24.1-1

Run the Bellman-Ford algorithm on the directed graph of Figure 24.4, using vertex z as the source. In each pass, relax edges in the same order as in the figure, and show the d and π values after each pass. Now, change the weight of edge (z,x) to 4 and run the algorithm again, using s as the source.

問題分成這兩個，都要用 Bellman-Ford algorithm 跑一遍

1. Using z vertex as the Source

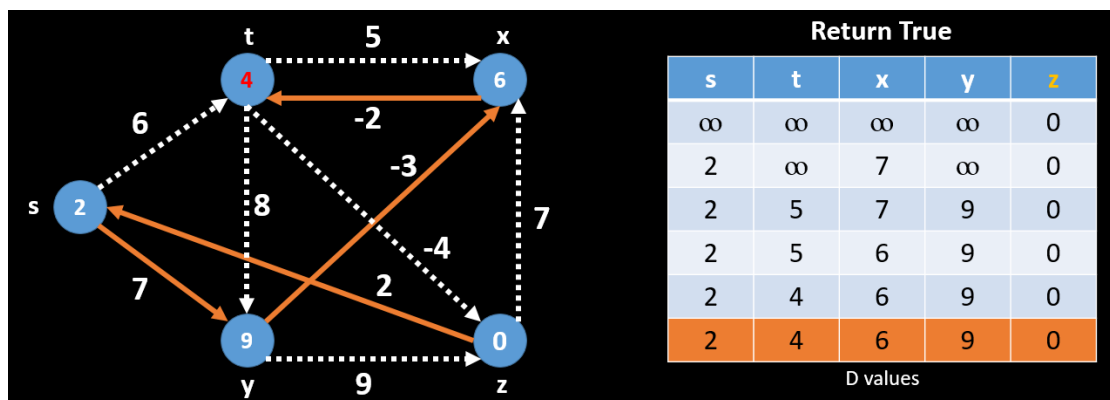2. Change the weight of edge (z,x) to 4 ,using s as source

Bellman-Ford algorithm

(i,u) ∈ E , dist[u] = min(dist[i] + weight[i][u] , dist[i])

Pseudocode:

for i from 1 to size(vertices)-1:

   for each edge (u, v) with weight w in edges:

      if distance[v] != ∞:

         if distance[u] + w < distance[v]:

            distance[v] = distance[u] + w

            predecessor[v] = u

1. Using z vertex as the Source

Return True				
s	**t**	**x**	**y**	**z**
∞	∞	∞	∞	0
2	∞	7	∞	0
2	5	7	9	0
2	5	6	9	0
2	4	6	9	0
2	4	6	9	0

D values

橘色 ROW 為檢查是否有負迴圈，只要跑 V-1 次以上還可更新代表有負迴圈存在，檢查結果為沒有負迴圈，return True

2. Change the weight of edge (z,x) to 4 ,using s as source

s	t	x	y	z
0	∞	∞	∞	∞
0	6	∞	7	∞
0	6	4	7	2
0	2	4	7	2
0	2	4	7	-2
0	2	2	7	-2

Return False

D values
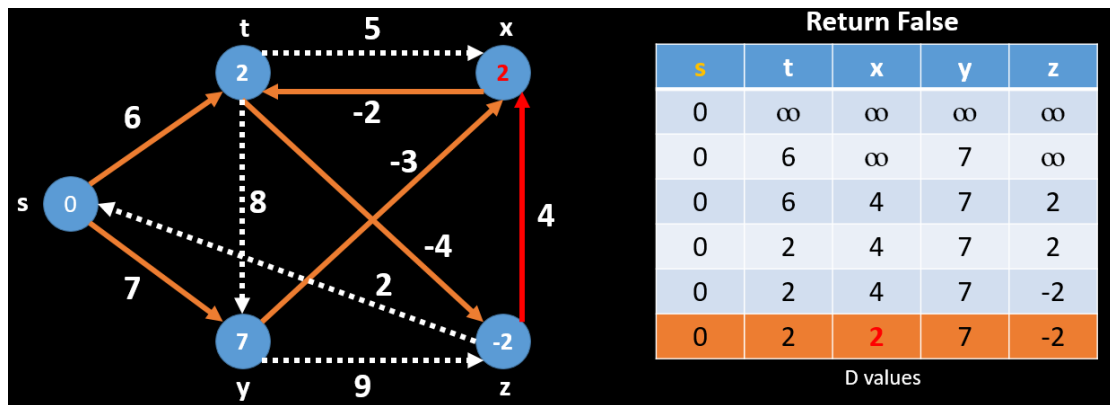
更新第 V 次 dist[x](4) >   dist[z](-2) + weight[z][x](4)

4 > -2+4

因此 Return False