TI-Concours 2017

Task 2
***

The final judgement

(2016.10.31 - 22:52:11) **D** Hayleia: je suis tellement une quiche, j'ai fait un backup du mauvais fichier

(2016.10.31 - 22:53:36) **P** TheMachine02: tu habites en Lorraine ?

(2016.10.31 - 22:53:49) **P** TheMachine02: Non parce que quiche-lorraine toussa 😈

(2016.10.31 - 22:54:32) **R** noelnadal: ...

(2016.10.31 - 22:55:03) **R** noelnadal: Quel est le mari de la Lorraine ? Le Lorroi.

(2016.10.31 - 22:55:06) **R** *noelnadal sort*

(2016.10.31 - 22:55:20) ***TI-Bot***: *noelnadal a été déconnecté (Éjecté).*

(2016.10.31 - 22:55:56) ***TI-Bot***: *noelnadal se connecte au Chat.*

(2016.10.31 - 22:56:17) **R** noelnadal: ça a jeté un froid

(2016.10.31 - 22:56:37) **P** TheMachine02: normal, la lorraine il fait pas chaud là bas 😈

(2016.10.31 - 22:57:19) **R** noelnadal: ouais, c'est pour ça que tu as dit «QUICHE-LORRAINE TOUSSA» ?

(2016.10.31 - 22:57:27) **R** noelnadal: parce qu'on tombe malade à cause du froid 😈

(2016.10.31 - 23:04:09) **P** TheMachine02: 😈

Warning: this document contains four pages.

Foreword

You have until April 23rd 2017, 23:59 (UTC+2) to send your production at the following e-mail address: info@tiplanet.org. The title should be "TI-Concours, Task 2", and in the message body you should write your first name, last name, full mailing address, and the name of the calculator that you used for this task. Don't forget to attach your programs, which should be put all together in a single ZIP or RAR archive, which name should be your family name in uppercase letters without accents, followed by a space and the number "2". This archive should contain all the programs you made for this task (and nothing else).

You may update your submission as much as you need, by sending a new e-mail as stated above. Only the last e-mail that was sent before the deadline will be taken into account.

For this task, your main program should have the following name: the first 5 letters of your family name, without spaces or accents, followed by "2". For example, if your family name is De Périgny, your main program should be called "DEPER2". By doing this, you reduce the risk that we get two programs with exactly the same name. Yet, if you know someone whose family name has the same 5 first letters as yours and might participate, don't worry, we will handle this case by ourselves.

For this task, sub-programs are allowed: their names should start with the same six characters as the main program's, and should end with one or two extra characters of your choice. Recall that the main program is the one that should be chosen by the user when running the program. You may not ask the user to run an "installation" program prior to the first use of the program strictly speaking.

Your programs must all be fully written in z80 or ez80 TI-Basic. It means that you may use neither external librairies nor assembly code. We would also ask you not to protect your code, as we judges would like to see in detail what you did exactly.

Don't forget to get a link cable that lets you send programs from your calculator to your computer, and install the required software to do this. If you are facing issues related to this, do not hesitate to ask question on http://tiplanet.org.

If there is anything that you don't understand in this document, you may ask question at any time on http://tiplanet.org, by sending a private message to the user whose handle is "noelnadal". If it occurs that something really needs to be clarified, this document might be updated on the website. Therefore, it is recommended a check regularly if something has changed or not.

Whatever happens, we hope you will have fun participating!

Good luck to everyone!

The final judgement

Story

Tired of seeing TI-Planet members quarreling on the chat to know who makes the best jokes, the big and powerful TI-Bot decided to take things in hand: it is him who is going to decide!

He is thus going to organize jokes tournaments, so that the numerous pretenders can be in confrontation with each other, and try to win the ultimate reward for all TI-Planetians: the "Trolling grandmaster » title.

As it is sometimes difficult to classify several members according to their sense of humor, things are going to take place in the following way: the confrontations will be made in one versus one format, and the winner will have the right to face a new opponent, and so on, until only one participant remains.

Obviously, this tournament arouses a lot of craze, in particular at the less experimented members, who are delighted to be able to attend it, to admire the overflowing with originality humor of their mentors. For them, it is also an opportunity to improve themselves by taking example on the best joke makers.

Nevertheless, according to their level, these members are not interested in the same confrontations. If they are real beginners, they will not go to see the matches from too high level, because they will be incapable to appreciate the quality of a professional sense of humor. On the contrary, if they have already reached a quite high level, they will not appreciate confrontations with a too low level, and thus would like to avoid seeing such matches.

As TI-Bot is always logged in the chat, he was already able to estimate in a rough way the level that each member I can achieve. For a given member, its skill level is characterized by a positive integer. When two members are involved in a one versus one confrontation, the estimated level for this match is the sum of both skill levels, because when a trolling conversation is taking place, the level of the jokes of every protagonist influences the others. This point is not to be questioned, because TI-Bot is always right.

The tournament is soon going to begin, and every spectator is going to come to observe matches the expected level of which is included in a given interval. To be able to organize their schedule, these spectators would like TI-Bot to give them the maximal number of different matches which can be organized with an expected level included in the interval that interests them. However, despite the face that TI-Bot is more intelligent than anybody else, he is very lazy, and since you feel sorry for all these potential spectators, you decide to find the answer to their questions.

Your task

In this task, you do not have to ask the user t do anything: when your program will be ran, some variables will already be filled with specific values.

N will contain the number of participants. Its value will always be between 1 and 999.

L_1 will contain the skill level of each participant. The skill level of a given participant will always be between 0 and 1337.

P will contain the number of potential spectators. Its value will always be between 1 and 999.

L_2 et L_3 will contain lower and upper bounds for spectators' intervals, as described in the previous page. The ith spectator is interested in matches which expected level belongs to the following interval : $[L_2(i), L_3(i)]$. These values will always be between 0 and 10000, and it is always guaranteed that the following is true: $L_2(i) \leq L_3(i)$.

When your program stops running, the answers should be in L_4. For every participant i, $L_4(i)$ should be equal to the number of matches that may look interesting for the participant i, as stated before.

Please note that your program does not have to display anything on the screen.

Judging

Every program taken into account for this task will first receive a score, between 0 and 100 inclusive. It will be tested on 10 different inputs, and each correct answer will give 5 points. The remaining 50 points will be given according to how fast the program computes the answers. Then, all the scores will be harmonized, so that the average score is 60 points, and the standard deviation is 10 points.

Please note, that all programs will be tested on the same calculator. Before each program is tested, this calculator will be reset, to guarantee equity between participants.

Example

Input : N = 4, L_1 = {4, 6, 8, 6}, P = 2, L_2 = {8, 14}, L_3 = {12, 20}.

Output : L_4 = {4, 2}.

There are four participants, whose skill levels are 4, 6, 8 and 6, respectively. Here are the possible matches:

- 1 versus 2 (expected level: 4+6=10);
- 1 versus 3 (expected level: 4+8=12);
- 1 versus 4 (expected level: 4+6=10);
- 2 versus 3 (expected level: 6+8=14);
- 2 versus 4 (expected level: 6+8=12);
- 3 versus 4 (expected level: 8+6=14).

Therefore, there are 4 matches whose expected level is between 8 and 12, and 2 matches whose expected level is between 14 and 20.