# Legacy

## Introduction

Old MacBeetle, having made quite a fortune on the trade in munitions from his many factories, decided at last to head into his well-deserved retirement and devote himself completely to growing radishes – his true passion. Before doing so, however, he must hand over the reins to the younger generation. MacBeetle intends to divide all of his factories fairly between his $N$ sons. With this purpose in mind, he spread a 3D map of the part of the Universum under his control before him and divided it into equal cubic zones. He decided that each of his sons will supervise all factories in one connected region built with of a number of such zones. MacBeetle wants to encourage his successors to cooperate, therefore each region must adjoin at least $R$ other regions. Moreover, he doesn't want to favor anybody, that is why he is particularly keen on all the regions being of similar size and bringing similar profits as the adjoining ones.

## Problem

MacBeetle controls factories in the part of the Universum shaped as a cuboid with dimensions $A \times B \times C$, divided into $A \cdot B \cdot C$ cubic zones. Each zone was assigned one integer denoting a cumulated average profit (or loss, when the number is negative) from factories located there. All zones should be distributed between $N$ sons, creating $N$ regions (one for each son) in such a manner that each region:

- is connected (two zones are adjoining, if they have one common face),
- consists of a proper number of zones: in the closed interval between $m$ and $M$ – $[m, M]$,
- adjoins at least $R$ other regions (region $A$ adjoins region $B$, if at least one zone of the region A adjoins one zone of the region B),

MacBeetle wants the division to be as fair as possible. Therefore, he defined the value of a region as a sum of values of all zones constituting the region and decided that the smaller the sum of nonnegative differences of values of adjoining regions, the better the division.

## Input data

Test sets are given in `legacy*.in` files.

The first line of the test set includes one integer $T$ denoting the number of tests. The following lines include descriptions of tests.

The first line of the description of each test includes three integers: $A$, $B$ and $C$ denoting respectively the width, length and height of the cuboid.

Next, there are integer values $v$ of all zones $A \cdot B \cdot C$. They are expressed as $B \cdot C$ lines, $A$ numbers each. The first $B$ lines describe values at the height of 1, the following $B$ lines describe values at the height of 2, and so forth, up to the height of $C$.

Following this description, in the next line there are 4 integers: $N$, $m$, $M$, $R$ denoting respectively: the number of regions the whole map must be divided into; a minimum number of zones one region can consist of; a maximum number of zones one region can consist of; a minimum number of neighbors of each of the created regions.

All values given in one line should be separated with single spaces.

$$1 \leqslant T \leqslant 10$$
$$1 \leqslant A, B, C \leqslant 100$$
$$-10^6 \leqslant v \leqslant 10^6$$
$$2 \leqslant N \leqslant 10^5$$
$$1 \leqslant m \leqslant M \leqslant 10^6$$
$$1 \leqslant R < N$$

## Output data

Write the fairest possible division of zones into regions for each test. Answers to the tests should be given in order corresponding to the input data.

Division into regions should consist of $A \cdot B \cdot C$ integers between 1 and $N$, in exactly the same format as the input description of single zone values. Zones of equal numbers are zones belonging to the same region. Additionally, the last line of the division description should include a single integer $S$ – a calculated sum of all nonnegative differences of values of adjoining regions plus 1.

$S = 1 + \sum_{i=1}^{m} |v_i^1 - v_i^2|$, where:

- $m$ is the number of all different pairs of adjoining regions,
- $v_i^1$ and $v_i^2$ are the values of two adjoining regions within $i$-$th$ pair.

## Example

For the input data:

```
1
4 3 2
1 7 2 8
2 -1 -2 0
12 9 -1 -10
-9 1 1 1
1 2 3 4
2 2 2 2
3 6 12 2
```

A possible correct answer is:

```
2 1 2 3
2 2 2 3
2 1 1 3
2 1 1 3
2 2 1 3
2 1 1 3
39
```

## Example clarification

Cumulated value of the region number 1 is 24 ($= 7 + 9 + (-1) + 1 + 1 + 3 + 2 + 2$), the value of the region number 2 is 10, and the value of the region number 3 is 5. All regions adjoin one another, therefore the sum of differences of values of adjoining regions is: $S = 1 + |24 - 10| + |24 - 5| + |10 - 5| = 39$.

## Score

If the answer is correct, the score for a given set equals the sum of $S$ values from all the tests. Otherwise the score is 0. The lower the positive score, the better position in the ranking.