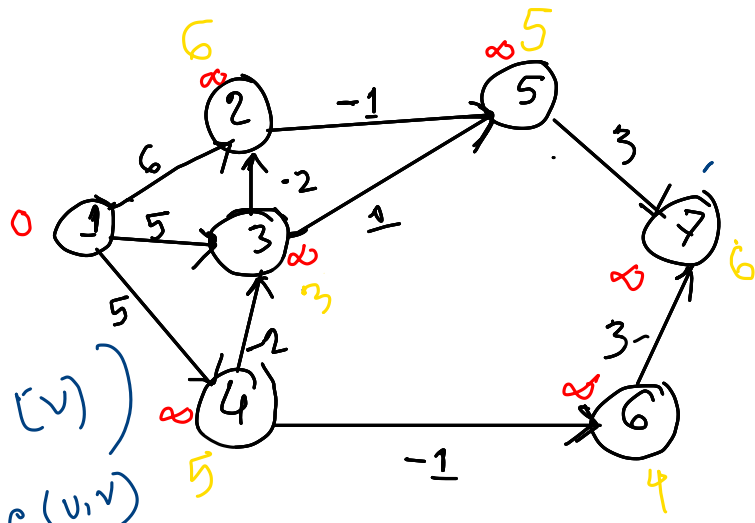
Single Source Shortest path → help to detect negative cycles

Bellmen - Ford



edgeList →

(1,2) (1,3) (1,4) (2,5) (3,5)
(4,3) (4,6) (6,7) (5,7)

Relaxation

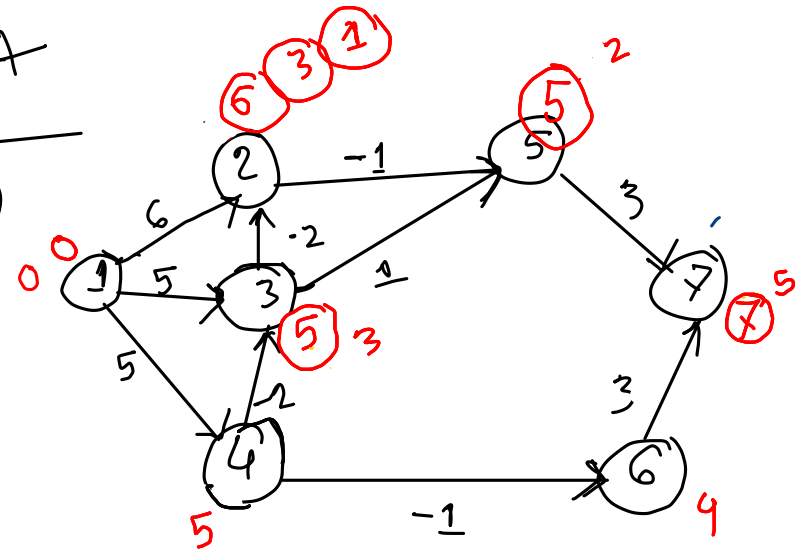
if $(d[v] + c(u,v) < d[v])$

$d[v] = d[u] + c(u,v)$

more Formally said it

if $(d[u] + \text{weight} < \text{dist}[v])$

$\text{dis}[v] = d[u] + \text{weight}$



edgeList →

(1,2) (1,3) (1,4) (2,5) (3,2)
(3,5) (4,3) (4,6) (5,7) (6,7)

Finally

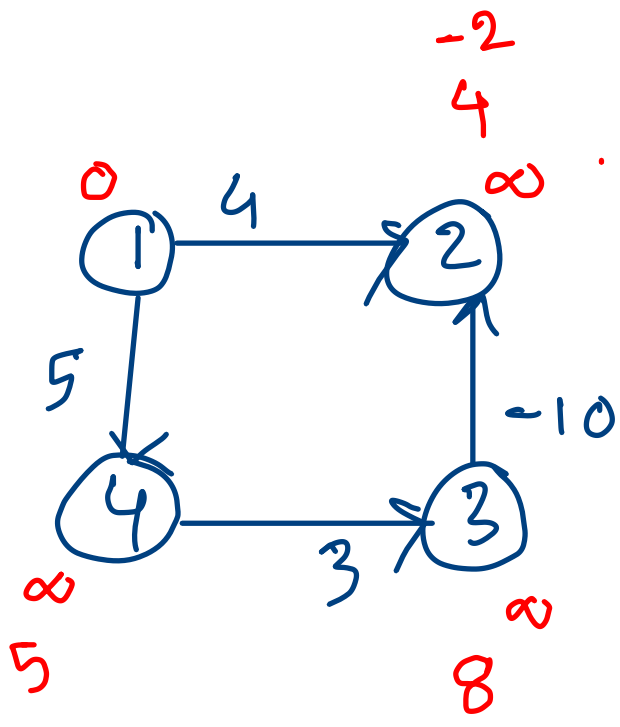
1 - 0
2 - 1
3 - 3
7 - 4
4 - 5
5 - 0
6 - 4

TC → $O(|E||V-1|)$

$O(n^2)$

Complete graph → $O(n^3)$

Ex.



(1,2)(1,4)(4,3)(3,2)

Final

1 - 0
2 - (-2)
3 - 8
4 - 5

Disadvantage →

• যদি negative cycle থাকে তাহলে TLE খাবে