C. LionAge II

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya plays the LionAge II. He was bored of playing with a stupid computer, so he installed this popular MMORPG, to fight with his friends. Vasya came up with the name of his character — non-empty string s, consisting of a lowercase Latin letters. However, in order not to put up a front of friends, Vasya has decided to change no more than k letters of the character name so that the new name sounded as good as possible. Euphony of the line is defined as follows: for each pair of adjacent letters x and y (x immediately precedes y) the bonus $c(x, y)$ is added to the result. Your task is to determine what the greatest Euphony can be obtained by changing at most k letters in the name of the Vasya's character.

Input

The first line contains character's name s and an integer number k ($0 \le k \le 100$). The length of the nonempty string s does not exceed 100. The second line contains an integer number n ($0 \le n \le 676$) — amount of pairs of letters, giving bonus to the euphony. The next n lines contain description of these pairs «$x\ y\ c$», which means that sequence xy gives bonus c (x, y — lowercase Latin letters, $-1000 \le c \le 1000$). It is guaranteed that no pair $x\ y$ mentioned twice in the input data.

Output

Output the only number — maximum possible euphony of the new character's name.

Examples

input
winner 4 4 s e 7 o s 8 l o 13 o o 8
output
36

input
abcdef 1 5 a b -10 b c 5 c d 5 d e 5 e f 5
output
20

Note

In the first example the most euphony name will be $looser$. It is easy to calculate that its euphony is 36.