Problem A. Ascent Sequences

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

Consider a sequence $\langle a_1, a_2, \ldots, a_n \rangle$ of non-negative integers. An *ascent* in the sequence is a pair of adjacent elements such that the element with greater index has greater value. For example, there are two ascents in sequence $\langle 0, 2, 3, 1, 0 \rangle$: $a_1 = 0$ to $a_2 = 2$, and $a_2 = 2$ to $a_3 = 3$. Let us denote the number of ascents among the first k elements of the sequence by A_k. In the given example, $A_1 = 0$, $A_2 = 1$, $A_3 = 2$, $A_4 = 2$ and $A_5 = 2$.

Sequence a is called an *ascent sequence* if $a_1 = 0$ and for every $i \geq 2$ inequality $a_i \leq A_{i-1} + 1$ is satisfied. For example, sequence $\langle 0, 2, 3, 1, 0 \rangle$ is not an ascent sequence because $a_2 = 2$ and $A_1 = 0$. Sequence $\langle 0, 1, 0, 2, 3 \rangle$ is, in turn, an ascent sequence because $A_1 = 0$, $A_2 = 1$, $A_3 = 1$, $A_4 = 2$.

Sequence $\langle a_1, a_2, \ldots, a_n \rangle$ of non-negative integers *avoids pattern 201* if there are no i, j and k such that $i < j < k$ and $a_j < a_k < a_i$. For example, sequence $\langle 0, 1, 0, 2, 3 \rangle$ avoids pattern 201, while $\langle 0, 1, 2, 3, 1, 0, 2 \rangle$ does not avoid pattern 201 because for $i = 4$, $j = 6$, $k = 7$ we have $a_j = 0 < a_k = 2 < a_i = 3$.

You are given two integers n and p. Find the number of ascent sequences of length n avoiding pattern 201, and output this number modulo p.

Input

The only line of the input contains two integers n and p ($1 \leq n \leq 500$; $2 \leq p \leq 10^9 + 123$; p is a prime).

Output

Output a single integer — the number of ascent sequences of length n avoiding pattern 201, modulo p.

Examples

standard input	standard output
3 23	5
5 239	52

Note

In the first example test case, there are five ascent sequences of length 3 avoiding pattern 201: $\langle 0, 0, 0 \rangle$, $\langle 0, 0, 1 \rangle$, $\langle 0, 1, 0 \rangle$, $\langle 0, 1, 1 \rangle$, $\langle 0, 1, 2 \rangle$.

In the second example test case, there are 53 ascent sequences of length 5 and all of them except $\langle 0, 1, 2, 0, 1 \rangle$ avoid pattern 201.