

World Finals 2013

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Submissions

Graduation Requirements

7pt Not attempted
18/20 users correct
(90%)

18pt Not attempted
5/9 users correct
(56%)

Drummer

9pt Not attempted
24/24 users correct
(100%)

20pt Not attempted
15/23 users correct
(65%)

X Marks the Spot

10pt Not attempted
6/11 users correct
(55%)

29pt Not attempted
1/4 users correct
(25%)

Can't Stop

11pt Not attempted
20/22 users correct
(91%)

32pt Not attempted
12/18 users correct
(67%)

Let Me Tell You a Story

14pt Not attempted
9/10 users correct
(90%)

50pt Not attempted

Top Scores

mystic	121
VasyI	111
winger	111
sdya	103
pieguy	97
mikhailOK	93
jonathanpaulson	93
EgorKulikov	89
Lovro	79
staniek	79

Problem B. Drummer

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input
9 points

Solve B-small

Large input
20 points

Solve B-large

Problem

The drummer has a very important role in any band -- keeping the rhythm. If the drummer's rhythm is uneven, it can ruin the entire performance.

You are the lead singer of a very popular rock band, and you have a bit of a problem. Your drummer has just quit the band to become a professional video gamer. You need to find a new drummer immediately. Fortunately, there is no shortage of candidates. Everyone wants a chance to join your band. Your task is to find the best drummer among the candidates, and you want the person who can keep the most consistent rhythm.

Your plan is as follows. You will ask each candidate to audition individually. During the audition, the candidate will play one drum by striking it with a drum stick several times. Ideally, the time difference between consecutive strikes should be exactly the same, producing a perfect rhythm. In a perfect rhythm, the drum strikes will have time stamps that follow an arithmetic progression like this: $T_0, T_0 + K, T_0 + 2 \cdot K, \dots, T_0 + (N - 1) \cdot K$.

In real life, of course, it is nearly impossible for a human to produce a perfect rhythm. Therefore, each candidate drummer will produce a rhythm that has an error **E**, such that each T_i differs by at most **E** from some perfect rhythm. Given a candidate's sequence of drum strikes, find the smallest possible **E** among all perfect rhythms that the candidate might have been trying to play.

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each one consists of two lines and represents the audition of one candidate. The first line contains a single integer -- **N**. The next line contains **N** integers separated by spaces -- the time stamps, in milliseconds, of the drum strikes played by the candidate. The time stamps are in increasing order.

Output

For each test case, output one line containing "Case #x: **E**", where x is the case number (starting from 1) and **E** is the smallest among all possible numbers that describe the error of the candidate's drum strike sequence.

Your answer will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer. See the [FAQ](#) for an explanation of what that means, and what formats of floating-point numbers we accept.

Limits

$1 \leq T \leq 100.$

Small dataset

$2 \leq N \leq 10.$
 $0 \leq T_i \leq 100.$

Large dataset

For 90% of the test cases, $2 \leq N \leq 1000.$
For all test cases, $2 \leq N \leq 50000.$
 $0 \leq T_i \leq 10^6.$

Sample

Input	Output
3	Case #1: 0
2	Case #2: 0.5
10 70	Case #3: 0.75
4	
0 10 19 30	
6	
2 5 10 15 20 24	

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