Algorithms and Datastructures

Assignment 5

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1

V is the vertex that we are looking at in that iteration.

V	A	B	C	D	E	F	G	H	I	S
X	0	∞	∞	∞	∞	∞	∞	∞	∞	∞
A	0	4	-2	∞	∞	∞	∞	∞	∞	∞
B	0	4	-2	∞	∞	∞	2	0	∞	∞
C	0	4	-2	0	∞	-1	2	0	∞	∞
D	0	4	-2	0	∞	-1	2	0	∞	∞
E	0	4	-2	0	∞	-1	2	0	∞	∞
F	0	4	-2	0	∞	-1	2	0	∞	∞
G	0	4	-2	0	∞	-1	2	0	1	∞
H	0	4	-2	0	∞	-1	2	0	1	∞
I	0	4	-2	0	∞	-1	2	0	1	∞
S	0	4	-2	0	∞	-1	2	0	1	∞

After $|V|$ iterations of checking the distance with different vertex lengths, the distances don't change.

2

No, this is not true, because if the amount of in-edges and the amount of out-edges are not the same, the minimum cut could be changed to another variant.

5

We have a minimum complexity of $\mathcal{O}$(V + E) because of BFS. If we have no negative weights, the loop over V will still happen V times, because in the worst case all the values will keep being updated, a negative value could ruin this, but since we don't have those, we are fine. So in a worst case sceneario the loop over V and the inner loop over E will still happen. Thus it is $\mathcal{O}(|V| * |E|)$