the-first-problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

For a string A, let $pref(A, i)$ denote the prefix of A of length i.

For strings A, B, let $occur(A, B)$ denote the number of occurrences of A in B.

Define:

$$score(A, B) = \sum_{i=1}^{len(A)} \sum_{j=1}^{len(B)} occur(pref(A, i), pref(B, j))$$

That is, the sum over every prefix of A of its number of occurrences in every prefix of B.

You are given a text string T.

There are q queries, each given by a_i pattern strings $S_1, S_2, \cdots, S_{a_i}$ and an integer b_i.

For each query, find the minimum x such that:

$$\sum_{j=1}^{a_i} score(S_j, pref(T, x)) \geq b_i$$

If no such x exists, output -1.

Input

The first line contains the text string $\mathbf{T}$ ($1 \leq |T| \leq 2 \times 10^5$, where $|T|$ denotes the length of T).

The second line contains a single integer $\mathbf{q}$ ($1 \leq q \leq 2 \times 10^5$).

For each query, the first line contains two integers $\mathbf{a_i}, \mathbf{b_i}$ ($1 \leq a_i \leq 2 \times 10^5$, $1 \leq b_i \leq 10^{18}$). The following $\mathbf{a_i}$ lines each contain a pattern string $\mathbf{S_1}, \mathbf{S_2}, \cdots, \mathbf{S_{a_i}}$ in order.

$\sum |S| \leq 2 \times 10^5$, where $\sum |S|$ is the total length of all pattern strings across all queries in one test case.

All strings consist of lowercase English letters.

Output

Output q lines, the answer to each query in order.

Example

standard input	standard output
abac 3 1 5 aba 2 10 a ac 1 1 x	3 4 -1