

World Finals 2013

- A. Graduation Requirements
- B. Drummer
- C. X Marks the Spot
- D. Can't Stop
- E. Let Me Tell You a Story

Contest Analysis
Questions asked

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 C. X Marks the Spot

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 C-small

Large input
29 points

Solve C-large

Problem

Fair King Tyrone and his four sons conquered the nation of Carrania. His four sons immediately started to squabble about dividing the land between the four of them. The main point of contention was the gold mines of Carrania - each son wanted to have no fewer gold mines than any other.

Fair King Tyrone soon got tired of the squabbling, especially when he learned the number of mines is $4N$, so dividing them should be easy. He gathered his sons, took a map, drew an X on it and declared each son would get one quarter of the nation, with borders defined by the X he drew.

Unfortunately, Fair King Tyrone is a bit shortsighted, and the map he drew on was not a map of Carrania. His first minister quickly hid the map, and now tries to draw an identical X on the map of Carrania so that each son gets the same number of gold mines. Unfortunately all sons saw King Tyrone draw the X, and know the borders should be two perpendicular straight lines - so the minister has to make them so.

Help him! Your task is to draw two perpendicular straight lines such that no gold mine lies on a border, and the borders divide the gold mines equally.

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each test case begins with a number N , describing the number of gold mines each son should get. $4N$ lines follow, each containing two integers, being the coordinates x_i, y_i of one of the gold mines. No three gold mines are co-linear.

Output

For each test case, output one line containing "Case #x: $x_a y_a x_b y_b$ ", where x is the case number (starting from 1), (x_a, y_a) are the coordinates of the point where the two borders intersect, and (x_b, y_b) are the coordinates of some other point on the X.

All coordinates must be between -10^9 and 10^9 , have at most 9 digits after the decimal point, and not use exponential notation. They must be exact: the resulting X will be drawn exactly at these coordinates. You should output IMPOSSIBLE instead if there is no good placement of borders.

Limits

$1 \leq T \leq 20$
 $-10^6 \leq x_i, y_i \leq 10^6$

Small dataset

$1 \leq N \leq 10$

Large dataset

$1 \leq N \leq 2500$

Sample

Input	Output
2	Case #1: 0.5 0.5 2 0.5
1	Case #2: 0 0 -3 -3
0 0	
1 0	
0 1	
1 1	
1	
1 0	
0 1	
-1 0	
0 -1	

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