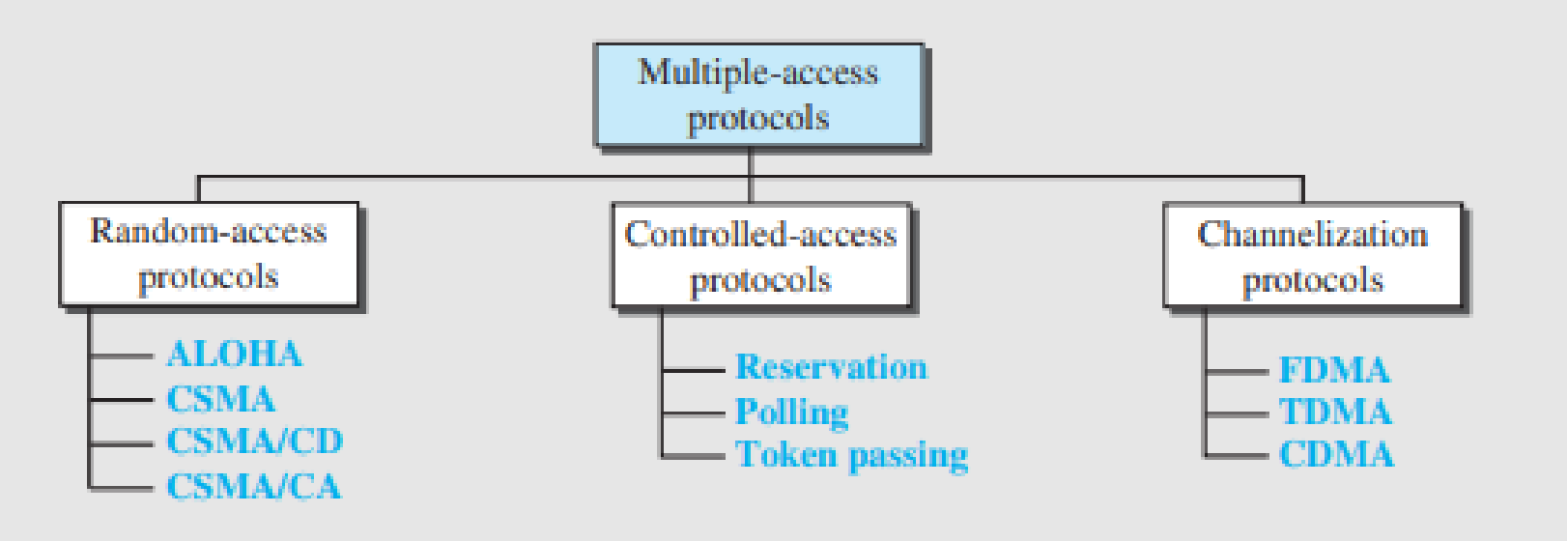
DATA LINK LAYER

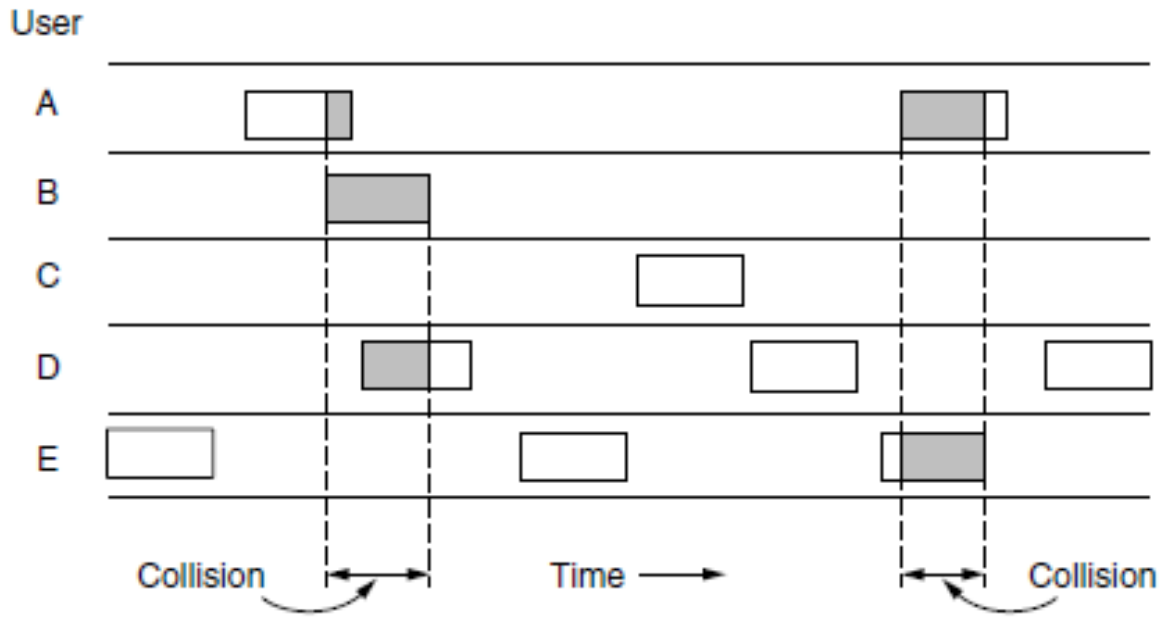
MAC Protocol Classification



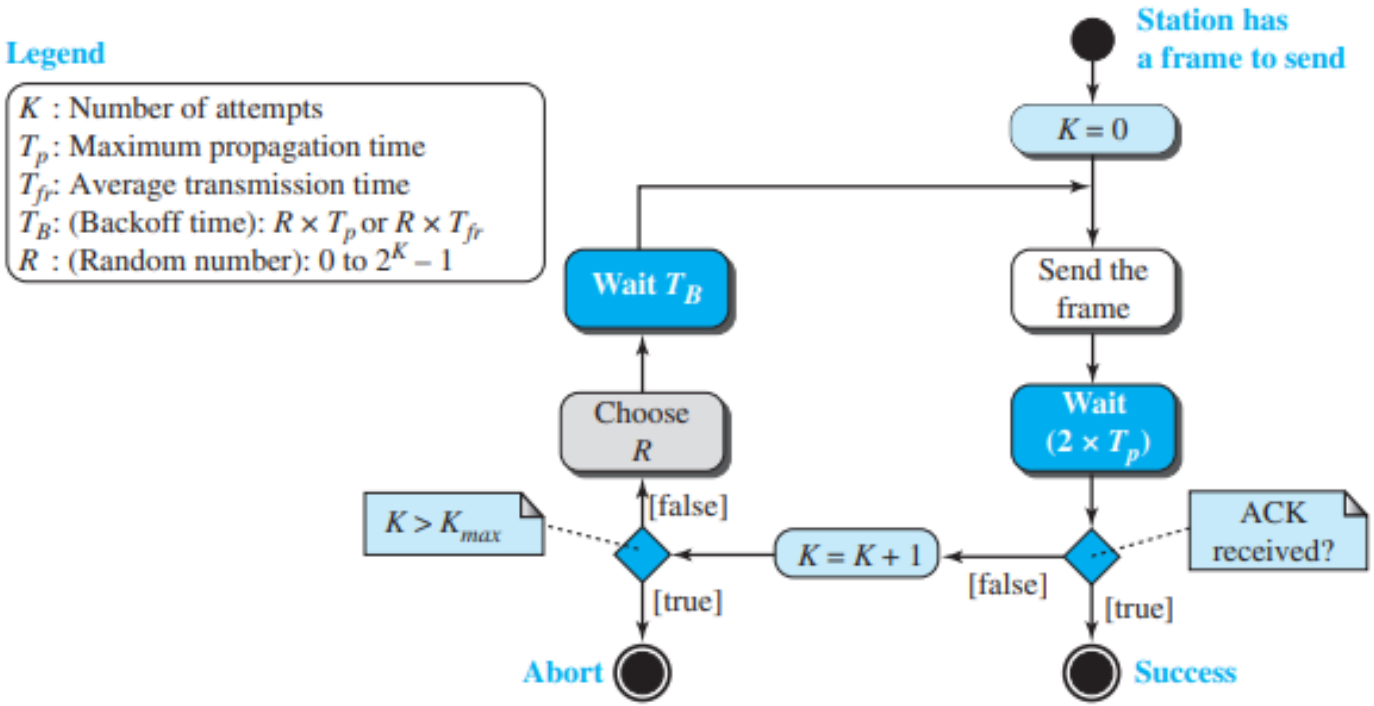
DLL-MAC

ALOHA- used short-range radios, with each user terminal sharing the same upstream frequency to send frames to the central computer

- Pure ALOHA- Users transmit whenever they have data to sent (contention System) and there will be collision as well as frame damage



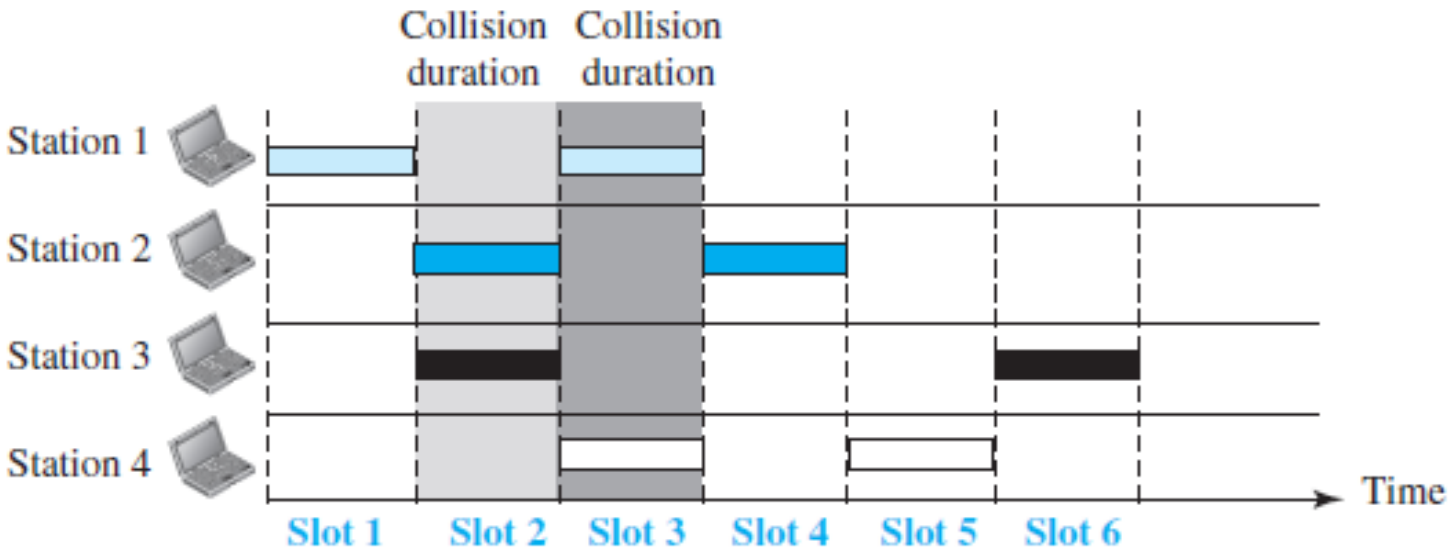
ALOHA Contd.


Legend
K : Number of attempts
T_p: Maximum propagation time
T_{fr}: Average transmission time
T_B: (Backoff time): $R \times T_p$ or $R \times T_{fr}$
R : (Random number): 0 to $2^K - 1$
Station has a frame to send
K = 0
Send the frame
Wait ($2 \times T_p$)
ACK received?
[false]
[true]
K = K + 1
$K > K_{max}$
[false]
[true]
Choose R
Wait T_B
Abort
Success

DLL-MAC

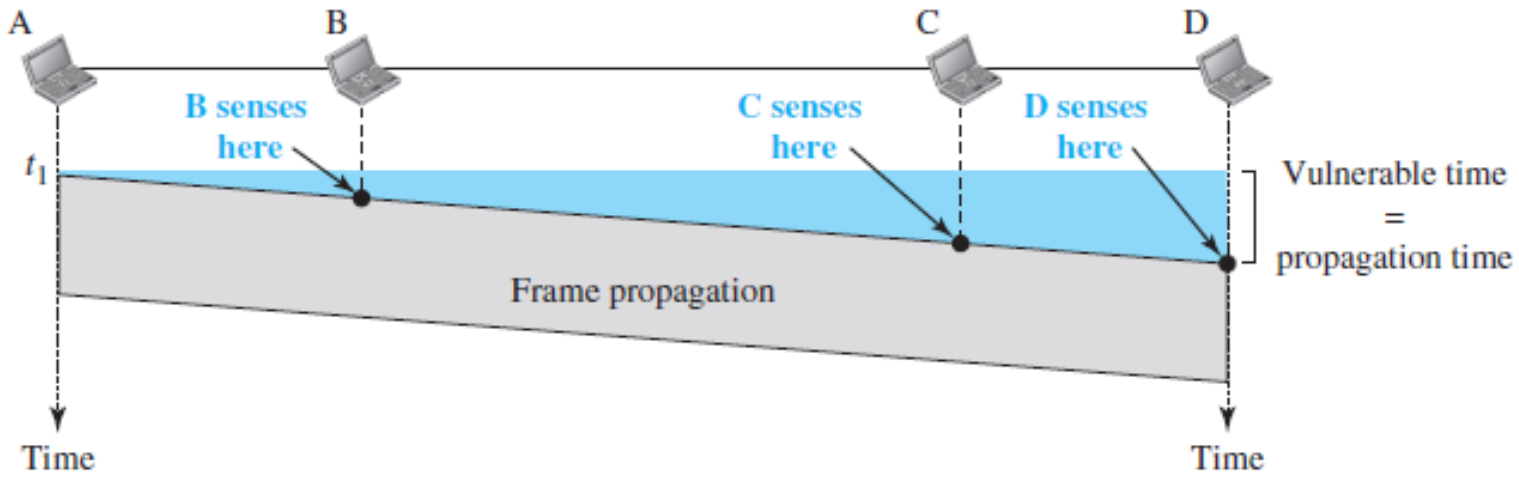
ALOHA

Slotted Aloha- Transmission during slot times (force the station to send only at the beginning of the time slot)

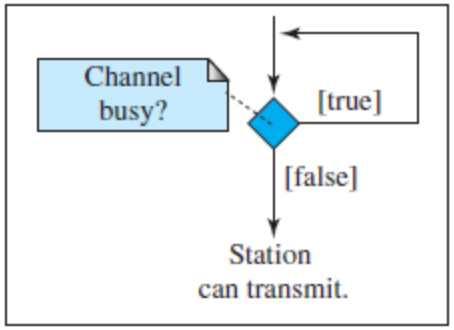


Carrier Sense Multiple Access Protocols

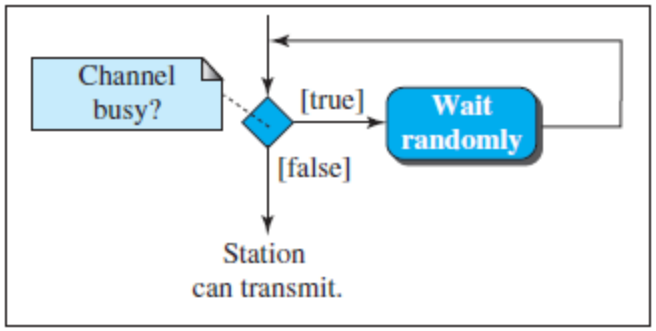
The vulnerable time for CSMA is the ***propagation time*** *Tp*
The leftmost station, A, sends a frame at time *t*1, which reaches the rightmost station, D, at time *t*1 + *Tp*. The gray area shows the vulnerable area in time and space.



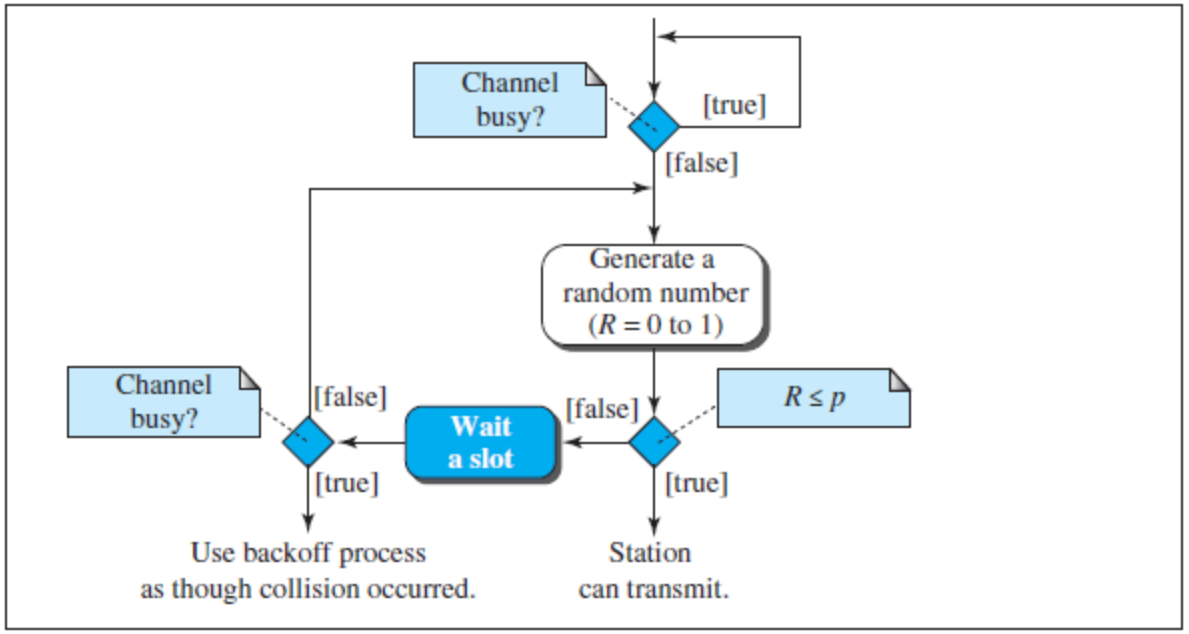
Carrier Sense Multiple Access Protocols



a. 1-Persistent



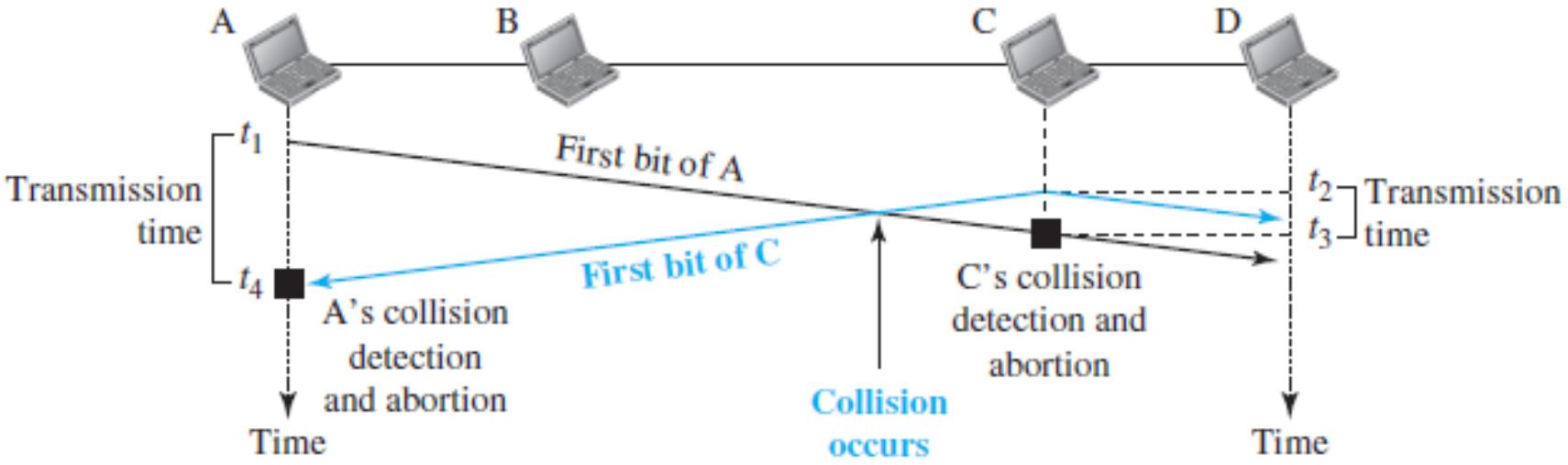
b. Nonpersistent



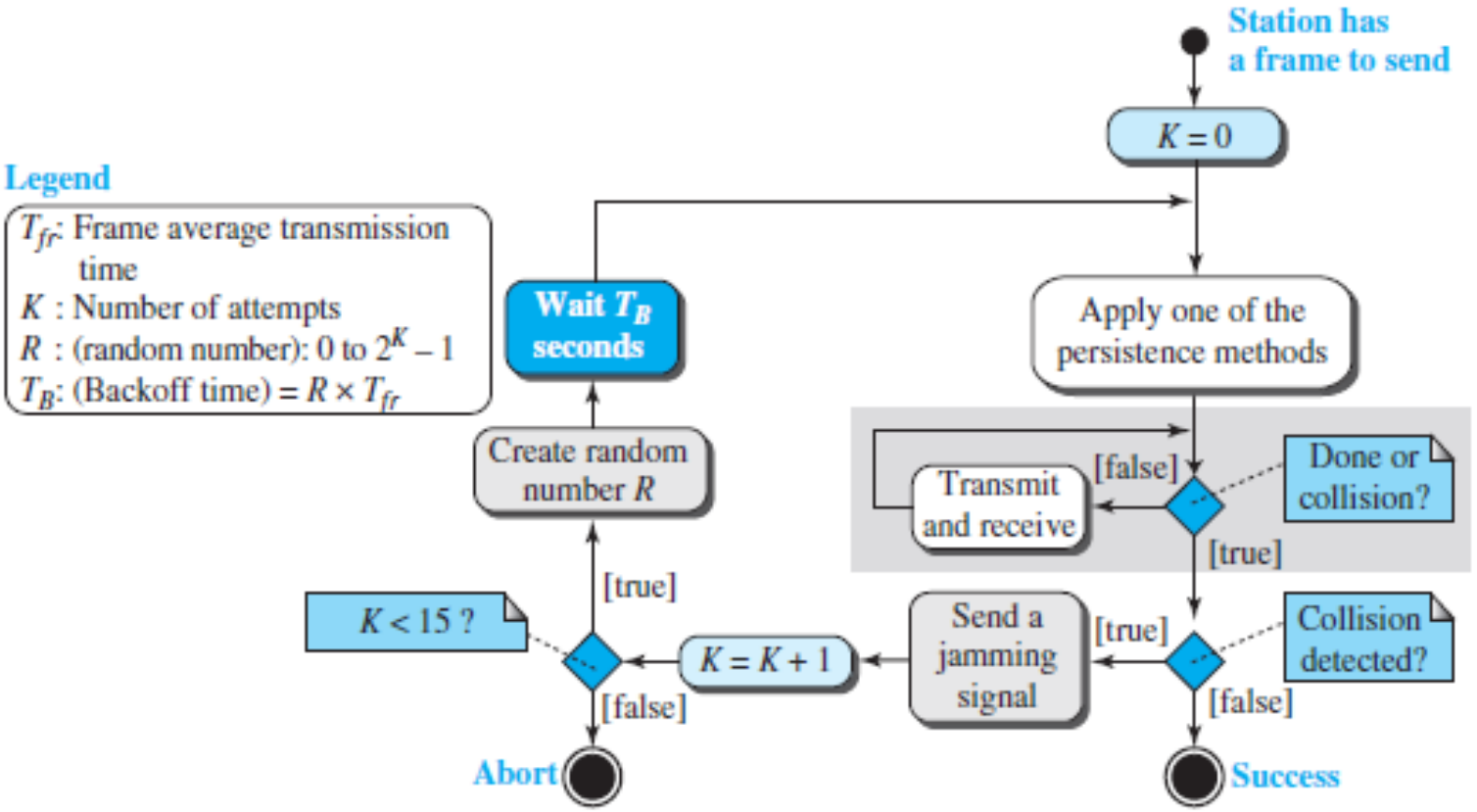
c. *p*-Persistent

Carrier Sense Multiple Access with Collision Detection(CSMA/CD)

Algorithm used to manage collisions



Carrier Sense Multiple Access with Collision Detection(CSMA/CD)



DLL-MAC

Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)