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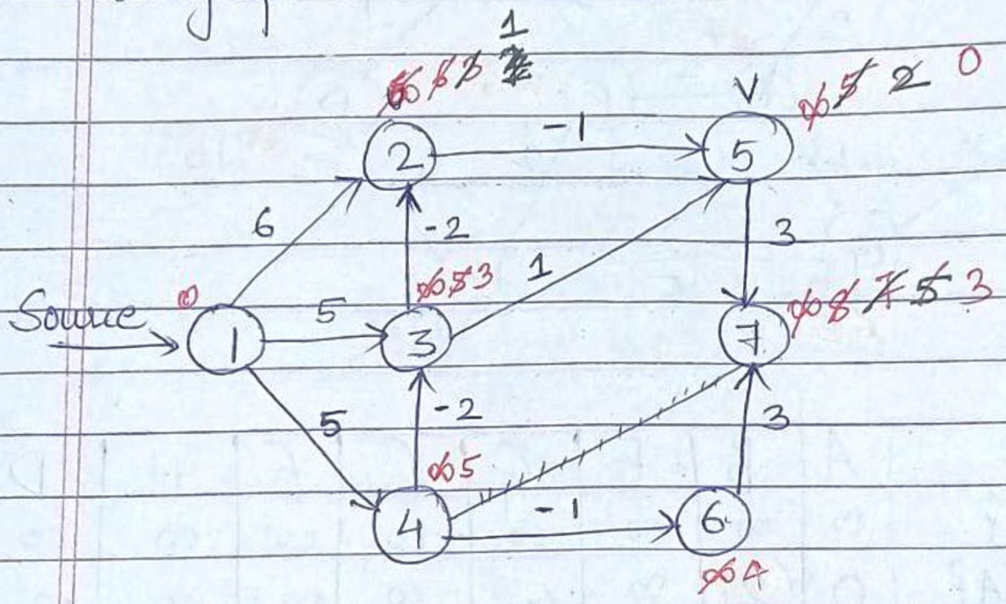
~~Floyd Warshall~~

BELLMAN FORD :-

Bellman-Ford algorithm is an algorithm that computes shortest path from a single source vertex to all of the other vertices in a weighted diagraph.



Relax all edges, (n-1) ie (Vertices - 1)

$$\text{if } (d[u] + c(u,v) < d[v]) \\ \quad d[v] = d[u] + c(u,v)$$

i) Prepare list of all edges.
(1,2), (1,3), (1,4), (2,5), (3,2), (3,5), (4,3), (4,6)
(5,7), (6,7)

for n = 1.

Initially Source = 1 = 0, all othere vertices are ∞

(1,2) = 6, (1,3) = 5, (1,4) = 5, (2,5) = 5, (3,2) = 3, (3,5) = No modification, =5 (4,3) = 3, (4,6) = 4, (5,7) = 8, (6,7) = 7

Edges	(1,2)	(1,3)	(1,4)	(2,5)	(3,2)	(3,5)	(4,3)	(4,6)	(5,7)	(6,7)
Cost	6	5	5	5	3	5	3	4	8	7

(Red)

for n = 2.

Edges	(1,2)	(1,3)	(1,4)	(2,5)	(3,2)	(3,5)	(4,3)	(4,6)	(5,7)	(6,7)
Cost	3	3	5	2	1	2	3	4	~~7~~ 5	5

(Black.

for n = 3.

Edges	(1,2)	(1,3)	(1,4)	(2,5)	(3,2)	(3,5)	(4,3)	(4,6)	(5,7)	(6,7)
Cost	1	3	5	0	1	0	3	4	3	3

(Red)

for n = 4

Edges	(1,2)	(1,3)	(1,4)	(2,5)	(3,2)	(3,5)	(4,3)	(4,6)	(5,7)	(6,7)
Cost	1	3	5	0	1	0	3	4	3	3

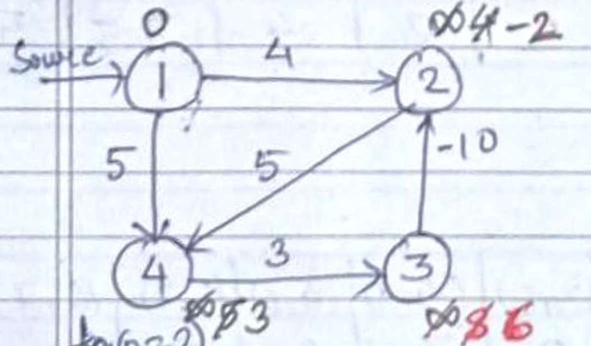
Now, there is no change for n = 3 and n = 4, so stop here.

1|8|11

Path cost :-

(1,2) = 1	Vertex : Cost
(1,3) = 3	1 = 0
(1,4) = 5	2 = 1
(2,5) = 0	3 = 3
(3,2) = 1	4 = 5
(3,5) = 0	5 = 0
(4,3) = 3	6 = 4
(4,6) = 4	7 = 3
(5,7) = 3	
(6,7) = 3	

DRAWBACK OF BELLMAN FORD ALGORITHM



for (n = 1)

(3,2)	(4,3)	(1,4)	(1,2)	(2,4)
∞	∞	5	4	5

for (n=2)

(3,2)	(4,3)	(1,4)	(1,2)	(2,4)
∞ 8	8	5	4	5

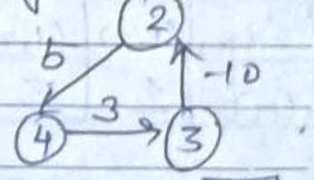
for n=3

(3,2)	(4,3)	(1,4)	(1,2)	(2,4)
-2	8	5	-2	3

for n=4

(3,2)	(4,3)	(1,4)	(1,2)	(2,4)
~~8~~ -2	6	3	-2	3

if we try (n=4) it will also change, as there is cycle of edges,



$5 + 3 - 10 = \boxed{-2}$

the cycle is -ve, It is disadvantage. Total weight is -ve so, not work.