

An artist's crisis

Notoriously broke artist G. R. Aphen is facing a capital crisis of colossal magnitude: art market and critics are scorning his ingenious œuvre!

Aphen's paintings each consist of a graph with nodes painted red and blue in such a way that no two neighbouring nodes (i.e. nodes connected by an edge) share the same colour. After a lot of considerations, he is sure that the disdain stems from a lack of blue in his paintings. Help him by writing a program that decides for a given graph whether it can be coloured according to the above rules and if so, how many nodes can be colored blue.

Input

The first line of input contains two space separated integers N, M . This means, that the graph under consideration consists of N nodes (numbered 1 to N) and M edges. After that, M lines follow with each one consisting of two space separated integers $1 \leq a, b \leq N, a \neq b$, meaning that there is an edge connecting nodes a and b .

Output

The first line of your output should consist of the word JA (German for "yes") if it is possible for Aphen to colour the graph as desired, otherwise NEIN (German for "no"). In the first case the second line should consist of a single integer: the maximum number of nodes Aphen can colour blue.

Constraints and grading

We always have $1 \leq N, M \leq 300\,000$.

Subtask 1 (20 points). $N \leq 15$ and $M \leq 50$.

Subtask 2 (20 points). The graph is connected.

Subtask 3 (60 points). No further constraints.

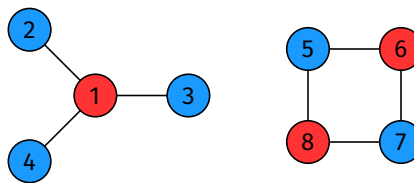
Moreover it holds: if only the first line of your output is correct, you'll be awarded 50% of points.

Samples

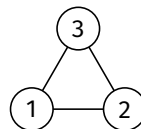
Input	Output
<pre> 8 7 1 2 1 3 1 4 6 7 5 6 5 8 7 8 </pre>	<pre> JA 5 </pre>

Input	Output
3 3 1 2 1 3 3 2	NEIN

An optimal colouring for the first test case would be the following:



The graph for the second case looks as follows:



Limits

Time: 1 s

Memory: 256 MiB

Feedback

restricted feedback is given for this task, i.e. the score shown equals your real score on this submission. However, for each testcase group you are only shown the verdict for the first testcase with minimal score in that group. (The order of the testcases in each of the groups is fixed.)