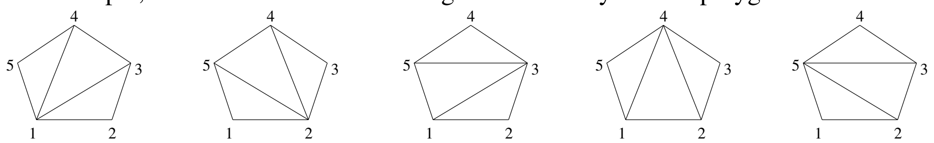
Task: TRI
Triangulations

Stage CPSPC 2007. Day third. Source file `tri.*` *14.06.2007*

Available memory: 32 MB.

A triangulation of a n-vertex convex polygon is a way of partitioning the polygon into triangles using some of its diagonals (in a convex polygon each angle is smaller than 180^o). No two of the chosen diagonals can intersect at any point different than any of the polygon's vertices. Two triangulations of a given polygon are considered different if the sets of the diagonals that they include are different (we assume that the vertices are numbered from 1 to n).

For example, there are five different triangulations of any convex polygon with 5 vertices:



Let us denote by T_n the number of triangulations of any n-vertex polygon. Your task is to count $T_3 + T_4 + \ldots + T_n$.

Task

Write a program which:

- reads two integers n and m from the standard input,
- counts the remainder of division of $T_3 + \ldots + T_n$ by m,
- writes the result to the standard output.

Input

The first and only line of input contains two integers n and m ($3 \leq n \leq 100\,000$, $2 \leq m \leq 10^9$), separated by a single space.

Output

The first and only line of output should contain one integer — $T_3 + \ldots + T_n$ modulo m.

Example

For the input data:

```
5 1000
```

the correct result is:

```
8
```

$T_3 = 1$ (no diagonals needed for a triangle), $T_4 = 2$ and $T_5 = 5$ (see picture above).