Problem A

In advertising campaigns, several stores published statements such as "In our store, the bread will always be by at least x CZK cheaper than in the store i", or "In our store, the bread will always be by at most y CZK more expensive than in the store j", or "The cost of bread in our store will always be at most k CZK". These promises are binding and the stores cannot violate them. Moreover, the government has mandated that the bread always costs at most b CZK. You bought out all the stores and want to change the prices to be as high as possible. You know it is possible to set non-negative prices so that all the constraints are satisfied (since this was the case before you bought the stores).

Input and output

The first line of the input contains three integers n, m and b ($n \leq 10\,000$, $m \leq 100\,000$, $b \leq 10^9$), the number of stores, the number of campaign promises, and the upper bound on the cost of bread, respectively. Each of the m following lines contains a description of the campaign promise; either three integers i, j, x ($i, j \in \{1, \ldots, n\}$, $i \neq j$, $|x| \leq 10^9$) indicating that the cost of bread in the store i can be at most the cost in the store j plus x, or two integers i and k ($i \in \{1, \ldots, n\}$, $0 \leq k \leq 10^9$, indicating that the cost of bread in the store i can be at most k.

The output consists of n lines; the i-th one contains the maximum possible cost of bread in the store number i.

Example

Input:

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3 4 10
1 5
2 1 3
3 2 3
1 3 -4
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Output:

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5
8
10
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