

Lies



There is a glitch in the matrix and the Oracle may not say the truth always. Deus ex machina's hand is seen in this. In this game, **Majority** exists but Neo must take into account Oracle's lies.

Neo is allowed to ask the same question, pick any 2 balls from a set of N balls and ask Oracle if they are the same or not. If they are of the same color, the Oracle answers **YES** and if they are not, Oracle answers **NO** but Oracle lies exactly L times in the game if played long enough.

Input Format

First line contains 5 single space separated characters/Integers.

1st is N which is the cardinality of the balls set.

2nd is 0 indicating that majority exists.

3rd is an integer L indicating the number of times Oracle might lie.

4th is the integer 2 indicating that the balls are of 2 colors only.

5th is an integer 1 indicating the oracle lies exactly L times

Second line is an integer D, D lines follow. Each line shows all your previous questions to Oracle. Each question is of the format

```
A B YES/NO
```

$0 \leq A, B$

Constraints

$N \in \{10, 20, 30, 40\}$

$k = 2$

$L \in \{1, 2, 3, 4\}$ lies for each of the testcases respectively.

A minimum of $(L + 1) * N/2$ queries must be asked to Oracle before Neo makes a guess.

Any guess of color before that would result in losing the game.

Output Format

Output 2 single spaced integers which serve as indices of the balls whose colors Oracle has to compare. When Neo is sure of the ball with the majority, output 1 integer which is the index of the ball whose color is the majority.

Sample Input

```
20 0 2 2 1
2
2 1 NO
3 4 NO
```

The 1st line says that there are 20 balls, majority exists, oracle lies exactly 2 times, and each ball has any of the 2 colors. 2nd says that two queries were asked to oracle. The 1st one was whether the balls indexed at 2 and 1 are of the same color or not and the Oracle's reply was a NO and the 2nd one was whether the balls indexed at 3 and 4 were of the same color or not and the Oracle's reply was a NO.

Sample Output

```
5 6
```

Neo wants to know whether the balls indexed at 5 and 6 are of the same color or not.

1

Neo answers that the ball indexed at 1 appears most in the set.

Task

Complete the function nextQuestion with takes in all the 5 integers, along with a 2-D array query where $\text{query}[i][j] = 1$ if a query

i j

is asked and the Oracle says YES. The same value is set to 0 if the oracle says 0.

Note:- $\text{query}[i][j] = \text{query}[j][i]$

and the values is set to -1 if no query is asked for i and j.

Scoring

If M queries were asked to Oracle, on correct answer

$M < (L + 1) * N/2$, score = 0

$M \geq (L + 1) * (N-1)$, score = 1

$(L + 1) * N/2 \leq M < (L + 1) * (N - 1)$, score = $((L + 1) * (N - 1) - M) / 12$

A minimum score of 1 is given for every correct submission.