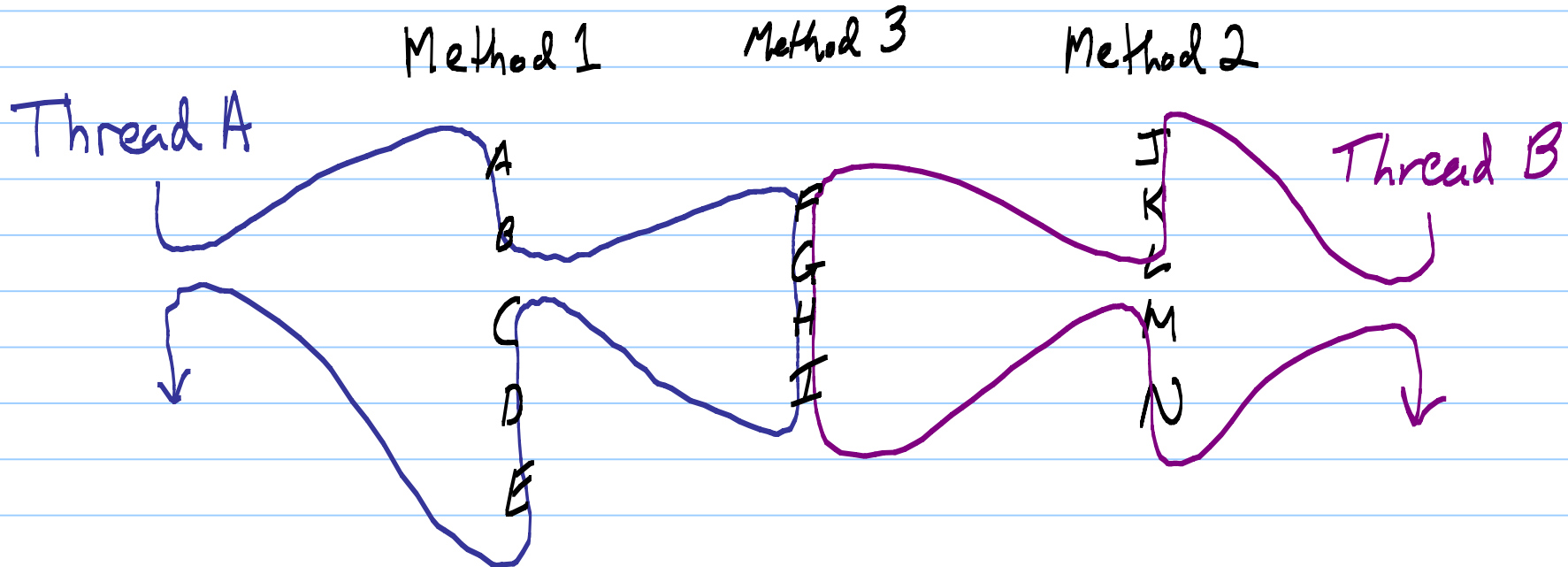


Threads (continued)

Note Title



How are the steps of the threads interleaved?

- Thread scheduler

A: A B F G

B:

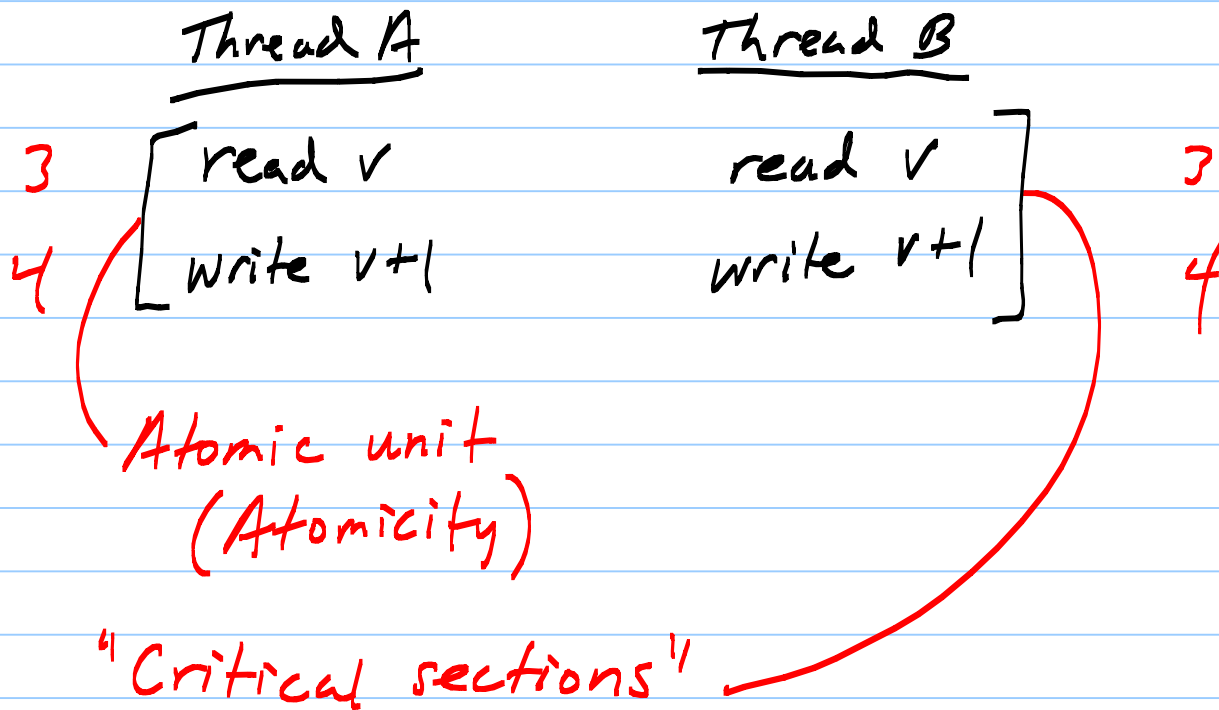
J K L F G

H I C

H I M N

DE

Sharing of a variable v



Basic concepts:

atomicity — a critical section appears indivisible

fairness — are all threads getting a chance?

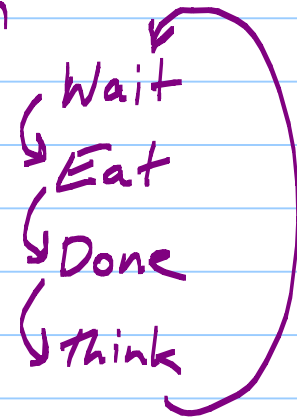
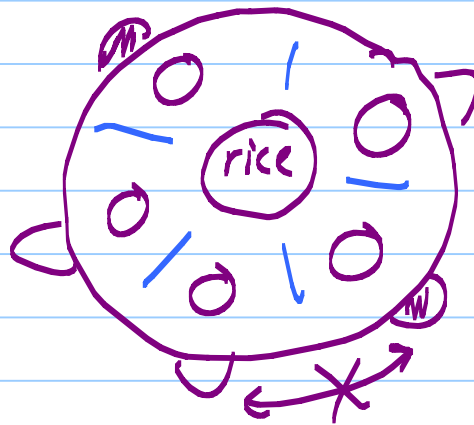
efficiency + concurrency

Illustration — Classic Problem:

Dining Philosophers Problem

Rule:

Considered rude
to eat while a
left or right
neighbor is eating.



Ideas!

- Check if a lock is locked already?

- Make picking up both chopsticks an atomic step

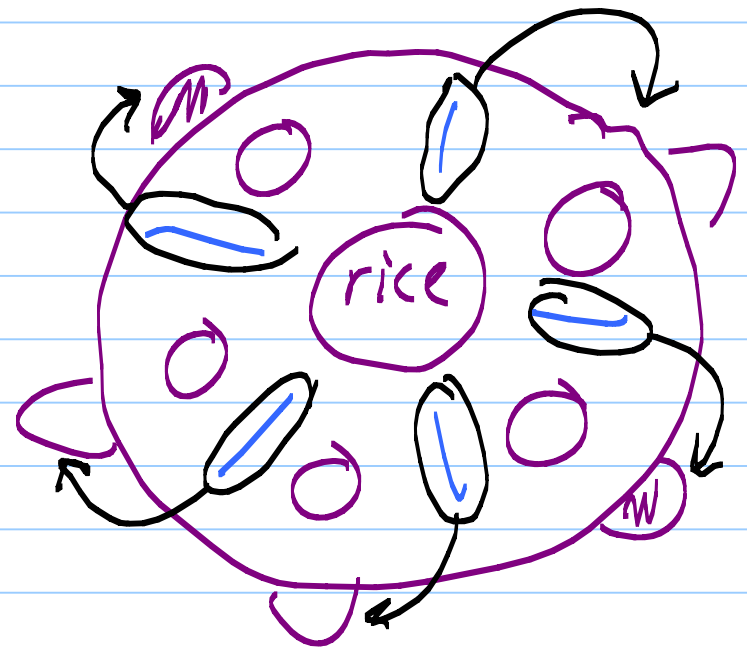
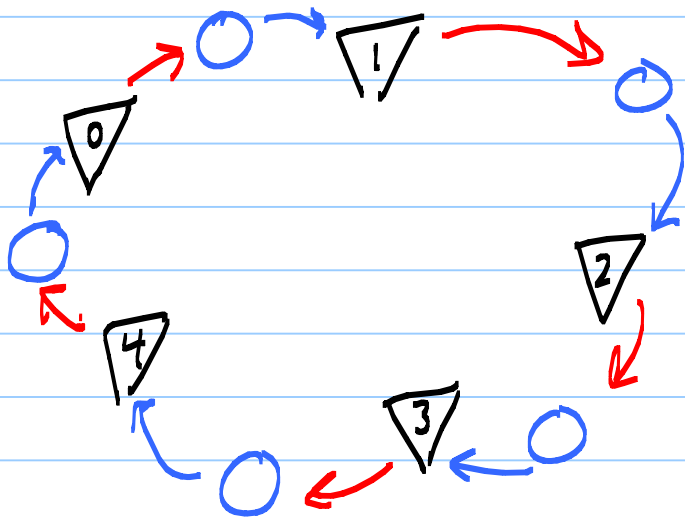
Another lock

arbiter of
which philosopher
can pick
up chopsticks



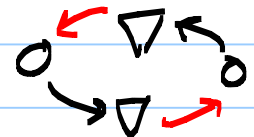
Problem: Contention for the token

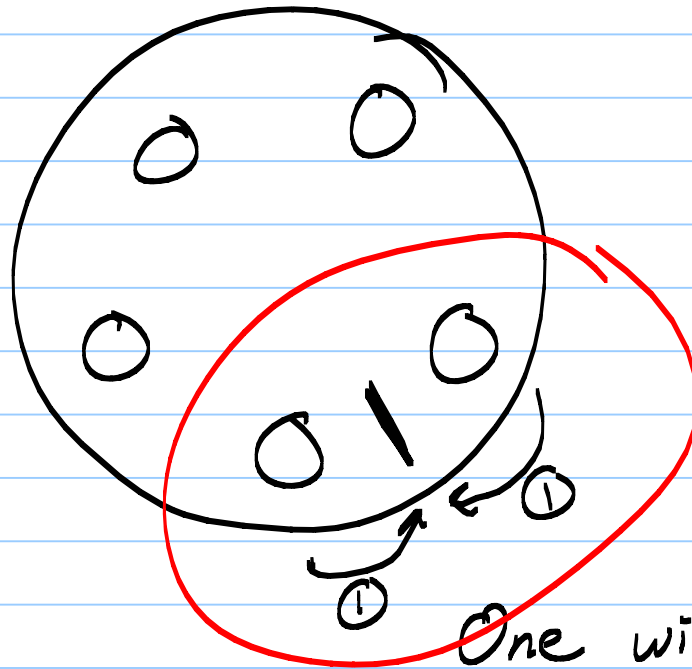
Resource Allocation graph



CYCLE \Rightarrow DEADLOCK

Problem: SYMMETRY





One will win!

No cycle possible →
can't have deadlock

The other has no locks.
⇒ Can't block either
neighbor.