Problem H. Random Walk

Input file:	*standard input*
Output file:	*standard output*
Time limit:	3.5 seconds
Memory limit:	512 mebibytes

There is an infinitely large 2-dimensional square grid. The coordinates on this grid are represented by a pair of integers (i, j).

Snuke wants to do a random walk. He starts from $(0, 0)$ and makes N steps. When he is at (i, j), his position after the next step will be one of $(i-1, j)$, $(i, j-1)$, $(i, j+1)$, and $(i+1, j)$. Each of these possibilities will happen with probability $\frac{1}{4}$.

Let E be the expected number of visited cells during the random walk. Compute the value $E \times 4^N$ modulo M (this value is guaranteed to be an integer). Note that $(0, 0)$ is always considered visited.

Input

Input consists of two integers N and M ($1 \leq N \leq 5000$, $10^9 \leq M \leq 2 \times 10^9$).

Output

Print the answer in a single line.

Examples

standard input	standard output
2 1000000007	44
2015 2000000000	1892319232