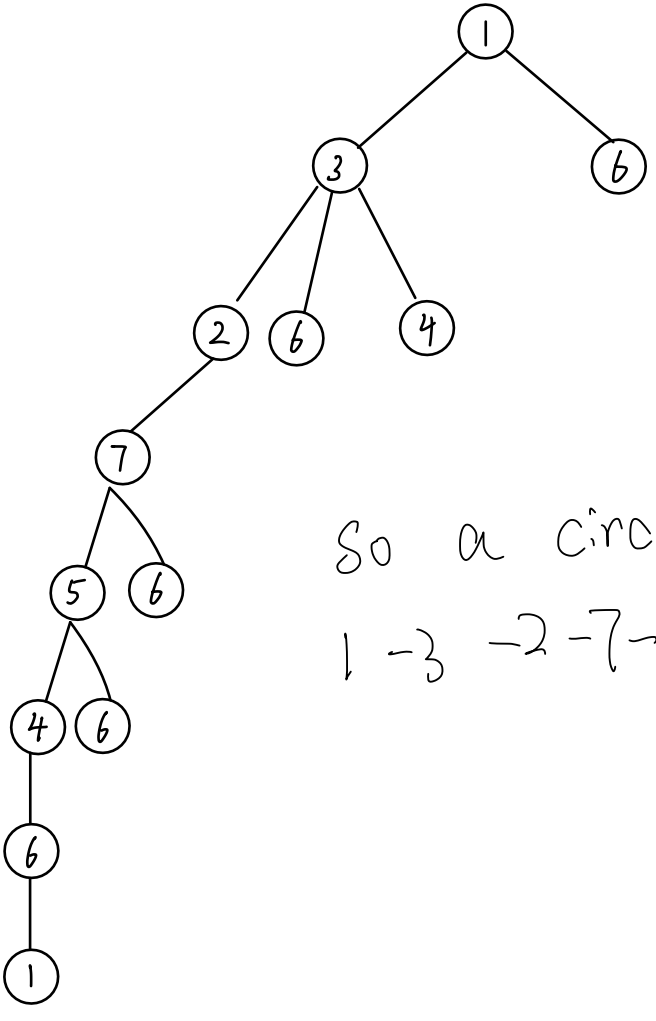
5.1 starting at point 1, use DFS.

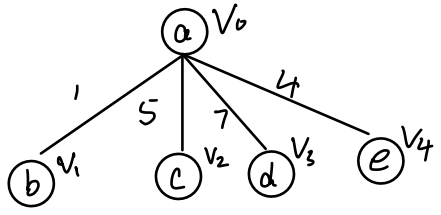


So a circle is

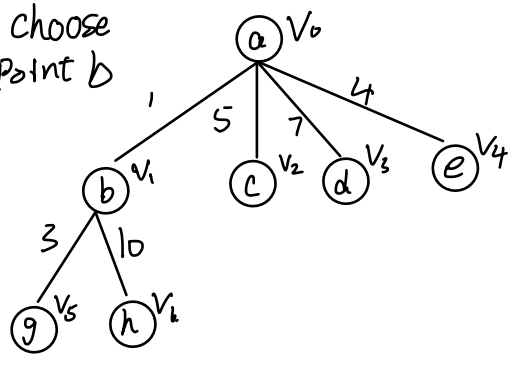
1-3-2-7-5-4-6-1

5.3 Start at V_0, use hill climbing scheme

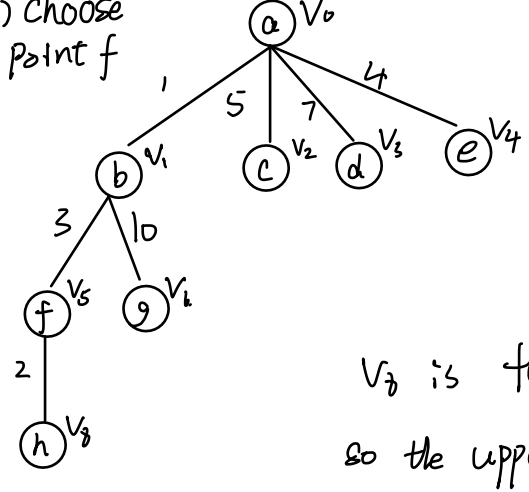
(1)



(2) choose point b



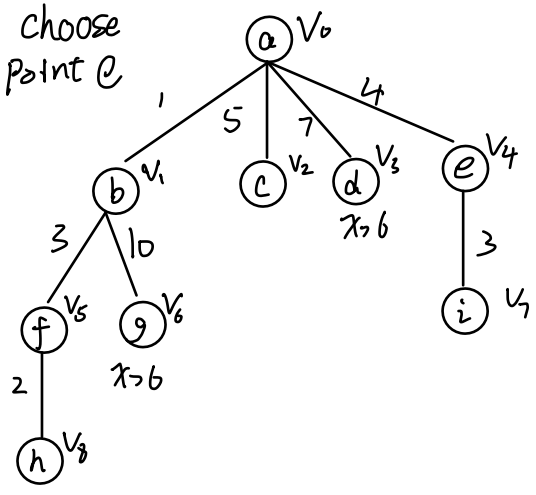
(3) choose point f



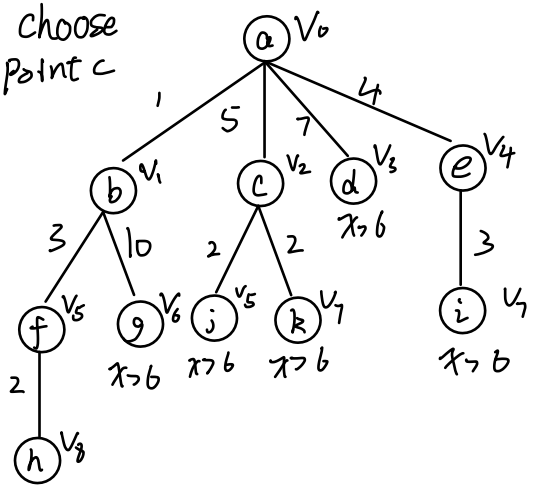
V_8 is feasible solution

so the upper bound of optimal solution is 6

(4) Choose point e



(4) Choose point c



So the final solution is $V_0 - V_1 - V_5 - V_8$

5.4 :

i \ j	1	2	3	4	5
1	∞	5	61	34	12
2	57	∞	43	20	7
3	39	42	∞	8	4
4	6	50	42	∞	8
5	41	26	10	35	∞

a reduced matrix →

i \ j	1	2	3	4	5	
1	∞	0	56	29	7	(-5)
2	50	∞	36	13	0	(-7)
3	35	38	∞	4	0	(-4)
4	0	44	36	∞	2	(-6)
5	31	16	0	25	∞	(-10)

reduced : 32

another reduced matrix ←

i \ j	1	2	3	4	5
1	∞	0	56	29	7
2	50	∞	36	13	0
3	35	38	∞	4	0
4	0	44	36	∞	2
5	31	16	0	25	∞

(-4)

Total cost reduced: 32+4 = 36 (lower bound)

(1,2): C(1,5)+C(5,2) = 7+16 = 23
(2,5): C(2,4)+C(4,5) = 13+2 = 15
(3,5): C(3,4)+C(4,5) = 4+2 = 6
(4,1): C(4,5)+C(3,1) = 2+35 = 37
(5,2): C(5,2)+C(2,3) = 16+36 = 52

① All — L.B = 36

- with 5-3 — L.B = 40
- without 5-3 — L.B = 94

matrix with 5-3

i \ j	1	2	4	5
1	∞	0	29	7
2	50	∞	13	0
3	35	38	4	∞
4	0	44	∞	2

reduced matrix

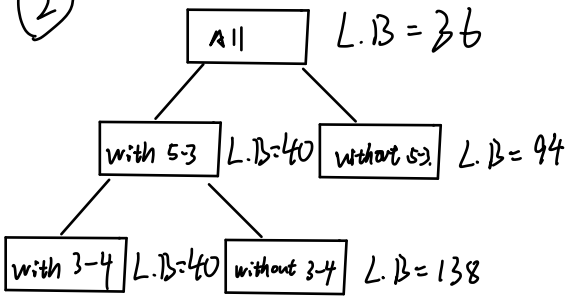
i \ j	1	2	4	5	
1	∞	0	29	7	
2	50	∞	13	0	
3	31	34	0	∞	(-4)
4	0	44	∞	2	

(1,2): C(1,5)+C(3,4) = 7+34 = 41
(2,5): C(2,4)+C(4,5) = 13+2 = 15
(3,4): C(3,1)+C(2,4) = 31+13 = 44
(4,1): C(4,5)+C(3,1) = 2+31 = 33

matrix with 3-4

i\j	1	2	5
1	∞	0	7
2	50	∞	0
4	0	44	∞

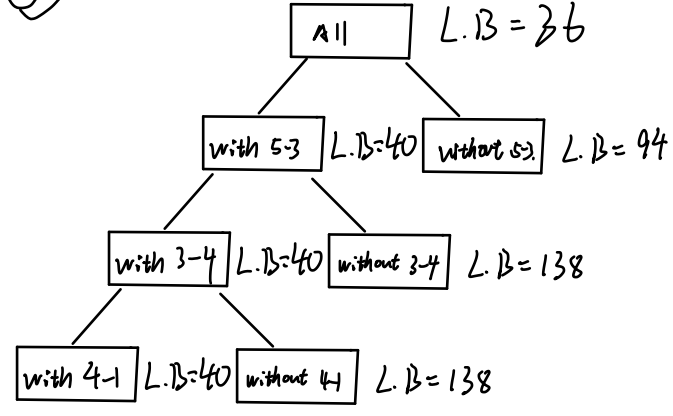
(1,2): C[1,5]+C[4,2] = 7+44 = 51
(2,5): C[1,2] + C[1,5] = 50 + 7 = 57
C[4,1]: C[4,2]+C[2,1] = 44 + 50 = 94

② 

matrix with 4-1

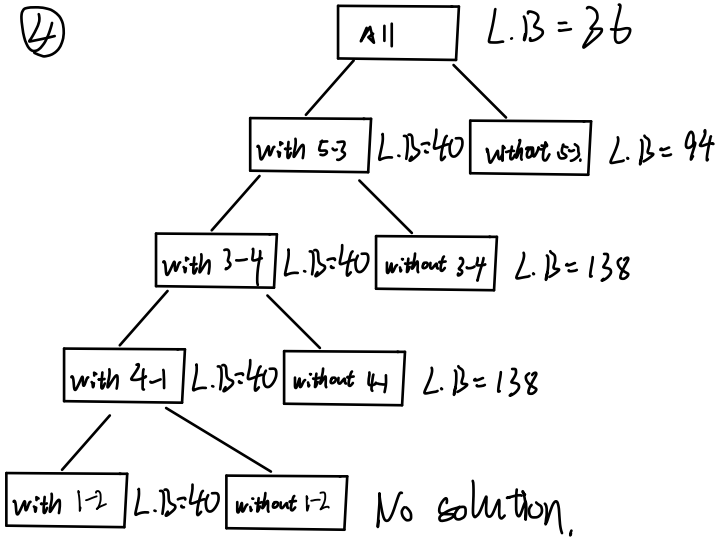
i\j	2	5
1	0	7
2	∞	0

C[1,2]: C[1,5]+C[2,2] = 7+∞ = ∞
C[2,5]: C[2,2]+C[1,5] = ∞ +7 = ∞

③ 

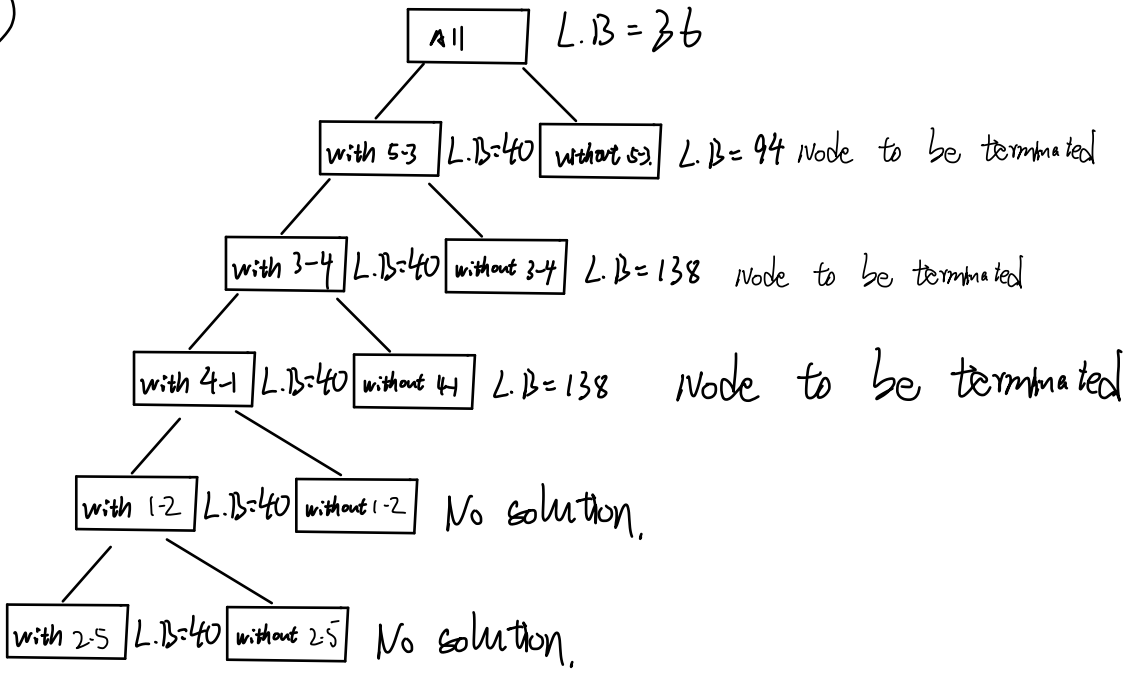
matrix with 1-2

i\j	5
2	0

④ 

No solution.

(5)



solution: 1-2-5-3-4-1

Cost = 40