

## 7668 Harmonic Matrix Counter

Freda is an expert of matrix theory. One day, she planned to do research on some specific matrixes consisting of  $N$  rows and  $M$  columns of '0's and '1's. Firstly, she defined a function for such a matrix  $A$  and a pair of integers  $x, y$ :

$$VAL(A, x, y) = \begin{cases} A_{x,y} & \text{if } 1 \leq x \leq N, 1 \leq y \leq M \\ 0 & \text{otherwise.} \end{cases}$$

She called a matrix "harmonic", if and only if for any  $1 \leq x \leq N, 1 \leq y \leq M$ . ("⊕" means bitwise XOR):

$$VAL(A, x, y) \oplus VAL(A, x-1, y) \oplus VAL(A, x, y-1) \oplus VAL(A, x+1, y) \oplus VAL(A, x, y+1) = 0$$

Then she came up with  $Q$  queries. At each time, three integers  $k, x, y$  were given by Freda. Meanwhile, you were asked to tell her the digit at the  $x$ -th row and  $y$ -th column of the  $k$ -th smallest harmonic matrix in lexicographic order.

### Input

The input consists of multiple test cases. For each test case:

The first line contains three integers  $N, M, Q$  ( $1 \leq N, M, Q \leq 800$ ).

Each of the following  $Q$  lines contains three integers  $k, x, y$  ( $1 \leq k \leq 2^{800}, 1 \leq x \leq N, 1 \leq y \leq M$ ).

Two adjacent integers in a line are separated by a single space.

Totally,  $1 \leq \sum N, \sum M, \sum Q \leq 10000$ .

### Output

For each test case, output a string of length  $Q$  consisting of '0's and '1's. The  $i$ -th character should be the answer of the  $i$ -th query. Specially, for each query, if  $k$  is larger than the total number of harmonic matrixes under given conditions, output '?' instead.

### Sample Input

```
1 2 3
1 1 1
2 1 1
3 1 2
3 5 9
1 2 5
2 1 2
3 2 3
4 1 5
5 1 2
6 2 5
7 3 5
8 3 1
9 2 3
```

**Sample Output**

01?

00010110?