Problem C : Moderation in all things

Initially, we have an array of length 1 containing only the number 0. All natural numbers are listed in ascending order in the "reservation list" (the first number in the list is 1). The array undergoes q operations. The i^{th} operation, is one of the following:

- `Insert(p, x)`: Insert the first x numbers from the reservation list after the number p in the array, in ascending order. These numbers are removed from the reservation list.
- `Remove(p, x)`: Remove the next x numbers after number p in the array. These numbers are not returned to the reservation list.

You are given information about q operations, and you are asked to determine the number written in the middle of the array after each operation. If the length of the array after the i^{th} operation is n, you should find the $\lceil \frac{n}{2} \rceil^{\text{th}}$ element of the array. Note that the indexing of the array starts from 1.

Input

The first line contains an integer q ($1 \leqslant q \leqslant 5 \cdot 10^5$), which represents the number of operations. Each of the next q lines contains two integers: p_i ($1 \leqslant p_i \leqslant 2 \cdot 10^9$), and k_i ($1 \leqslant |k_i| \leqslant 2 \cdot 10^9$).

If $k_i = +x$, operation `Insert(`p_i`, x)` is executed. If $k_i = -x$, operation `Remove(`p_i`, x)` is executed. It is guaranteed that all operations are valid, and no impossible operation is performed on the array. Additionally, at most $2 \cdot 10^9$ numbers are moved from the reservation list into the array.

Output

Output q lines. In the i^{th} line, print the middle element of the array after performing the i^{th} operation.

Example

Standard Input	Standard Output
10 0 3 0 2 5 -2 4 1 0 -2 5 2 7 3 3 2 10 5 12 20	1 5 4 6 5 7 9 10 16 22