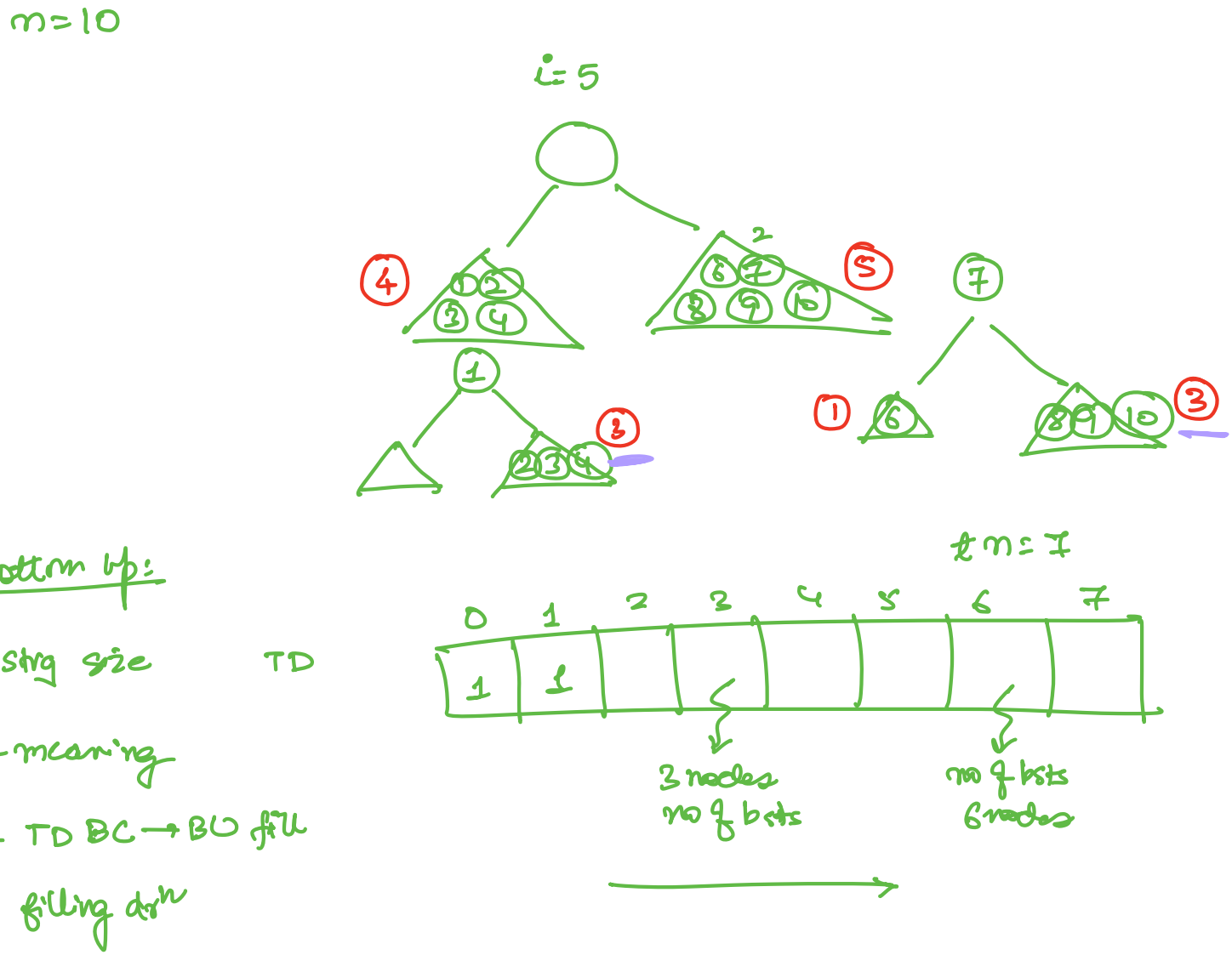


0/1 KNAPSACK

Several items each having a specific weight and price.
You are also given a knapsack of capacity C i.e. knapsack can't hold more than C unit of weight.

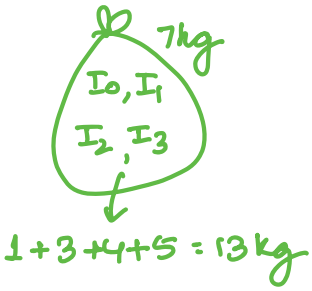
You need to put some items in bag/knapsack in such a way that
- Total weight of items doesn't exceed bag's capacity.
- Total profit can be maximized.

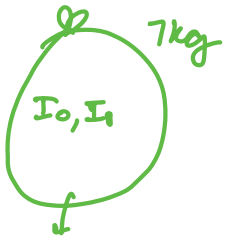
You need to tell what is the maximum profit we can achieve.

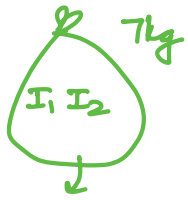
Eg :	I_0	I_1	I_2	I_3
Weight = {	1	3	4	5 }
Price = {	1	4	5	7 }

Knapsack Capacity = 7 kg → knapsack can't hold more than 7kg

max profit ? [9] $I_1 I_2$







0/1 knapsack :

Binary : either add the item or don't add at all

	I_0	I_1	I_2	I_3	
Wt:	1	3	4	5	cap: 7kg
price:	1	4	5	7	
P/w:	1	1.3	1.25	1.4	

Acc to greedy strategy: Pick I_3, Remaining cap = 7-5 = 2kg
now only option left is I_0 whose weight is less than 2kg.

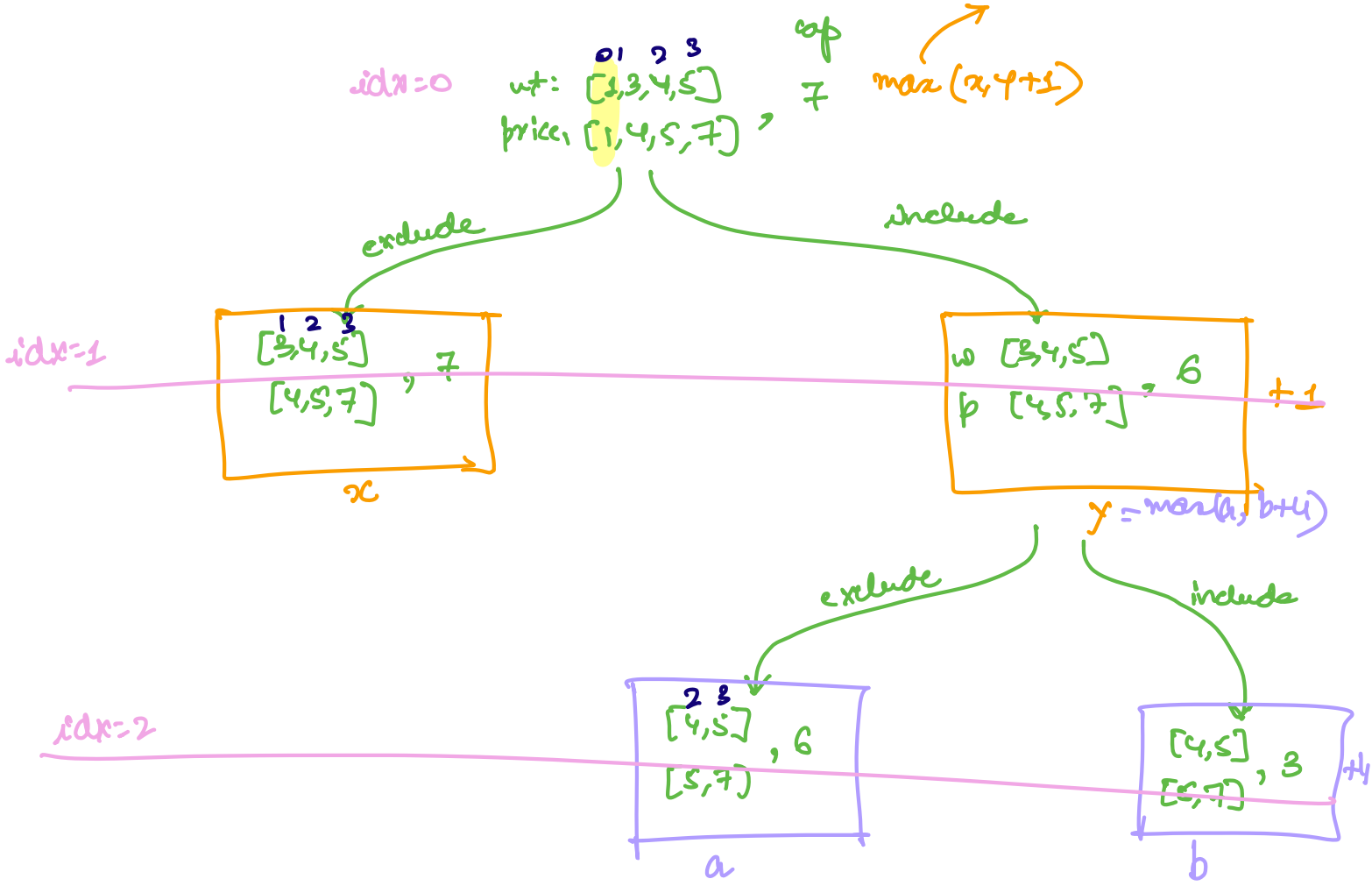
profit: 7+1 = 8 Rs

If we explore all options:

profit = 4+5 = 9 Rs

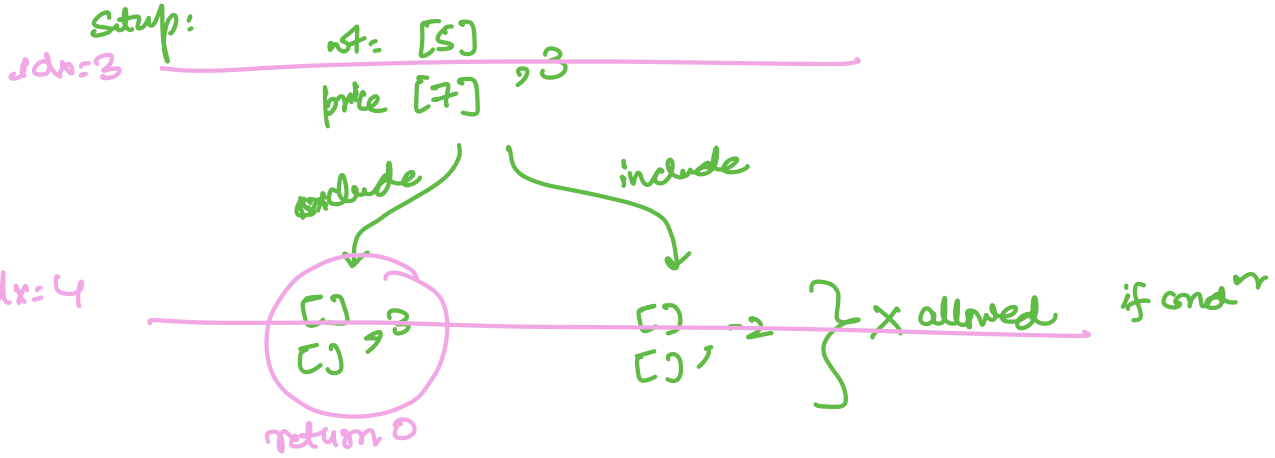
wt: [1,3,4,5] cap=7 max profit ?

price: [1,4,5,7]

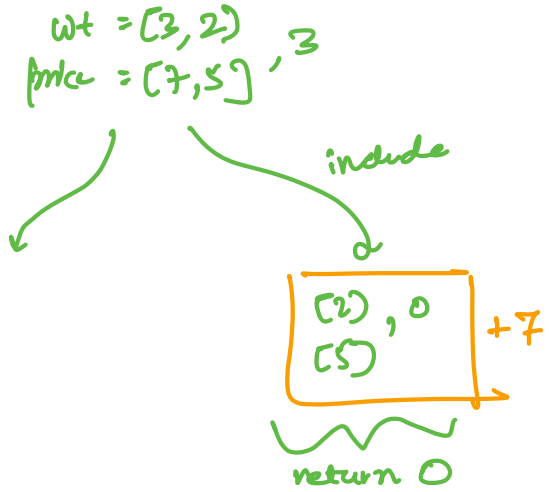


Base Case:

- no items are left (idx == n)



- remaining capacity is 0



Bottom up:

wt: [1, 3, 4, 5] (0 1 2 3)

price: [1, 4, 5, 7]

cap = 7

- String 2D
- meaning
- TD BC return
  ↓
  BU fill

idx == n → last row

cap = 0 → others

- filling