NOI '15 P5 - Cocktail Party

Time limit: 1.0s **Memory limit:** 512M

You are given a string of length n representing the labels of n cups of cocktail. The i-th cup of cocktail has label s_i , and the labels are among the 26 lowercase English letters. Let $\mathrm{Str}(l,r)=s_ls_{l+1}\cdots s_r$ be the string formed by the labels of the cocktails from the l-th cup to the r-th cup. If $\mathrm{Str}(p,p_0)=\mathrm{Str}(q,q_0)$ where $1\leq p\leq p_0\leq n$, $1\leq q\leq q_0\leq n$, $p\neq q$, $p_0-p+1=q_0-q+1=r$, we say the p-th cup of cocktail and q-th cup of cocktail are r-similar. Of course, for two cups of cocktail that are r-similar (r>1) they are also 1-similar, 2-similar, ..., and (r-1)-similar. In particular, for any $1\leq p\leq q\leq n$, $p\neq q$, the p-th cup of cocktail and q-th cup of cocktail are 0-similar.

Freda assigns the "deliciousness" for each cup of cocktail, and the i-th cup has deliciousness a_i . If we mix p-th cup of cocktail and q-th cup of cocktail, we may obtain cocktail with deliciousness $a_p a_q$. The problem asks for each $r=0,\ldots,n-1$, how many ways we may select two cups of cocktail that are r-similar, and compute the maximum possible deliciousness by mixing two cups of cocktail that are r-similar.

Input Specification

The first line of the input contains an integer n denoting the number of cups of cocktail. The second line contains a string S with length n such that the i-th character denotes the label of the i-th cup of cocktail. The third line contains n integers separated by a single space such that the i-th integer denotes the i-th cup of cocktail has deliciousness a_i .

Output Specification

The output contains n lines. The i-th line contains two integers separated by a single space. The first integer denotes the number of ways to choose two cups of (i-1)-similar cocktails. The second integer denotes the maximum possible deliciousness by mixing two cups of cocktails that are (i-1)-similar. Notice if there does not exist two cups of cocktail that are (i-1)-similar, both integers in that line of the output shall be 0.

Sample Input 1

10 ponoiiipoi 2 1 4 7 4 8 3 6 4 7

Sample Output 1

Sample Input 2

```
12
abaabaabaa
1 -2 3 -4 5 -6 7 -8 9 -10 11 -12
```

Sample Output 2

```
66 120
34 120
15 55
12 40
9 27
7 16
5 7
3 -4
2 -4
1 -4
0 0
0 0
```

Constraints

Test Case	n	a_i	Additional Constraints

1	n=100	$ a_i \leq 10000$	
I	n = 100	$ a_i \leq 10000$	
2	n = 200		
3	n = 500		
4	n = 750		
5	n=1000	$ a_i \leq 1000000000$	
6			
7	n=2000		
8			
9	n=99991	$ a_i \leq 1000000000$	There will not exist 10-similar cocktails.
10			
11	n=100000	$ a_i \leq 1000000$	All a_i are equal.
12	n=200000		
13	n=300000		
14			
15	n=100000	$ a_i \leq 1000000000$	
16			
17	n=200000		
18			
19	n=300000		
20			