



Croatian Open Competition in Informatics

Round 3, December 14th 2019

Tasks

Task	Time limit	Memory limit	Score
Preokret	1 second	512 MiB	50
Grudanje	1 second	512 MiB	70
Total			120



Task Preokret

It's *Saint Stephen's Day*, the day after Christmas. The secular version of the same holiday in England is known as *Boxing day*. While people in Croatia celebrate Saint Stephen's Day by stuffing themselves with ridiculous amounts of food, our British friends traditionally play football. Premier league, Championship, amateur leagues – everybody plays football on Boxing day.

This year, Pep ate too much roast beef on Christmas and decided to take a break from Boxing day football. He stayed in bed that day, analyzing an old City fixture against an unknown opponent.



Pep knows that there were N goals scored during the match and he also knows in which order were they scored. He watches the game and wishes to answer the following questions

1. What was the final score, i.e., how many goals did City score and how many goals did their opponents score?
2. How many different ties were featured during the course of the game? We say that the game is tied if both teams have scored the same number of goals. The starting score 0:0 is also considered a tie.
3. Let's define a *turnover* as a situation in which a losing team, i.e. the team that scored less goals than its opponent, scores a certain number of successive goals and takes the lead after those goals have been scored. Pep wonders what is the largest turnover in the game. In other words, he wants to know what was the largest number of successive goals scored by one team such that before those goals they were losing and after those goals they were winning. Pep knows that this specific game had at least one turnover.

Input

First line contains an integer N ($1 \leq N \leq 250$) from the task description.

In the next N lines there is a single number 1 or 2 which represents a team that scored a goal (in order of goals scored in the game). City is denoted by number 1 and their opponents by number 2.

Output

In the first line you should output two space-separated integers, the number of goals scored by City and the number of goals scored by the opposing team.

In the second line you should output the number of different ties featured during the course of the game.

In the third line you should output the largest turnover in the game.

Scoring

In this task, each line of output is graded separately. The correct output in the first line is worth 1 point in each test case. The correct output in the second line is also worth 1 point in each test case. The correct output in the third line is worth 3 points in each test case.



Examples

input

5

1

1

2

2

2

output

2 3

2

3

input

9

1

2

2

1

1

1

2

1

1

output

6 3

3

3

input

3

2

1

1

output

2 1

2

2

Explanation of the first example: Different scores during the game were: 0:0, 1:0, 2:0, 2:1, 2:2, 2:3. Out of those, there were two ties: 0:0 and 2:2. The largest turnover happened when the opposing team were losing 2:0 and then scored three successive goals, thereby winning 2:3.

Explanation of the second example: Different scores during the game were: 0:0, 1:0, 1:1, 1:2, 2:2, 3:2, 4:2, 4:3, 5:3, 6:3. Out of those, there were three ties: 0:0, 1:1 and 2:2. The largest turnover happened when City were losing 1:2 and then scored three successive goals and started winning 4:2.



Task Grudanje

Patrik loves to study the words in English language. He especially loves words that contain exactly N letters. When he sees such a word, he instantly starts observing Q of its subwords and for each of those subwords he determines whether all of its letters are distinct. If that is the case for each of the Q subwords, then he considers the original word to be perfect.



Krešimir doesn't love studying English words, he loves to throw snowballs at Patrik instead. On a cold, winter morning, he was walking around town carrying exactly N snowballs and stumbled upon Patrik who was observing a giant N -lettered word that was written on the wall by some hooligans. What a coincidence...

Krešimir fiercely threw the first snowball in Patrik's direction, but Patrick skillfully dodged the snowball so it hit and completely covered the p_1 -st letter of the word on a wall. In a similar manner, Krešimir failed to hit Patrik with the next $(N - 1)$ snowballs. More precisely, his i -th snowball missed Patrik and completely covered the p_i -th letter of the word on a wall. Interestingly enough, after Krešimir threw all of the snowballs, the entire word was covered in snow.

Patrik glanced at the completely covered word and concluded that it was perfect. Therefore, he needed to slightly alter his definition of a perfect word. The word is perfect in none of the Q subwords contain two equal letters that are not covered in snow. Now he wants to know after which snowball (possibly zero) did the word on the wall become perfect.

Input

The first line contains a word that consists of N ($1 \leq N \leq 10^5$) lowercase letters from the English alphabet.

The second line contains an integer Q ($1 \leq Q \leq 10^5$) from the task description.

The i -th of the next Q lines contains two integers a_i and b_i ($1 \leq a_i \leq b_i \leq N$) which denote that the i -th of the Q subwords from the task description spans from a_i -th to the b_i -th letter of the word on a wall.

The next line contains N different integers p_i ($1 \leq p_i \leq N$) from the task description.

Output

In the only line you should output after which snowball (possibly zero) did the word on the wall become perfect.

Scoring

In test cases worth a total of 14 points, it will hold $1 \leq N, Q \leq 500$.

In test cases worth additional 21 points, it will hold $1 \leq N, Q \leq 3000$.

In test cases worth additional 14 points the word will only contain letters 'a'.



Examples

input

aaaaa

2

1 2

4 5

2 4 1 5 3

output

2

input

abbabaab

3

1 3

4 7

3 5

6 3 5 1 4 2 7 8

output

5

input

abcd

1

1 4

1 2 3 4

output

0

Clarification of the second example:

The state of the word on the wall after each thrown snowball is:

abbab*ab

ab*ab*ab

ab*a**ab

*b*a**ab

*b****ab

*****ab

*****b
