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Q1)

101 is wrong, It should be 30

$\therefore$  it can be relaxed by 18 and 12.

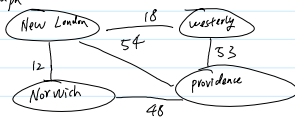
$\therefore 101 > 18 + 12$

$\therefore 101$  should be 30

	Providence	Westbury	New London	Norwich
Providence	0	53	54	48
Westbury	53	0	18	30
New London	54	18	0	12
Norwich	48	30	2	0

\* Red indicates the change

Graph



Q2)

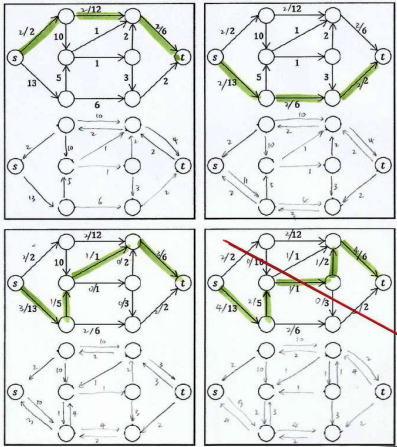
	A	B	C	D	E	F	G	H
0	0	X	X	X	X	X	X	X
1	0	4	7	5	X	X	X	X
2	0	4	6	5	8	8	13	9
3	0	4	6	5	8	7	12	9
4	0	4	6	5	8	7	11	9

Q3)

$M^2(i, j)$  is the shortest path distance between  $i$  to  $j$  consist of no more than 2 edges

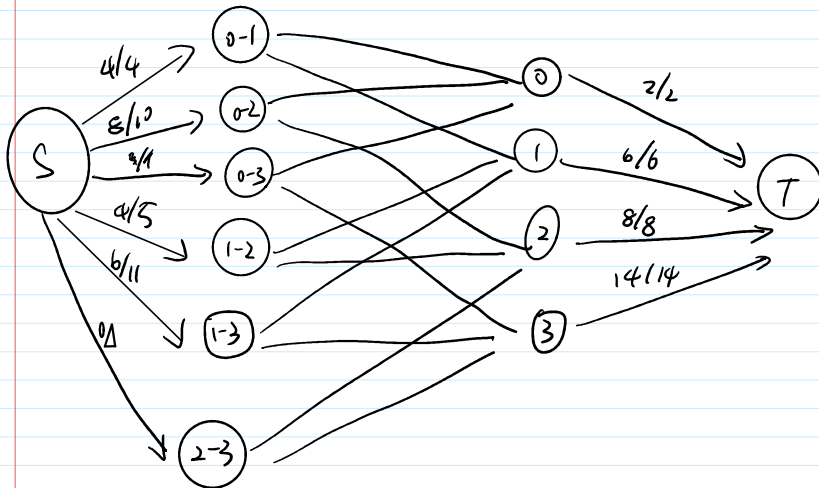
$M^k(i, j)$  is the shortest path distance between  $i$  to  $j$  consist of no more than  $k$  edges

Q4)

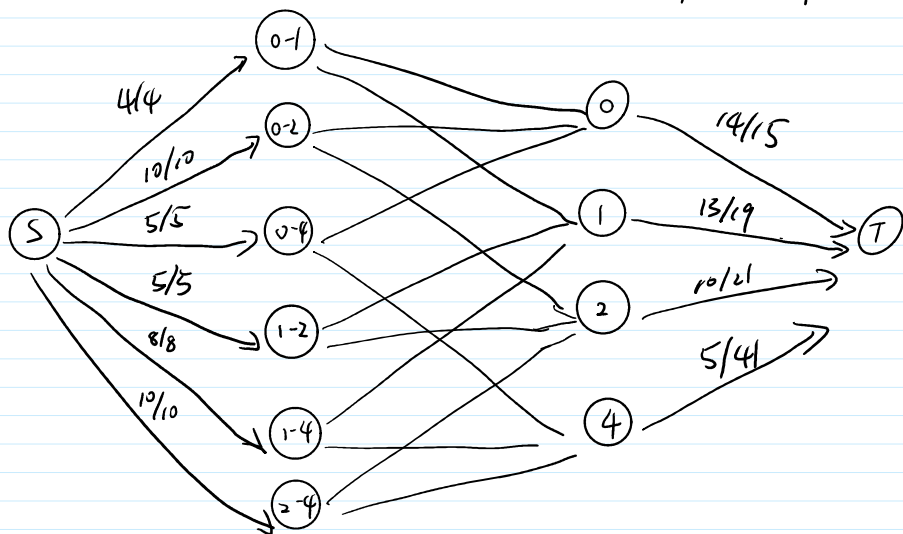


Green trace is the augment path  
the red line shows the minimum cut

Q5) Detroit is eliminated, because all edges out of S are not full.



Trouton is not eliminate, Since all edge out of S are full.



Q6) we can use binary search.

Assume there are  $n$  teams, their indices are  $0$  to  $n-1$

we can calculate  $W_i + V_i$  for each of team  $i$

Next, we sort  $W_i + V_i$  in ascending order.

Then, we use binary search to find an integer  $K$ , such that team  $k$  is eliminated and team  $k+1$  is not eliminated.

Note, by using binary search, we can only use  $\log n$  terms of solving, so we find  $K$ .

Finally, we can say team 0 to  $k$  are eliminated, team  $k+1$  to  $n-1$  are not eliminated