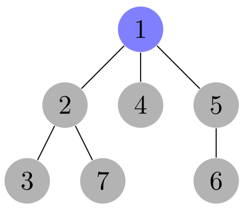
DFS Order 4

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Little Cyan Fish, also known as Qingyu Xiao, loves the concept of DFS order. Today, he has a rooted tree T with n vertices labeled from 1 to n. The root of the tree is vertex 1, and the parent of vertex i ($2 \le i \le n$) is vertex f_i ($1 \le f_i < i$).

A DFS order $D = (D_1, D_2, \cdots, D_n)$ represents the sequence of nodes visited during a depth-first search of the tree. A vertex appearing at the j-th position in this order (where $1 \le j \le n$) indicates that it is visited after $j-1$ other vertices. During the depth-first search, if a vertex has multiple children, they are visited in **ascending order** of their indices. Thus, in this problem, each rooted tree has a **unique** DFS order.



A tree with 7 vertices. The DFS Order of the tree is $[1, 2, 3, 7, 4, 5, 6]$.

The following pseudocode describes a way to generate the DFS order given a rooted tree T. T is uniquely represented by the array $f = \{f_2, \ldots, f_n\}$. The function GENERATE() returns the DFS order starting at the root vertex 1:

Algorithm 1 An implementation of the depth-first search algorithm

```
procedure DFS(vertex x)
    Append x to the end of dfs_order
    for each child y of x do          ▷ Children are iterated in ascending order of index.
        DFS(y)
    end for
end procedure
procedure GENERATE()
    Let dfs_order be a global variable
    dfs_order ← empty list
    DFS(1)
    return dfs_order
end procedure
```

Let D be the array returned by GENERATE(). There are $(n-1)!$ different possible configurations for the array f, each representing a distinct tree T. Little Cyan Fish wonders: for all these $(n-1)!$ configurations of f, how many distinct DFS orders D can be generated? We consider two DFS orders D and D' to be different if and only if there exists an index $1 \le i \le n$ such that $D_i \ne D'_i$. Given that the number can be very large, your task is to compute this number modulo a given prime integer P.

Input

The first line of the input contains two integers n and P ($1 \le n \le 800$, $10^8 \le P \le 1.01 \times 10^9$).

It is guaranteed that P is a prime number.

Output

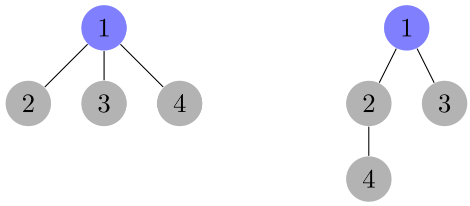
Output a single line containing a single integer, indicating the answer.

Examples

standard input	standard output
4 114514199	2
10 998244353	11033
100 1000000007	270904395

Note

In the first example, there are two distinct DFS orders: $D_1 = [1, 2, 3, 4]$ and $D_2 = [1, 2, 4, 3]$, which can be obtained by $T_1 : f_2 = 1, f_3 = 1, f_4 = 1$ and $T_2 : f_2 = 1, f_3 = 1, f_4 = 2$, respectively.



T_1 T_2