Matched Brackets

Problem Code: **ZCO12001**

Submit (/ZCOPRAC/submit/ZCO12001)

Zonal Computing Olympiad 2012, 26 Nov 2011

My Submissions (/ZCOPRAC/status/ZCO12001/ksvcng) All Submissions (/ZCOPRAC/status/ZCO

Successful Submissions +

A sequence of opening and closing brackets is *well-bracketed* if we can pair up each opening bracket with a matching closing bracket in the usual sense. For instance, the sequences `()`, `(())` and `()(())` are well-bracketed, while `(`, `())`, `(()()`, and `)(` are not well-bracketed.

The *nesting depth* of a well-bracketed sequence tells us the maximum number of levels of inner matched brackets enclosed within outer matched brackets. For instance, the nesting depth of `()` and `()()()` is 1, the nesting depth of `(())` and `()(())` is 2, the nesting depth of `((()))` is 3, and so on.

Given a well-bracketed sequence, we are interested in computing the following:

- The nesting depth, and the first position where it occurs–this will be the position of the first opening bracket at this nesting depth, where the positions are numbered starting with 1.
- The maximum number of symbols between any pair of matched brackets, including both the outer brackets, and the first position where this occurs–that is, the position of the first opening bracket of this segment

For instance, the nesting depth of `()(())()(()())(()())` is 2 and the first position where this occurs is 4. The opening bracket at position 10 is also at nesting depth 2 but we have to report the first position where this occurs, which is 4.

In this sequence, the maximum number of symbols between a pair of matched bracket is 6, starting at position 9. There is another such sequence of length 6 starting at position 15, but this is not the first such position.

Input format

The input consists of two lines. The first line is a single integer *N*, the length of the bracket sequence. Positions in the sequence are numbered 1,2,…,*N*. The second line is a sequence of *N* space-separated integers that encode the bracket expression as follows: 1 denotes an opening bracket (and 2 denotes a closing bracket). Nothing other than 1 or 2 appears in the second line of input and the corresponding expression is guaranteed to be well-bracketed.

Output format

Your program should print 4 space-separated integers in a line, denoting the four quantities asked for in the following order: nesting depth, first position that achieves the nesting depth, length of the maximum sequence between matching brackets and the first position where such a maximum length sequence occurs.

Testdata

You may assume that $2 \le N \le 10^5$. In 30% of the test cases, $2 \le N \le 10^3$.

- **Subtask 1 (30 marks)**
- **Subtask 2 (70 marks)**

Sample Input

```
20
1 2 1 1 2 2 1 2 1 1 2 1 2 2 1 1 2 1 2 2
```

Sample Output

```
2 4 6 9
```

Author:	admin3 (/users/admin3)
Date Added:	2-11-2015
Time Limit:	1 secs
Source Limit:	50000 Bytes
Languages:	C, C99 strict, CPP 4.3.2, CPP 6.3, CPP14, JAVA, PYTH, PYTH 3.5

Submit (/ZCOPRAC/submit/ZCO12001)

Comments

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

Compete (https://www.codechef.com/problems/easy) - Monthly Programming Contests and Cook-offs

Here is where you can show off your **computer programming skills**. Take part in our 10 day long monthly coding contest and the shorter format Cook-off **coding contest**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to INR 20,000 (for Indian Community), $700 (for Global Community) and lots more CodeChef goodies up for grabs.

Programming Tools

Online IDE (https://www.codechef.com/ide)

Upcoming Coding Contests (http://www.codechef.com/contests#FurtureContests)

Contest Hosting (http://www.codechef.com/hostyourcontest)

Problem Setting (http://www.codechef.com/problemsetting)

CodeChef Tutorials (http://www.codechef.com/wiki/tutorials)

CodeChef Wiki (https://www.codechef.com/wiki)

Practice Problems

Easy (https://www.codechef.com/problems/easy)

Medium (https://www.codechef.com/problems/medium)

Hard (https://www.codechef.com/problems/Hard)

Challenge (https://www.codechef.com/problems/challenge)

Peer (https://www.codechef.com/problems/extcontest)

School (https://www.codechef.com/problems/school)

FAQ's (https://www.codechef.com/wiki/faq)

Initiatives

Go for Gold (http://www.codechef.com/goforgold)

CodeChef for Schools (http://www.codechef.com/school)

Campus Chapters (http://www.codechef.com/campus_chapter/about)

Domain Registration in India (http://www.bigrock.in/) and Web Hosting (http://www.bigrock.com/web-hosting/) powered by BigRock