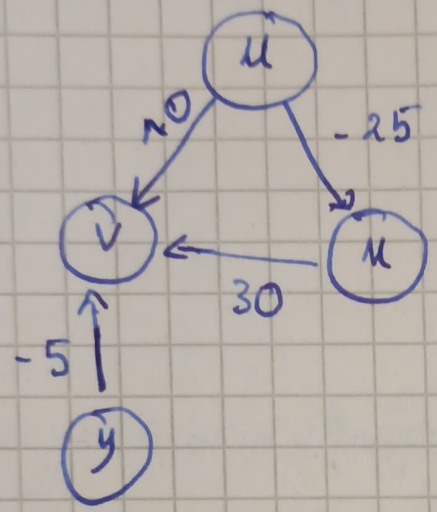
Problem 13. 1:

Even though the suggested algorithm may look logical, it is not.

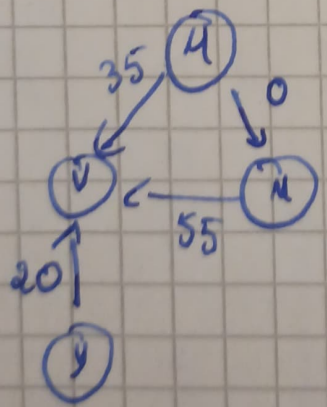
We consider a directed graph $G=(V,E)$, containing negative edge weights as follow:



We consider the shortest path, that is obvious:

$u \to x \to v$, that contains two edges.

We add value +25 to all nodes, (smallest negative weight):



graph

$G'=(V,E')$

The shortest actual path between u and v is in this case $u \to v$, which contains only one edge.

The path after the modification is different than the actual shortest path given the initial graph G.

Hence the algorithm is incorrect.

In the path $u \to u \to v$, we added the weight 2 times since the path has 2 edges.

In the other hand, in path $u \to v$, we added the positive weight only one time.

The additional weight is not equally distributed between the ~~edges~~ paths