

12th South African Regional ACM Collegiate Programming Contest

Sponsored by IBM

16 October 2010

Problem D - Green Balloon Next, please!

Problem Description

Your younger brother has just received a homework assignment which involves predicting the next number in a sequence. Rather than slog through all the problems by hand, you have decided to write a program to help him check his answers.

Given the sequence of integers

$$s_0, s_1, s_2, s_3$$

you must predict the value of the next element, s_4 . All you know is that one of the following two properties holds:

1. $(s_1 - s_0) = (s_2 - s_1) = (s_3 - s_2) = k$, for some integer k , or
2. $((s_2 - s_1) - (s_1 - s_0)) = ((s_3 - s_2) - (s_2 - s_1)) = c$, for some integer $c \neq 0$.

Unfortunately, some of the problem sequences contain errors, so it is possible that neither of the two conditions stated above hold. These sequences must be identified and flagged.

Input

Your input will consist of an arbitrary number of records adhering to the following format:

s_0 s_1 s_2 s_3

where s_0, \dots, s_3 denote the four known numbers in the sequence.

The end of input is indicated by a line containing only the value “-1” (equivalent to $s_0 = -1$). The values s_0, \dots, s_3 are in the range -1000..1000.

Output

For each input record, print out the line

s_4

where s_4 denotes the next number in the sequence if the input sequence s_0, \dots, s_3 is valid, otherwise print out the line

invalid sequence

Sample Input

```
1 4 7 10
1 3 7 13
2 4 8 16
-1
```

Sample Output

```
13
21
invalid sequence
```

Time Limit

10 seconds