Problem D
Discovering Secrets in Islands

Time limit: 3 seconds

Memory limit: 1024 megabytes

Problem Description

Two villages are connected together by a two-way road. In an environment, there are many villages. A traveler starts from a village (source) and moves to a predefined village (destination). To do so, the traveler moves along the roads to visit villages until the traveler reaches the destination. The traveler can find some moon stones at a village. Each road has a travel cost. Determine a path for the traveler so that the traveler takes the lowest cost. If there are two paths with the same cost, the one with the highest amount of moon stones is selected. The total influence cost of a village, v, is the sum of the cost of all the villages in the k-neighborhood of village v. The k-neighborhood of village v does not include the village v itself. For two different villages u and v, village u is a member of the k-neighborhood of village v *iff* there are at most k roads that are visited for moving from village v to village u.

The travel cost from one village v_s to an adjacent village v_a via road r is computed as:

$$\text{Travel cost} = c_t(v_s) + c_r$$

where road r connects villages v_s and v_a, $c_t(v_s)$ is the total influence cost of v_s, and c_r is the cost of the road.

The villages have unique names. A name is formed by four letters in lowercase.

Input Format

The first line contains three numbers, N, M, and k, where N is the total number of villages, M is the total number of roads, and k is the value used for defining the neighborhood of villages. The second line contains the source village name and the destination village name. Then there are N set of village records. Each village record contains: the village name, the number of moon stones of the village, and the influence cost. Then there are M road records. Each road record contains two village names and the road cost.

Output Format

For each problem instance, output the lowest cost and the maximum moon stones.

Technical Specification

- $1 \le N \le 10000$
- $1 \le M \le 10000$
- $0 \le k \le 5$
- $1 \le c \le 99$, where c is the cost of a road
- $1 \le m \le 8$, where m is the number of moonstones at a village
- $1 \le f \le 5$, where f is the influence cost of a village

Sample Input 1

```
6 4 0
nagi nage
nagi 5 1
nagf 7 2
nagh 2 2
nagd 6 5
nagg 5 2
nage 2 5
nagh nagd 96
nagi nagh 25
nagh nagg 49
nagd nage 3
```

Sample Output 1

```
124 15
```

Sample Input 2

```
4 2 1
akko akkm
akko 2 5
akkp 8 2
akkn 1 1
akkm 6 3
akkn akkm 20
akko akkn 3
```

Sample Output 2

```
32 9
```

Sample Input 3

```
6 5 2
gaam gaak
gaak 2 1
gaan 2 3
gaaj 1 2
gaao 5 5
gaal 1 2
gaam 1 3
gaan gaaj 96
gaao gaal 25
gaak gaao 95
gaan gaal 37
gaaj gaam 89
```

Sample Output 3

```
384 12
```