

DECEMBER 2010						
M	T	W	T	F	S	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November

26

Friday

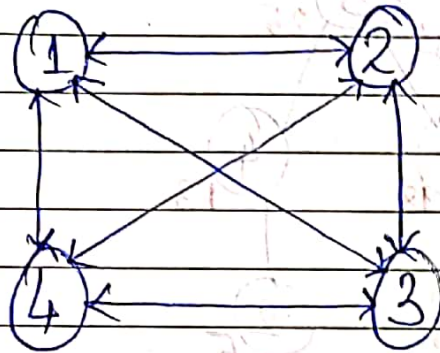
(Day 330-035)

JANUARY 2011						
M	T	W	T	F	S	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Travelling Salesman Problem.

Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city and returns to the origin city?

Example:-



Problem:-

We need to select one vertex as a starting vertex and find out a path such that it is going through all the vertices and returning back to starting vertex.

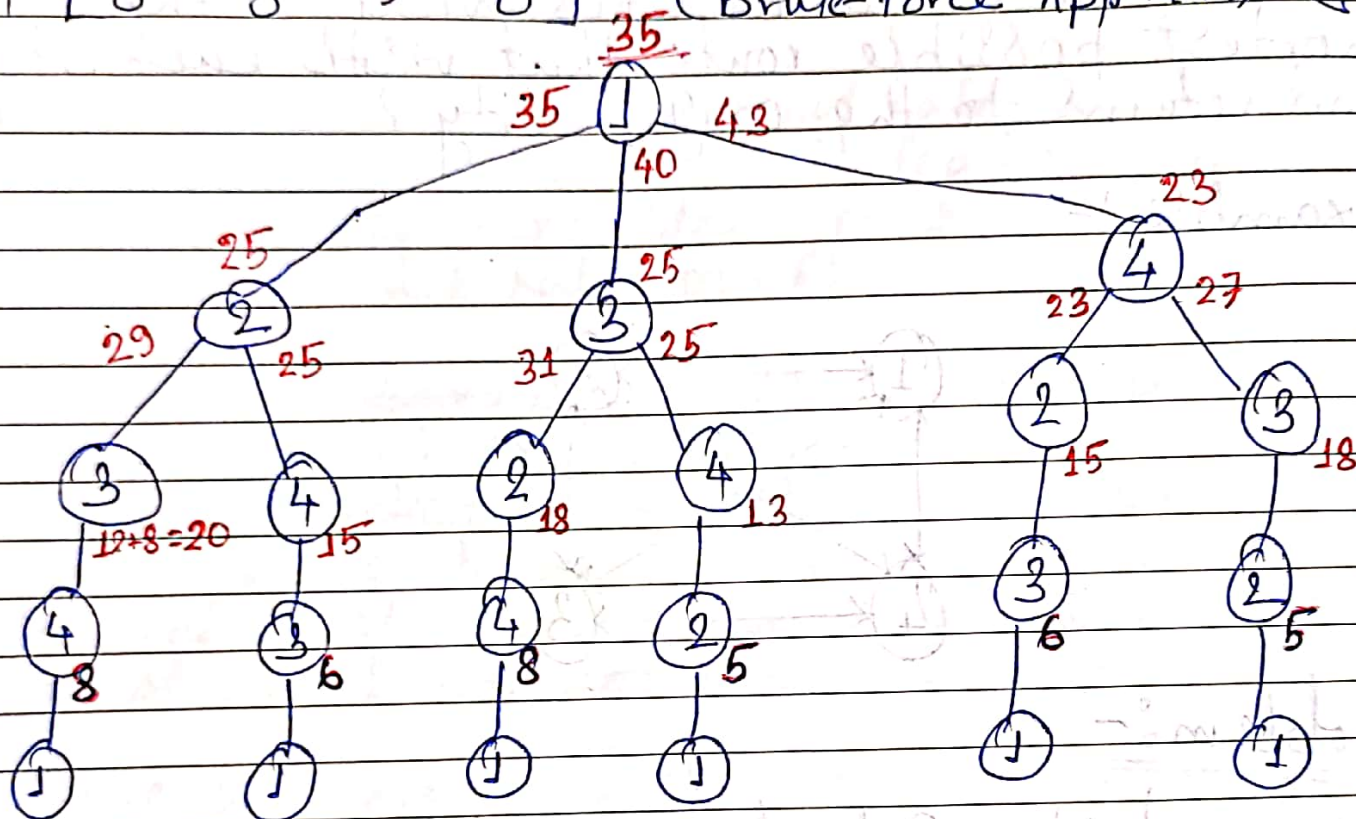
OCTOBER 2010						
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November **27** Saturday
(Day 331-034)

NOVEMBER 2010						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

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

Dynamic Algorithm
Says trying out all possible way.
(brute-force Approach).



If 1 is the starting vertex \rightarrow

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

Sunday 28

General formula:-

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

\rightarrow Set of vertices.

DECEMBER 2010						
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November

29

Monday

(Day 333-032)

JANUARY 2011						
M	T	W	T	F	S	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

C_i

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

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

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

$$g(2, \{3\}) = 15 = C_{23} + g(3, \emptyset) = 9 + 6 = 15$$

$$g(2, \{4\}) = 18 = C_{24} + g(4, \emptyset) = 10 + 8 = 18$$

$$g(3, \{2\}) = 18 = C_{32} + g(2, \emptyset) = 13 + 5 = 18$$

$$g(3, \{4\}) = 20 = C_{34} + g(4, \emptyset) = 12 + 8 = 20$$

$$g(4, \{2\}) = 13 = C_{42} + g(2, \emptyset) = 8 + 5 = 13$$

$$g(4, \{3\}) = 15 = C_{43} + g(3, \emptyset) = 9 + 6 = 15$$

Now we compute $g(i, S)$ with $|S| = 2$.

$$\begin{aligned} g(2, \{3, 4\}) &= \min(C_{23} + g(3, \{4\}), C_{24} + g(4, \{3\})) \\ &= \min(9 + 20, 10 + 15) = 25 \end{aligned}$$

$$\begin{aligned} g(3, \{2, 4\}) &= \min(C_{32} + g(2, \{4\}), C_{34} + g(4, \{2\})) \\ &= \min(13 + 18, 12 + 13) = 25 \end{aligned}$$

$$\begin{aligned} g(4, \{2, 3\}) &= \min(C_{42} + g(2, \{3\}), C_{43} + g(3, \{2\})) \\ &= \min(8 + 15, 9 + 18) \\ &= 23. \end{aligned}$$

OCTOBER 2010						
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November **30** Tuesday
(Day 334-031)

NOVEMBER 2010						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Finally

$$g(1, \{2, 3, 4\}) = \min (C_{12} + g(2, \{3, 4\}), \\ C_{13} + g(3, \{2, 4\}), \\ C_{14} + g(4, \{2, 3\})) \\ = \min (10 + 25, 15 + 25, 20 + 25) \\ = 35$$

Path $1 \rightarrow 2 \rightarrow 4 \rightarrow 3 \rightarrow 1$.