Problem E. Exciting Menus

Input file:	`exciting.in`
Output file:	`standard output`
Balloon Color:	`White`

In a restaurant, given N menus, where the menus are represented by the strings $S^1, \cdots, S^N$. Each string S^i is associated with an array A^i (of the same length) of joy levels. In this problem, you should choose a submenu defined by three integers (i, j, k), where i is the index of one of the menus, and j, k specify a substring of this chosen menu.

We need to find the submenu of the highest quality, where the quality Q is defined by the function:

$$Q(i, j, k) = \text{popularity}(S^i_{j,k}) \cdot A^i_k \cdot |S^i_{j,k}|$$

- $S^i_{j,k}$ = The substring $[j, k]$ (where j, k are one-based, inclusive) of the string S^i.
- popularity$(S^i_{j,k})$ = number of menus (from $S^1, \cdots, S^N$) that contain the submenu-string $S^i_{j,k}$ as a prefix.
- $|S^i_{j,k}|$ is the size of the submenu, which is the length of the substring representing the submenu.
- A^i_k is the joy level of the submenu (k^{th} entry of the i^{th} array), please note that the index j is not used here.

Can you find the submenu of the highest quality? Please output the corresponding highest quality of the function Q.

Input

The first line of the input contains a single integer T specifying the number of test cases.

Each test case begins with a line containing an integer N ($1 \le N \le 10^5$) specifying the number of menus in the restaurant.

Then N lines follow, the i^{th} line contains a string S^i representing the i^{th} menu. All the menus are non-empty strings consisting of lowercase English letters, and the sum of their lengths will not exceed 10^5 per test case.

Then N lines follow, the i^{th} line contains array A^i, in which A^i has the same length as string S^i and ($0 \le A^i_k \le 10^9$). The values of each array are space-separated.

Output

For each test case, print a single line containing an integer Q representing the maximum quality corresponding to the best submenu (i, j, k).

Example

exciting.in	standard output
2 2 aabaa aa 0 0 0 0 100 0 1 4 bbbaa aa aab aax 0 0 0 0 100 0 0 0 0 0 0 0 0	500 600

Note

The triples corresponding to the answers of the two given cases are $(1, 1, 5)$ and $(1, 4, 5)$.