ICHB Selection Contest '17 Problem 3 - Parallel Universe

Time limit: 1.2s **Memory limit:** 64M

You are locked in a parallel universe and for you to be able to escape you have to answer Q queries on an array named v with N elements. The queries are as follows:

- `U x val` - Change the value of $v[x]$ to val.
- `Q x y val` - Print $val \ \& \ v[x] \ \& \ v[x+1] \ \& \cdots \& \ v[y]$. Here, $\&$ refers to bitwise AND.

Constraints

For all subtasks:

$1 \leq N, Q \leq 100\,000$

$0 \leq val \leq 2^{32} - 1$

$1 \leq x \leq y \leq N$

Subtask 1 [25%]

$1 \leq N, Q \leq 1\,000$

Subtask 2 [30%]

There will be at most $75\,000$ `Q` queries.

Subtask 3 [45%]

No additional constraints.

Input Specification

On the first line, you will find N and Q.
On the second line, you will find N numbers, where the i^{th} number is $v[i]$.
On the next Q lines, you will find the queries.

Output Specification

For each `Q` type query, print each result on a different line.

Sample Input

```
3 3
5 7 15
Q 1 3 7
U 1 0
Q 1 3 15
```

Sample Output

```
5
0
```