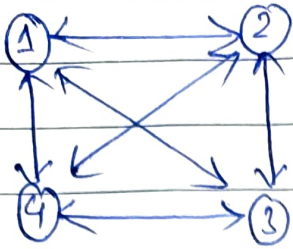
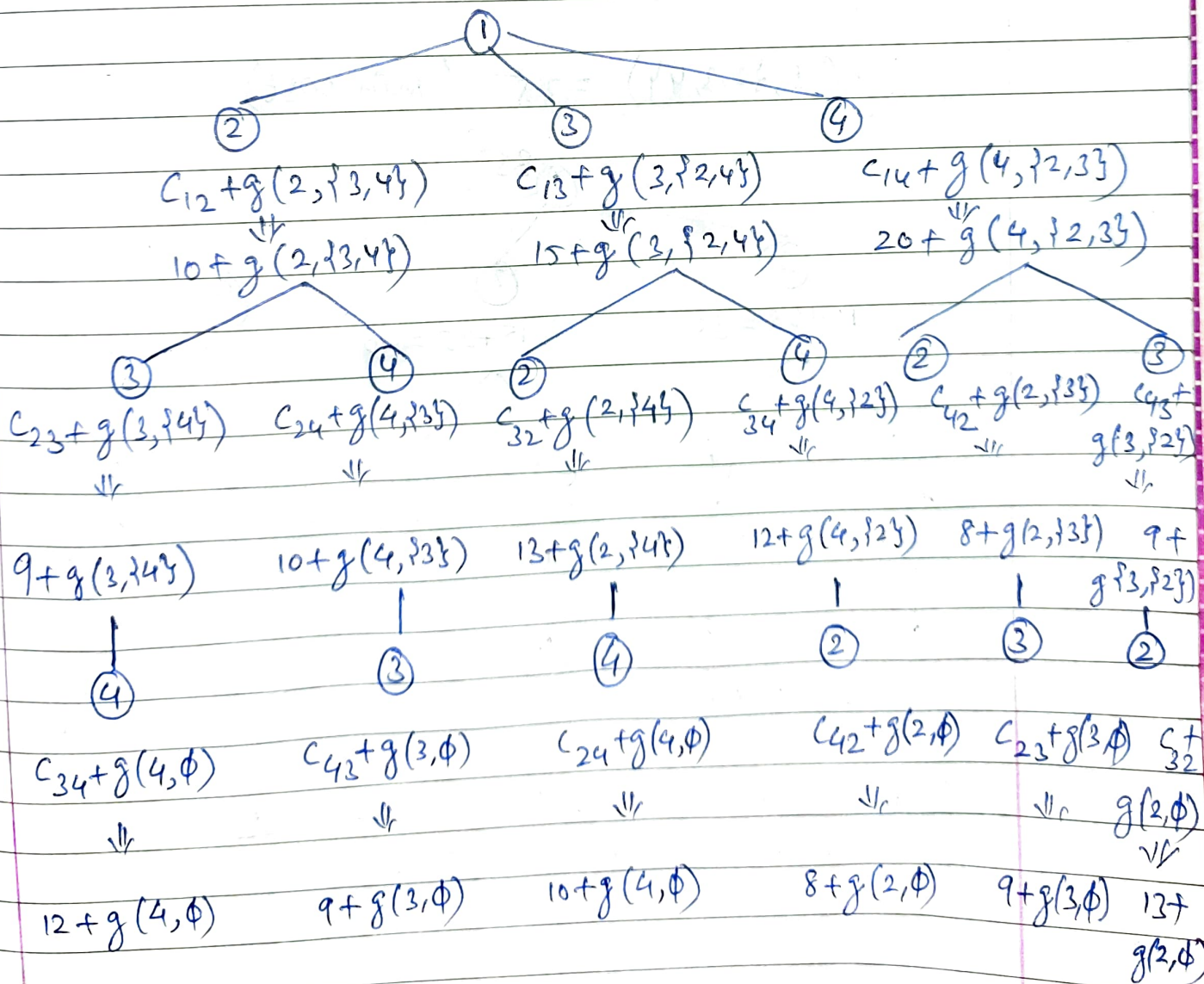


## Travelling Salesperson Problem Using Dynamic Programming


$$\begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 0 & 10 & 15 & 20 \\ 2 & 5 & 0 & 9 & 10 \\ 3 & 6 & 13 & 0 & 12 \\ 4 & 8 & 8 & 9 & 0 \end{array}$$

$$g(i, s) = \min_{k \in S} \{ C_{ik} + g(k, s - \{k\}) \}$$

$$\therefore g(1, \{2, 3, 4\}) = \min_{k \in \{2, 3, 4\}} \{C_{1k} + g(k, \{2, 3, 4\} - \{k\})\}$$



$$g(2, \emptyset) = 5$$

$$g(3, \emptyset) = 6$$

$$g(4, \emptyset) = 8$$

$$g(2, \{3\}) = 15$$

$$g(2, \{4\}) = 18$$

$$g(3, \{2\}) = 18$$

$$g(3, \{4\}) = 20$$

$$g(4, \{2\}) = 13$$

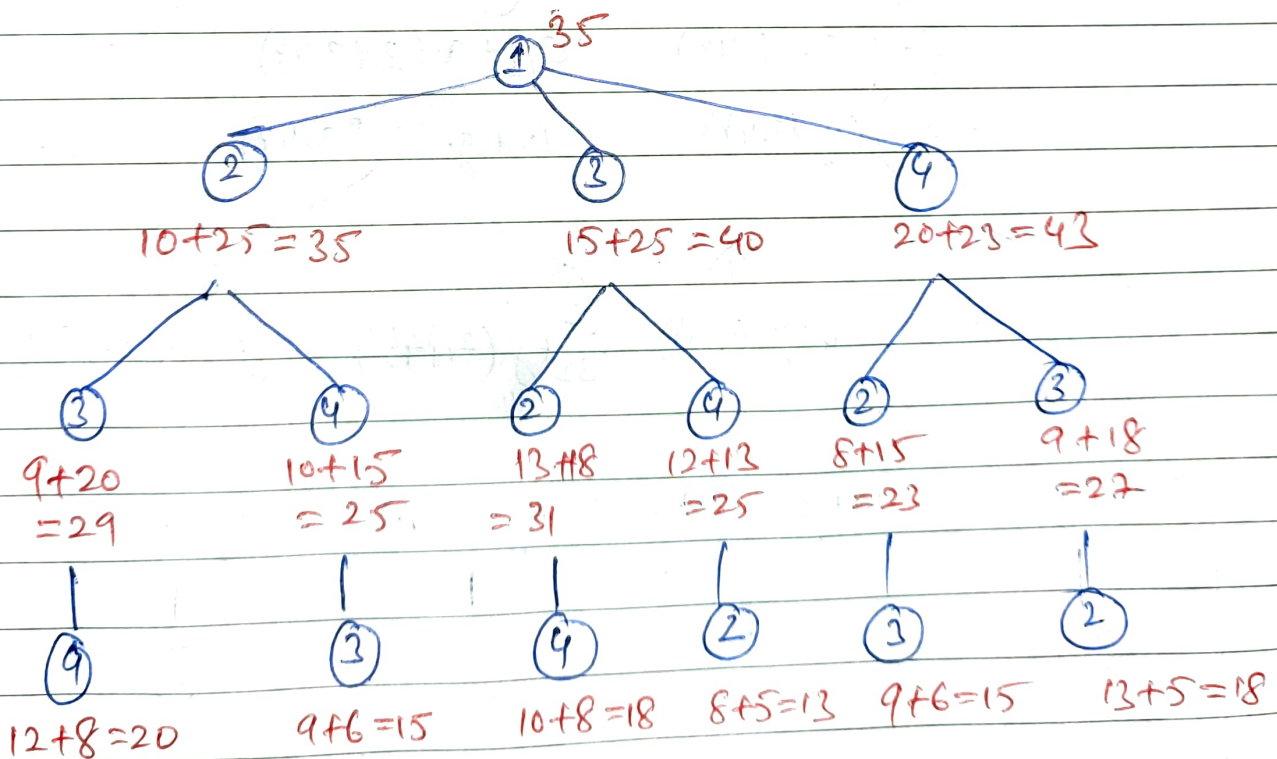
$$g(4, \{3\}) = 15$$

$$g(2, \{3, 4\}) = 25$$

$$g(3, \{2, 4\}) = 25$$

$$g(4, \{2, 3\}) = 23$$

$$g(1, \{2, 3, 4\}) = 35 \text{ (min cost)}$$

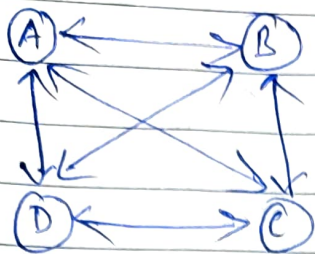


Shortest Path is 1-2-4-3-1

and minimum cost is 35.

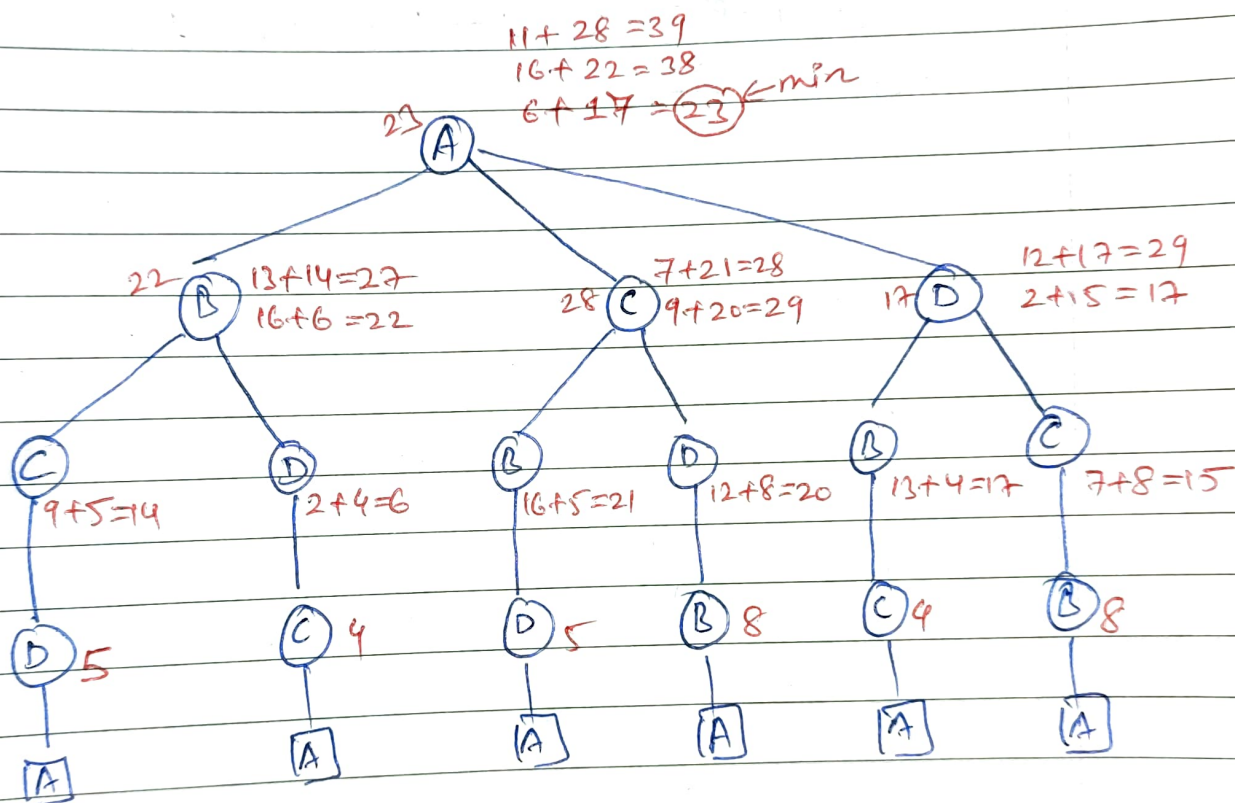
Q

Travelling Salesperson Problem using Dynamic Programming.



	A	B	C	D
A	0	16	11	6
B	8	0	13	16
C	4	7	0	9
D	5	12	2	0

Soln



Path is A-D-C-B-A  
cost is 23



(AKTU 2020-21)

Q

Travelling Salesman problem using Dynamic programming

	1	2	3	4
1	0	1	15	6
2	2	0	7	3
3	9	6	0	12
4	10	4	8	0

Soln

Shortest path is 1-2-4-3-1

Cost is 21

