Xorry Queries

Robin has an array $a = [a_1, a_2, \ldots, a_n]$ consisting of nonnegative integers. He wants to process m queries. There are two types of queries:

- $1\ i\ x$. Replace a_i with $a_i \oplus x$. Here, $\oplus$ represents the bitwise XOR operation.
- $2\ l\ r$. Find the sum

$$\sum_{i=l}^{r} P(i) = P(l) + P(l+1) + \ldots + P(r).$$

Here, we define $P(i)$ as follows:

$$P(i) = \begin{cases} a_i \oplus a_{i+1} \oplus \ldots \oplus a_{i+p-1} & \text{if } i+p-1 \leq n \\ 0 & \text{otherwise} \end{cases}$$

Complete the functions `xorQueries` which takes in an integer array a and two integers m and p, and processes m queries, returning the answers to all type-2 queries as an array. You need to take the query information from the standard input, as described in the input format section below.

Input Format

The first line contains three space-separated integers n, m and p.

The second line contains n space-separated integers $a_1, a_2, \ldots, a_n$.

The following m lines describe the queries. The i^{th} line describes the i^{th} query in the format described in the problem statement, i.e., either $1\ i\ x$ or $2\ l\ r$.

Constraints

- $1 \leq n, m \leq 10^5$
- $1 \leq p \leq n$
- $0 \leq a_i, x \leq 10^5$
- $1 \leq i \leq n$
- $1 \leq l \leq r \leq n$

Output Format

For each type-2 query, print the answer for that query in a single line.

Sample Input 0

```
8 4 2
5 9 9 2 4 4 5 4
1 4 2
1 4 3
1 8 7
2 3 8
```

Sample Output 0

```
24
```

Explanation 0

The array is intially

$$a = [5, 9, 9, 2, 4, 4, 5, 4],$$

but after the first three queries, it becomes

$$a = [5, 9, 9, 3, 4, 4, 5, 3].$$

In the fourth query, we have $l = 3$ and $r = 8$. Note also that $p = 2$.

- $P(3) = 9 \oplus 3 = 10$.
- $P(4) = 3 \oplus 4 = 7$.
- $P(5) = 4 \oplus 4 = 0$.
- $P(6) = 4 \oplus 5 = 1$.
- $P(7) = 5 \oplus 3 = 6$.
- $P(8) = 0$.

Thus, the answer to the fourth query is $10 + 7 + 0 + 1 + 6 = 24$.