

## Problem 10: Bigsaw

### 7+4=11 Points

Problem ID: `boxcars`

Rank: 3+3

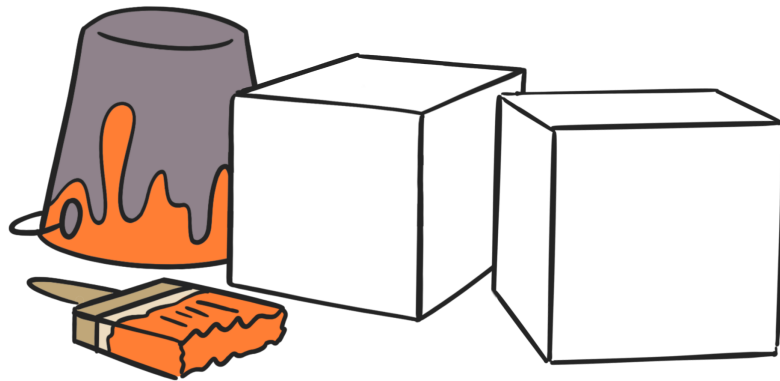
## Introduction

Bigsaw has locked you in his basement. You feel around; a damp concrete floor surrounds you. A rusty chain is tied around your ankles. Is this your punishment for complaining about the CALICO contest starting late? A light flickers on. In the corner, you see a figure, locked in a box. It's old and tattered, vaguely resembling a childhood story your mother told you about a silly bear who loved playing with paint, cards, and bricks. Its eyes flash to life, muttering in a staticky robotic voice "30 ... 14 ... 10". Nervously you walk towards it, where you see two cubes popping about around the bear's box. Underneath it, you find a paintbrush and a bucket of orange paint.

## Problem Statement

You're given two cubes with empty faces. You want to paint their faces with numbers, turning them into dice. Find two lists of six positive integers  $a_1, a_2, \dots, a_6$  and  $b_1, b_2, \dots, b_6$  to paint them with such that the sorted list of all pairwise sums  $a_1 + b_1, a_1 + b_2, \dots, a_6 + b_6$  is the same as the given sorted list  $S_1 S_2 \dots S_{36}$ .

If there is no solution, output `IMPOSSIBLE`



## Input Format

The first line of the input contains a single integer  $T$  denoting the number of test cases that follow. Each test case is described in a single line containing 36 space-separated integers  $S_1 S_2 \dots S_{36}$  denoting the desired list of pairwise sums.

## Output Format

For each test case, if there exists a valid solution, output two lines:

- The first line should contain six space-separated positive integers  $a_1 a_2 \dots a_6$  denoting the values of the faces on one of the dice.
- The second line should contain six space-separated positive integers  $b_1 b_2 \dots b_6$  denoting the values of the faces on one of the dice.

Otherwise, output a single line containing `IMPOSSIBLE`

## Constraints

Time limit: 2 seconds (both test sets)

There are exactly 36 values in  $S$ .

$2 \leq S_i \leq 10^9$  for all  $i$

$S_1 S_2 \dots S_{36}$  are sorted in nondecreasing order.

### Main Test Set

$1 \leq T \leq 5$

### Bonus Test Set

$1 \leq T \leq 100$

# Sample Test Cases

## Sample Input

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```
5
2 3 3 4 4 4 5 5 5 5 6 6 6 6 6 7 7 7 7 7 7 8 8 8 8 8 9 9 9 9 10 10 10
11 11 12
2 2 4 4 4 4 4 5 5 5 5 6 6 6 7 7 7 7 7 7 7 7 9 9 9 9 10 10 12 12 12
14 14 14 17
12 13 19 19 20 20 21 22 22 23 26 30 32 33 33 35 36 37 37 39 39 39 40
41 42 42 43 43 50 50 52 53 56 60 62 73
86 94 142 214 222 270 283 337 345 352 360 362 393 408 408 411 490 534
536 536 544 549 592 612 613 620 628 659 668 674 733 809 812 858 888
934
2 3 3 4 4 4 5 5 5 5 6 6 6 6 6 7 7 7 7 7 7 8 8 8 8 8 9 9 9 9 10 10 10
11 11 11
```

*Note: Each test case input listed above is on **ONE LINE**, despite what it may appear as above due to line wrapping. The original file can be [downloaded here](#).*

## Sample Output

[Download](#)

```
1 2 3 4 5 6
1 2 3 4 5 6
1 1 3 3 3 6
1 3 4 4 6 11
21 38 27 25 8 7
15 12 5 35 12 14
270 4 530 132 255 454
279 404 82 138 358 90
IMPOSSIBLE
```

*Note: Each test case output listed above is still two lines, one for each die.*

*Note that this is one of many possible correct outputs. If there are multiple solutions, you may output any of them.*

## Sample Explanations

For test case #1, the distribution for the two dice in the solution is shown below on the left. Note that the same distribution can also be achieved with two other dice (also known as [Sicherman dice](#)), whose sums are shown below on the right.

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

	1	2	2	3	3	4
1	2	3	3	4	4	5
3	4	5	5	6	6	7
4	5	6	6	7	7	8
5	6	7	7	8	8	9
6	7	8	8	9	9	10
8	9	10	10	11	11	12

Either solution is acceptable for the given input, so the program outputs 1 2 3 4 5 6 and 1 2 3 4 5 6

For test case #3, the distribution can be achieved with the dice 7 8 21 25 27 38 and 5 12 12 14 15 35, as demonstrated below:

	7	8	21	25	27	38
5	12	13	26	30	32	43
12	19	20	33	37	39	50
12	19	20	33	37	39	50
14	21	22	35	39	41	52
15	22	23	36	40	42	53
35	42	43	56	60	62	73

Note that there exists other solutions that can yield the same distribution.

For test case #5, despite being very similar to the distribution of a standard die, no assignment of values exists that yields a valid solution, so we output IMPOSSIBLE

## 第 10 题: 锯无霸

7+4=11 分

问题标识符: 货车

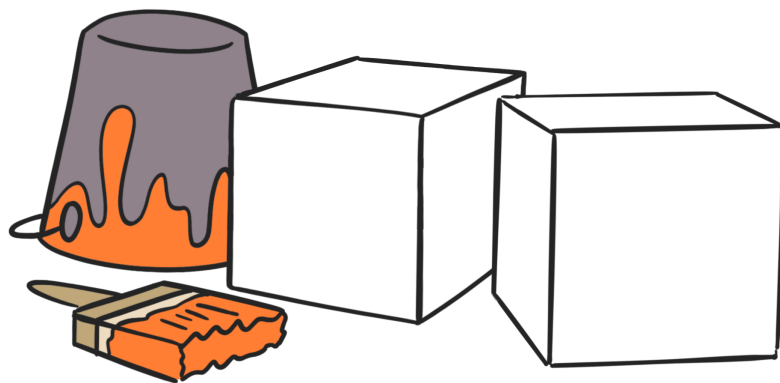
难度等级: 3+3

### 问题背景

邪恶的妖怪 Neb 将你关在潮湿的地下室中，四周是用水泥混凝土砌成的墙壁。你的脚踝被一条生锈的铁链锁住。这难道就是你抱怨 CALICO 比赛延迟开始的惩罚吗？借着小灯闪烁发出的微弱灯光，你看到角落里有一个被锁在箱子里的身影。这个苍老的身影衣衫褴褛，让你想起了自己听过的睡前故事里的大本熊。它的眼睛中闪烁着诡异的光芒，用机械般的声音嘟囔着“30 ... 14 ... 10”。你紧张地走近，看到箱子周围有两个跳动的方块，下方是一把油漆刷和一桶橙色油漆。

### 问题描述

给定两个空白的方块。你想给它们涂上数字，把它们变成骰子。寻找两组正整数  $a_1, a_2, \dots, a_6$  和  $b_1, b_2, \dots, b_6$ ，把这些数字分别涂在两个方块的六个面上，使得每对数字之和  $a_1 + b_1, a_1 + b_2, \dots, a_6 + b_6$  在排序后与给定的顺序数列  $S_1 S_2 \dots S_{36}$  相同。



## 输入格式

输入的第一行包含一个整数  $T$ ，表示后面的测试用例数量。每个测试用例由一行表示，包含 36 个用空格隔开的整数  $S_1 S_2 \dots S_{36}$ ，代表希望得到的每组数字之和的数列。

## 输出格式

对于每个测试用例，输出两行：

- 第一行包含六个用空格隔开的正整数  $a_1 a_2 \dots a_6$  表示其中一个骰子上各个面的数值。
- 第二行包含六个用空格隔开的正整数  $b_1 b_2 \dots b_6$  表示另外一个骰子上各个面的数值。

## 限制条件

$$1 \leq T \leq 10$$

$S$  有 36 个数字。

对于所有  $i$ ,  $2 \leq S_i \leq 10^9$ ,

$S_1 S_2 \dots S_{36}$  按非递减顺序排列。

### 主测试集

时间限制：2 秒。

### 附加测试集

时间限制：1 秒。

注意：主测试集和附加测试集的测试用例文件完全相同。

# 测试样例

## 样例输入

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```
4
2 3 3 4 4 4 5 5 5 5 6 6 6 6 6 7 7 7 7 7 8 8 8 8 8 9 9 9 9 10 10 10
11 11 12
2 2 4 4 4 4 4 5 5 5 5 6 6 6 7 7 7 7 7 7 7 7 9 9 9 9 10 10 12 12 12
14 14 14 17
12 13 19 19 20 20 21 22 22 23 26 30 32 33 33 35 36 37 37 39 39 39 40
41 42 42 43 43 50 50 52 53 56 60 62 73
86 94 142 214 222 270 283 337 345 352 360 362 393 408 408 411 490 534
536 536 544 549 592 612 613 620 628 659 668 674 733 809 812 858 888
934
```

注意：以上排列方式是出于排版考虑。输入时，上述每个测试样例都在一行上。[在此下载原文件](#)。

## 样例输出

[下载](#)

```
1 2 3 4 5 6
1 2 3 4 5 6
1 1 3 3 3 6
1 3 4 4 6 11
21 38 27 25 8 7
15 12 5 35 12 14
270 4 530 132 255 454
279 404 82 138 358 90
```

注意：上述每个测试样例输出仍为两行，每一行对应一个骰子。

## 主样例解释

### 测试用例 #1:

此解决方案中，这两个骰子的赋值分布如下左图所示。注意，同样的分布情况也可以出现在另外两个骰子中(被称为Sicherman 骰子), 如下右图所示。

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

	1	2	2	3	3	4
1	2	3	3	4	4	5
3	4	5	5	6	6	7
4	5	6	6	7	7	8
5	6	7	7	8	8	9
6	7	8	8	9	9	10
8	9	10	10	11	11	12

上述两种方式都可以得到给定的数列。此例输出其中一种，1 2 3 4 5 6 以及 1 2 3 4 5 6

### 测试用例 #3:

此分布情况需要通过给两个骰子分别赋值7 8 21 25 27 38 和5 12 12 14 15 35来实现，如下图所示：

	7	8	21	25	27	38
5	12	13	26	30	32	43
12	19	20	33	37	39	50
12	19	20	33	37	39	50
14	21	22	35	39	41	52
15	22	23	36	40	42	53
35	42	43	56	60	62	73

请注意，其他赋值方式也可能实现相同的分布情况。

### 测试用例 #5:

尽管其分布与标准骰子的分布非常相似，但没有任何赋值方式可以获得我们想要的数列，因此输出IMPOSSIBLE。