[D1] Blanc's Balls Ball (150 pts)

Time Limit: 1s
Memory Limit: 512MB

Problem Description

The Yellow King's sworn brother, His Highness Saint Francisco Ballin, is finally ascending to the throne of the Balls Kingdom! As the foremost Seeker in the land, Blanc Enyelu is tasked with an important mission: Go undercover and attend the coronation to monitor it for any suspicious activity.

Gaining entrance to the event is no small feat - Ballin is holding an exclusive gathering reserved only for the best of the best! The ball of balls, the Balls Ball! To enter the venue, all attendees are required to present a specific ball (the circular one) given with their invitation letter. Only one of these balls are needed and will serve as proof that they are qualified to Ballin. As the Balls Kingdom is famous for its round and varied balls, Blanc Enyelu was able to gather a list of all known balls in the kingdom (and how much money it costs to buy one of such ball). There are N such balls, each with a price of p_i in gold pieces.

To get his hands on one of these balls, Blanc Enyelu must act with utmost secrecy and purchase it from the black market. Unfortunately, these extravagant balls cost extravagant prices. To make things worse, the king's stingy treasurer Frescio P.G. Gottlieb has advised Blanc Enyelu to *assemble* the required ball from cheaper to save costs. With Blanc Enyelu's crafting experience, she can determine how many of various balls are needed to assemble another ball.

For example, if a red ball costs 1000 gold pieces but needs 3 green balls (each costing 50 gold pieces), and 2 blue balls (each costing 100 gold pieces) to make, then it is much more economical to just buy the green and blue balls then assemble the red ball. Note that this assembly can go even further down - if green/blue balls can also be assembled for cheaper, then it will also affect the total cost of the final red ball.

Given this, can you help Frescio and Blanc Enyelu to find the cheapest cost to acquire (by any combination crafting/buying from the market) the required ball by Ballin to attend the Balls Ball?

Input Specification

There is one test case per file.

The test file begins with three positive integers N (number of different balls), R (number of requirement criteria), and Q (queries).

N ball descriptions then follow, each in a single line. Each ball description i is composed of an alphanumeric string S_i and an integer C_i, which is the name of the i^{th} ball and its cost in gold pieces respectively.

R requirements then follow in one line each, as described below:
Each requirement k is represented as two alphanumeric strings Res_k, Req_k and integer M_k, all space-separated.

1. Res_k denotes the resulting ball (based on its name in the previous section)
2. Req_k denotes the requirement ball (based on its name in the previous section)
3. M_k denotes how many of the requirement ball is needed to assemble the resulting ball.

For example, `red green 3` means that we need 3 green balls to assemble a red ball. Note that the same resulting ball can appear across multiple requirements, this means that all requirement balls are needed to craft one of such resulting ball. Likewise, it is also possible that a ball cannot be assembled and can only be bought at market cost.

Finally, Q queries follow. Each query i consists of an alphanumeric string q_i denoting which of the N balls Ballin has selected to be the one needed to join the Balls Ball.

Output Specification

There is one line of output per query in the test file.

Output the cheapest cost to acquire (by any combination crafting/buying from the market) the ball q_i given the market costs C_i and its assembly requirements.

Constraints

$1 \leq N, Q \leq 10^4$
$1 \leq R \leq 10^5$
$1 \leq C_i, M_k \leq 10^9$
Length of S_i, Res_k, Req_k, q_i is at least 1 and at most 10 and are all composed of alphanumeric characters.
Res_k, Req_k, q_i are valid ball names (an S_i exists that will match them)
Res_k will never be the same as Req_k per requirement (i.e. it will never require itself)
Crafting a ball will not require a ball of the same type, whether directly or indirectly.

Sample Input

```
3 2 1
red 1000
blue 100
green 50
red blue 2
red green 3
red
```

Sample Output

```
350
```