IOI Training Camp 2018 Final Test 2

Coin Denominations

You are given an integer C and an array $A = A_1, A_2, \ldots, A_N$ which has distinct positive integers. It is guaranteed that $A_i \leq C$ for $1 \leq i \leq N$. You have an infinite supply of coins of denomination A_i for $1 \leq i \leq N$. You have another array $W = W_1, W_2, \ldots, W_N$. This denotes that a single coin of denomination A_i has a weight of W_i.

You are given M queries: $Q_1, Q_2, \ldots, Q_M$. You need to get a collection of coins, such that their values add up to exactly Q_i (ie. sum of denominations), and the sum of their weights is minimized. Output this minimum weight, or say that it is impossible to get exactly a sum of Q_i. As the minimum weight could be huge, output it module $10^9 + 7$.

Input

The first line of the input contains three integers: N, C and M.
The i-th of the next N lines contains two numbers A_i and W_i, which have been described above.
The i-th of the next M lines contains a single integer: Q_i.

Output

M lines, each of which should contain a single integer. If it is possible to achieve the queried value, then your output should be the remainder when the minimum total weight is divided by $10^9 + 7$.
If it is not possible to achieve the exact value in the query, print -1. Note that we do not take modulo anything here.

General Constraints

Unless otherwise mentioned, the following constraints are met throughout all subtasks:

- $1 \leq N \leq C \leq 100$
- $1 \leq M \leq 10^6$
- $1 \leq A_i \leq C$
- $A_i \neq A_j$, if $i \neq j$
- $1 \leq W_i \leq 10^9$
- $1 \leq Q_i \leq 10^{18}$

Subtasks

Subtask 1 (12 Points):

- $1 \leq Q_i \leq 10^6$

Subtask 2 (88 Points):

- No further constraints.

Sample Input 1

```
3 100 2
2 50
8 1
3 40
9
7
```

Sample Output 1

```
120
140
```

Explanation

You can get a total value of 9 by taking three coins of denomination 3. Their total weight comes to $3 * 40 = 120$. You can check that you cannot do better than this.

You can get a total value of 7 by taking two coins of denomination 2 and one coin of denomination 3 ($2 * 2 + 3 = 7$). Their total weight comes to $2 * 50 + 40 = 140$. You can check that you cannot do better than this.

Limits

Time: 4 seconds

Memory: 128 MB