7727 Aninteresting game

Let's play a game.We add numbers 1,2,...,n in increasing order from 1 and put them into some sets.

When we add i, we must create a new set, and put into it. And meanwhile we have to bring $[i - lowbit(i) + 1, i - 1]$ from their original sets, and put them into the new set, too. When we put one integer into a set, it costs us one unit physical strength. But bringing integer from old set does not cost any physical strength.

After we add 1,2,...,n, we have q queries now. There are two different kinds of query:

- `1` L R: query the cost of strength after we add all of $[L, R]$ $(1 \le L \le R \le n)$
- `2` x: query the units of strength we cost for putting x $(1 \le x \le n)$ into some sets.

Input

There are several cases, process till end of the input.

For each case,the first line contains two integers n and q. Then q lines follow. Each line contains one query. The form of query has been shown above. $n \le 10^{18}$, $q \le 10^5$

Output

For each query, please output one line containing your answer for this query

Hint

- $lowbit(i) = i\&(-i)$. It means the size of the lowest nonzero bits in binary of i. For example, 610=1102, $lowbit(6) = 102 = 210$
- When we add 8, we should bring [1,7] and 8 into new set.
- When we add 9, we should bring [9,8] (empty) and 9 into new set.
- So the first answer is $8 + 1 = 9$.
- When we add 6 and 8, we should put 6 into new sets.
- So the second answer is 2.

Sample Input

```
10 2
1 8 9
2 6
```

Sample Output

```
9
2
```