



Determining DNA Health

 by satyaki3794

Problem

Submissions

Leaderboard

Discussions

Editorial 

DNA is a nucleic acid present in the bodies of living things. Each piece of DNA contains a number of *genes*, some of which are beneficial and increase the DNA's *total health*. Each gene has a *health value*, and the *total health* of a DNA is the sum of the health values of all the beneficial genes that occur as a substring in the DNA. We represent genes and DNA as non-empty strings of lowercase English alphabetic letters, and the same gene may appear multiple times as a substring of a DNA.

Given the following:

- An array of beneficial gene strings, $genes = [g_0, g_1, \dots, g_{n-1}]$. Note that these gene sequences are *not* guaranteed to be distinct.
- An array of gene health values, $health = [h_0, h_1, \dots, h_{n-1}]$, where each h_i is the health value for gene g_i .
- A set of s DNA strands where the definition of each strand has three components, *first*, *last*, and *d*, where string *d* is a DNA for which genes $g_{start}, \dots, g_{end}$ are healthy.

Find and print the respective total healths of the *unhealthiest* (minimum total health) and *healthiest* (maximum total health) strands of DNA as two space-separated values on a single line.

Input Format

The first line contains an integer, n , denoting the total number of genes.

The second line contains n space-separated strings describing the respective values of g_0, g_1, \dots, g_{n-1} (i.e., the elements of *genes*).

The third line contains n space-separated integers describing the respective values of h_0, h_1, \dots, h_{n-1} (i.e., the elements of *health*).

The fourth line contains an integer, s , denoting the number of strands of DNA to process.

Each of the s subsequent lines describes a DNA strand in the form *start end d*, denoting that the healthy genes for DNA strand *d* are $g_{start}, \dots, g_{end}$ and their respective correlated health values are $h_{start}, \dots, h_{end}$.

Constraints

- $1 \leq n, s \leq 10^5$
- $0 \leq h_i \leq 10^7$
- $0 \leq \textit{first} \leq \textit{last} < n$
- $1 \leq$ the sum of the lengths of all genes and DNA strands $\leq 2 \times 10^6$
- It is guaranteed that each g_i consists of lowercase English alphabetic letters only (i.e., a to z).

Output Format

Print two space-separated integers describing the respective total health of the *unhealthiest* and the *healthiest* strands of DNA.

Sample Input 0

```
6
a b c aa d b
1 2 3 4 5 6
3
1 5 caaab
0 4 xyz
2 4 bcdybc
```

Sample Output 0

```
0 19
```

Explanation 0

In the diagrams below, the ranges of beneficial genes for a specific DNA on the left are highlighted in *green* and individual instances of beneficial genes on the right are bolded. The total healths of the $s = 3$ strands are:

1.

d = caaab, first = 1, last = 5												
indices	0	1	2	3	4	5						
genes	a	b	c	aa	d	b	gene	caaab	caaab	caaab	caaab	caaab
health	1	2	3	4	5	6	value	3	4	4	2	6

The total health of caaab is $3 + 4 + 4 + 2 + 6 = 19$.

2.

$d = xyz$, first = 0, last = 4							
indices	0	1	2	3	4	5	
genes	a	b	c	aa	d	b	
health	1	2	3	4	5	6	
						gene	xyz
						value	0

The total health of `xyz` is **0**, because it contains no beneficial genes.

3.

$d = bcdybc$, first = 2, last = 4

indices	0	1	2	3	4	5
genes	a	b	c	aa	d	b
health	1	2	3	4	5	6

gene	bcdybc	bcdybc	bcdybc
value	3	5	3

The total health of `bcdybc` is **3 + 5 + 3 = 11**.

The unhealthiest DNA strand is `xyz` with a total health of **0**, and the healthiest DNA strand is `caaab` with a total health of **19**. Thus, we print `0 19` as our answer.

[f](#) [t](#) [in](#)

 Submissions: [1426](#)

Max Score: 50

Difficulty: Hard

Rate This Challenge:

☆☆☆☆☆

[More](#)

Need Help? Get advice from the [discussion forum](#) for this challenge. Or check out the [environments page](#)

C++



```

1 #include <bits/stdc++.h>
2
3 using namespace std;
4
5 int main(){
6     int n;
```

```
7   cin >> n;
8   vector<string> genes(n);
9   for(int genes_i = 0; genes_i < n; genes_i++){
10      cin >> genes[genes_i];
11  }
12  vector<int> health(n);
13  for(int health_i = 0; health_i < n; health_i++){
14      cin >> health[health_i];
15  }
16  int s;
17  cin >> s;
18  for(int a0 = 0; a0 < s; a0++){
19      int first;
20      int last;
21      string d;
22      cin >> first >> last >> d;
23      // your code goes here
24  }
25  return 0;
26 }
27
```

Line: 1 Col: 1

 [Upload Code as File](#)☐ Test against custom input

Run Code

Submit Code

Copyright © 2017 HackerRank. All Rights Reserved

Join us on IRC at [#hackerrank](#) on freenode for hugs or bugs.[Contest Calendar](#) | [Interview Prep](#) | [Blog](#) | [Scoring](#) | [Environment](#) | [FAQ](#) | [About Us](#) | [Support](#) | [Careers](#) | [Terms Of Service](#) | [Privacy Policy](#) | [Request a Feature](#)