

Task: GIL

Guilds



Training Camp, , Day 5. Source file `gil.*` Available memory: 128 MB.

10.07.2015

King Byteasar faces a serious matter. Two competing trade organisations, The Tailors Guild and The Sewers Guild asked, at the same time, for permissions to open their offices in each town of the kingdom.

There are n towns in Byteotia. Some of them are connected with bidirectional roads. Each of the guilds postulate that every town should:

- have an office of the guild, or
- be directly connected to another town that does.

The king, however, suspects foul play. He fears that if there is just a single town holding the offices of both guilds, it could lead to a clothing cartel. For this reason he asks your help.

Input

Two integers, n and m , are given in the first line of the standard input ($n \geq 1, m \geq 0$). These denote the number of towns and roads in Byteotia, respectively. The towns are numbered from 1 to n . Then the roads are given as follows: the input line no. $i + 1$ describes the i -th road; it holds the numbers a_i and b_i ($1 \leq a_i, b_i \leq n, a_i \neq b_i$) denoting that the i -th road connects the towns a_i and b_i . Every pair of towns is (directly) connected by at most one road. The roads do not cross—meeting only in towns—but may lead through tunnels and overpasses.

Output

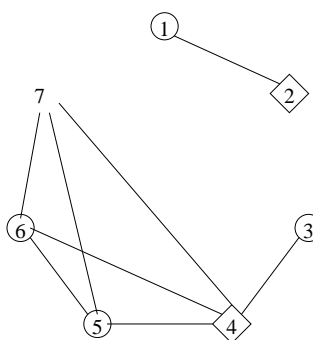
Your program should print out one word in the first line of the standard output: **TAK** (*yes* in Polish), if the offices can be placed in towns according to these rules, or **NIE** (*no* in Polish), in the opposite case. If the answers is **TAK**, then the following lines should give an exemplary placement of the offices. Thus the line no. $i + 1$ should hold:

- the letter **K** if there should be an office of The Tailors Guild in the town i , or
- the letter **S** if there should be an office of The Sewers Guild in the town i , or
- the letter **N** if there should be no office in the town i .

Example

For the input data:

```
7 8
1 2
3 4
5 4
6 4
7 4
5 6
5 7
6 7
```



the correct result is:

```
TAK
K
S
K
S
K
K
N
```

The towns in which an office of The Tailors Guild should open are marked with circles, whereas those in which an office of The Sewers Guild should open are marked with rhombi.

Grading

Subtask	Conditions	Points
1	$n, m \leq 2000$	50
2	$n \leq 200\,000, m \leq 500\,000$	50