

Problem D. Nimber Sequence

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

Given are Nimbers $a_1, a_2, \dots, a_{K-1}$, $b_1, b_2, \dots, b_5$, and $c_1, c_2, \dots, c_5$.

Let $a_n = \left(\bigoplus_{i=1}^5 a_{n-i} \otimes b_i \right) \oplus \left(\bigoplus_{i=1}^5 a_{n-K+i} \otimes c_i \right)$ for all $n \geq K$.

Find the value of a_m .

Note

Nimbers are non-negative integers associated with Nim games. For the purposes of this problem, two operations are necessary:

- “ $\oplus$ ” is the Nim sum: $a \oplus b = \text{mex}(\{a' \oplus b \mid 0 \leq a' < a\} \cup \{a \oplus b' \mid 0 \leq b' < b\})$,
- “ $\otimes$ ” is the Nim product: $a \otimes b = \text{mex}(\{(a' \otimes b) \oplus (a \otimes b') \oplus (a' \otimes b') \mid 0 \leq a' < a, 0 \leq b' < b\})$.

Here, $\text{mex}(S)$ represents the smallest non-negative integer $d \notin S$.

Input

The first line of input contains two positive integers K and m ($6 \leq K \leq 10^5$, $1 \leq m \leq 10^{18}$).

The second line contains $K - 1$ non-negative integers $a_1, a_2, \dots, a_{K-1}$ ($0 \leq a_i < 2^{32}$).

The third line contains five non-negative integers $b_1, b_2, \dots, b_5$ ($0 \leq b_i < 2^{32}$).

The fourth line contains five non-negative integers $c_1, c_2, \dots, c_5$ ($0 \leq c_i < 2^{32}$).

Output

Output a single line with a single integer: the value of a_m .

Examples

standard input	standard output
6 10000000000000000000 1 2 3 4 5 1 0 0 0 0 0 0 0 0 0	5
6 10 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	9
11 123 849 674 223 677 243 657 979 583 643 845 979 282 313 567 433 122 443 132 554 132	32098