The 36th ACM
International Collegiate Programming Contest

Oklahoma State University Qualifier

Sep 14, 2011

Rules

- All questions require you to read the test data from standard input and write results to standard output. You cannot use files for input or output.
- Your program must produce an answer within 2 minutes.
- All programs will be recompiled prior to testing.
- The allowed programming languages are C, C++, and Java.
- Nonstandard libraries cannot be used in solutions.
- Programming style is not considered in this contest. You are free to code in whatever style you prefer. Documentation is not required.
- All communication with the judges will be handled by the contest environment.
- Listen for possible announcements or clarifications during the contest.
- Judges' decisions are to be considered final. No cheating will be tolerated.
- You may only use functionality provided by the programming contest environment.
- You are *not* allowed to access the Internet via a web browser, terminal window, or other any other manner. You will be disqualified if you attempt to do so.
- Winner is the one with the most number of problems solved. Total time taken to solve the problems will break any ties.

1. Orders

Description

The stores manager has sorted all kinds of goods in an alphabetical order of their labels. All the kinds having labels starting with the same letter are stored in the same warehouse (i.e. in the same building) labelled with this letter. During the day the stores manager receives and books the orders of goods which are to be delivered from the store. Each order requires only one kind of goods. The stores manager processes the requests in the order of their booking.

You know in advance all the orders which will have to be processed by the stores manager today, but you do not know their booking order. Compute all possible ways of the visits of warehouses for the stores manager to settle the entire demands piece after piece during the day.

Input
Input contains a single line with all labels of the requested goods (in random order). Each kind of goods is represented by the starting letter of its label. Only small letters of the English alphabet are used. The number of orders doesn't exceed 200.

Output
Output will contain all possible orderings in which the stores manager may visit his warehouses. Every warehouse is represented by a single small letter of the English alphabet -- the starting letter of the label of the goods. Each ordering of warehouses is written in the output file only once on a separate line and all the lines containing orderings have to be sorted in an alphabetical order (see the example). No output will exceed 2 megabytes.

Sample Input
bbjd

Sample Output
bbdj
bbjd
bdbj
bdjb
bjbd
bjdb
dbbj
dbjb
djbb
jbbd
jbdb
jdbb

2. Atlantis

Description

There are several ancient Greek texts that contain descriptions of the fabled island Atlantis. Some of these texts even include maps of parts of the island. But unfortunately, these maps describe different regions of Atlantis. Your friend Bill has to know the total area for which maps exist. You (unwisely) volunteered to write a program that calculates this quantity.

Input
The input consists of several test cases. Each test case starts with a line containing a single integer n (1 <= n <= 100) of available maps. The n following lines describe one map each. Each of these lines contains four numbers x1;y1;x2;y2 (0 <= x1 < x2 <= 100000;0 <= y1 < y2 <= 100000), not necessarily integers. The values (x1; y1) and (x2;y2) are the coordinates of the top-left resp. bottom-right corner of the mapped area.

The input file is terminated by a line containing a single 0. Don't process it.

Output
For each test case, your program should output one section. The first line of each section must be "Test case #k", where k is the number of the test case (starting with 1). The second one must be "Total explored area: a", where a is the total explored area (i.e. the area of the union of all rectangles in this test case), printed exact to two digits to the right of the decimal point.

Output a blank line after each test case.

Sample Input
2
10 10 20 20
15 15 25 25.5
0

Sample Output
Test case #1
Total explored area: 180.00

3. Sticks

Description

George took sticks of the same length and cut them randomly until all parts became at most 50 units long. Now he wants to return sticks to the original state, but he forgot how many sticks he had originally and how long they were originally. Please help him and design a program which computes the smallest possible original length of those sticks. All lengths expressed in units are integers greater than zero.

Input
The input contains blocks of 2 lines. The first line contains the number of sticks parts after cutting, there are at most 64 sticks. The second line contains the lengths of those parts separated by the space. The last line of the file contains zero.

Output
The output should contain the smallest possible length of original sticks, one per line.

Sample Input
9
5 2 1 5 2 1 5 2 1
4
1 2 3 4
0

Sample Output
6
5

4. Dividing

Description

Marsha and Bill own a collection of marbles. They want to split the collection among themselves so that both receive an equal share of the marbles. This would be easy if all the marbles had the same value, because then they could just split the collection in half. But unfortunately, some of the marbles are larger, or more beautiful than others. So, Marsha and Bill start by assigning a value, a natural number between one and six, to each marble. Now they want to divide the marbles so that each of them gets the same total value. Unfortunately, they realize that it might be impossible to divide the marbles in this way (even if the total value of all marbles is even). For example, if there are one marble of value 1, one of value 3 and two of value 4, then they cannot be split into sets of equal value. So, they ask you to write a program that checks whether there is a fair partition of the marbles.

Input
Each line in the input file describes one collection of marbles to be divided. The lines contain six non-negative integers n1 , . . . , n6 , where ni is the number of marbles of value i. So, the example from above would be described by the input-line "1 0 1 2 0 0". The maximum total number of marbles will be 20000.

The last line of the input file will be "0 0 0 0 0 0"; do not process this line.

Output
For each collection, output "Collection #k:", where k is the number of the test case, and then either "Can be divided." or "Can't be divided.". Output a blank line after each test case.

Sample Input
1 0 1 2 0 0
1 0 0 0 1 1
0 0 0 0 0 0

Sample Output
Collection #1:
Can't be divided.

Collection #2:
Can be divided.

5. Difference Is Beautiful

Description

Mr. Flower's business is growing much faster than originally planned. He has now become the CEO of a world-famous beef corporation. However, the boss never lives a casual life because he should take charge of the subsidiary scattered all over the world. Every year, Mr. Flower needs to analyze the performance reports of these subsidiary companies.

Mr. Flower has N companies, and he numbered them with 0 to N – 1. All of the companies will give Mr. Flower a report about the development each year. Among all of the tedious data, only one thing draws Mr. Flower's attention – the turnover. Turnover of a company can be represented as an integer Pi: positive one represents the amount of profit-making while negative for loss-making.

In fact, Mr. Flower will not be angry with the companies running under deficit. He thinks these companies have a large room for future development. What dissatisfy him are those companies who created the same turnover. Because in his eyes, keeping more than one companies of the same turnover is not necessary.

Now we know the annual turnover of all companies (an integer sequence Pi, the ith represents the turnover of the ith company this year.). We say a number sequence is perfect if all of its numbers are different from each other. Mr. Flower wants to know the length of the longest consecutive perfect sequence in a certain interval [L, R] of the turnover sequence, can you help him?

Input
The first line of the input contains two integers N and M. N is the number of companies. M is the number of queries. ($1 \leqslant N, M \leqslant 200000$). The second line contains N integer numbers not exceeding 106 by their absolute values. The ith of them represents the turnover of the ith company this year. The following M lines contain query descriptions, each description consists of two numbers: L, R ($0 \leqslant L \leqslant R \leqslant N - 1$) and represents the interval that Mr. Flower concerned.

Output
The output contains M lines. For each query, output the length of the longest consecutive perfect sequence between [L, R]

Sample Input
9 2
2 5 4 1 2 3 6 2 4
0 8
2 6

Sample Output
6
5

Hint
The longest perfect sequence of the first query in the sample input is '5 4 1 2 3 6', so the answer for this query is 6.

Problem 1. Test Case

input1
aac

output1
aac
aca
caa

input2
abc

output2
abc
acb
bac
bca
cab
cba

Problem 2. Test Case

input
3
40 20 70 60
60 35 85 50
55 40 90 80
0

output
Test case #1
Total explored area: 2525.00

Problem 3. Test case

input
10
2 4 5 7 3 2 1 3 2 1

output
10

Problem 4. Test case

input
0 1 0 0 0 2
1 0 1 1 0 1
0 0 0 0 0 0

output
Collection #1:
Can't be divided.

Collection #2:
Can be divided.

Problem 5. Test Case

input
11 2
-1 6 7 6 -2 1 3 8 6 9 11
0 10
1 9

Output
7
6