "Deferring On?" decision block delays the packet for Inter Frame Gap(IFG) once MAC identifies the channel is idle and available for a transmission.

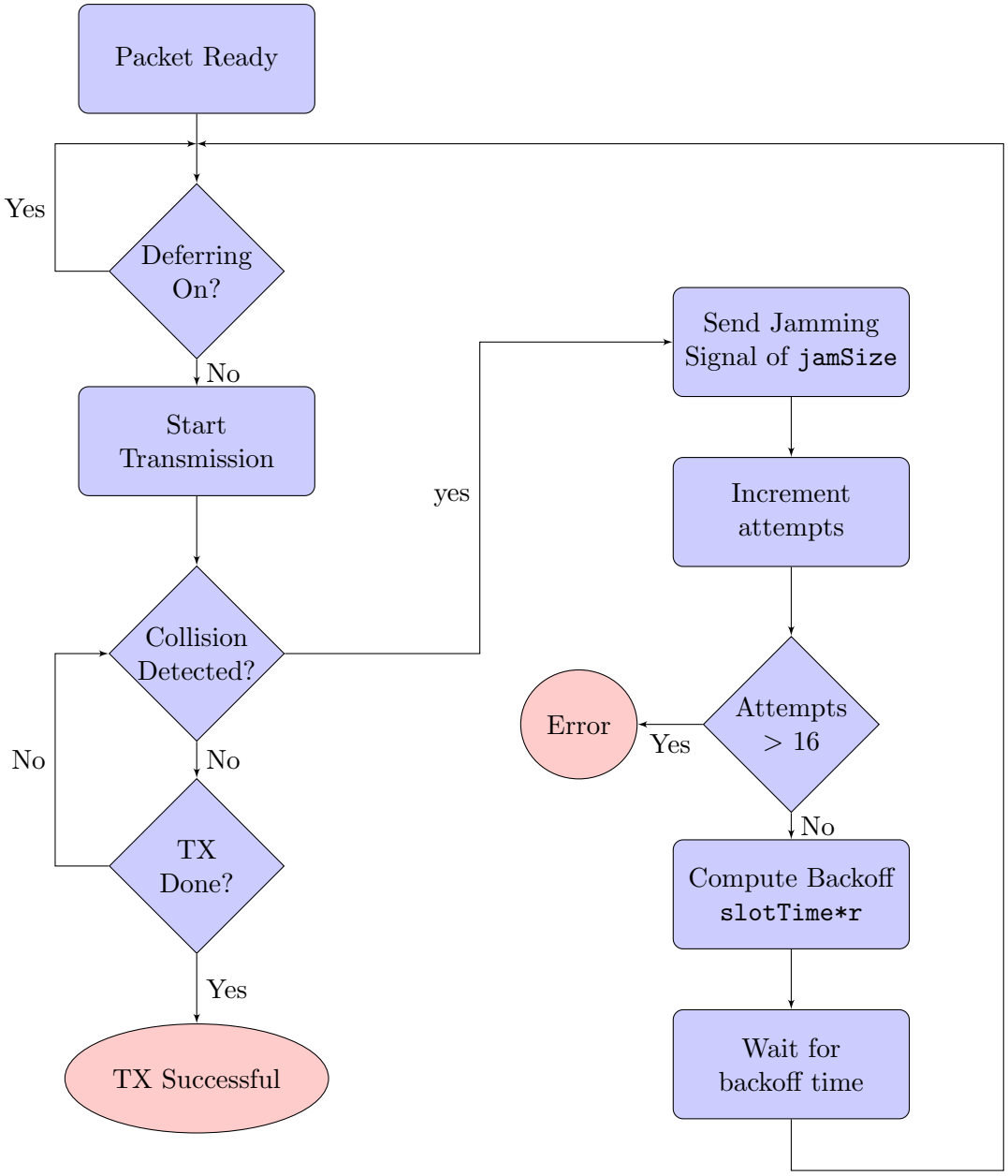

Figure 1: Block-level circuit diagram of Backoff algorithm

References: Ieee standard for ethernet. *IEEE Std 802.3-2018 (Revision of IEEE Std 802.3-2015)*; Minimizing Mobiles Communication Time Using Modified Binary Exponential Backoff Algorithm: http://dx.doi.org/10.5121/ijcnc.2013.5605