17/01/2024.

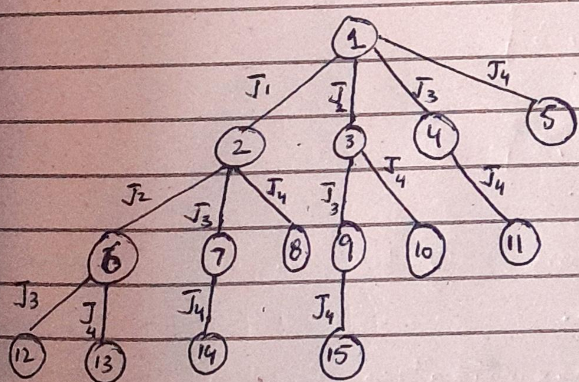
Wednesday

Lec No. 24

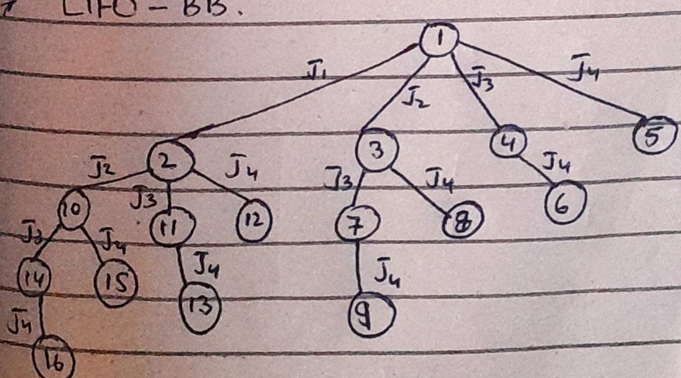
→ Branch and Bound:

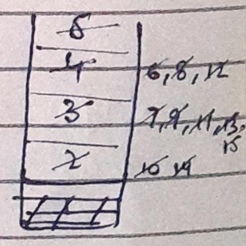
- A problem Solving strategy.
- Uses state Space Tree.
- Optimization problems
  ↳ only for minimization.
- FIFO Branch & Bound
- LIFO Branch & Bound
- Least cost Branch & Bound.

* FIFO - BB

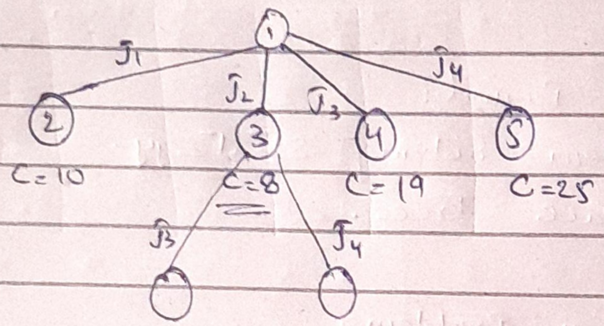


* LIFO - BB.





* Least Cost – BB



* JOB SEQUENCING:

Jobs = {J1, J2, J3, J4}

P = {10, 5, 8, 3}

d = {1, 2, 1, 2}

Variable-size : {J1

Fixed-size: {1,0,0

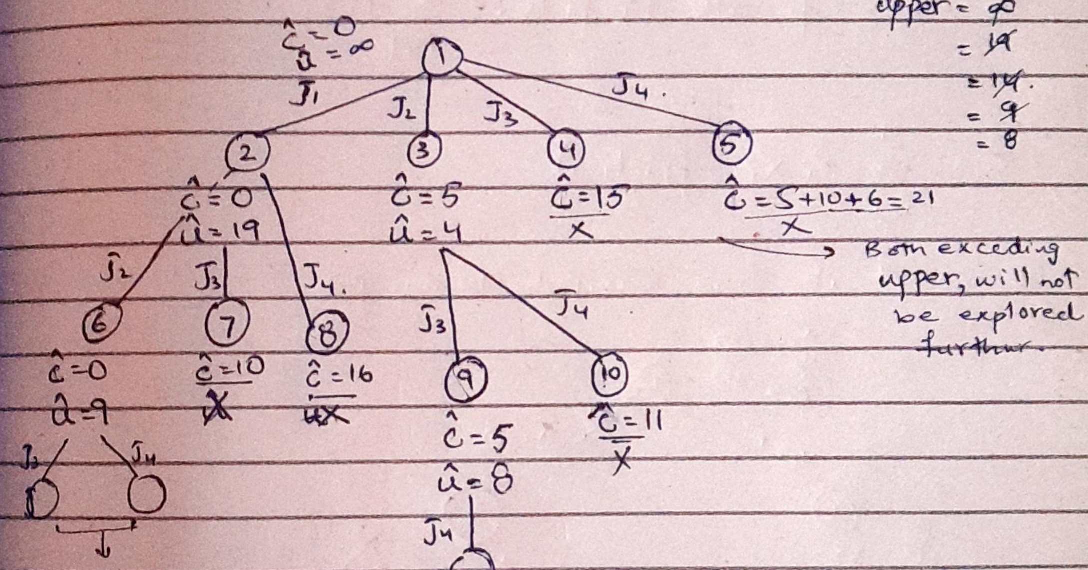
- Branch & Bound can only be used for minimization problem.
  So incase of maximization problem we have to convert it into minimization Problem

Jobs :	1	2	3	4
Penalty :	5	10	6	3
DeadLine :	1	3	2	1
Time :	1	2	1	1

Cost → $\hat{C} = \sum_{i \in S_k} P_i$ Sum of Penalities till the last Job

Upper: $\hat{u} = \sum_{i \notin S} P_i$ Sum of all Penalities except those ~~inclded~~ included in the solution.

(Least Cost – BB)



Both infeasible Solutions (Not Possible), will be Branched out

Infeasible

Last Active Node is 9. So Solution is

$\{J_2, J_3\}$

Variable size

* 0/1 Knapsack Problem.

	1	2	3	4
Profit	10	10	12	18
Weight	2	4	6	9

$m = 15$

$n = 4$

$\hat{u} = -$ Sum of all Profits. $= -\sum_{i=1}^{n} P_i x_i \leq m$ (without fraction).

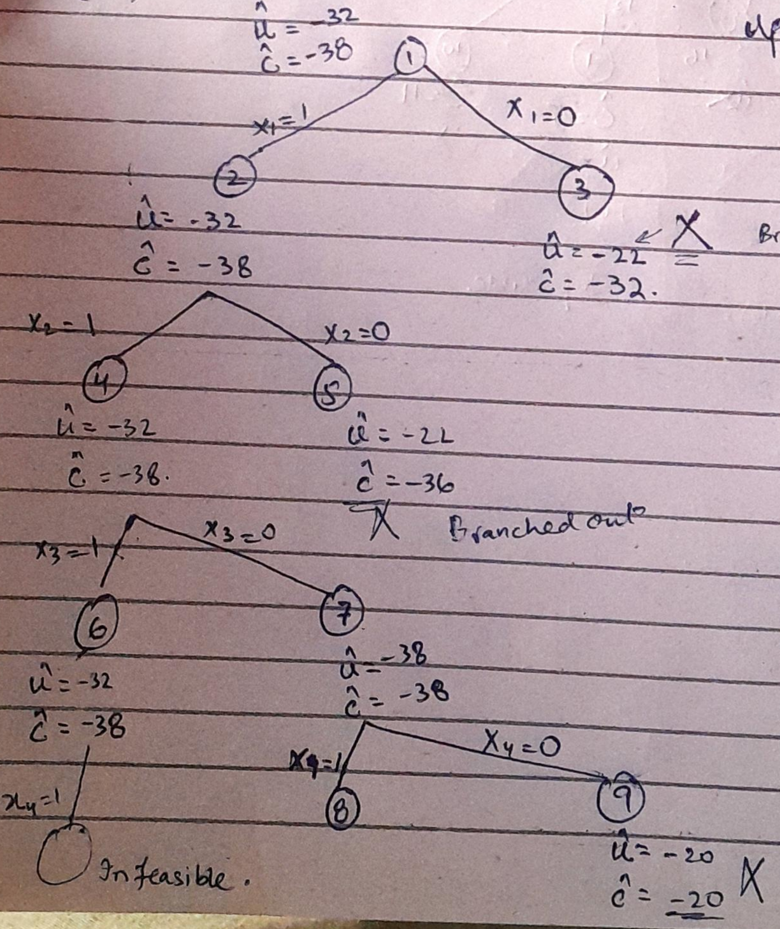
$\hat{c} = -\sum_{i=1}^{n} P_i x_i$ (fraction)

To convert it from max. prob to min. prob initially $\hat{u}$ $\hat{c}$ will be (-ve).

upper $= \cancel{\infty}$

$\cancel{-32}$.

-38



Solution:

{1, 1, 0, 1}