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Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	1024 megabytes

In order to protect your physical and mental health, we strongly recommend you to skip this problem if you are not a experienced programmer! :o

—Writers of this problem

This is the hard version of *Problem A. stral Reflection*. In this version, w can be in $[1, 1e9]$, but we promise any operation of type 2 will be after any operation of type 1.

In event *Unreconciled Stars*, some meteorites fell on Teyvat and confused people's minds. In order to protect the people of Teyvat, Mona needs to clean up these meteorites.

Teyvat can be represented by a line $[1, n]$, and meteorites can be represented by some points in this line. For clearing meteorites, Mona can use some types of her talents. A talent can be represented by three integers l, r, w, which means Mona can spend w Power clearing all meteorites in $[l, r]$ by using this talent. At the beginning, Mona has no talent, but she will learn gradually.

Mona wants to spend as few Power as possible. For each wave of meteorite shower, Mona wants to know if she can clean up all the meteorites by using the talents she has mastered by then, and if yes, what the minimum possible Power it requires to clean all of them. More specifically, there will be two types of operation:

- `1 l r w`: Mona learns a new talent to clear all meteorites in $[l, r]$ with w Power.
- `2 k a_1 a_2 ... a_k`: There are k meteorites in point $a_1, a_2, \ldots, a_k$. Mona needs to calculate the minimum power she needs to spend to clear these k meteorites, or point out that some of meteorites are impossible to clear.

Note: Meteorites from the previous wave will be cleared automatically, no matter if Mona succeeds in clearing all of them or not.

Input

The first line contains two integers n, m $(1 \leq n, m \leq 10^5)$ — the size of Teyvat and the number of operations.

In the following m lines, each line will be in one of the following format as described in the statement:

- `1 l r w` ($1 \le l \le r \le n$, $1 \le w \le 10^9$)
- `2 k a_1 a_2 ... a_k` ($1 \le k \le n$, $1 \le a_1 < a_2 < \cdots < a_k \le n$)

All of input are integers.

It is guaranteed that the sum of k for all operations does not exceed 10^5.

Output

For each operation of type 2, output the minimum power Mona needs to spend to clear these meteorites. If some of meteorites are impossible to clear, output -1.

Example

standard input	standard output
10 10 1 1 10 15 1 2 3 5 1 2 5 6 1 3 7 8 1 5 6 1 1 6 9 3 1 7 10 5 2 4 1 2 4 5 2 4 4 5 6 8 2 5 3 6 7 8 10	15 9 11

Note

In the first example, operations are explained as follows:

- Firstly, Mona learns 7 talents:
  - Spend 15 Power clearing up all meteorites in $[1, 10]$
  - Spend 5 Power clearing up all meteorites in $[2, 3]$
  - Spend 6 Power clearing up all meteorites in $[2, 5]$
  - Spend 8 Power clearing up all meteorites in $[3, 7]$
  - Spend 1 Power clearing up all meteorites in $[5, 6]$
  - Spend 3 Power clearing up all meteorites in $[6, 9]$
  - Spend 5 Power clearing up all meteorites in $[7, 10]$
- Secondly, Mona needs to clean up 3 waves of meteorites:
  - In the first wave, there are meteorites in point $1, 2, 4, 5$. Mona spends 15 Power clearing up all meteorites in $[1, 10]$.
  - In the second wave, there are meteorites in point $4, 5, 6, 8$. Mona spends 6 Power clearing up all meteorites in $[2, 5]$, then spends 3 Power clearing up all meteorites in $[6, 9]$. She spends $6 + 3 = 9$ Power totally.
  - In the third wave, there are meteorites in point $3, 5, 6, 7, 10$. Mona spends 5 Power clearing up all meteorites in $[2, 3]$, then spends 1 Power clearing up all meteorites in $[5, 6]$, then spends 5 Power clearing up all meteorites in $[7, 10]$. She spends $5 + 1 + 5 = 11$ Power totally.