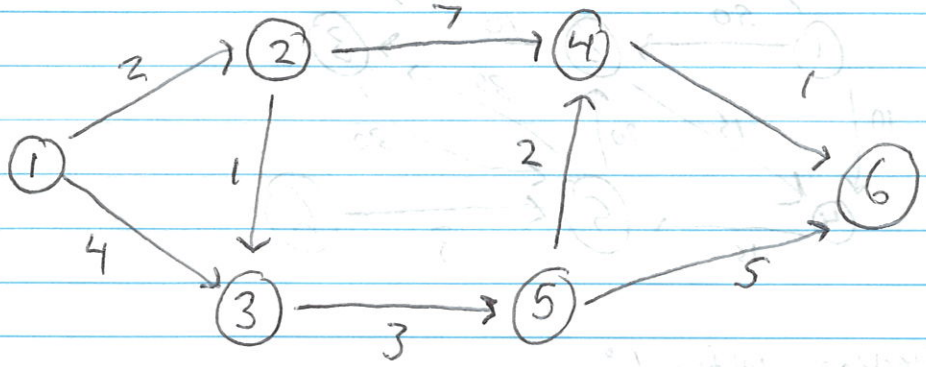
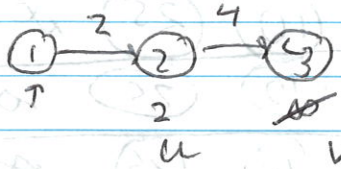
Dijkstra's Algorithm

Single source shortest path to all vertices.



optimization, minimization, therefore Greedy!

small ex:

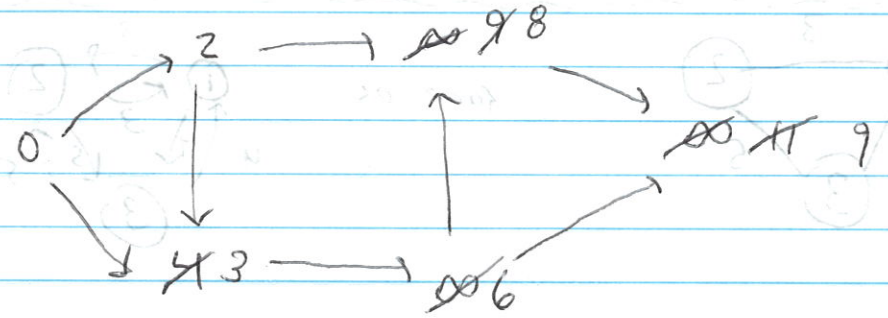


1→3 is 6
1→2 is 2

Relaxation is the updating.

yes!

if (d[u] + c(u,v) < d[v]) 2+4 < ∞
d[v] = d[u] + c(u,v)

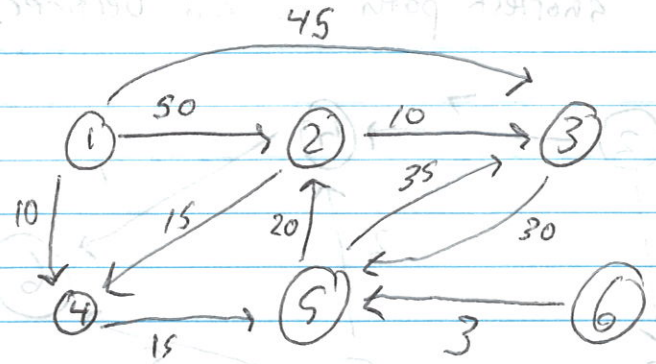


now select smallest, which is 2 and check distances do relaxing if needed.

now we have vertex 1 to all others

v:	2	3	4	5	6
d[v]:	2	3	8	6	9

Now Let's do example with table

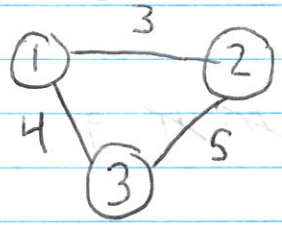


starting vertex 1:

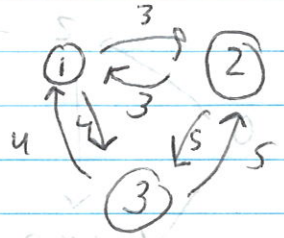
selected vertex	2	3	4	5	6
4	50	45	(10)	∞	∞
5	50	45	(10)	(25)	∞
2	(45)	45	(10)	(25)	∞
3	(45)	(45)	(10)	(25)	∞
6	(45)	(45)	(10)	(25)	(∞)

Done

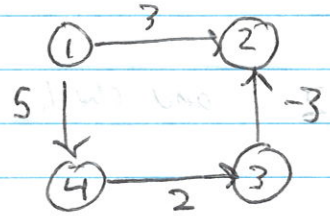
can do undirected!



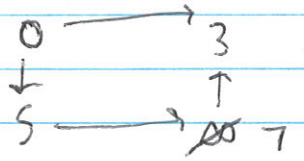
same as



negatives



Dijkstra's didn't include negatives



← 3 already relaxed can't do it again so fails