A xor B plus C

Input file:	`standard input`
Output file:	`standard output`
Time limit:	8 seconds
Memory limit:	1024 megabytes

You are given non-negative integers A, B, and C. Define a sequence of non-negative integers $X = (X_1, X_2, \dots)$ as follows:

- $X_1 = A$
- $X_2 = B$
- $X_{i+2} = (X_i \oplus X_{i+1}) + C \quad (i = 1, 2, \dots)$

Here, $\oplus$ represents the bitwise XOR operation.

You are also given a positive integer N. Calculate X_N mod 998244353.

Input

A B C N

- All input values are integers.
- $0 \leq A, B, C < 2^{20}$
- $1 \leq N \leq 10^{18}$

Output

Output X_N mod 998244353.

Examples

standard input	standard output
1 2 3 4	7
123 456 789 123456789	567982455
0 0 0 1000000000000000000	0

Note

In the first example, $X = (1, 2, 6, 7, \dots)$. Here, $X_4 = 7$ is the answer.