Round 1A 2008

A. Minimum Scalar Product

B. Milkshakes

C. Numbers

Contest Analysis

Questions asked 3

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

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
$1 \le n \le 8$
$-1000 \le x_i, y_i \le 1000$

Large dataset

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

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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