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 $\mathrm{Str}(l, r) = s_l s_{l+1} \cdots s_r$ 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 $1 \le p \le p_0 \le n$, $1 \le q \le q_0 \le n$, $p \ne q$, $p_0 - p + 1 = q_0 - q + 1 = r$, 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 $1 \le p \le q \le n, p \ne q$, 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

```
45 56
10 56
3 32
0 0
0 0
0 0
0 0
0 0
0 0
0 0
```

Sample Input 2

```
12
abaabaabaaba
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	$n = 100$	$\lvert a_i \rvert \leq 10\,000$	
2	$n = 200$		
3	$n = 500$		
4	$n = 750$		
5	$n = 1000$	$\lvert a_i \rvert \leq 1\,000\,000\,000$	
6			
7	$n = 2000$		
8			
9	$n = 99\,991$	$\lvert a_i \rvert \leq 1\,000\,000\,000$	There will not exist *10-similar* cocktails.
10			
11	$n = 100\,000$	$\lvert a_i \rvert \leq 1\,000\,000$	All a_i are equal.
12	$n = 200\,000$		
13	$n = 300\,000$		
14			
15	$n = 100\,000$	$\lvert a_i \rvert \leq 1\,000\,000\,000$	
16			
17	$n = 200\,000$		
18			
19	$n = 300\,000$		
20			