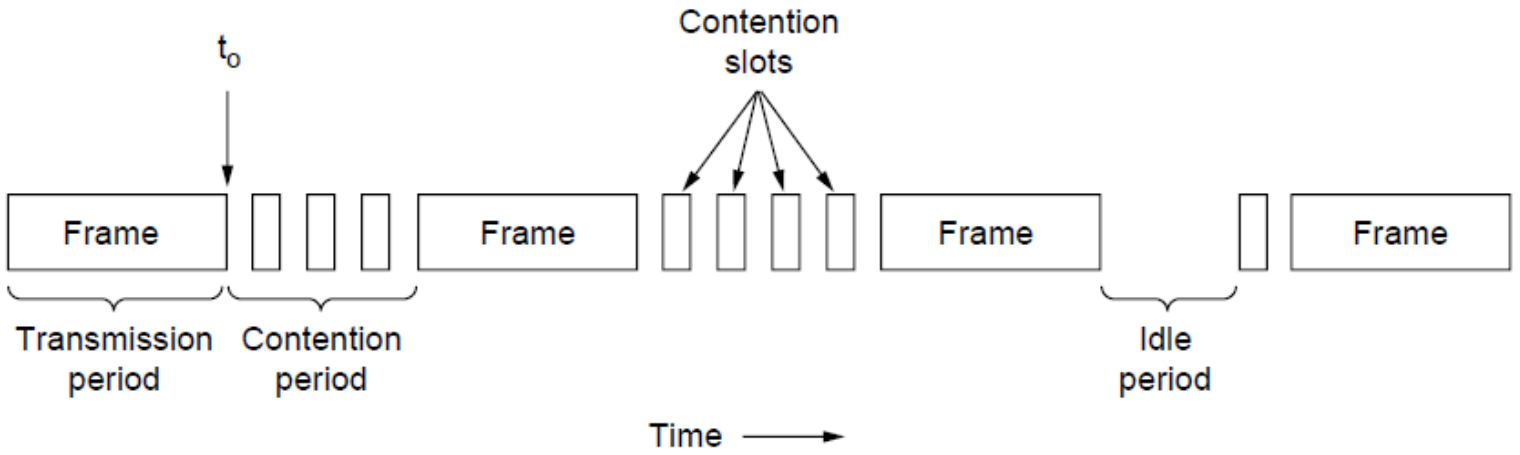
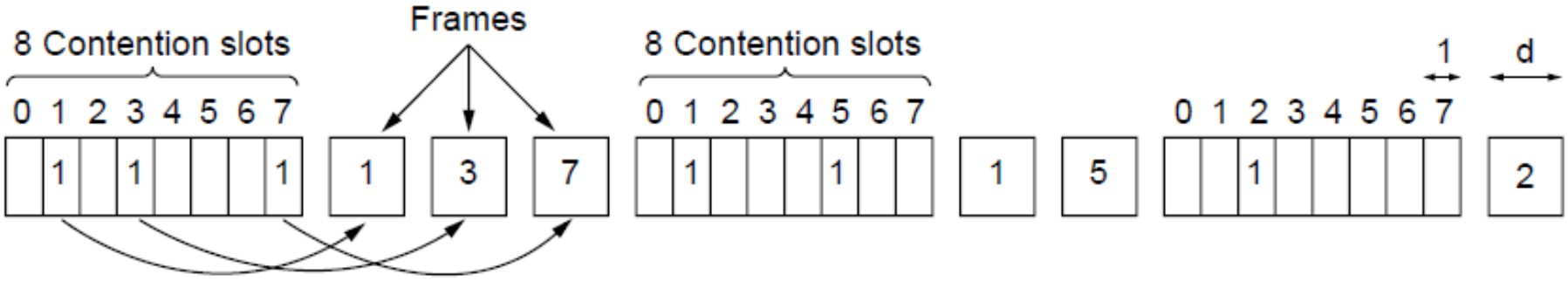
CSMA with Collision Detection

- Process: After collision detected, abort transmission, wait random period, try again
- Channel must be continually monitored
- Reduce contention times to improve performance



Collision Free Protocols (1)

- Bit Map Protocol
  - Reservation-based protocol
  - 1 bit per station overhead
  - Division of transmission right, and transmission event - no collisions as this is a reservation-based protocol

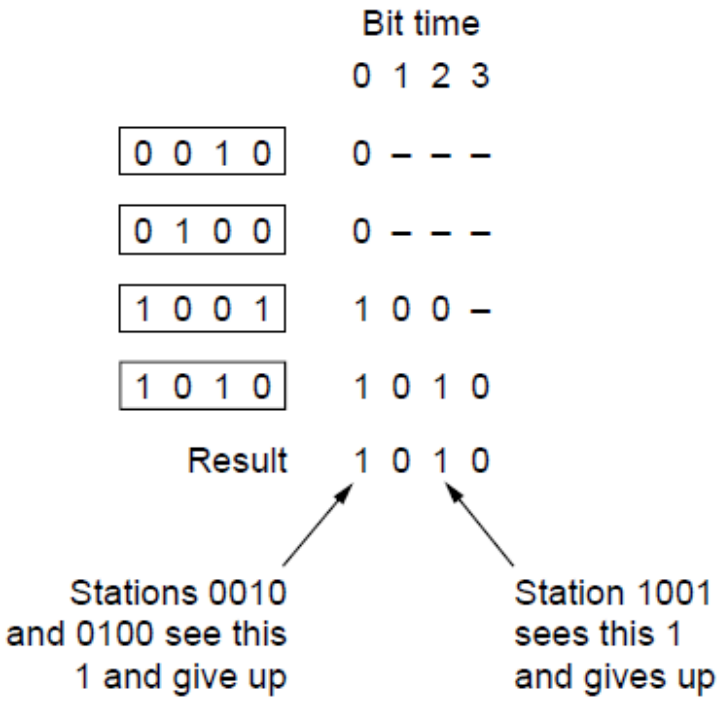


Collision Free Protocols (2)

- Binary Countdown Protocol
  - Uses binary station addressing
  - Higher numbered stations have a higher priority
  - No collisions as higher-order bit positions are used to arbitrate between stations wanting to transmit

Collision Free Protocols (3)

- Binary Countdown Protocol
  - Stations send their address in contention slot ($\log_2$ N slots instead of N)
  - Channel medium ORs bits; stations give up when they send a “0” but see a “1”
  - Station that sees its full address is next to send



Contention vs. Collision Free

- **2 strategies: contention** and **collision free**
  - Under **low loads** (collisions are rare), the collision free is less attractive due to the overhead.
  - Under **higher loads**, contention method is less attractive due to higher number of collisions.
- Both become inefficient at different points