

Minimum Scalar Product

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

Time limit: 30 seconds per test set.

Memory limit: 1GB.

Small dataset (Test set 1 - Visible)

T = 1000

$1 \leq n \leq 8$

$-1000 \leq x_i, y_i \leq 1000$

Large dataset (Test set 2 - Hidden)

T = 10

$100 \leq n \leq 800$

$-100000 \leq x_i, y_i \leq 100000$

Sample

Sample Input

2
3

Sample Output

Case #1: -25
Case #2: 6

```
1 3 -5
-2 4 1
5
1 2 3 4 5
1 0 1 0 1
```

