Problem K. Kth Query

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

MianKing has a sequence $a_{1...n}$ and he wants to answer Q queries about it.

Let $f(a, S, K)$ denote the K-th smallest number of sequence $b_{1...n}$ which satisfies that $\forall i \in [1, n], b_i = a_i \ xor \ S$.

Now for each query, give you L, R, K, you need to answer $Min_{S=L}^{R} f(a, S, K)$.

Input

The first line has two integers n, Q.

The second line has n integers which denote $a_{1...n}$.

Then there are Q lines, the i-th line has three integers L, R, K which represents the i-th query.

$1 \le n, Q \le 10^5$

$0 \le a_i < 2^{30}$

$0 \le L \le R < 2^{30}$

$1 \le K \le n$

Output

There are Q lines, the i-th line has one integer which denotes $Min_{S=L}^{R} f(a, S, K)$.

Examples

standard input	standard output
3 3 1 2 3 0 4 1 0 4 2 0 4 3	0 1 2
5 4 0 1 2 3 4 2 3 4 4 5 1 2 2 3 1 4 5	3 0 2 5