Lecture 8

Parallel-machine Scheduling

We consider problem $n|P_m||C_{max}$ where the goal is to schedule n jobs on m identical parallel machines M_i, $(i = 1, \cdots, m)$ minimizing the makespan C_{max}.

Multi-machine Scheduling Algorithms

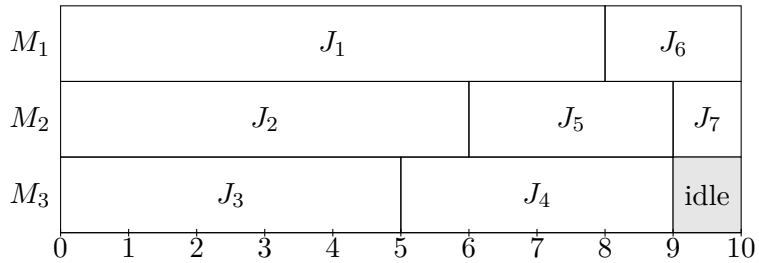
–Independent Jobs Scheduling Algorithms

- **Longest–Processing–Time Scheduling Algorithm (LPT)**
  The LPT algorithm is a simple, often-used multimachine scheduling algorithm. It sorts the jobs in decreasing order of their processing times and then assigns one job at a time to the available machine.

Example :
Suppose you have the problem $7|3||C_{max}$ as below. Find the optimal scheduling using Longest–Processing–Time Scheduling Algorithm (LPT).

J_i	p_i
J_1	8
J_2	6
J_3	5
J_4	4
J_5	3
J_6	2
J_7	1

Solution :



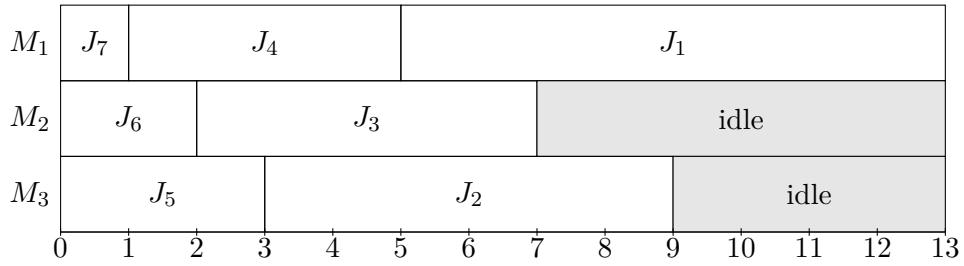
Thus the completion time will be $C_{\max} = 10$

- **Shortest–Processing–Time Scheduling Algorithm (SPT)**
  This algorithm works in reverse to the LPT scheduling algorithm. It sorts the jobs in increasing order of their processing times, and when the machine becomes idle, it is assigned the job with the shortest processing time.

  Example :
  For the same problem $7|3||C_{max}$ as in the previous example. Find the optimal scheduling using Shortest–Processing–Time Scheduling Algorithm (SPT).

J_i	p_i
J_1	8
J_2	6
J_3	5
J_4	4
J_5	3
J_6	2
J_7	1

  Solution :



  Thus the completion time will be $C_{\max} = 13$