Space travel

Zaphod Beeblebrox is celebrating his 47-th birthday... again. He invited K of his friends to the party.

There are N planets in the galaxy where the party will take place. No two of Zaphod's friends live on the same planet, and none of them lives on the planet where the party is.

Some pairs of planets are connected by bidirectional intragalactic highways. For each highway we know its endpoints and its length in light years.

Each of Zaphod's friends has his own personal spaceship. Each spaceship has some fixed speed in light years per second.

In addition to the highways, there is one other way of travel: teleporters. There are several companies that provide teleporation services. Each company serves a set of planets, and the sets of planets served by different companies are disjoint.

At any point during the travel, Zaphod's friends may use the teleporters to transport their spaceships instantaneously between any two planets that are served by the same company.

You may assume that the spaceships' navigation systems pick the fastest paths to reach the party. For each of Zaphod's friends compute the time it will take him to reach the party, and output the sum of these times.

Input

The first line of the input contains three integers: N, M, and K ($1 \leq N \leq 50000, 1 \leq M \leq 200000, 1 \leq K < N$). Here, N is the number of planets in the universe, M the number of highways and K the number of Zaphod's friends. Planets are numbered from 1 to N in such a way that the friends live on planets 1 to K, and the party takes place on planet N.

The next line contains a string with exactly N characters. The i-th character in this string specifies the teleporter company that serves the i-th planet. Each company is identified by some lowercase letter. A planet that is not serviced by any company is denoted by the character #.

Each of the following M lines contains three integers x, y, d ($1 \leq x, y \leq N, 1 \leq d \leq 2^{30}$) that describe one highway: the planets x and y are connected by a highway of length d.

K lines follow, the i-th of them contains a single integer s_i ($1 \leq s_i \leq 100$) – the speed of the spaceship of the friend that lives on planet i.

You may assume that it is always possible to travel between any two planets (using a suitable combination of highways and teleports).

Output

Output a single line with a single real number – the total travel time of Zaphod's friends.

Your answer will be considered correct if it has an absolute or relative error at most 10^{-7}.

Example

vstup	výstup
4 3 2	2.91666666667

```
4 3 2
#aa#
1 3 7
2 4 2
3 4 5
4
3
```

2.91666666667

The first friend takes the highway from planet #1 to #3, teleports to #2 and then takes the highway to #4, which will take him 9/4=2.25 seconds. The second friend takes just the highway from #2 to #4, which will take him 2/3=0.66666667 seconds. The total travel time is 2.25 + 0.66666667 = 2.91666667.