

Round 1B 2012

A. Safety in Numbers

B. Tide Goes In, Tide Goes Out

C. Equal Sums

Contest Analysis

Questions asked

Submissions

Safety in Numbers

10pt	Not attempted 2687/5608 users correct (48%)
11pt	Not attempted 2008/2680 users correct (75%)

Tide Goes In, Tide Goes Out

18pt	Not attempted 682/892 users correct (76%)
18pt	Not attempted 619/670 users correct (92%)

Equal Sums

6pt	Not attempted 2257/2531 users correct (89%)
37pt	Not attempted 149/853 users correct (17%)

Top Scores

Gennady.Korotkevich	100
bmerry	100
hansonw	100
marcina	100
ZhukovDmitry	100
random.johnnyh	100
yeputons	100
rng..58	100
pashka	100
mikhailOK	100

Problem A. Safety in Numbers

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  
10 points

Solve A-small

Large input  
11 points

Solve A-large

Problem

There are  $N$  contestants in a reality TV show. Each contestant is assigned a point value by the judges and receives votes from the audience. The point value given by the judges and the audience's votes are combined to form a *final score* for the contestant, in the following way:

Let  $X$  be the sum of the judge-assigned point values of all contestants. Now suppose a contestant got  $J$  points from the judges, and that she received a fraction  $Y$  (between 0 and 1, inclusive) of the audience's votes ( $Y$  might be, for example, 0.3). Then that contestant's final score is  $J+X*Y$ . Note that the sum of all contestants' audience vote fractions must be 1.

The contestant with the lowest score is eliminated.

Given the points contestants got from judges, your job is to find out, for each contestant, the minimum percentage of audience votes he/she must receive in order for him/her to be guaranteed **not to be eliminated**, no matter how the rest of the audience's votes are distributed.

If the lowest score is shared by multiple contestants, no contestants will be eliminated.

Input

The first line of the input gives the number of test cases,  $T$ .  $T$  test cases follow, one per line. Each line starts with an integer  $N$ , the number of contestants, followed by a space, followed by  $N$  integers  $s_0, s_1, \dots, s_{N-1}$ , separated by single spaces. The integer  $s_i$  is the point value assigned to contestant  $i$  by the judges.

Output

For each test case, output one line containing "Case #x: " followed by  $N$  real numbers:  $m_i$ s. The value  $x$  is the case number (starting from 1). The value  $m_i$  is the smallest percentage of audience votes required for contestant  $i$  to definitely avoid elimination.

Answers within an absolute or relative error of  $10^{-5}$  of the correct answer will be accepted.

Limits

$0 \leq s_i \leq 100.$

$s_i > 0$  for some  $i$ . This means at least one contestant will have a point value greater than 0.

Small dataset

$1 \leq T \leq 20.$   
 $2 \leq N \leq 10.$

Large dataset

$1 \leq T \leq 50.$   
 $2 \leq N \leq 200.$

Sample

Input	Output
4	Case #1: 33.333333 66.666667
2 20 10	Case #2: 0.000000 100.000000
2 10 0	Case #3: 25.0 25.0 25.0 25.0
4 25 25 25 25	Case #4: 34.666667 26.666667 38.666667
3 24 30 21	

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