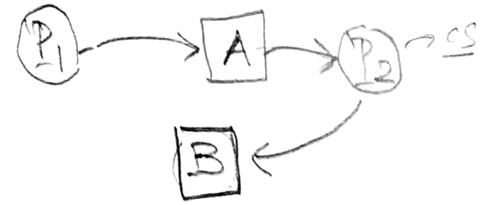
Distributed Mutual Exclusion

15
MAR
2022
3-4 PM

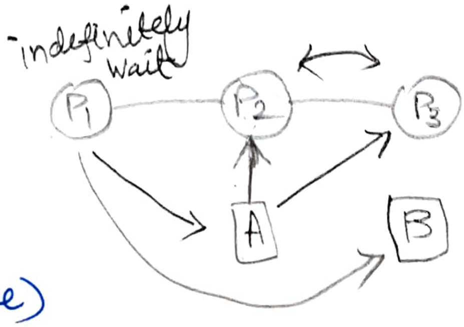
ONLY
- one process should be in a CS.

③ Properties:

→ No deadlock



→ No Starvation



fault-free network ✗

→ Fairness

→ request should honorned (must enter CS in finite time)

✓ → Fault-tolerance

→ Algo is able to survive in case failure (node / channel)

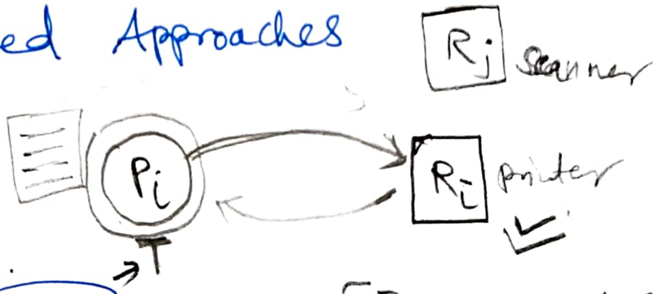
node → PE

channel → connection

Types:

* Token-based Approaches

→ Suzuki-Kasame's Algo (3 page) AcM Trans.



(Special msg) ← Token (Privilege)

Acquire T ← Send reques
enter CS
releas T

* Non-token Based Approaches

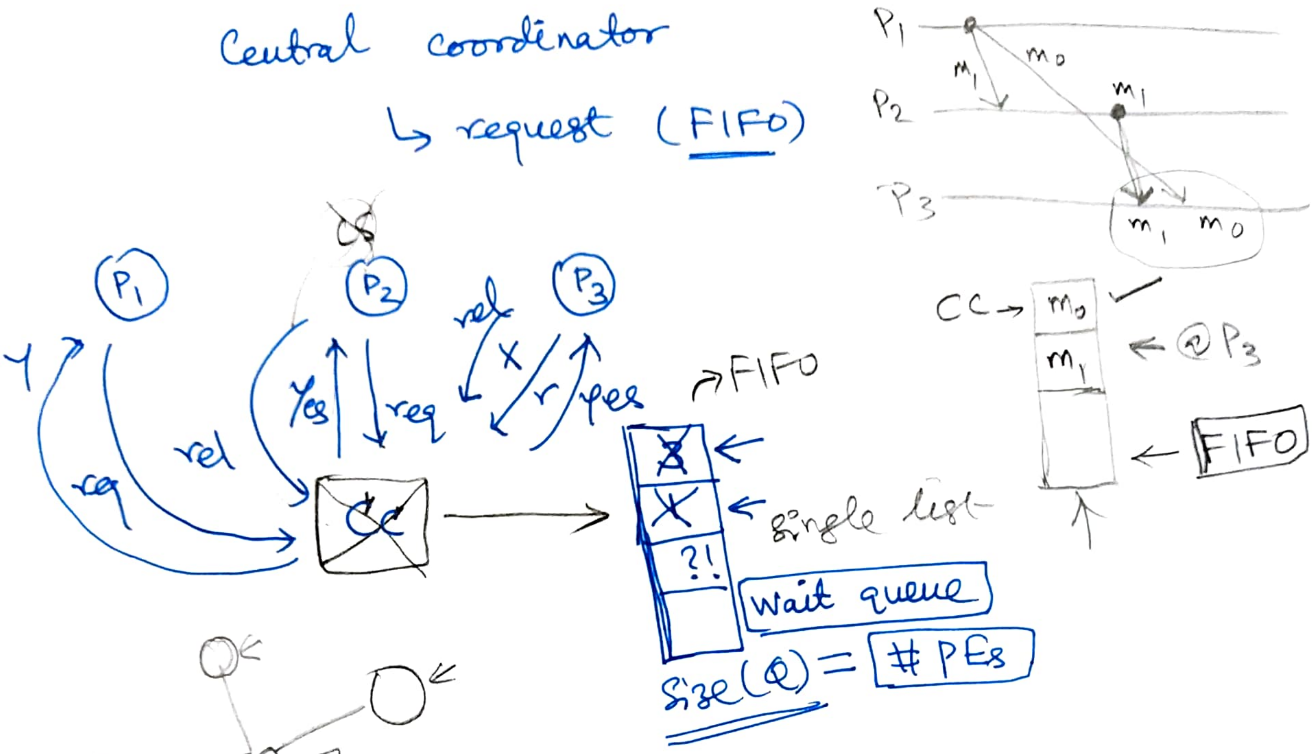
— Lamport's Algo

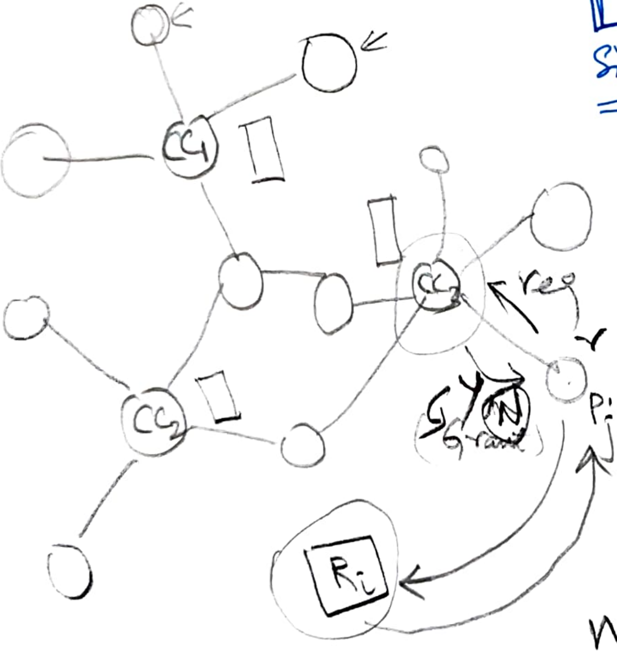
→ Ricart-Agrawala's Algo.

Centralized MutEx

Central coordinator

↳ request (FIFO)





Distributed Hash Table

	CC1	CC2	CC3
PE1			
PE2			
PE3			

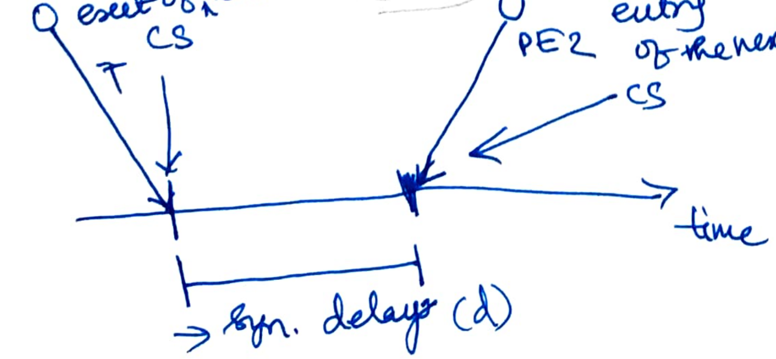
n PEs (CC) m<<n

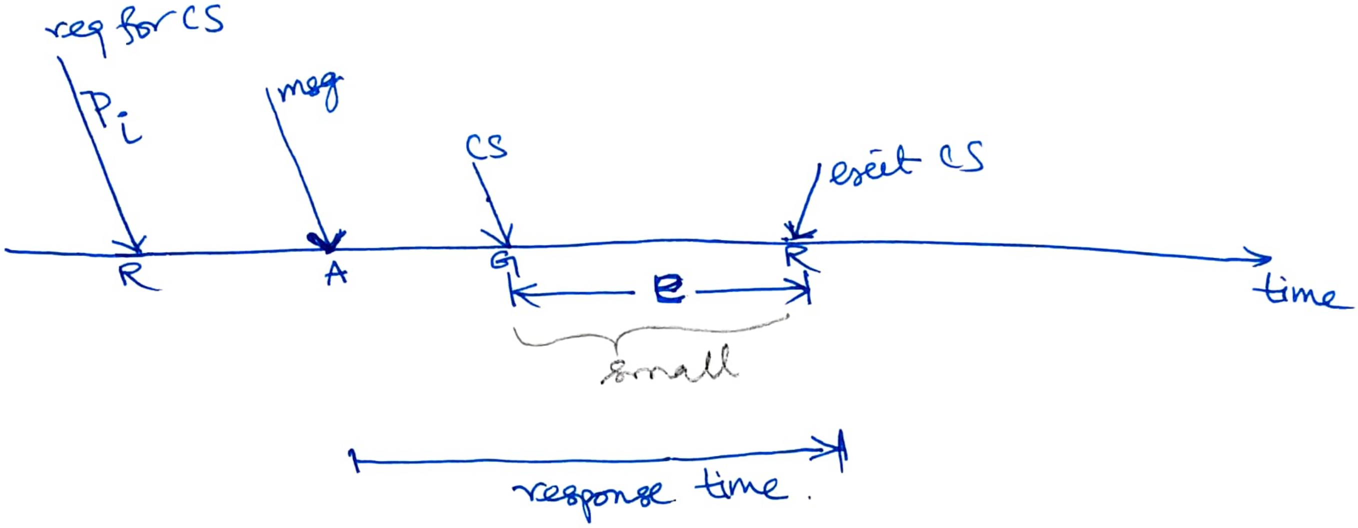
m PES (CC) = $(> \frac{n}{2})$ coordinator

3

2 must agree

Metrics





→ System throughput = $\frac{1}{d+e}$ ← avg CS exec. time

syn. delay

→ # messages per CS invocation.

<u>Low and Highload</u>.

only one node asking for R

every node is asking for R

<u>Best and Worst case</u>:

LL → round-trip message delay + exec. time.

$= 2(T) + E$

Message Traffic:

↳ low, high and <u>average</u> cases

Token-Based MutEX

Tobe taken in the next class!!