

## ✓ branch and bound

Two additional items

- \* For every node of a state space tree, a bound on the best value of objective function on any solution
- \* Value of the best solution

Idea of branch and bound.

We compare a node's bound value with a value of the best solution seen so far. If the bound value is not better than the best solution so far is not smaller for a minimization problem and not larger for a maximization problem.

Reason.

- \* Value of the node's bound is not better than the value of the best solution
- \* node represents no feasible solution because the constraints of the problem.
- \* Subset of feasible solution represented by the node consists of a single point.

Assignment Problem.

# Assignment Problem.

(A)

The problem is to assign  $n$  people to  $n$  jobs so that the total cost of assignment is as small as possible.

- \* Select one element in each row of the matrix so that no two selected elements are in the same column and their sum is the smallest

J1	J2	J3	J4	
9	2	7	8	2
6	4	3	7	3
5	8	1	8	1
7	6	9	4	4
				<u>10</u>

select 9 from <sup>the</sup> first row, the lower bound will be  $9 + 3 + 1 + 4 = 17$ .

- \* Compare the lower bounds of the live node. (live node means - non terminated, i.e. still promising, leaves are also called live).
- \* It is sensible to consider a node with the best bound as most promising, although this does not, of course, preclude the possibility that an optimal solution will ultimately belong to a different branch of the state-space tree. This variation of the strategy is called best first branch and bound.