

Lecture 18

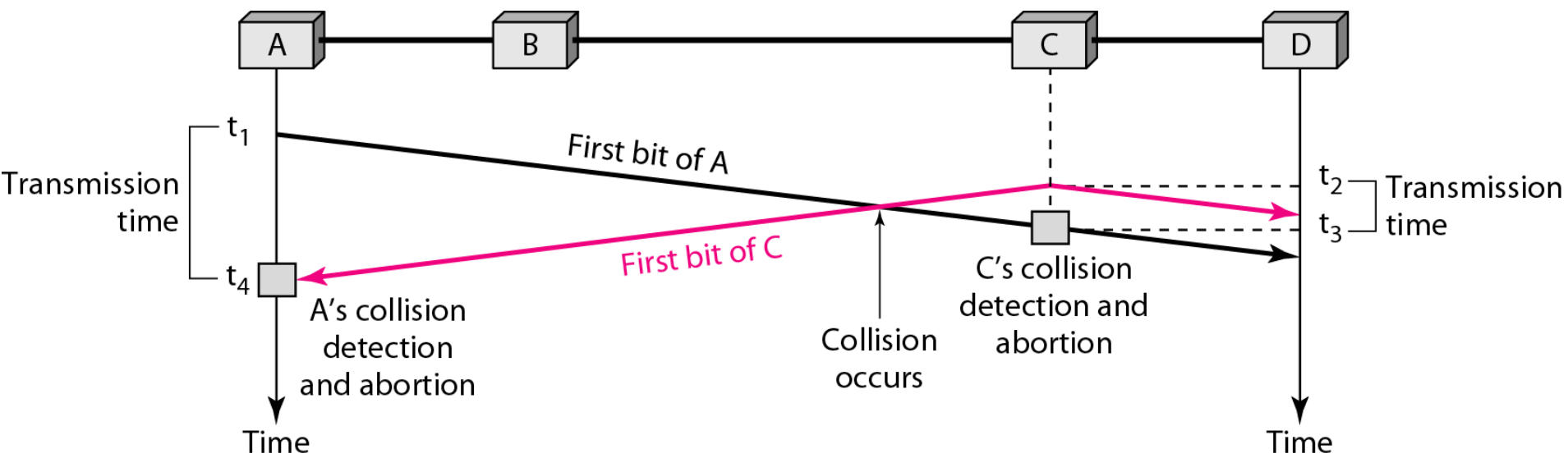
Local Area Network

Protocols for Multiple Access Control (II)

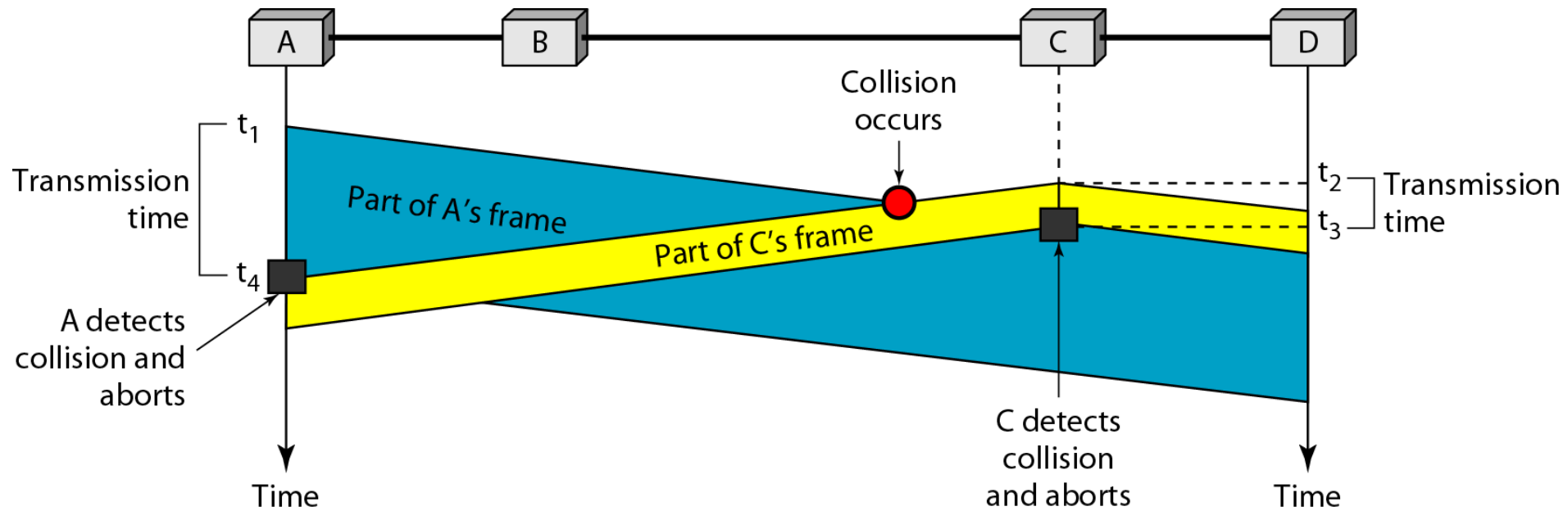
Topics Covered

- CSMA/CD
- CSMA/CA
- CONTROLLED ACCESS
- Reservation access method
- Applications

Collision of the first bit in CSMA/CD

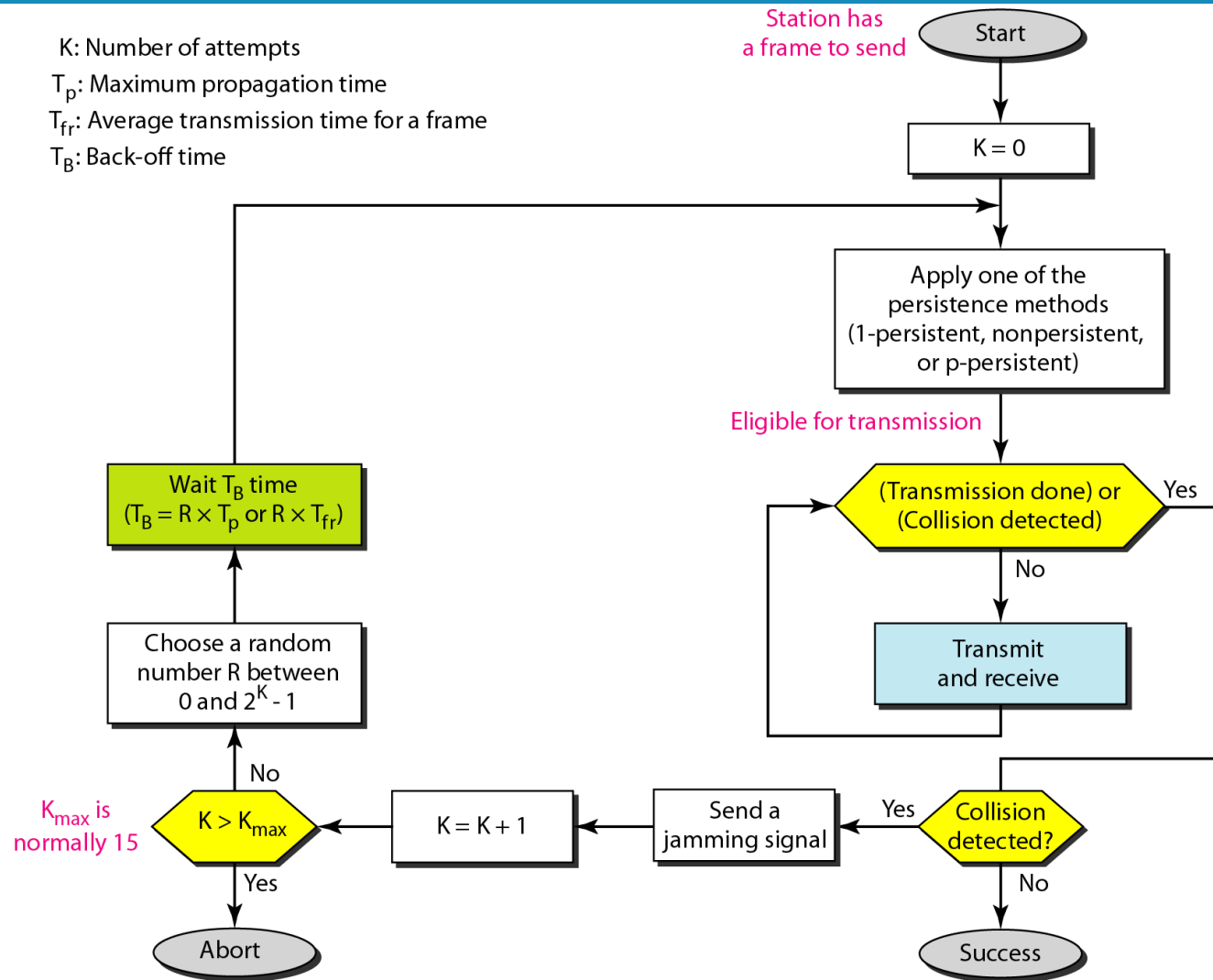


Collision and abortion in CSMA/CD

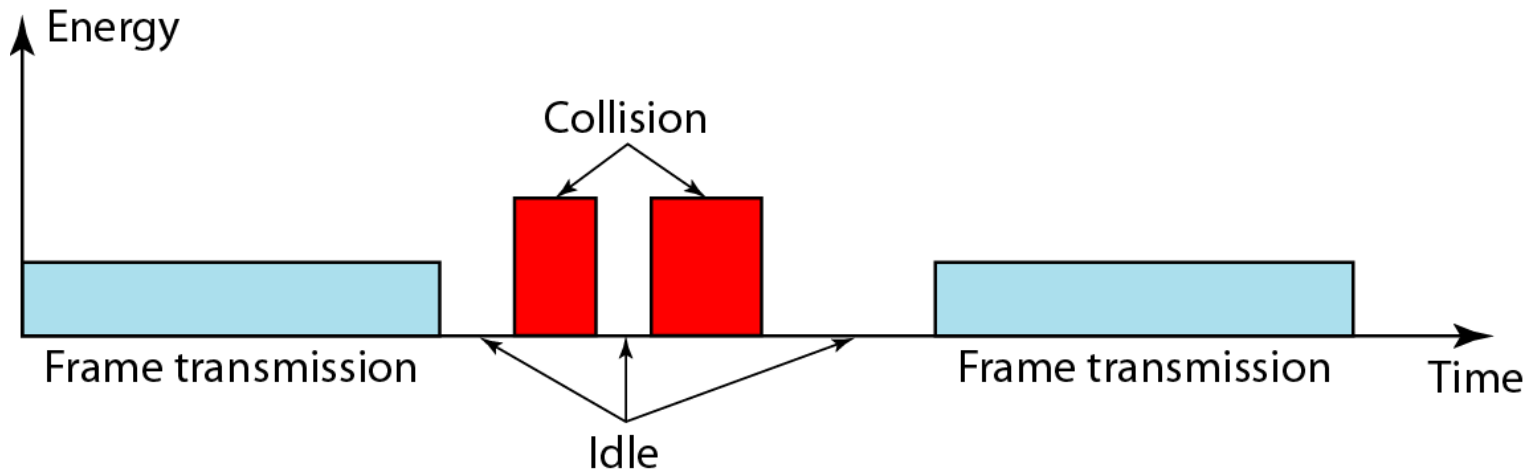


Flow diagram for the CSMA/CD

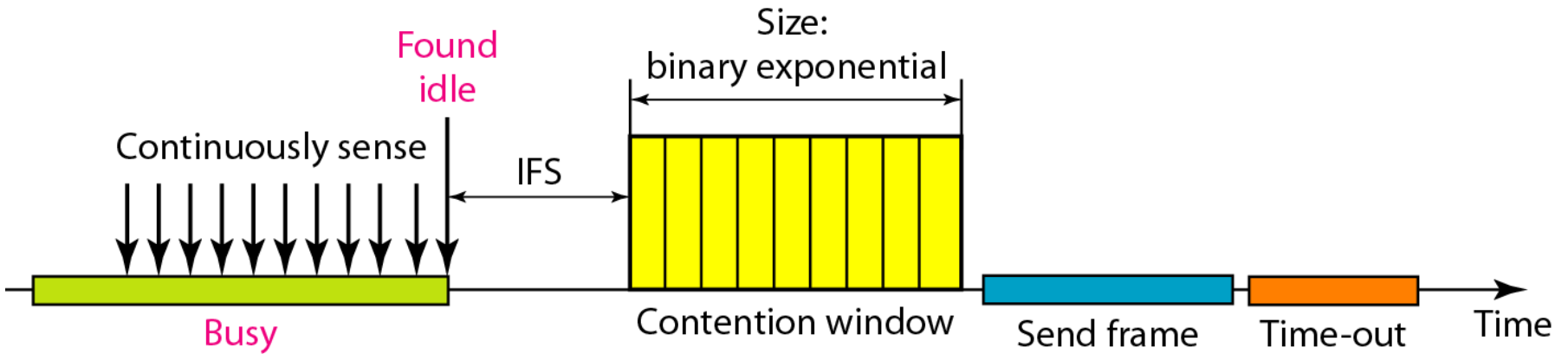
K: Number of attempts
 T_p : Maximum propagation time
 T_{fr} : Average transmission time for a frame
 T_B : Back-off time



Energy level during transmission, idleness, or collision



Timing in CSMA/CA





Note

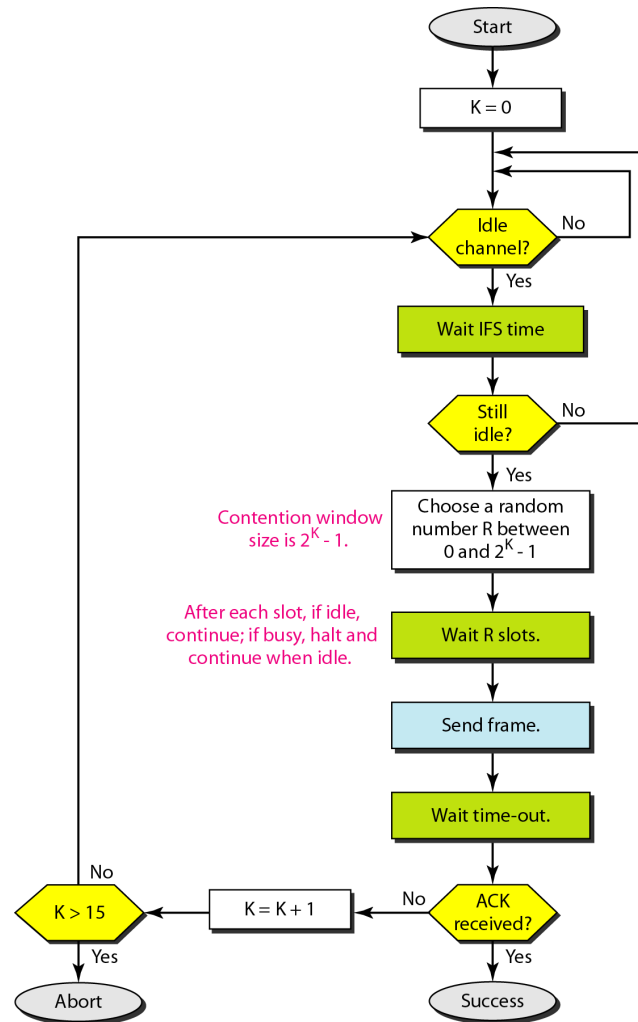
In CSMA/CA, the IFS can also be used to define the priority of a station or a frame.



Note

In CSMA/CA, if the station finds the channel busy, it does not restart the timer of the contention window; it stops the timer and restarts it when the channel becomes idle.

Flow diagram for CSMA/CA

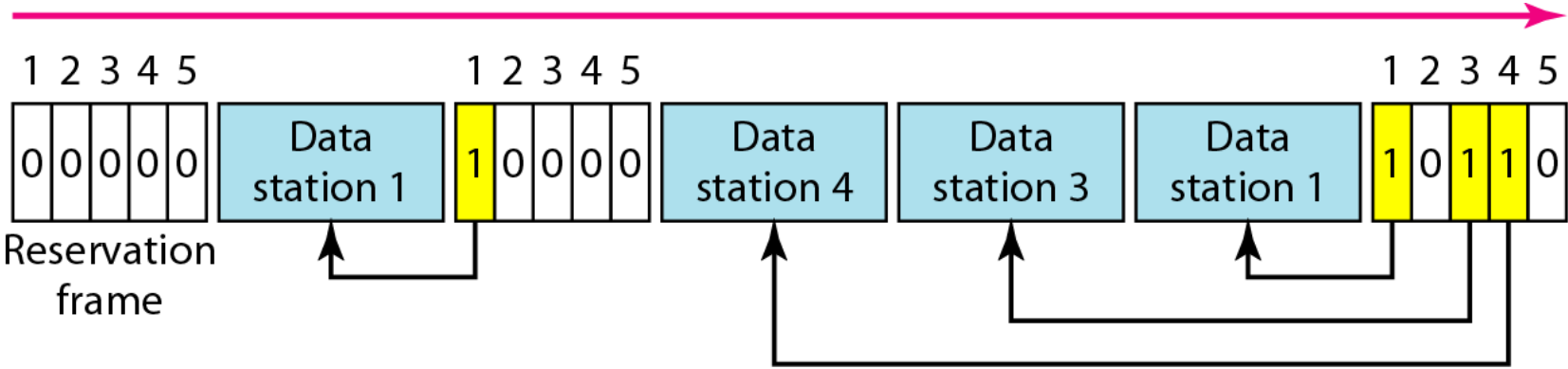


CONTROLLED ACCESS

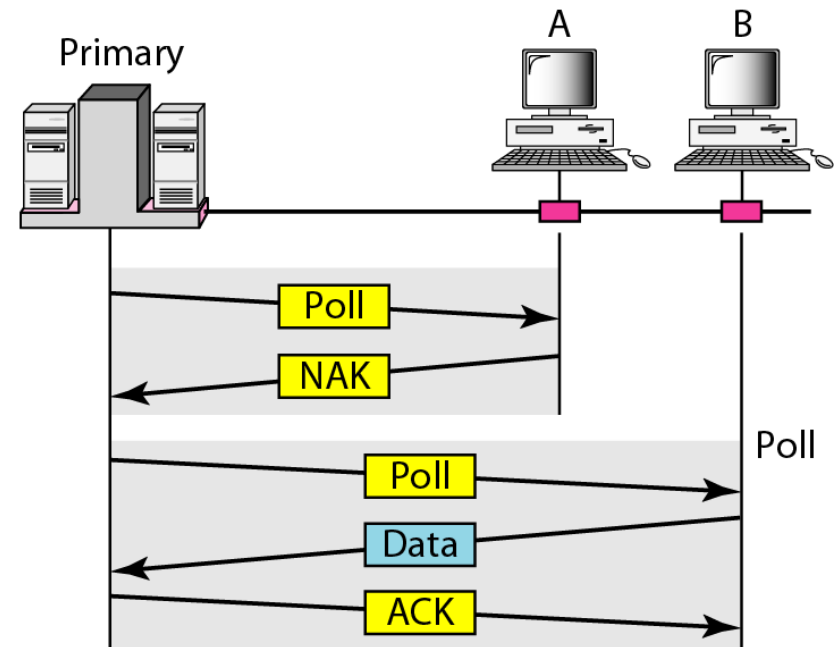
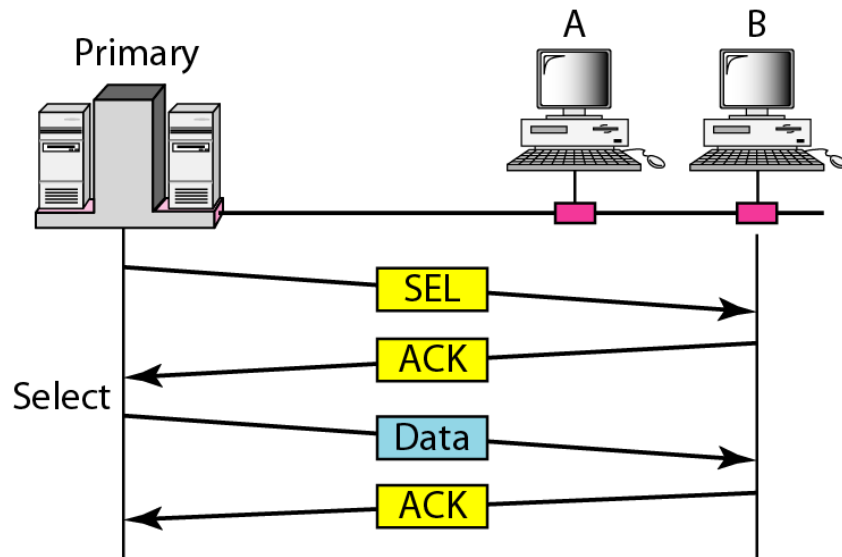
In **controlled access**, the stations consult one another to find which station has the right to send. A station cannot send unless it has been authorized by other stations. We discuss three popular controlled-access methods, which are:

- Reservation
- Polling
- Token Passing

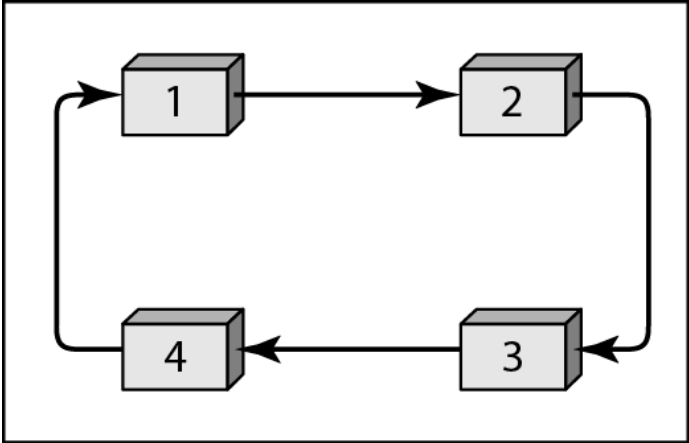
Reservation access method



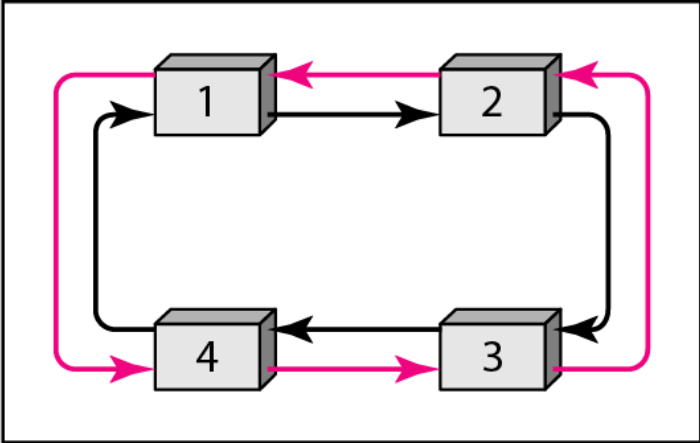
Select and poll functions in polling access method



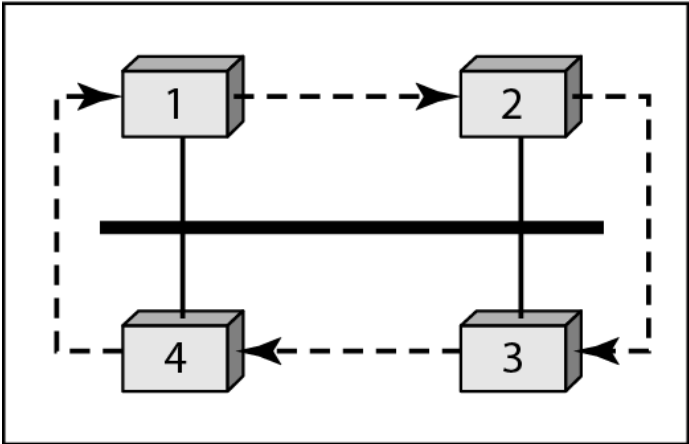
Logical ring and physical topology in token-passing access method



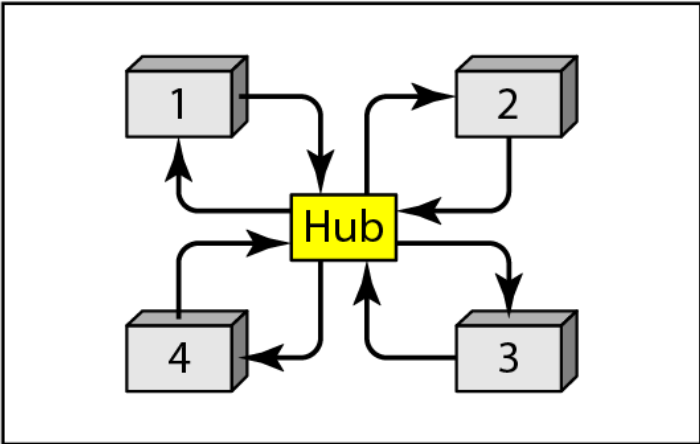
a. Physical ring



b. Dual ring



c. Bus ring



d. Star ring

Applications

- Multiple Access Protocols are used in case of shared media/ shared channels
- These protocols are applicable in wireless communications

Scope of Research

- Protocol Support for 3G and 4G networks
- MAC algorithms for mobile networks
- MAC algorithms for wireless networks