Speakers

Mr. Panda is organising an event where he invites guest speakers to talk. Each speaker is invited to talk for **L** time units. This duration is fixed for all speakers. This means that if any speaker starts their speech at time **S,** the speech will end at time (**S + L – 1**). However, due to their busy schedules, each speaker can only come for a specific time period of **L** time units and some of these might clash since only 1 speaker can be talking at any time during the event. For example, if there is already a speaker who starts their speech at time **S**, then another invited speaker must either **end their speech before time S** or **start their speech from time S + L** onwards.

In order to make things easy for himself, Mr. Panda decides to schedule the speakers on a first come first serve basis. This means that when a speaker tells Mr. Panda their schedule, Mr. Panda will only allow the speaker to speak if their speech does not clash with that of any other speaker that is currently scheduled. Otherwise, he will simply reject the speaker.

Furthermore, some speakers might decide to pull out halfway. If this is done, Mr. Panda does not re-consider the speakers that he has rejected since this will look bad on him. In summary, Mr. Panda needs to implement a **Data Structure** that can support the following operations:

|  |  |
| --- | --- |
| **Operation** | **Description** |
| INSERT [S] | Attempt to insert a speech that starts at time **S** and ends at (**S + L – 1)**. If there is no other speech that clashes with speech, output **“Y”** on one line and add it to the schedule. Otherwise, output **“N”** on one line and ignore the operation. |
| REMOVE [S] | Attempt to remove a speech that starts at exactly time **S** and ends at (**S + L – 1)**. If such a speech exists, output **“Y”** and remove it from the schedule. Otherwise, output **“N”** on one line and ignore the operation. |

Lastly, Mr. Panda wants you to list the final schedule by listing all the start times of the speeches in **increasing** order. It is guaranteed that there is at least one speech in the schedule at the end of all the operations.

**Input**

The first line of input contains two integers **Q** an **L**. **Q** lines will follow, representing an operation each. The operations should be executed in order and the format would be as described in the table above. (See sample)

**Output**

For every **INSERT** and **REMOVE** operation, output **“Y”** or **“N”** according to the description.

At the end of all **Q** operations, output all the starts times of the speeches in the schedule in **increasing** order. Add a single space between two consecutive start times. **Do not print a space after the last start time.** Instead, remember to print an end-line character at the end of the output.

**Limits**

* 1 ≤ **Q** ≤ 200,000
* 1 ≤ **L** ≤ 1018
* All the start times will range from 1 to 1018 inclusive.
* Make sure to use the **‘long’** 64-bit data type to store the value of **L** and the start times.
* It is guaranteed that there is at least one speech in the schedule at the end of all the operations.

|  |  |
| --- | --- |
| Sample Input (**speakers1.in**) | Sample Output (**speakers1.out**) |
| 10 4  INSERT 5  INSERT 2  INSERT 8  INSERT 1  INSERT 9  REMOVE 2  REMOVE 9  INSERT 12  INSERT 10  REMOVE 5 | Y  N  N  Y  Y  N  Y  Y  N  Y  1 12 |

**Explanation**

|  |  |  |
| --- | --- | --- |
| **Operation** | **Result** | **Schedule** |
| INSERT 5 | Successfully adds [5, 8] | [5, 8] |
| INSERT 2 | [2, 5] clashes with [5, 8] | [5, 8] |
| INSERT 8 | [8, 11] clashes with [5, 8] | [5, 8] |
| INSERT 1 | Successfully adds [1, 4] | [1, 4], [5, 8] |
| INSERT 9 | Successfully adds [9, 12] | [1, 4], [5, 8], [9, 12] |
| REMOVE 2 | No such speech in schedule. | [1, 4], [5, 8], [9, 12] |
| REMOVE 9 | Successfully removes [9, 12] | [1, 4], [5, 8] |
| INSERT 12 | Successfully adds [12, 15] | [1, 4], [5, 8], [12, 15] |
| INSERT 10 | [10, 13] clashes with [12, 15] | [1, 4], [5, 8], [12, 15] |
| REMOVE 5 | Successfully removes [5, 8] | [1, 4], [12, 15] |