Magical String

Problem Statement

Julia is trying to generate a magical string *S* consisting of only *'1'* and *'2'*. The string is magical because concatenating the number of contiguous occurrences of characters *'1'* and *'2'* generates the string *S* itself.

As the string contains an infinite amount of characters, it is not possible for *Julia* to generate the whole string. She managed to generate the first few characters only:

- $S = 122112122122112112 \ldots\ldots$
- The number of contiguous occurrences:

$$\underbrace{1}_{1}\ \underbrace{2\,2}_{2}\ \underbrace{1\,1}_{2}\ \underbrace{2}_{1}\ \underbrace{1}_{1}\ \underbrace{2\,2}_{2}\ \underbrace{1}_{1}\ \underbrace{2\,2}_{2}\ \underbrace{1\,1}_{2}\ \underbrace{2}_{1}\ \underbrace{1\,1}_{2} \ldots\ldots$$

- Concatenating the occurrences produces $12211212212 \ldots\ldots$ and this is the string *S* itself.

Julia knows that you can generate the magical string *S*, so she wants you to answer *two* types of queries:

- $1\ N$: Count the number of occurrences of *'1'* between positions *1* and *N* inclusively.
- $2\ N$: Count the number of occurrences of *'2'* between positions *1* and *N* inclusively.

Input Format

First line of test case is *Q*: total number of queries. Each of the next *Q* lines constains two space separated integers *T* and *N* denoting the type of the query.

Constraints

- $1 \leq Q \leq 10^5$
- $T = 1\ or\ 2$
- $1 \leq N \leq 5 \times 10^6$

Output Format

Print the answer of each query in separate line.

Sample Input

```
4
1 6
2 4
1 4
2 6
```

Sample Output

```
3
2
2
3
```

Explanation

String $S = 122112122122112112 \ldots\ldots$

So, $S_1 = 1$, $S_2 = 2$, $S_3 = 2$, $S_4 = 1$, $S_5 = 1$ and $S_6 = 2$.

- *Query 1*: 1 6
  1 occurs at positions *{1, 4, 5}*. So, the answer is *3*.
- *Query 2*: 2 4
  2 occurs at positions *{2, 3}*. So, the answer is *2*.
- *Query 3*: 1 4
  1 occurs at positions *{1, 4}*. So, the answer is *2*.
- *Query 4*: 2 6
  2 occurs at positions *{2, 3, 6}*. So, the answer is *3*.