Token-Ring Distributed Mutual Exclusion
Distributed Systems 2g1509

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Distributed ME – Token-Ring [1/4]

**Idea:**
- Form a logical ring of processes
- Let a logical token (special message) is regularly passed around on the ring
  - Initially $p_1$ has the token
- A process is only allowed to enter the critical section iff it has the token
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- **Bootstrapping**
  - Assign numbers 1..\(n\) to each process
  - Form a logical ring of \(n\) processes
    - Process \(i\) is connected to its successor process \(i+1\), where \(1 \leq i \leq n-1\)
    - Process \(n\) is connected to its successor process 1
  - Process 1 starts by sending a token message to process 2
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- **Each process**
  - Upon receipt of the token message a process:
    - enters the critical section if needed and after it exists the critical section, it sends the token message to its successor
    - if it does not need to enter the critical section it simply passes the token to its successor
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- **Advantages:**
  - Simple
  - Decentralized (not bottlenecks)
  - No starvation

- **Disadvantages:**
  - Lost token/duplicate tokens!
  - Not fair (not serving FIFO)
  - Many messages sent, even if no process wants to enter the critical section