

Just Another String Problem

Input file: **standard input**
Output file: **standard output**
Time limit: **2 seconds**
Memory limit: **256 megabytes**

You are given a string s of length n consisting of lowercase English letters and a non-decreasing array $\{v_1, v_2, \dots, v_n\}$.

A set T of non-empty strings is called good if and only if:

- There does not exist a pair of strings in T such that one is a suffix of the other. Here, string A is said to be a suffix of string B if A can be obtained by deleting some letters (possibly, none) in B in the beginning.

For a good set T , denote the value of T as $\sum_{t \in T} v_{|t|}$, where $|t|$ is the length of string t .

For a string t and some positive integer k , define $f(t, k)$ as the maximum value among all good sets T that satisfies the following conditions:

- $|T| \leq k$;
- T only contains substrings of t . Here, string A is said to be a suffix of string B if A can be obtained by deleting some letters (possibly, none) in B in the beginning and some letters (again, possibly none) in the end.

You need to answer q queries. For each of them, you are given two values l, k ($1 \leq l \leq n, 1 \leq k \leq 10^9$), and you need to find out $f(s[1, l], k)$, where $s[1, l]$ denotes the prefix with l letters of s .

Input

The input consists of multiple test cases.

The first line contains a single integer T – the number of test cases. Then T test cases descriptions follow.

The first line of each test case contains two integers n, q ($1 \leq n, q \leq 2 \times 10^5$) – the length of the string s and the number of queries.

The second line contains the string s .

The third line contains n positive integers $v_1, v_2 \dots v_n$ ($1 \leq v_i \leq 10^9$). It is guaranteed that $v_1 \leq v_2 \leq \dots \leq v_n$.

For the next q lines, each line contains two positive integers l, k ($1 \leq l \leq n, 1 \leq k \leq 10^9$), describing a query.

It is guaranteed that $T \leq 20, \sum q \leq 10^6, \sum n \leq 10^6$.

Output

For each query, print an integer indicating your answer.

Example

standard input	standard output
2	10
8 3	1
ababaaab	7
1 2 2 5 7 8 10 10	19
8 1	72
1 2	
4 4	
6 2	
abcacb	
4 7 9 10 13 49	
4 2	
6 3	