# Roman Numerals

| | |
|---|---|
| Input file: | *standard input* |
| Output file: | *standard output* |
| Time limit: | 2 seconds |
| Memory limit: | 1024 mebibytes |

Consider the following generalization of Roman numerals. There are $n$ digits in total, and each digit has its own *priority* and *value*. In this problem, we will denote the numerals by strings of lowercase and uppercase English letters. Let us denote the priority, value, and string representation of the $i$-th Roman numeral by $p_i$, $v_i$, and $d_i$, respectively.

A *number* in Roman numerals is an array consisting of Roman numerals. The *value* of a number $d_1 \dots d_m$ is calculated recursively. First, choose a position $i$ such that the digit $d_i$ has the highest priority. In case there are multiple digits with the highest priority, choose one of them with the lowest position $i$. Then

$$\text{value}(d_1 \dots d_m) = v_i - \text{value}(d_1 \dots d_{i-1}) + \text{value}(d_{i+1} \dots d_m),$$

where $v_i$ is the value of $d_i$. The value of an empty number is conventionally set to zero.

For example, consider the following triples $(p_i, v_i, d_i)$: $(1, 1, \texttt{I})$, $(2, 5, \texttt{V})$, and $(3, 10, \texttt{X})$. They assign the usual values to the usual Roman numerals: for example, value(`II`) $= 2$, value(`IX`) $= 9$, and value(`XIV`) $= 14$. On the other hand, the representation now is not unique: value(`IXI`) $=$ value(`IIIIIXV`) $=$ value(`X`) $= 10$.

You are given an array $s_1 \dots s_n$ of Roman numerals and $q$ independent queries of the form $(\ell, r)$. For each query, calculate the value of the subarray $s_\ell \dots s_r$.

## Input

The first line contains three integers $m$, $n$, and $q$ ($1 \le m \le 10^5$, $1 \le n, q \le 3 \cdot 10^5$): the number of Roman numerals, the length of the given array, and the number of queries.

Then follow $m$ lines. The $i$-th of them contains two integers, $p_i$ and $v_i$ ($1 \le p_i \le m$, $1 \le v_i \le 10^9$), followed by a string $d_i$ of lowercase and uppercase English letters ($1 \le |d_i| \le 7$). These are the priority, value, and string representation of the $i$-th Roman numeral, respectively. All $d_i$ are distinct.

The next line contains $n$ space-separated representations of Roman numerals $s_1 \dots s_n$.

Then follow $q$ lines, each of them containing two integers $\ell$ and $r$ ($1 \le \ell \le r \le n$).

## Output

For each query, output a line with a single integer: the value of the number $s_\ell \dots s_r$.

## Examples

| *standard input* | *standard output* |
|---|---|
| 3 5 3<br>1 1 I<br>2 5 V<br>3 10 X<br>I X I V X<br>1 2<br>1 3<br>3 5 | 9<br>10<br>6 |
| 3 6 1<br>1 6 six<br>1 16 sixteen<br>1 60 sixty<br>six sixty six sixteen six sixteen<br>1 6 | 110 |