Multiple Access Protocols

Types

I. Contention/Random Access Methods

A. ALOHA

B. CSMA

C. CSMA/CD

D. CSMA/CA

II. Collision-free protocols

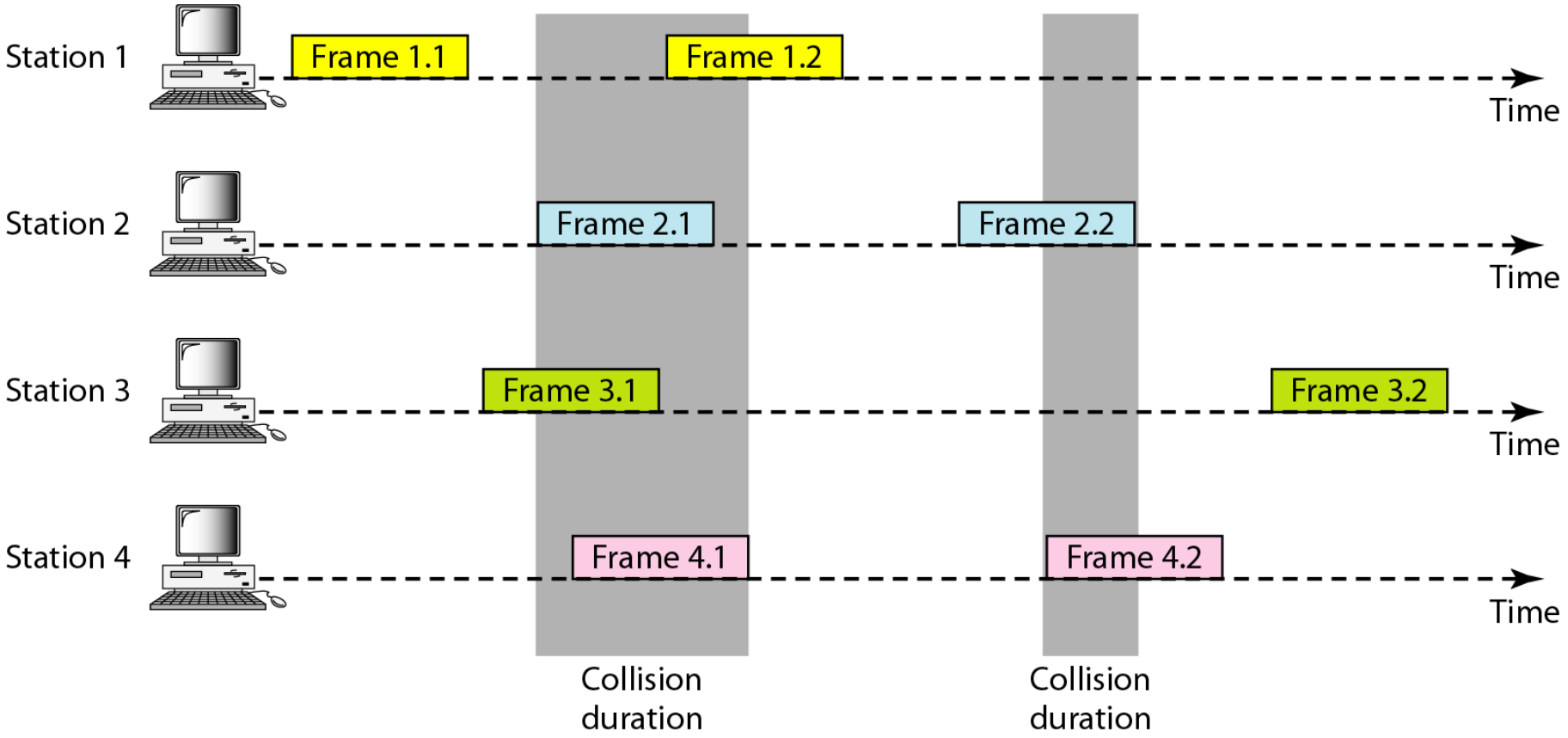
A. Bit- Map

B. Binary countdown

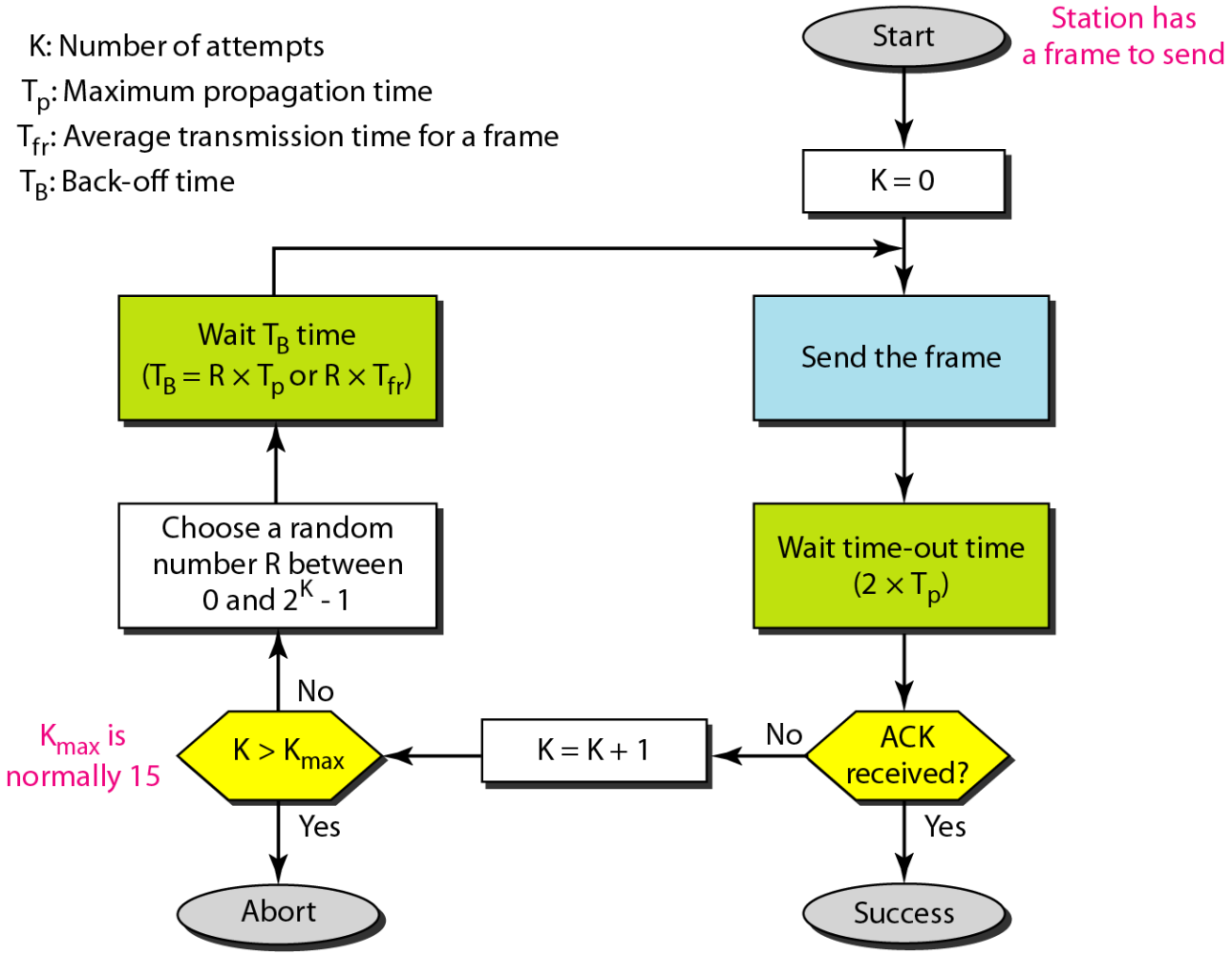
III. Limited Contention Protocols

A. Adaptive Tree Walk

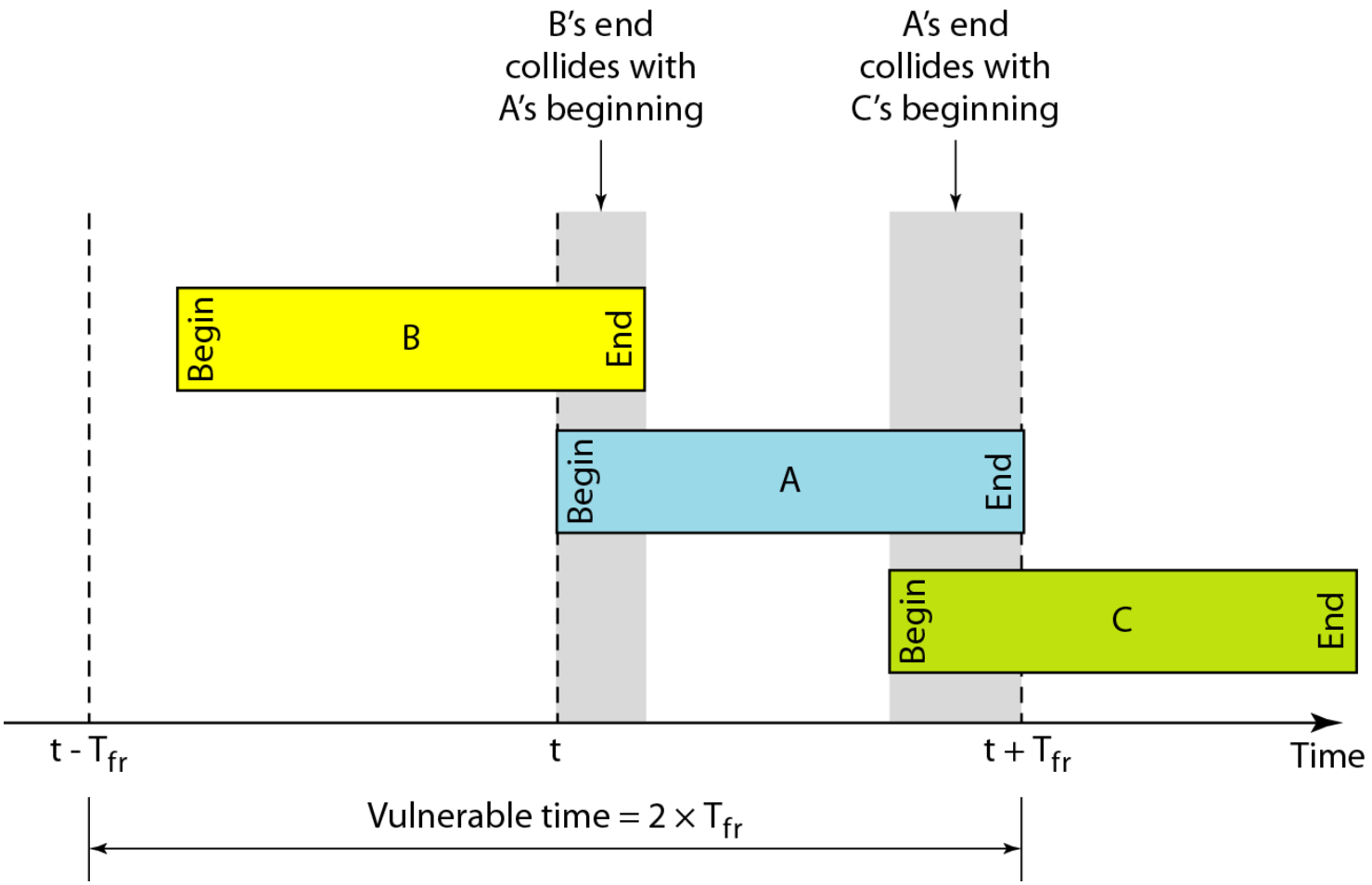
ALOHA or Pure ALOHA



Procedure for pure ALOHA protocol



Vulnerable time for pure ALOHA protocol



Throughput

Avg no. of successfully transmitted frames

$$S = G * e^{-2G}$$

Max throughput is 0.184 when G=1/2

Problem-1

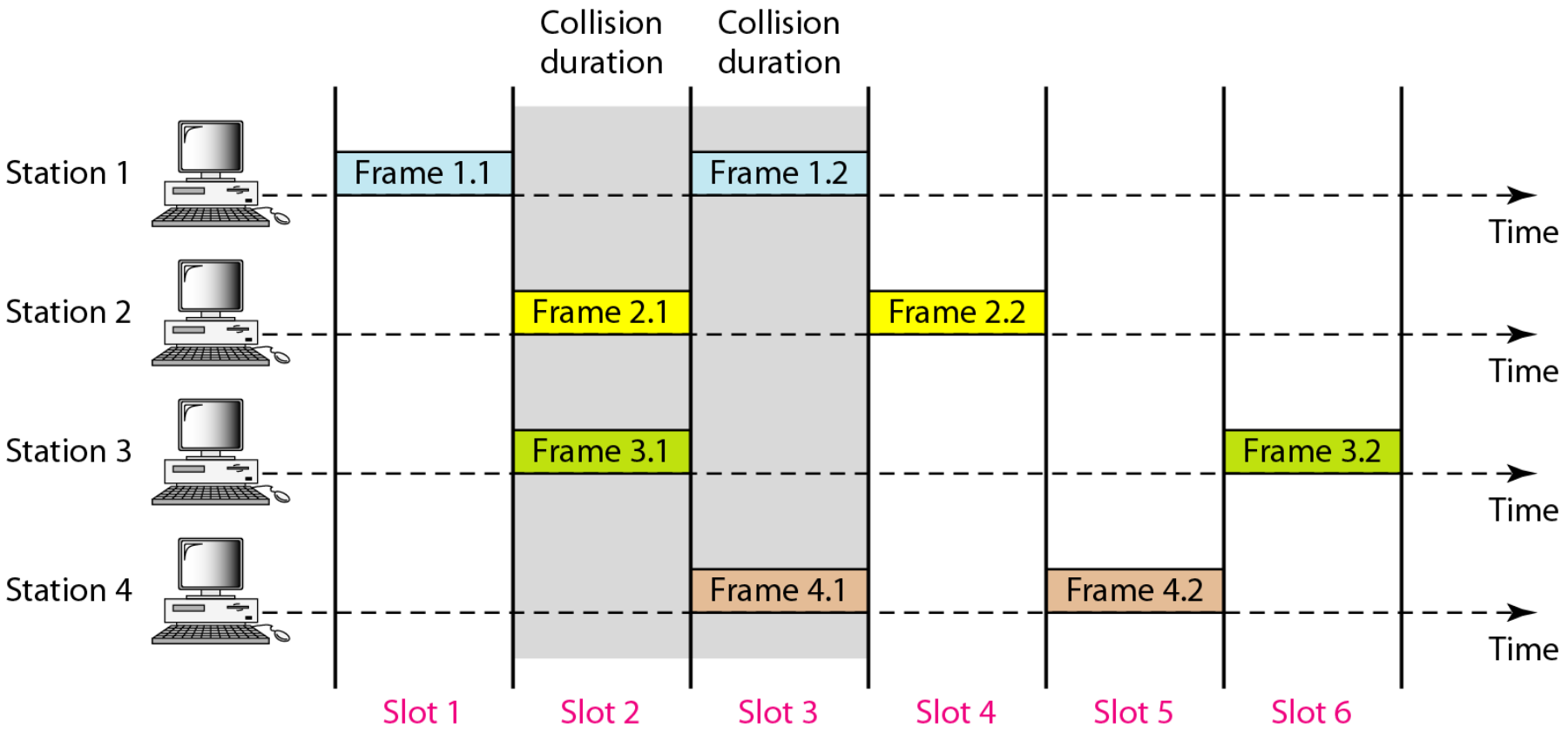
A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces

a. 1000 frames per second b. 500 frames per second

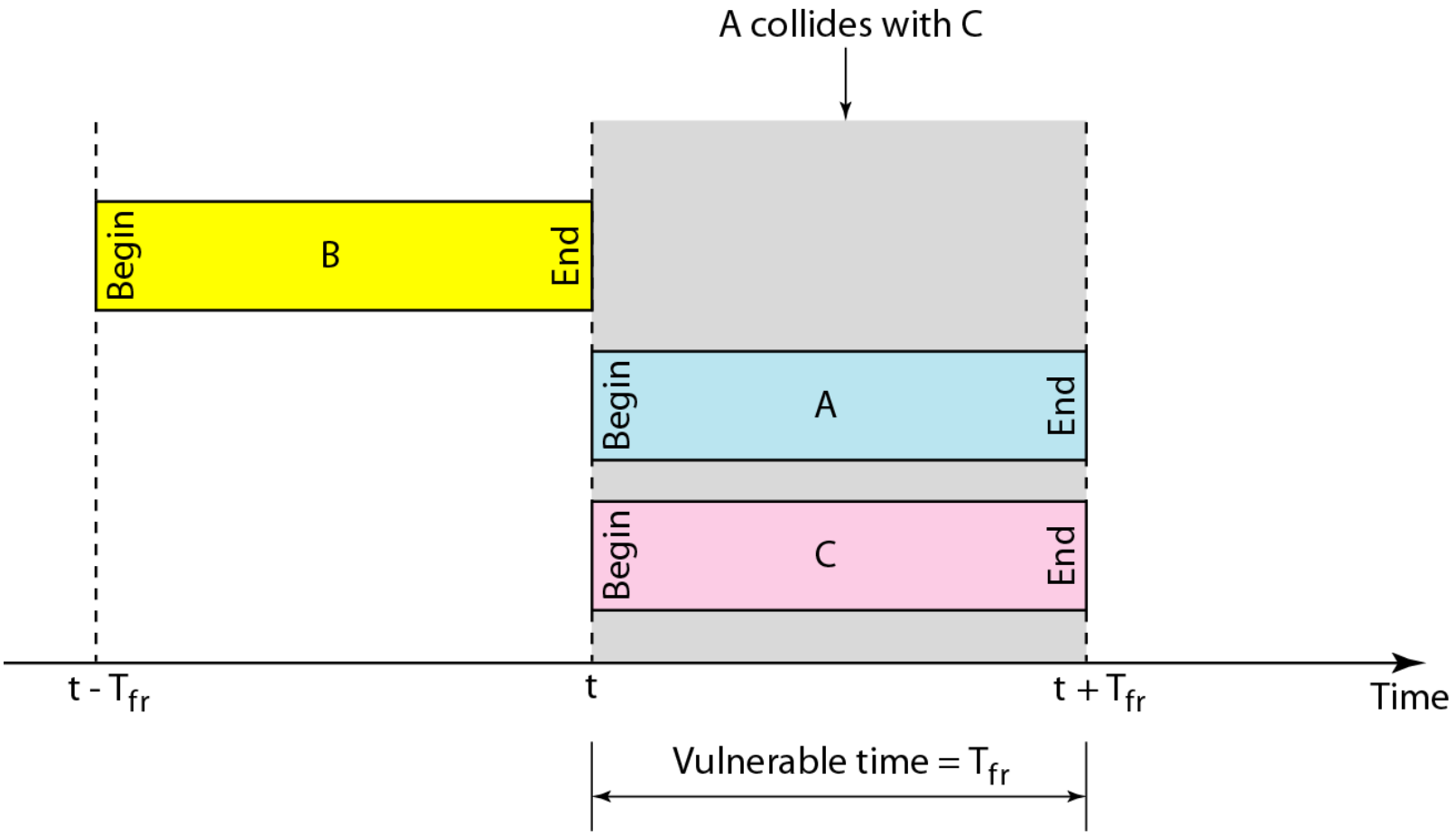
c. 250 frames per second.

Slotted ALOHA

Frames in a slotted ALOHA network



Vulnerable time for slotted ALOHA protocol



Throughput

Avg no. of successfully transmitted frames

$$S = G * e^{-G}$$

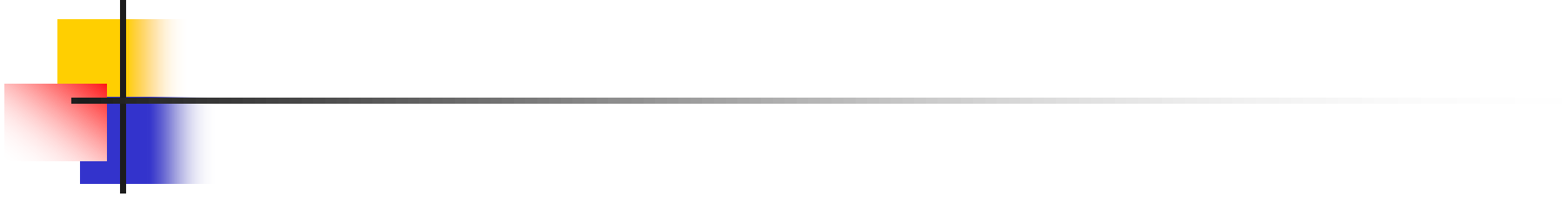
Max throughput is 0.368 when G=1

Problem -2

A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces

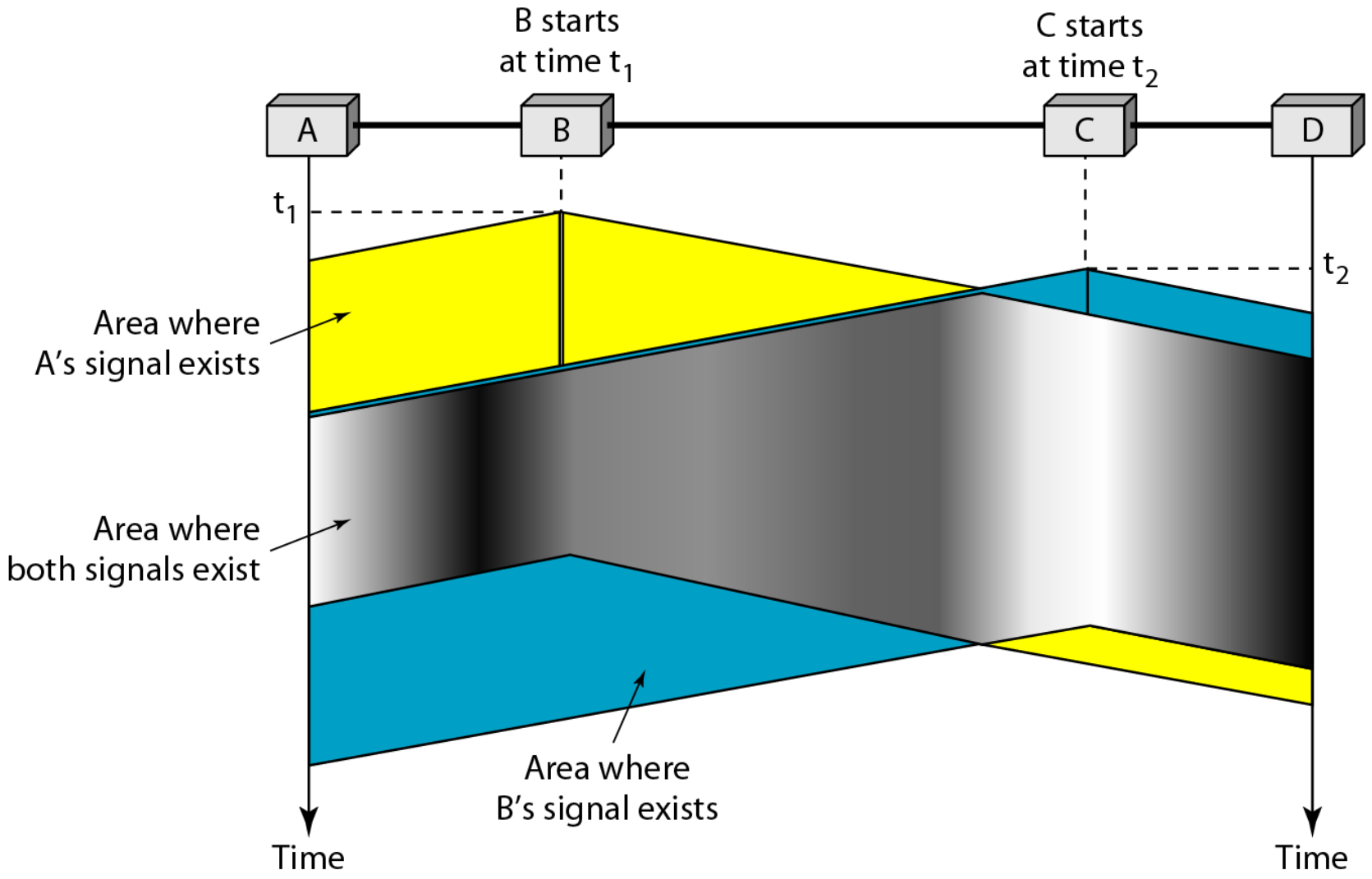
a. 1000 frames per second *b. 500 frames per second*

c. 250 frames per second.

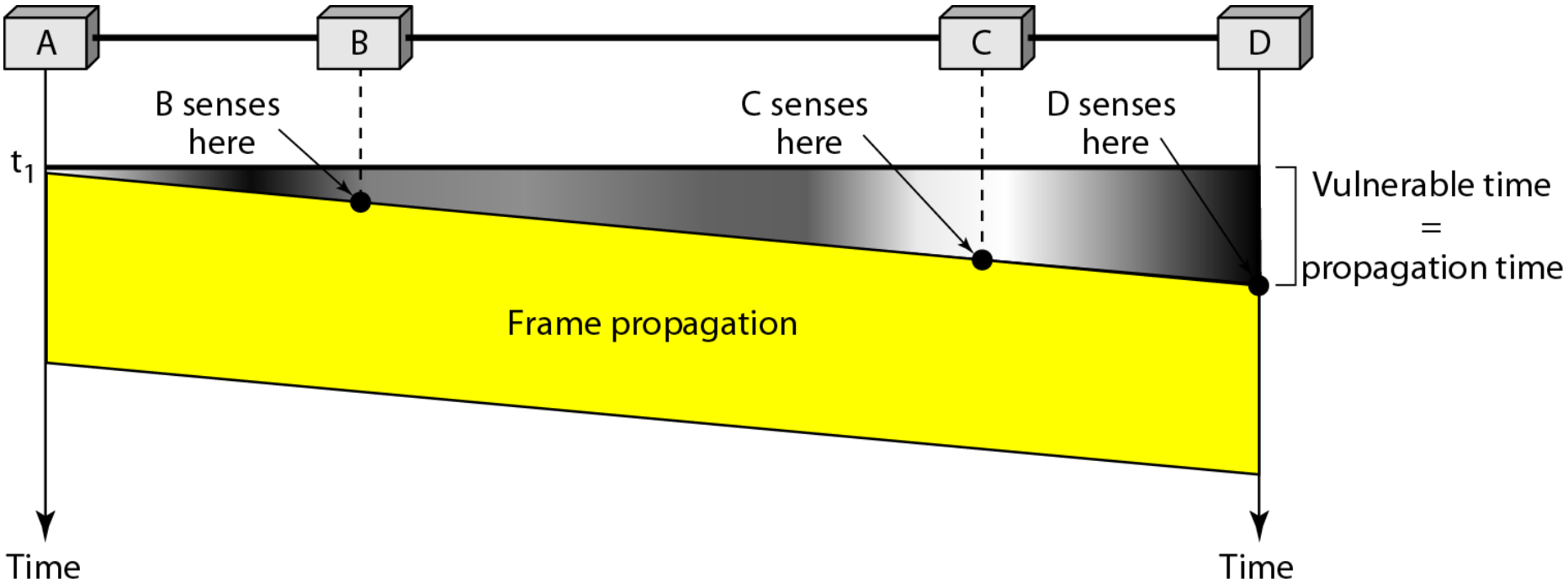


CSMA

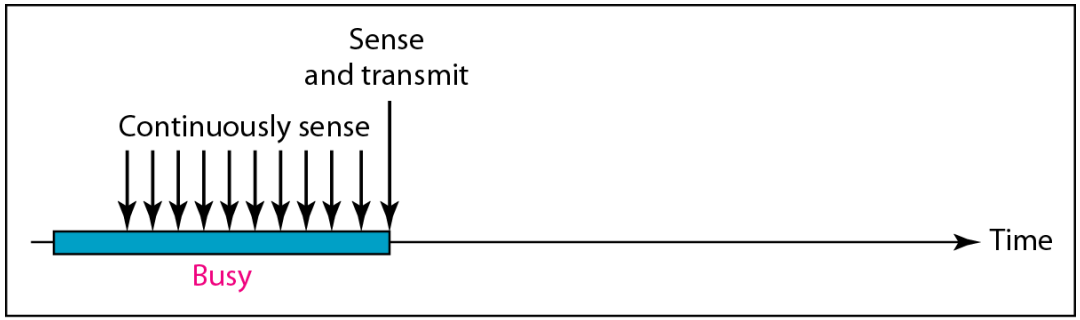
Space/time model of the collision in CSMA



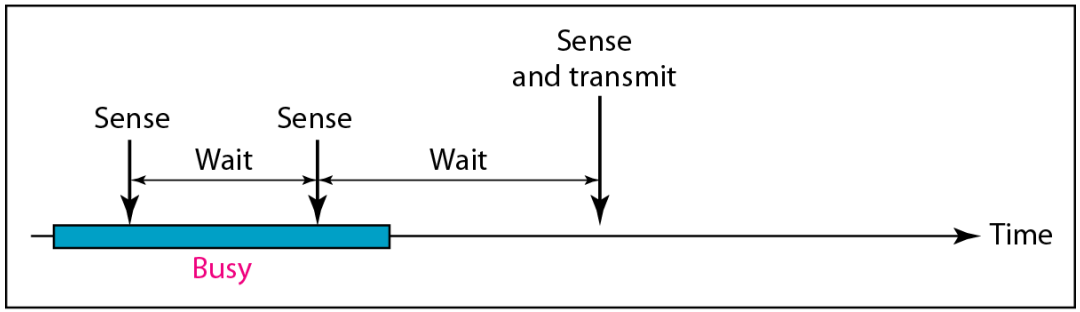
Vulnerable time in CSMA



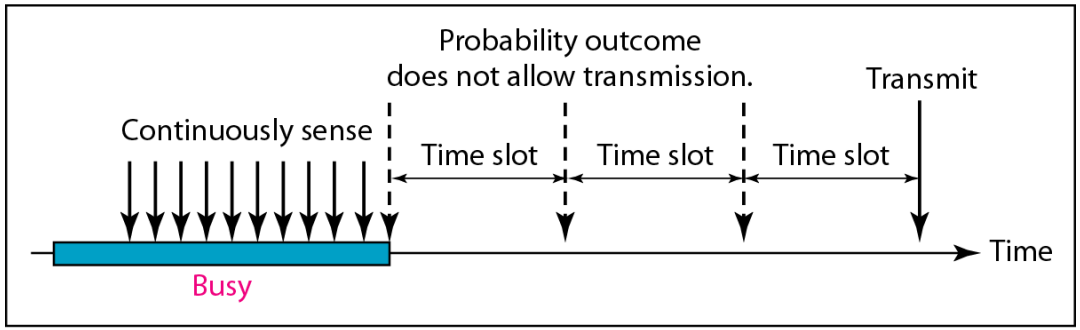
Behavior of three persistence methods



a. 1-persistent

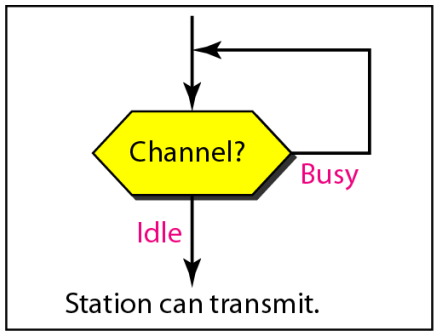


b. Nonpersistent

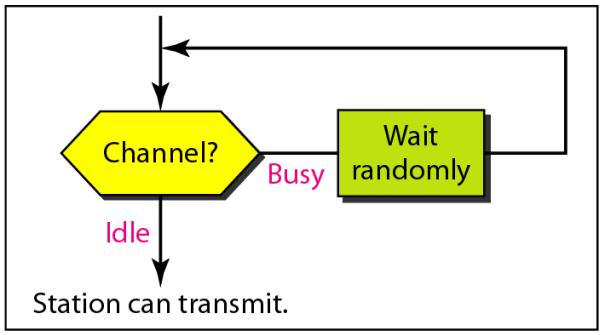


c. p-persistent

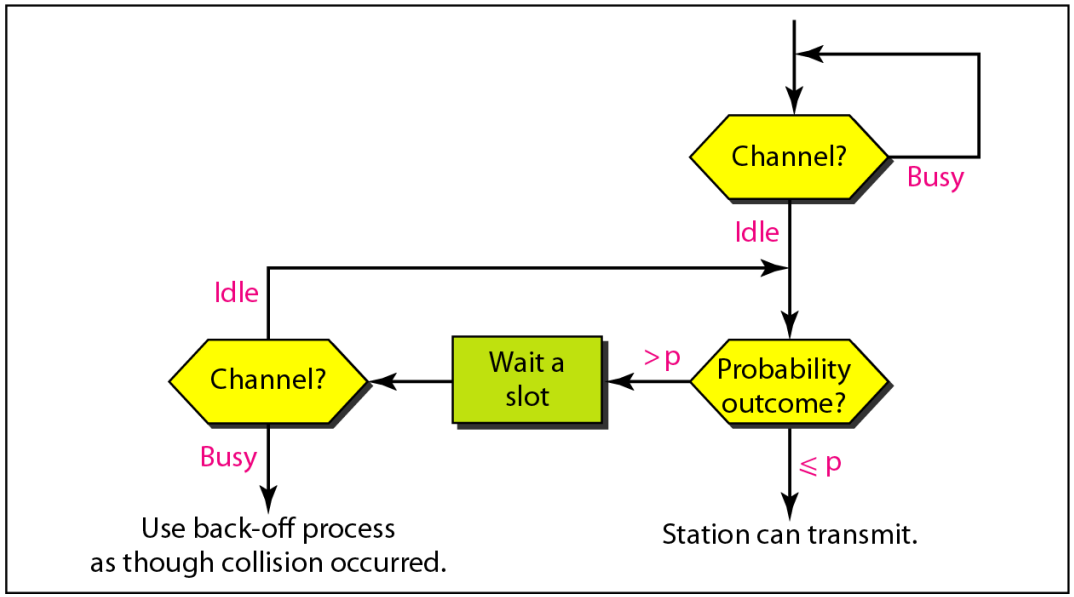
Flow diagram for three persistence methods



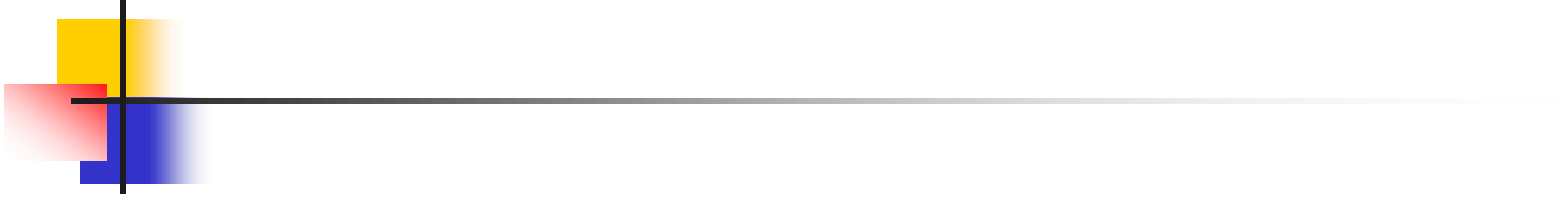
a. 1-persistent



b. Nonpersistent

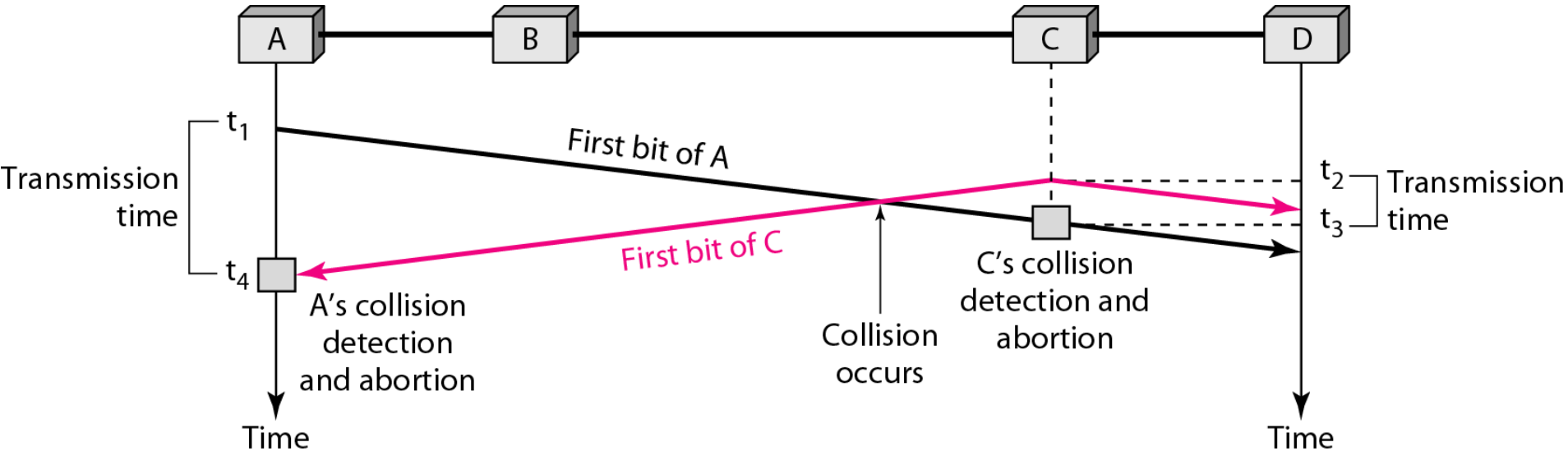


c. p-persistent

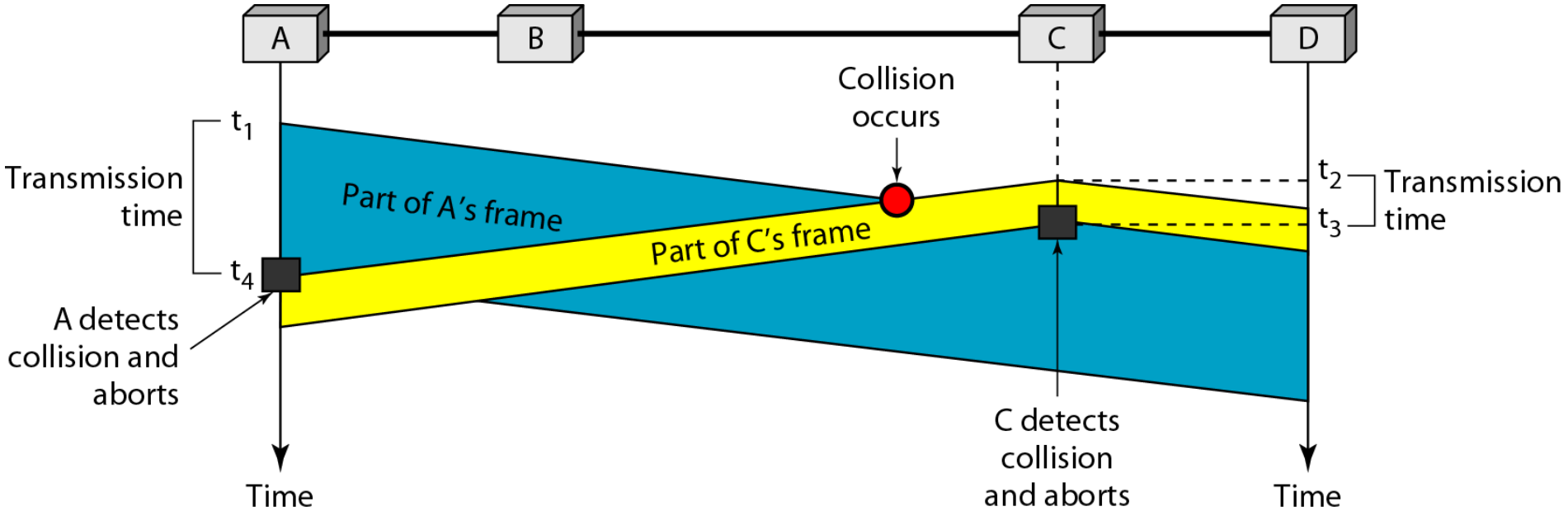


CSMA/CD

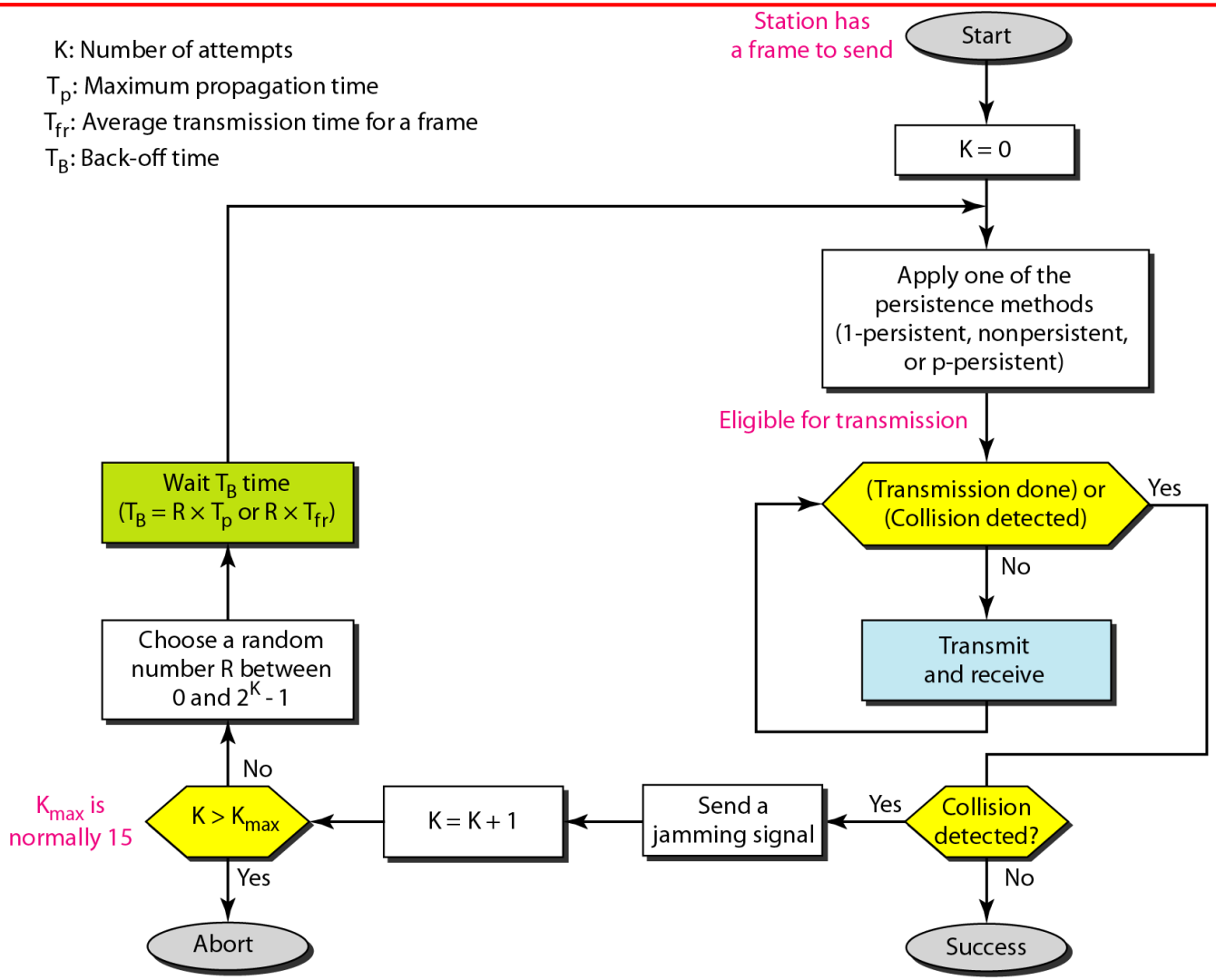
Collision of the first bit in CSMA/CD

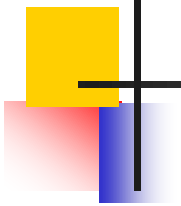


Collision and abortion in CSMA/CD



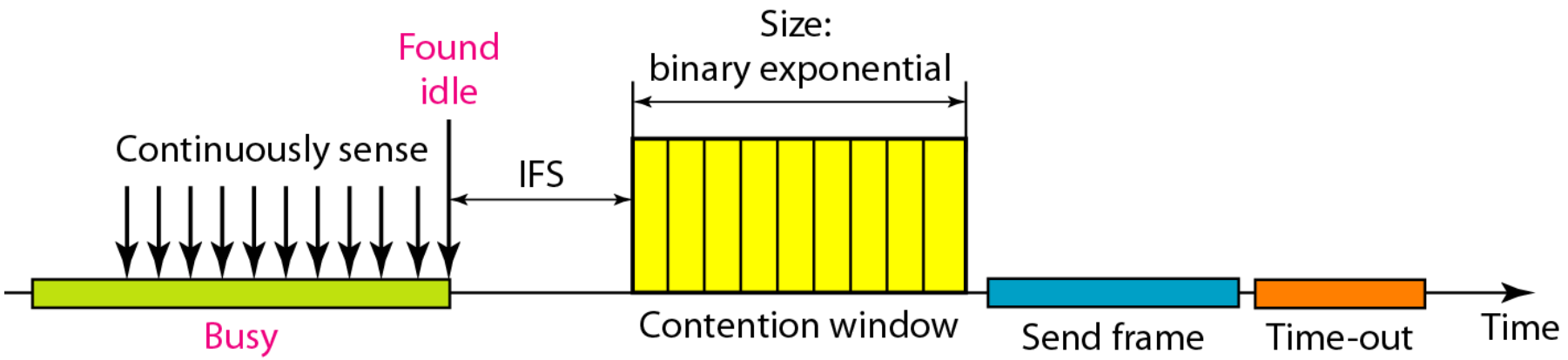
Flow diagram for the CSMA/CD



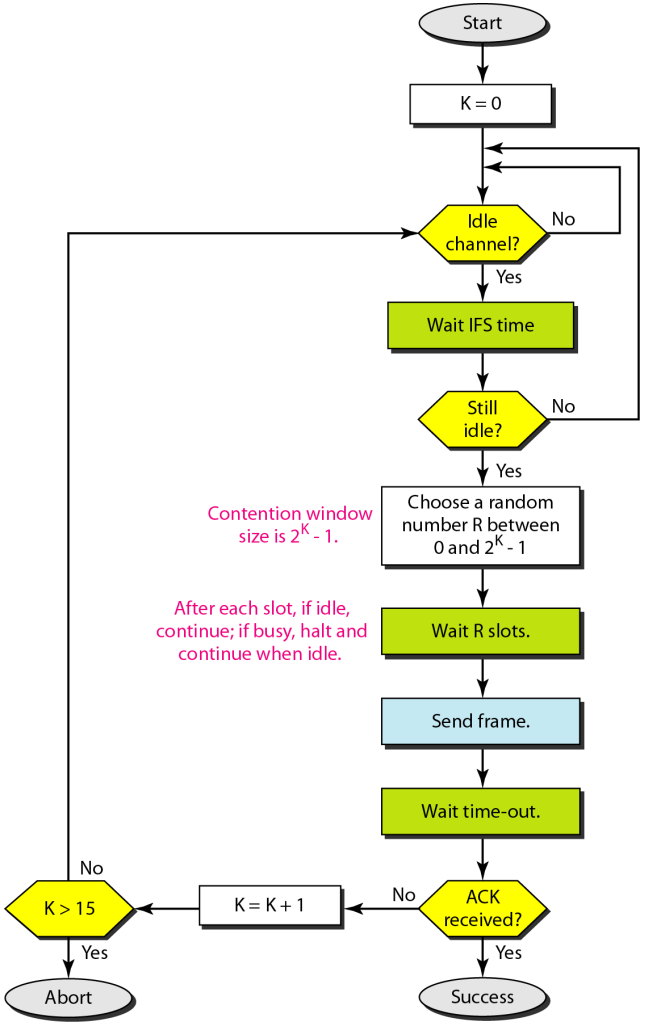


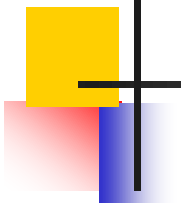
CSMA/CA

Timing in CSMA/CA



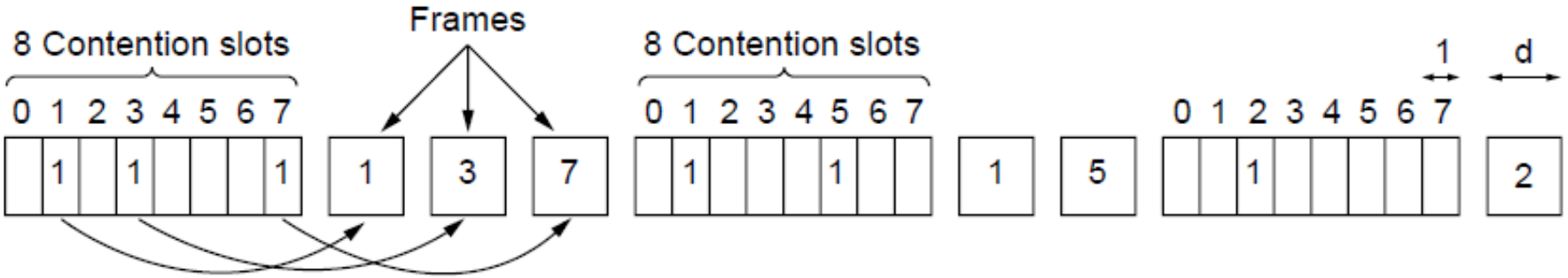
Flow diagram for CSMA/CA



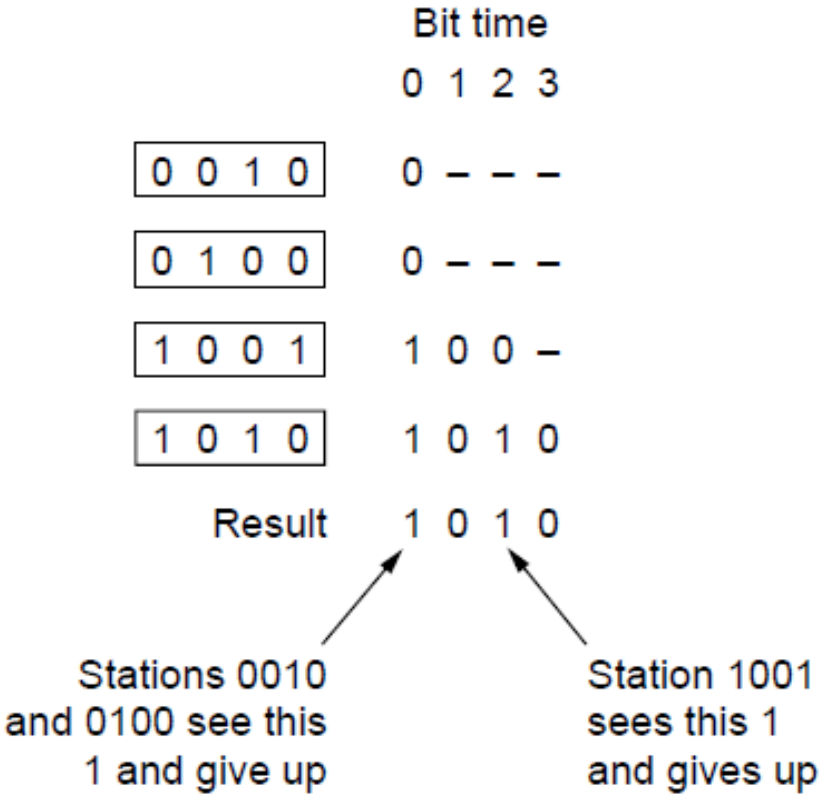


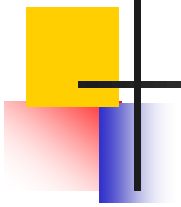
II. Collision Free Protocols

A. Bit Map Protocol



B. Binary Countdown





III. Limited Contention Protocol

Adaptive Tree Walk Protocol