Task: UKL
Integrated circuit

Olimpiada Informatyczna

XXVII OI, Stage I. Source file `ukl.*` Available memory: 128 MB. *21.10 – 18.11.2019*

A new integrated circuit being developed by the Bytel company has $n \cdot m$ memory chips arranged in n rows and m columns. The chip in the i-th row and j-th column (for $1 \leq i \leq n$, $1 \leq j \leq m$) has coordinates (i, j).

The chip in upper left corner, with coordinates $(1, 1)$, is supplied with power. To feed the remaining chips with power, $nm-1$ further connections have to be made. Specifically, each chip should be connected to at least one of the adjacent chips on its left, right, top or bottom so that there exists a route connecting it with the chip in the upper left corner. The company's electrical engineers insist that the longest path (between some pair of chips) in the connection network must have length exactly k lest quantum effects render the circuit useless.

Write a program that will find such a connection network if it exists.

Input

In the first and only input line, there are three integers n, m, and k ($n, m \geq 1$, $0 \leq k \leq 1\,000\,000$) which specify the circuit's parameters: number of rows and columns, as well as desired length of the longest path.

Output

If there is no network with the desired properties, then the single word `NIE` (Polish for *no*) should be printed to the output.

Otherwise, nm lines should be printed, the first one consisting of the word `TAK` (Polish for *yes*), and each of the following $nm-1$ lines containing four integers i_1, j_1, i_2, j_2 ($1 \leq i_1, i_2 \leq n$, $1 \leq j_1, j_2 \leq m$), separated by single spaces, which indicate that the network contains the connection between chips with coordinates (i_1, j_1) and (i_2, j_2).

Should more than one correct solution exist, your program may report any of those.

Example

For the following input data:

```
2 3 4
```

a correct result is:

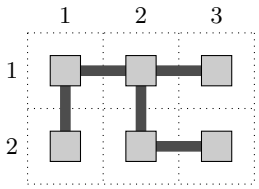
```
TAK
1 1 1 2
1 1 2 1
1 2 2 2
2 3 2 2
1 2 1 3
```

whereas for the following input data:

```
2 3 1
```

the correct result is:

```
NIE
```



Explanation for the example: A sample connection network is depicted for the 2×3 integrated chip. The longest path connects the chips with coordinates $(2, 1)$ and $(2, 3)$, and has a length of 4.

Sample grading tests:

`1ocen:` $n = 2$, $m = 3$, $k = 3$;

`2ocen:` $n = 1$, $m = 10$, $k = 10$;

`3ocen:` $n = 1000$, $m = 1000$, $k = 999\,999$.

Grading

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

Your program will be awarded 20% of the score for each test where it correctly prints `TAK` to the first output line but then prints an incorrect network scheme.

Subset	Condition	Score
1	$n, m \leq 6$	20
2	$n \leq 3$, $m \leq 1000$	20
3	$n, m \leq 1000$, odd number of chips	30
4	$n, m \leq 1000$, even number of chips	30