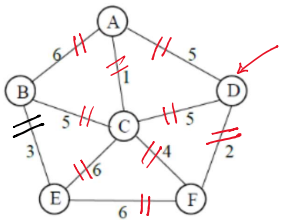
Y section

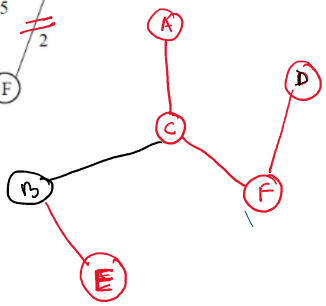
10 April 2025 08:22

Find MST using ⊙ Kruskal Algo.

⊙ Prim's Algo.

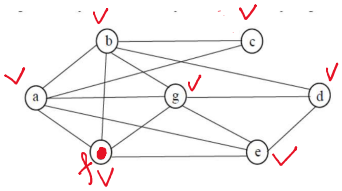


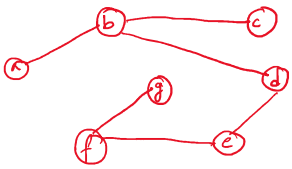
Prim's:



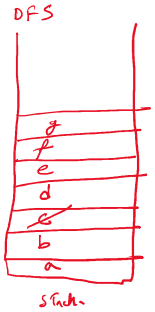
Node From	Node To	Weight
C	A	1 ✓
C	B	5 ✓
C	D	5 -
C	E	6
C	F	4 ✓
A	B	6
A	D	5 ✗ (loop)
F	E	6
F	D	2 ✓
B	E	3 ✓

MST wt = 15

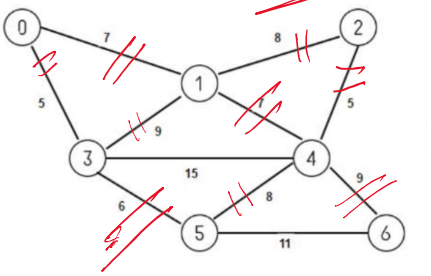


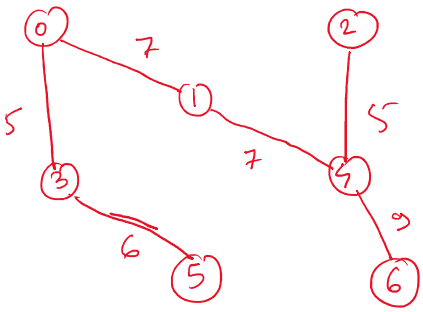


DFS



KRUSKAL'S



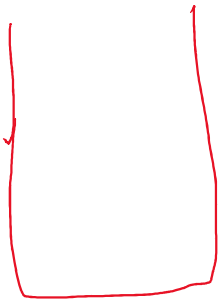


30.

Q2. Use an algorithm for greedy strategies for the knapsack to find an optimal solution to the knapsack instance n=7,m=15, (p1,p2….,p7)= (10,5,15,7,6,18,3), and (w1,w2,…w7) =(2,3,5,7,1,4,1).

Object	Weight	Profit
1	2	10
2	3	5
3	5	15
4	7	7
5	1	6
6	4	18
7	1	3

W = 15.
Knapsack capacity



Knapsack

Algo:
1. Profit/weight Ratio for all objects. (1 kg per Price).
2. Sort all objects in descending order based on their Profit/Weight Ratio.
3. Max Ratio ⟶ First will go inside the bag.
4. Jab Tak bag is not full. capacity is not overflow.

Object	Weight	Profit	Profit/Weight (1 kg Price)
1	2	10	5 ✓
2	3	5	1.67 ⟶
3	5	15	3 ✓
4	7	7	1
5	1	6	6 ✓
6	4	18	4.5 ✓
7	1	3	3 ✓

W = 15

Object	Wt	Profit (Sum)	Remaining capacity of knapsack (bag)
5	1	6	15−1 = 14
1	2	10	14−2 = 12.
6	4	18	12−4 = 8
7	1	3	8−1 = 7.
3	5	15	7−5 = 2.
2	2	2×1.67 =	2−2 = 0

Q2. Formulate Fractional Knapsack Problem. Write Greedy Algorithm for fractional Knapsack Problem. Find the optimal solution for the following fractional Knapsack problem.
n=4, m = 60, W={40, 10, 20, 24} and P={280, 100, 120, 120}

Object	Weight	Profit	Profit/Weight
1 ✓	40	280	7.
2 ✓	10	100	10
3	20	120	6 ✓

Object	Wt	Profit	Remaining capacity of the bag/knapsack
2	10	100	60−10 = 50.
1	40	280	50−40 = 10.
3	10	6×10	10−10 = 0.
		440	


2
3
4
10
20
24
100
120
120
10
6
5
3
10
6×10
10 - 10 = 0.
440