Task: ZJA
Globetrotter Congress

Olimpiada Informatyczna

XXVI OI, Stage III, Day one. Source file `zja.*` Available memory: 256 MB. *10.04.2019*

The Globetrotters Association is organizing a Grand Globetrotter Congress. This is not an easy task, since globetrotters are constantly traveling. The association has k members. These move around the globe, which to them appears as n shelters interconnected by one way trail segments. Each globetrotter travels in the following fashion: Each dawn, a globetrotter who spent the night at a shelter, chooses one of the trail segments leading from this shelter to another, follows that segment (in its prescribed direction) throughout the day, arriving before dusk at the next shelter, where they spent the next night. We note that there are trail segments leaving every shelter, so no globetrotter ever gets stuck.

Knowing the location of each globetrotter on an initial night, determine if all k globetrotters can meet one evening in some shelter, and if so, what is the minimum number of days after which they can meet.

Input

In the first line of the standard input, there are three integers n, m, and k ($2 \leq n \leq 250$, $n \leq m \leq n^2$, $2 \leq k \leq n$), separated by single spaces, specifying the number of shelters, the number of trail segments, and the number of globetrotters respectively. The shelters are numbered from 1 to n.

The next line contains a sequence of k integers $s_1, s_2, \ldots, s_k$ ($1 \leq s_i \leq n$), separated by single spaces, such that s_i is the number of the shelter where the i-th globetrotter spent the initial night.

The last m lines specify the trail segments. The j-th segment is represented as a pair (not necessarily distinct) of integers a_j, b_j ($1 \leq a_j, b_j \leq n$), separated by a single space, such that the segment leads from shelter a_j to shelter b_j. No trail segment is ever repeated on input. For each shelter, there is at least one trail segment leading from it.

Output

If the globetrotters cannot congregate, a single line with the word `NIE` (Polish for *no*) should be printed to the standard output. Otherwise, to the first line the word `TAK` (Polish for *yes*) should be printed, and to the second line a single integer: the minimum number of days after which the association members can meet in one shelter.

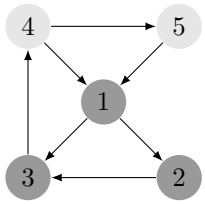
Examples

For the following input data:

```
5 7 3
1 2 3
1 2
1 3
2 3
3 4
4 1
4 5
5 1
```

the correct answer is:

```
TAK
3
```



Explanation for the example: The figure depicts the shelters and the trail segments. The shelters where globetrotters spend the initial night are darker. To meet, the globetrotters can follow these routes:

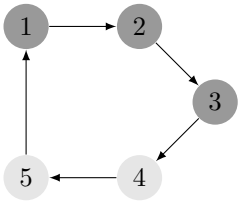
$$1 \to 3 \to 4 \to 1, \qquad 2 \to 3 \to 4 \to 1, \qquad 3 \to 4 \to 5 \to 1.$$

Whereas for the following input data:

```
5 5 3
1 2 3
1 2
2 3
3 4
4 5
5 1
```

the correct answer is:

```
NIE
```



Sample grading tests:

`1ocen:` a simple test with $n = 5$;

`2ocen:` $n = 250$; for each shelter $1 \leq i < n$ there is a trail segment $i \to (i + 1)$; moreover, segments $248 \to 250$ and $250 \to 249$ exist;

`3ocen:` $n = 250$; a cycle $1 \to \ldots \to 250 \to 1$: for each shelter, it is possible to either remain in it or move to its successor on the cycle (this test conforms with conditions of subset 2 – see below);

`4ocen:` $n = 250$; a cycle $1 \to \ldots \to 250 \to 1$: from each shelter, it is possible to move either to its successor or that successor's successor on the cycle.

Grading

The set of tests consists of the following subsets. Within each subset, there may be several tests.

Your program will be awarded 40% of the score per test for which only its first output line is correct. Keep in mind that the program still has to properly terminate, exceeding neither the time nor the memory limit.

Time limits for particular subsets are published in SIO.

Subset	Conditions	Score
1	$n \leq 10$	20
2	it is possible to remain in any shelter, $n > 10$	30
3	remaining cases	50

Formally speaking, every test in the second subset has the property that for each shelter there is a trail segment leading from that shelter back to itself, i.e., a loop.