Problem A

Let G be the $3 \times n$ cylindrical grid, i.e., the graph with vertex set $\{(x, y) : x \in \{1, \ldots, n\}, y \in \{1, 2, 3\}\}$, where distinct vertices (x_1, y_1) and (x_2, y_2) are adjacent iff $x_1 = x_2$ and $|y_1 - y_2| = 1$, or $y_1 = y_2$ and either $|x_1 - x_2| = 1$ or $\{x_1, x_2\} = \{1, n\}$. Compute the number of proper k-colorings of G.

Input and output

The input consists of a single line containing two integers n and k ($3 \le n \le 10^{18}$, $3 \le k \le 1000$). Output a single integer, the number of proper k-colorings of the cylindical $3 \times n$ grid, modulo $10^9 + 7$.

Example

Input:

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5 5
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Output:

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132115320
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