TSP using DP by formula

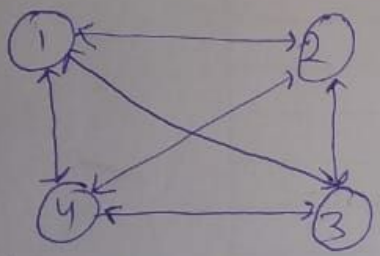
$$g(i,S) = \min_{k \in S} \{ C_{ik} + g(k, S - \{k\}) \}$$

here $g(i,s)$ is a recursive function

and S is the set of vertices and k is selected vertices except i, $S - \{k\}$ → is set of vertices without k

C_{ik} is cost

example



adjacency matrix

	1	2	3	4
1	0	10	15	20
2	5	0	9	10
3	6	13	0	12
4	8	8	9	0

here
$C_{10} = 10$
$C_{12} = 10$
etc
$C_{21} = 5$
both the way 1 do 2 2 do 1 may have different cost

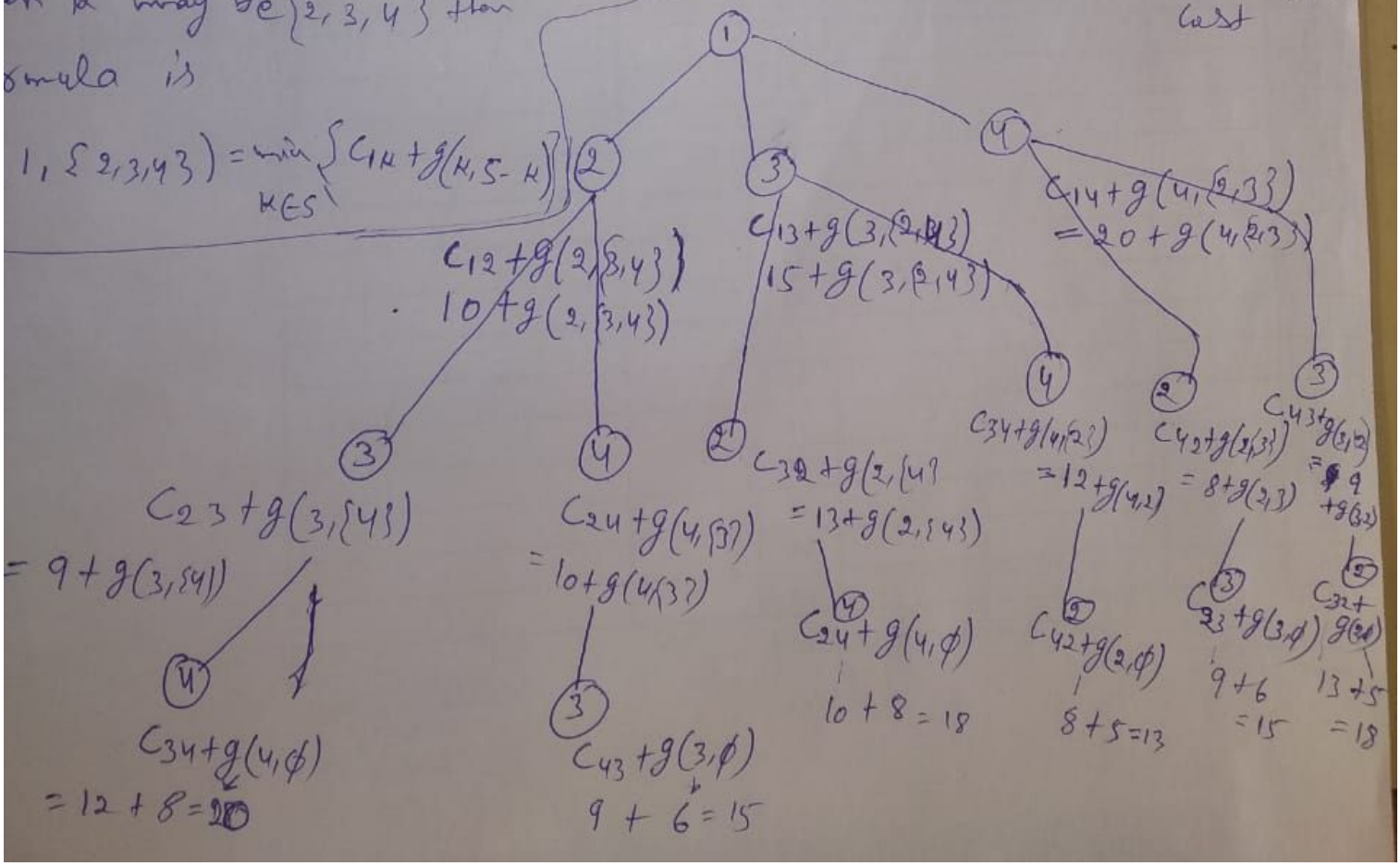
starting → $S = \{2,3,4\}$ ~~or other solution~~ ~~$S = \{2,3,4\}$~~

Assume that starting vertex is i is 1

k may be {2, 3, 4} then

formula is

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



(2) do't do from tree method that is not DP but roughly it help so to finding or putting value in tabular form see in tabular method (~~top to down~~ bottom up)

First find (Assume Nothing means ϕ or starting)

$g(2, \phi) = 5$ then $g(3, \phi) = 6$ then $g(4, \phi) = 8$

date 1

$g(2, \{3\}) = 15$ then
$g(2, \{4\}) = 18$
$g(3, \{2\}) = 18$
$g(3, \{4\}) = 20$
$g(4, \{2\}) = 13$
$g(4, \{3\}) = 15$

date 2

$g(2, \{3,4\}) = 25$
$g(3, \{2,4\}) = 25$
$g(4, \{2,3\}) = 23$

~~Now date 3~~
Now date 3

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

Now in tree