# Problem J. Just Another String Problem

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|---|---|
| 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 $\{v_1, v_2, \cdots, v_n\}$.

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:

- $|T| \le k$;
- $T$ 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 $l, k$ ($1 \le l \le n, 1 \le k \le 10^9$), 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 $n, q$ ($1 \le n, q \le 2 \times 10^5$) – 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 $v_1, v_2 \cdots v_n$ ($1 \le v_i \le 10^9$). It is guaranteed that $v_1 \le v_2 \le \cdots \le v_n$.

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

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

## Output

For each query, print an integer indicating your answer.

## Example

| standard input | standard output |
| --- | --- |
| 2<br>8 3<br>ababaaab<br>1 2 2 5 7 8 10 10<br>8 1<br>1 2<br>4 4<br>6 2<br>abcacb<br>4 7 9 10 13 49<br>4 2<br>6 3 | 10<br>1<br>7<br>19<br>72 |