K – Routing K-Codes

Memory limit: 1024 MB
Time limit: 1 s

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In the internal network of the Bajtex company, there are n routers numbered from 1 to n. Some pairs of routers are connected by bidirectional links. Each link connects two different routers, and there is at most one direct link between any two routers. Every two routers are connected by a sequence of links in at least one way.

The system administrator is deploying a new algorithm for packet routing. This requires assigning a unique 32-bit routing code $K(a)$ to each router a ($0 \leq K(a) < 2^{32}$, $K(a) \neq K(b)$ for $a \neq b$). If two routers are connected by a direct link, one of these codes should be half of the other, rounded down. In other words, if routers a and b are connected by a link then:

$$K(a) = \left\lfloor \frac{K(b)}{2} \right\rfloor \qquad \text{or} \qquad K(b) = \left\lfloor \frac{K(a)}{2} \right\rfloor$$

Check if it is possible to assign routing codes according to these requirements. If it is possible, calculate the minimum possible sum of these codes, $\sum_{i=1}^{n} K(i)$.

Input

The first line of the input contains two integers, n and m ($1 \leq n \leq 200\,000$, $n - 1 \leq m \leq 200\,000$), representing the number of routers and the number of links.

The next m lines describe the links. In the i-th of these lines there are two integers, a_i and b_i ($1 \leq a_i, b_i \leq n$, $a_i \neq b_i$), describing a link between routers a_i and b_i. Each link appears in the input at most once (if $i \neq j$ then $(a_i, b_i) \neq (a_j, b_j)$ and $(a_i, b_i) \neq (b_j, a_j)$).

Output

If it is possible to assign unique routing codes correctly, the output should contain a single integer: the minimum possible sum of the codes $\sum_{i=1}^{n} K(i)$. If it is not possible, the output should consist of only the word `NIE`.

Example

For the input data:

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

the correct output is:

```
6
```

For the input data:

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

the correct output is:

```
NIE
```

Explanation of the examples:

In the first example, the routers can be assigned codes respectively: 1, 0, 2, 3, which sum up to 6.

In the second example it is not possible to assign codes.