Task: PAW
Park Walks

AACPP SuSe 2025 Round 4 Memory: 256MiB 2025.06.03 – 2025.06.17

The owner of Dexter the Cat started taking Dexter on walks in the park near a famous local palace. In the park, there are n crossroads numbered from 1 to n, each with statues or fountains, and m paths between them. With those, Dexter can get between any two amuzement spots in the park, though he may have to use multiple paths.

The owner, having nothing to do in the meantime, started traking the routes Dexter takes, and noticed that he prefers routes that start and end at the same spot, and neither go through any other spot more than once nor use any path more than once.

After the most recent trip, the owner noted that all of the recorded routes so far used the same number of paths. A suspicion arose that it's an intended part of the park design, so the owner decided to investigate further. If it's really the case, he wants to find out the number of all possible such routes. He doesn't really care about the specific number though, only its remainder of division by $10^9 + 7$.

A recorded route can be described as a sequence of numbers of successively visited crossroads amuzement spots. Two routes of the same length are different if there is an index i such that the i-th spots in the two sequences differ; the length of the route is the number of paths used in it.

Input

The first line of input contains two integers n and m, which specify the number of amuzement spots and of the paths between them, respectively. Then m lines follow, describing the paths. The i-th of these lines contains two integers a_i and b_i, which indicate the path connecting spots numbered a_i and b_i ($1 \leq a_i, b_i \leq n$, $a_i \neq b_i$). There is at most one path between any two spots.

Output

If there is no route in the style that Dexter prefers, your program should write "FUR-LORN" to the standard output. If such routes exist, but they don't all have the same length, then the phrase "MEOW-NO" should be written instead. Finally, if all the routes have the same length, then the phrase "PURR-FECT" should be written on the first line, followed with two integers on the second line: the common length of such routes and their number modulo $10^9 + 7$.

Example

For the input:

```
5 6
1 2
2 3
3 1
1 4
4 5
5 1
```

the correct output is:

```
PURR-FECT
3 12
```

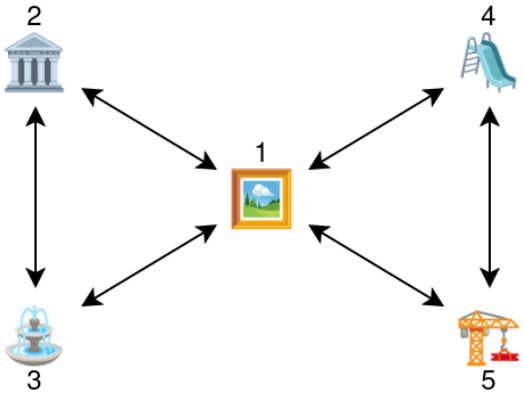

Figure 1: Simple park with routes that Dexter likes.

There are 12 routes that Dexter prefers, all of which have length 3. These are: 1-2-3-1, 1-3-2-1, 2-1-3-2, 2-3-1-2, 3-1-2-3, 3-2-1-3, 1-4-5-1, 1-5-4-1, 4-1-5-4, 4-5-1-4, 5-1-4-5, 5-4-1-5.

while for the input:

```
12 14
1 2
2 4
3 1
4 3
4 5
5 6
6 7
7 8
8 4
7 9
9 12
12 11
11 10
10 6
```

the correct output is:

```
MEOW-NO
```

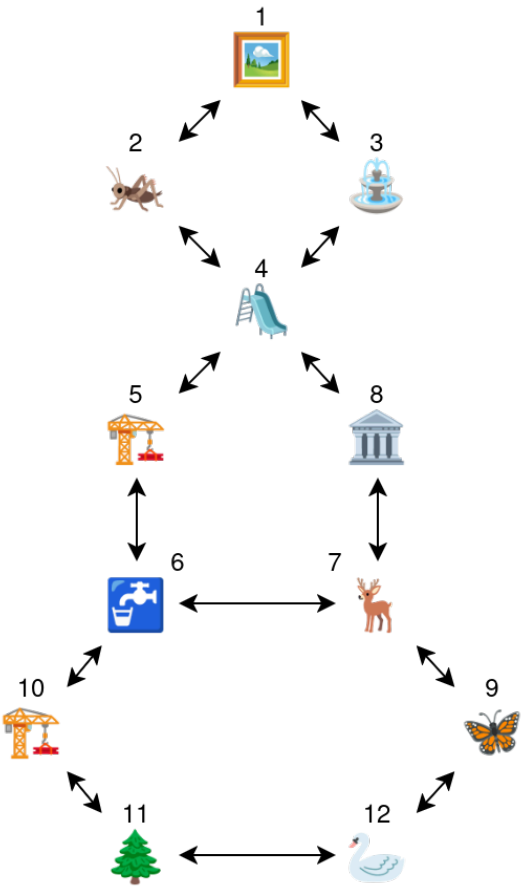

Figure 2: More complex park with some paths Dexter doesn't particularly like.

Additional examples

The following initial tests are also available:

- `0c` – $n = 500$, ordinary park, that Dexter doesn't particularly like, so `MEOW-NO`;
- `0d` – $n = 500000$, all spots lie along a chain path; the answer, clearly, is `FUR-LORN`;
- `0e` – $n = 299998$, ordinary big park that Dexter likes;

Limits

Your solution will be evaluated on a number of hidden test cases divided into groups. Points for a group are awarded if and only if the submission returns the correct answer for each of the tests in the group within the allotted time limit. These groups are organised into subtasks with the following limits and points awarded.

In all tests $n \geq 1$, $m \geq 0$.

Subtask	Limits	Points
1.	$n \leq 18$	2
2.	$n, m \leq 2000$	4
3.	$n \leq 500000$, $m \leq 1000000$	4