B Game of Galadriel

Time limit: 2s

Once upon a time, there was an enchanted forest known for its mystical properties. Deep within this forest laid a hidden treasure guarded by an ancient magical portal. The portal could only be unlocked by solving a series of mathematical riddles each involving a modulus operation, to achieve the value t. The operations were of the form $(a \cdot x + b) \,\%\, m$, where a and b were magical constants described in a hidden scroll, and m was a mysterious modulus number known only to the portal.

Galadriel, a brave adventurer, sets out on a quest to unlock the portal and retrieve the hidden treasure. She begins her journey at the edge of the forest, where she finds the starting remainder s and the ancient spirit of the forest who would help her to unlock the portal. The spirit of the forest would give her the hidden scroll and the modulus value of the portal m. However, each operation comes with a cost of energy that Galadriel has to spend. The scroll consists of n lines each with numbers a, b, the coefficient and additive value of the operation, and c, the energy used by the operation.

Galadriel knows she has to choose her path wisely, to transform the remainder s step by step. Her challenge is to reach the target remainder t with the smallest total cost, by applying the operations described in the scroll. The operations can be applied in any sequence, and each operation may be applied multiple times.

To plan her moves carefully, Galadriel needs to find out the smallest amount of energy she has to spend in order to reach the target, or determine if reaching the target is not possible at all. Help her to complete her quest.

Input

The input consists of:

- One line with four integers m, s, t and n ($1 \leq m \leq 10^5$, $0 \leq s, t \leq m-1$, $1 \leq n \leq 50$), the portal modulus value, starting remainder, target remainder and the number of modulo operations described in the scroll.
- n lines, each with three integer a, b and c ($0 \leq a, b < m$, $1 \leq c \leq 10^9$), describing the modulus operation and its consumed energy. Applying the operation transforms the current remainder x into the remainder $(a \cdot x + b) \,\%\, m$, at the cost of c units of energy.

Output

If it is not possibe to achieve remainder t from s by applying the operations in the scroll, output -1. Otherwise output the minimum amount of energy needed to succeed in the quest.

Sample Input 1	**Sample Output 1**
4 0 3 3 1 1 2 2 1 5 3 2 6	6