Problem H. Hilarious Cooking

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

All laws of physics appearing in this problem statement are fictitious. Any resemblance to the real world is purely coincidental.

To discuss problem proposals and select a proper problemset for an upcoming competition jury team has gathered at a magnificent palace in Moscow suburbs (typically called *dacha*). Chief judge is now struggling to prepare a roast beef barbecue using a recipe he just found in the Internet.

According to recipe a roast beef should be cooked for exactly n seconds. The total amount of heat received by beef should be equal to T. Formally, if we denote the temperature inside the barbecue during the i-th second as t_i, the sum $t_1 + t_2 + \ldots + t_n$ should be equal to T. Moreover, there are m additional instructions, the i-th of them states that in order to achieve the perfect result the temperature inside the barbecue during the a_i-th second should be equal to b_i, i.e. t_{a_i} should be b_i.

However, the task is complicated by the fact that the barbecue that chief judge is using this time has some restrictions. First of all, the barbecue only allows t_i to take non-negative integer values. Second, t_i can't change too fast, i.e. the condition $|t_i - t_{i+1}| \le 1$ should be satisfied for all i from 1 to $n - 1$.

There are no other restrictions, in particular it is allowed to start and finish with any temperature, i.e. the values t_1 and t_n can be arbitrary non-negative integers, unless the opposite is directly specified in the recipe. Your goal is to help chief judge and determine whether his task is even possible, or he should look for another recipe.

Input

The first line of the input contains three integers T, n and m ($1 \le T \le 10^{18}$, $1 \le n \le 2 \cdot 10^9$, $1 \le m \le 100\,000$) — the total amount of heat that beef should receive, the exact number of seconds it should be cooked for, and the number of instructions in the recipe.

The next m lines contain the instructions in chronological order. The i-th instruction is defined by two integers a_i and b_i ($1 \le a_i \le n$, $0 \le b_i \le 10^9$) stating that the temperature inside the barbecue should be equal to b_i during the second a_i. It is guaranteed that $a_1 < a_2 < \ldots < a_m$.

Output

If there exists a sequence of non-negative $t_1, t_2, \ldots, t_n$ such that $\sum_{i=1}^{n} t_i = T$, $|t_i - t_{i+1}| \le 1$ for all $1 \le i \le n - 1$, and $t_{a_i} = b_i$ for all i from 1 to m, print "`Yes`" (without quotes) in the only line of the output. Otherwise, print "`No`" (without quotes).

Examples

standard input	standard output
3 3 1 2 1	Yes
10 3 1 1 1	No
13 5 2 2 2 4 2	Yes

Note

In the first sample, a possible solution is $t_1 = t_2 = t_3 = 1$. In the third sample, a possible solution is $t_1 = 3$, $t_2 = 2$, $t_3 = 3$, $t_4 = 2$, $t_5 = 3$.