

Round 1A 2008

A. Minimum Scalar Product[B. Milkshakes](#)[C. Numbers](#)[Contest Analysis](#)[Questions asked](#) 3

- Submissions

Minimum Scalar Product

5pt	Not attempted 2352/2567 users correct (92%)
10pt	Not attempted 1048/2336 users correct (45%)

Milkshakes

10pt	Not attempted 655/1042 users correct (63%)
25pt	Not attempted 312/432 users correct (72%)

Numbers

15pt	Not attempted 577/1925 users correct (30%)
35pt	Not attempted 96/364 users correct (26%)

- Top Scores

Bohua	100
yuhch123	100
neal.wu	100
newman	100
Plagapong	100
Ahyangyi	100
Reid	100
Qingchun	100
ploh	100
kubus	100

Problem A. Minimum Scalar Product

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
5 points

Solve A-small

Large input
10 points

Solve A-large

Problem

You are given two vectors $v_1=(x_1,x_2,\dots,x_n)$ and $v_2=(y_1,y_2,\dots,y_n)$. The scalar product of these vectors is a single number, calculated as $x_1y_1+x_2y_2+\dots+x_ny_n$.

Suppose you are allowed to permute the coordinates of each vector as you wish. Choose two permutations such that the scalar product of your two new vectors is the smallest possible, and output that minimum scalar product.

Input

The first line of the input file contains integer number T - the number of test cases. For each test case, the first line contains integer number n . The next two lines contain n integers each, giving the coordinates of v_1 and v_2 respectively.

Output

For each test case, output a line

Case # X : Y

where X is the test case number, starting from 1, and Y is the minimum scalar product of all permutations of the two given vectors.

Limits**Small dataset**

$T = 1000$
 $1 \leq n \leq 8$
 $-1000 \leq x_i, y_i \leq 1000$

Large dataset

$T = 10$
 $100 \leq n \leq 800$
 $-100000 \leq x_i, y_i \leq 100000$

Sample

Input	Output
2	Case #1: -25
3	Case #2: 6
1 3 -5	
-2 4 1	
5	
1 2 3 4 5	
1 0 1 0 1	

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