

All in One

Before you begin, you should try this problem! [AVL Tree](#)

This problem is simple. Initially, there is a list and it's empty. Then you are given four types of query.

1. Insert data to the list
2. Remove data from the list
3. Print an index (1-based) from a specified data after the list was sorted ascendingly
4. Print data from a specified index (1-based) after the list was sorted ascendingly

Input

Input contains several lines. Each line follows one of these formats.

1 n: Insert n ($0 \leq n \leq 2^{31} - 1$) to the list

2 n: Remove n from the list. If n was not found, do nothing

3 n: Print n 's index (1-based) after the list was sorted ascendingly

4 i: Print data on i -th index (1-based) after the list was sorted ascendingly ($0 \leq i \leq 2^{31} - 1$)

-1: End of input

Output

For each query 3, print n 's index in one line. If n was not found, just print -1

For each query 4, print data on i -th index in one line. If the index is not valid, just print -1

Example

Input:

3 20

-1

Output:

-1