

Problem C

Weighted Substring Queries

Time limit: 1 second
Memory limit: 256 megabytes

You are given N distinct strings. The i -th string is s_i and has weight c_i . You are also given a text string T .

For each query $[L, R]$ (1-indexed, inclusive), consider the substring

$$\text{st} = T[L] T[L + 1] \dots T[R].$$

Define the *value* of the substring st as

$$\text{val}(L, R) = \sum_{i=1}^N c_i \cdot k_i,$$

where k_i is the number of (possibly overlapping) occurrences of s_i as a **contiguous** substring of st . For every query, output $\text{val}(L, R)$.

Input

The first line contains two integers N and Q ($1 \leq N, Q \leq 10^5$).

Each of the next N lines contains a string s_i and an integer c_i ($1 \leq c_i \leq 10^9$). All s_i are pairwise distinct.

The next line contains the text string T .

Each of the last Q lines contains two integers L and R denoting a query.

Additional guarantees:

- The total length of all input strings (all s_i plus T) does not exceed 10^5 .
- The total number of occurrences of all s_i inside T is at most 10^5 .

Output

Print Q lines. The j -th line contains a single integer — the answer to the j -th query.

Sample Input	Sample Output
6 3	17
she 3	6
he 2	6
her 5	
sh 1	
er 4	
us 2	
ushersheher	
1 5	
2 4	
6 8	

Note

For the first query $[1, 5]$, the substring is `usher`. Occurrences inside `usher`:

- `she` occurs 1 time: contributes 3
- `he` occurs 1 time: contributes 2
- `her` occurs 1 time: contributes 5
- `sh` occurs 1 time: contributes 1
- `er` occurs 1 time: contributes 4
- `us` occurs 1 time: contributes 2

Total: $3 + 2 + 5 + 1 + 4 + 2 = 17$.