Savings

Time Limit: 1.0s   Memory Limit: 256M

Sylva and Müko have a $N \times M$ chessboard which they use as a piggy bank. Rows are numbered from 0 to $N - 1$ and columns -- from 0 to $M - 1$. Sylva uses white cells for his savings while Müko uses black ones (the cell at row 0 and column 0 is white). Currently the cell at row $r$ and column $c$ contain $r \text{ xor } c$ coins. Here $\text{xor}$ is a bitwise exclusive or operation.

Because of coronavirus in order to make a living the guys have to take $K$ coins out of each board cell (if a cell contains less than $K$ coins they take everything from it). Then they need to calculate a savings balance which is a difference between the number of Sylva's coins and the number of Müko's coins. Your task is to help them to find the balance value modulo $1000000007$ ($10^9 + 7$).

Input

The only line contains three integers $N$, $M$, and $K$.

- $1 \leq N, M \leq 10^{18}$,
- $0 \leq K \leq 10^{18}$.

Output

The savings balance modulo $1000000007$.

Examples

Input 1:

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5 3 3
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Output 1:

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2
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