Goal: Minimization of makespan with precedence

Pm/ prec/ Cmax

(*) In first step, forward pass calculations are made to find out earliest completion times of jobs as under:

Let C_j' = earliest completion time of Job j

$$C_j' = \max_{i \in Y} (C_i') + P_j$$

where C_i' is the earliest completion time of job i that belongs to set Y. set Y contains precedessor jobs for job j

(*) To find critical path on the precedence network, latest completion times of all jobs are calculated as follows:

Let

C_j' = latest completion time of job j

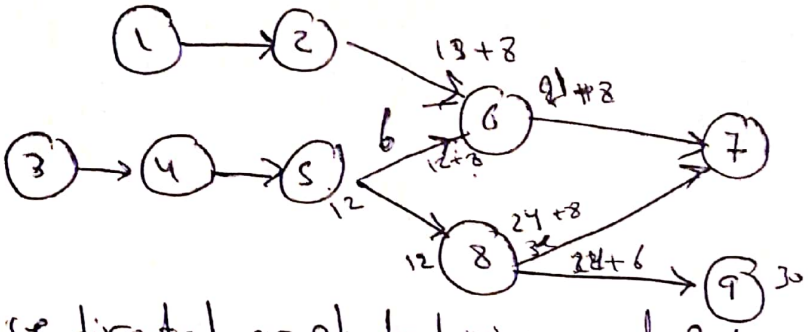
$$C_j'' = \min_{k \in S2} (C_k'' - P_k)$$

where C_k'' = latest completion time of job k that belongs to set S2

set S2 contains successor jobs for job j. All the jobs without any successor are assigned a value equal to Cmax for backward pass calculations.

Q.2 A parallel shop has nine jobs with process times as follows

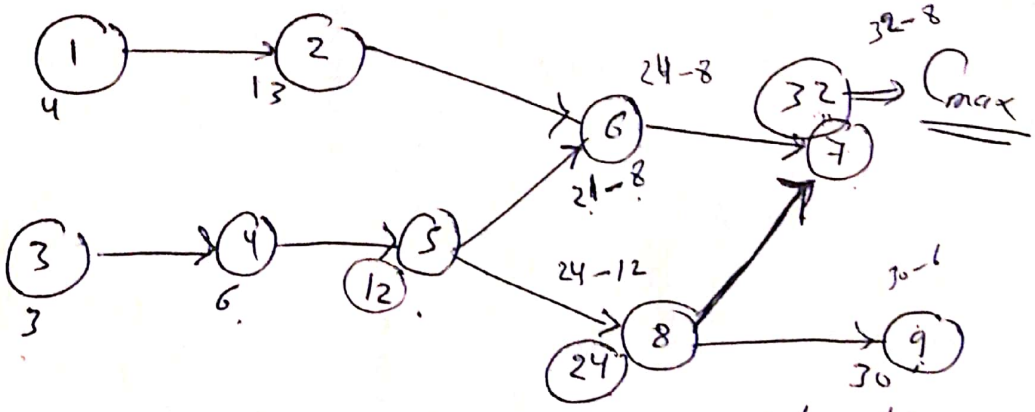
Job j	1	2	3	4	5	6	7	8	9
P_j	4	9	3	3	6	8	8	12	6



use directed graph technique and find ① Makespan ② critical path

Solution The earliest completion time C_j' of all jobs are shown below in table

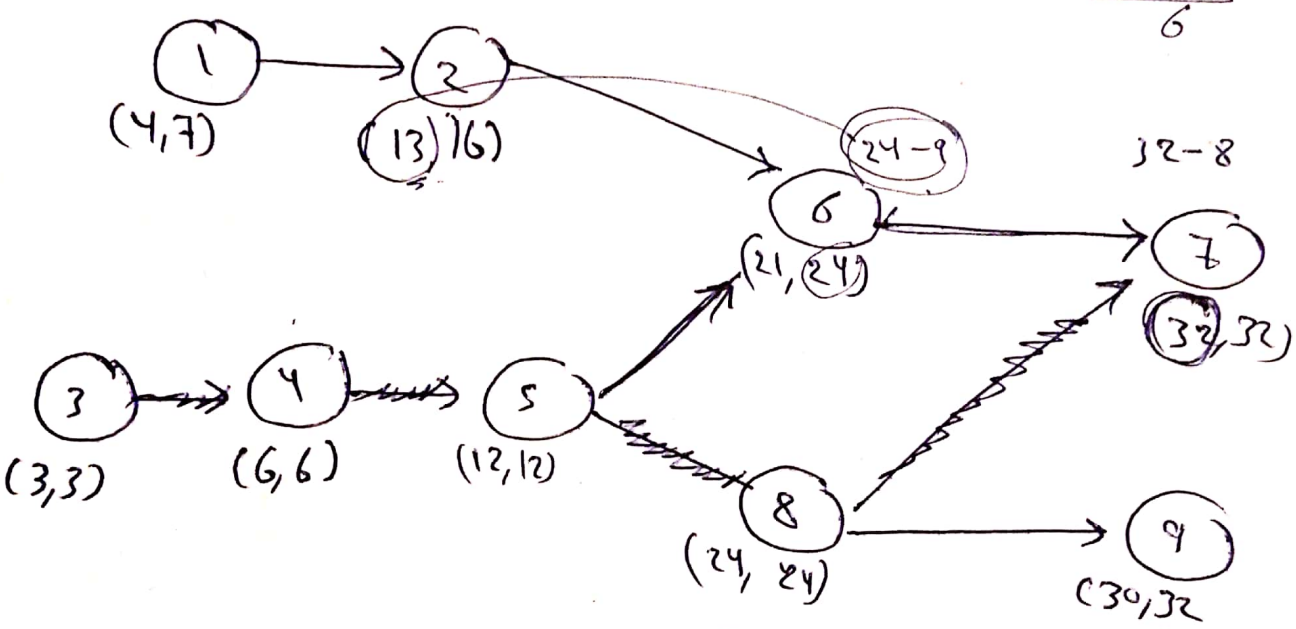
Job j	1	2	3	4	5	6	7	8	9
P_j	4	9	3	3	6	8	8	12	6
C_j'	4	13	3	6	12	21	32	24	30



precedence diagram showing earliest completion times

$$C_8'' = \min\{C_7'' - P_7,\ C_9'' - P_9\} = \min\{32-8,\ 32-6\} = \min\{24,\ 26\} = 24$$

32-
24
6



critical path $(J_3 - J_4 - J_5 - J_8, J_7)$ for the precedence diagram