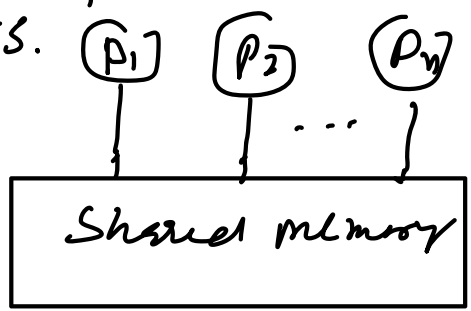
13-01-2022

Multiprocessor models & Communication Networks for parallel processing

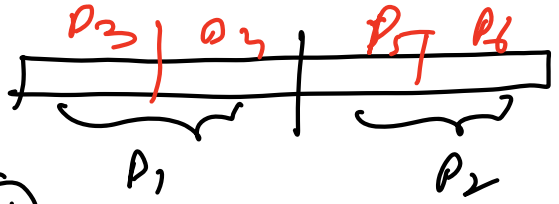
1) PRAM
2) Lmm - Local memory machine
3) mmm - modular memory machine

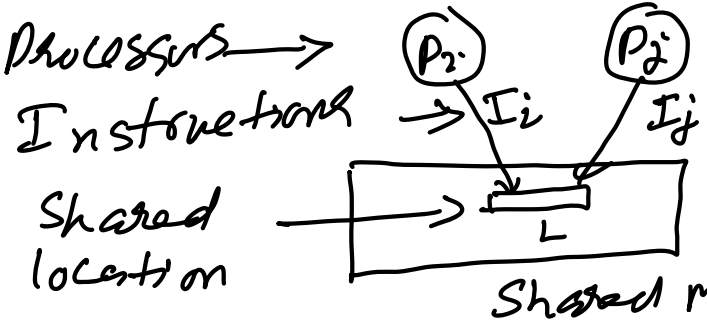
1) PRAM: Large memory and many processors. Memory is partitioned among processors.



$P_1, P_2, \ldots P_n$ are physically located close to each other.

Quick-Sort can be run in parallel: ⇒





← Problem when there is simultaneous access.

- Exclusive Read Exclusive Write (EREW-PRAM)
  (Implementation responsibility is of the algorithm designer)
- Concurrent Read Exclusive Write (CREW-PRAM):
  (Implementation responsibility is that of algorithm designer)

If x is global: ⇒

For example, For P_i ⇒ x = 100;
For P_j ⇒ x = 500;] ?

- Concurrent Read Concurrent Write (CRCW-PRAM):

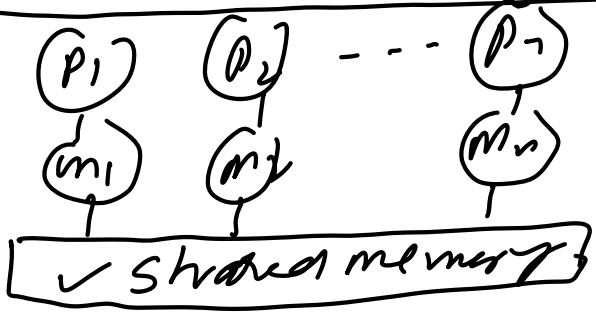
∴ conflict is unpredictable

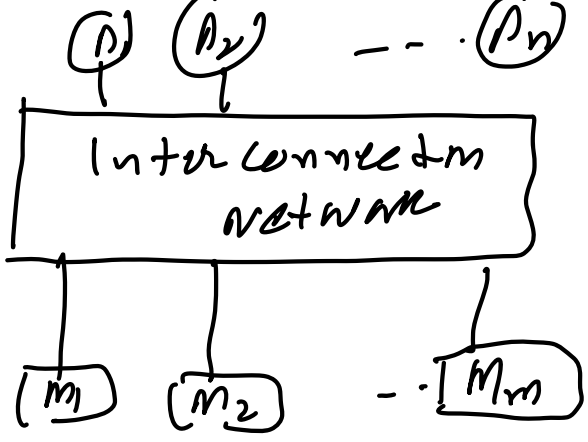
a) consistent ✓

b) Arbitrary → only one is allowed

c) Priority

2) LMM - local memory machine





⇒

3) mmm : multiple memory machine

Adv: lot of flexibility, size no problem,

Challenges: - Complexity of network

- speed reduces.

- ∴ not so easily scalable

∴ performance reduces if network becomes very large

Specific challenges :-

- Routing properly can help to reduce complexity, C.: there are routing algorithms)
- flow-control (algorithms)
- Network topology (can be dynamically changed).