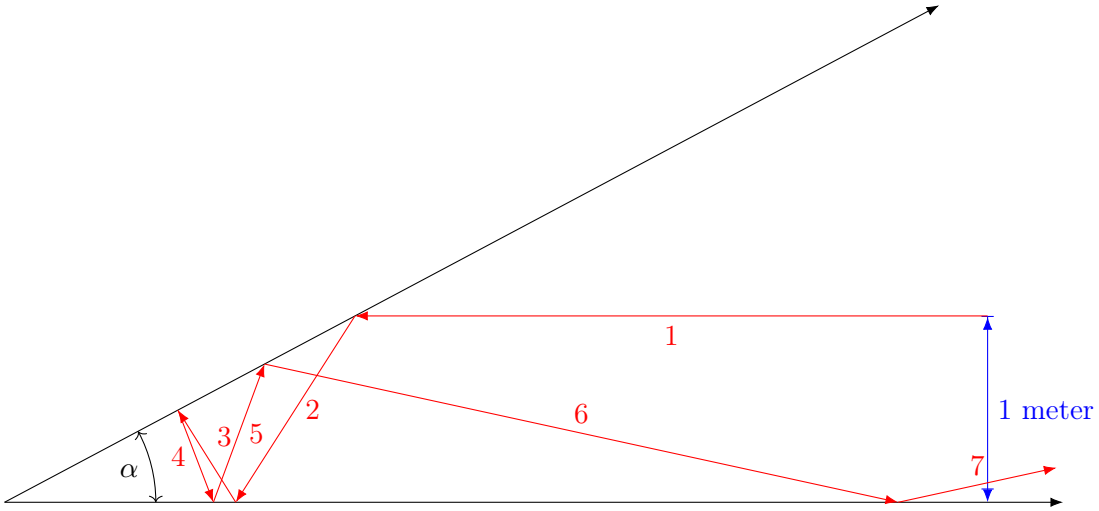
Problem A. Ailin and the Mirrors

Source file name:	mirror.c, mirror.cpp, mirror.java, mirror.py
Input:	`standard`
Output:	`standard`
Author(s):	`Eddy Cael Mamani Canaviri - Universidad Tecnica de Oruro`

Ailin is dreaming again and she is playing with two giant mirrors and also with a laser pen. She is having fun when suddenly his father propose her a challenge: put a mirror on the table, and the other above the former with a angle α. Then use the laser pen and point to the second mirror such the laser is horizontal and parallel to the horizontal plane. The distance between the horizontal and the laser is 1 meter. The laser will be reflected and eventually it will escape from the mirrors. For example, let $\alpha = 28$ degrees. The laser will impact and change its direction several times before escape.



Now the task is very simple, can you count the amount of times the laser is reflected in the mirrors?

Input

There are several test cases, each case contains the angle α for the mirrors. You can asumme that both mirros are infinite semiplanes. The angle will have at most 9 decimal places and at least 1 decimal place.

$0 < \alpha \leq 180$

Output

For each test case print the answer resquested.

Example

Input	Output
28.0 180.00	6 0

Use fast I/O methods

Problem B. Good Meeting

Source file name:	meeting.c, meeting.cpp, meeting.java, meeting.py
Input:	Standard
Output:	Standard
Author(s):	Eddy Cael Mamani Canaviri - Universidad Tecnica de Oruro

Ailin and her friend Mandrilo want to have a meeting on a restaurant near to university. The restaurant is open T minutes. Ailin arrives anytime in the range from 0 to T (She follow a uniform distribution of probability), and she stay on the restaurant exactly A minutes if the restaurant is open. If the restaurant closes, she leaves. In the same way Mandrilo arrives at anytime in the range from 0 to T, stay exactly A minutes (if the restaurant is still open). They want to know what is the probability of the meet at least a moment. (note that the event when Ailin is leaving while Mandrilo is entering to the restaurant is a valid event).

$1 \leq T \leq 1000$

$1 \leq A \leq T$

Input

The input contains several test cases. For each case there is a line with two integers T, A

Output

For each case output a line with the answer in the following format: "X/Y" where X and Y are integers and also $GCD(X, Y) = 1$ holds. If the answer is a integer number X print the result in the form "X/1"

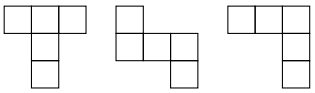
Example

Input	Output
60 15	7/16

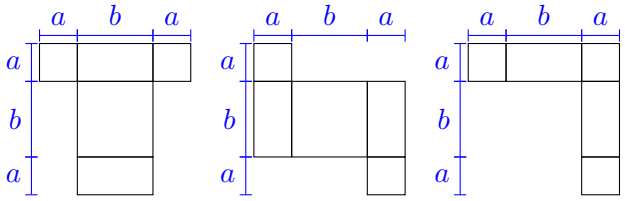
Problem C. America and Tetris

Source file name:	tetris.c, tetris.cpp, tetris.java, tetris.py
Input:	`Standard`
Output:	`Standard`
Author(s):	`Eddy Cael Mamani Canaviri - Universidad Tecnica de Oruro`

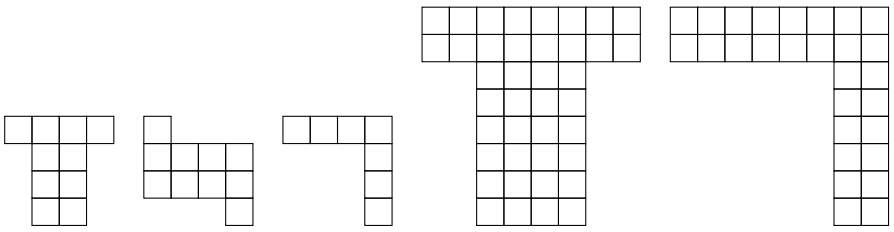
America is playing with a giant cube in her dreams, each face of the cube has several patterns, and she is interested in the following figures:



Each face of the cube is made of asterisks and dots. She wants to look for the three figures described above, but she is also interested in some figures that are proportional to the pattern (a number R is proportional to another number W if exists a positive integer k such: $R = W * k$), so she defines a proportion rule for the figures. Let's see an example of that. Suppose that $a = 1, b = 2$. Now she will look for patterns that are proportional to this.

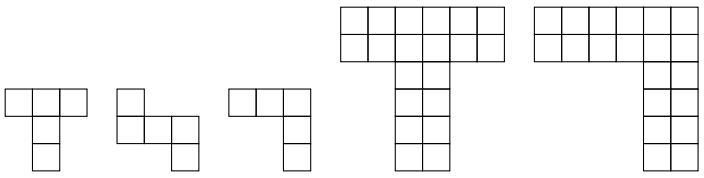


The following figures are proportional and valid to the values defined before ($a = 1, b = 2$):



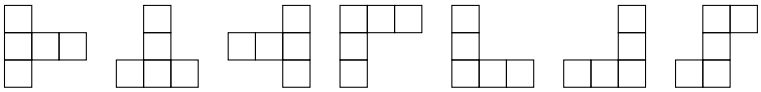
And so on...

Now if we set $a = 1, b = 1$ the previous samples are not valid, but the following ones are:



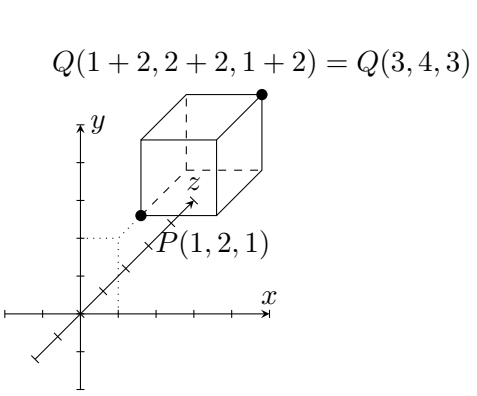
And so on...

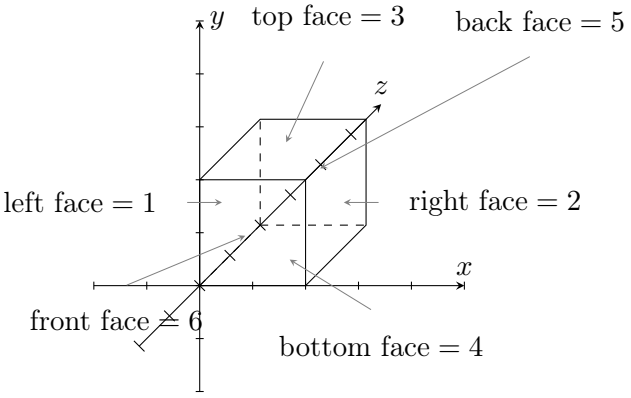
Note that America also consider a valid pattern to any rotation of the figure, so assuming $a = 1, b = 1$ the following patterns are also valid (and also the proportional figures to them):



Note that each figure must be connected. We assume that any two cells in the same face, are considered connected if the share a side or a corner. So, a cell can be neighbour of at most 8 cells in the same face of the cube. America wants to count the number of tetris figures in each side of the cube, so she has six patterns and she needs your help with this task.

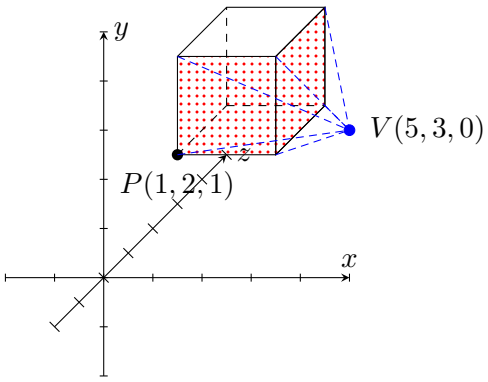
In her dreams America is playing in the tridimentional space, so the cube has its edges parallel to the axes, and each face is numbered (see the second graphic below). Note that the opposite point of the cube is the point $Q(x+N, y+N, z+N)$ where N is the size of the cube

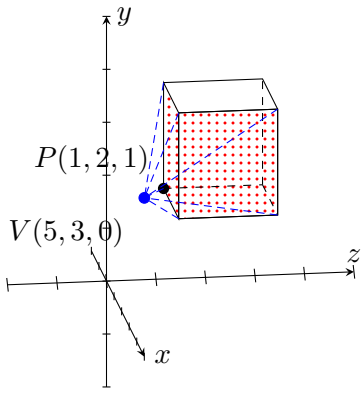




Also America has a point of view in the space and she needs to know how many figures are visible for her (she counts the visible figures in each face). If America's coordinates are touching the cube or she is inside of it, you can assume that she can see all the faces of the cube.

For example, if America is in the point $V(5,3,0)$ she only see the faces front and right (face 6 and face 2). We can see it in the graphics below, both are the same graphic but with different points of view. So you must count the number of tetris figures that America can see from a point V.





Input

The input file contains several test cases. The first line of each case contains a integer N, the size of the cube. Next line contains the integer M . Next line contains three numbers x, y, z that are the coordinates of the point P. Next line contains the value of A and B, the values used for the proportions.

Next we have the description of the six faces. Each face is represented by M rows with M columns. Note that we are looking for tetris figures of '*'. After each face description there is a blank line. Next line contains a integer T, the number of queries, each query contains three integers x_v, y_v, z_v, the coordinates of the point V.

Constraints:

$1 \leq N, M \leq 1000$

$1 \leq A, B \leq 10$

$-1000 \leq x, y, z, x_v, y_v, z_v \leq 1000$

$1 \leq T \leq 10000$

Is guaranteed that $GCD(A, B) = 1$, so the numbers A and B are coprimes.

Output

For each query output the answer on a line.

Example

Input	Output
2 6 1 2 1 1 1 ***... ..*... ..*... .... ***... ..*... ..*... ...*.. .... ****** ****** ....** ....** ....** ....** .***.. ..*... ..*..* .....* ...***	1 6 6 0 4

Input continued from the previous page	Output continued from the previous page
.. **.... ****** ****** ....** **..** ***..* *..*** *....* ..*... ..*..* ***.** 4 5 3 0 1 2 1 2 3 2 5 2 2 0 1 4	

Use fast I/O methods

Explanation

The amount of tetris figures in the six faces are 1, 0, 1, 2 , 1, 1 respectively.

The first query is explained in the statement, and the answer is the face 6 and the face 2, so $1 + 0 = 1$.

The second query touch the cube, so America can see all the figures in the cube: $1+0+1+2+1+1 = 6$.

The third query are inside the cube so America can see all the faces and all the figures too.

In the fourth query America only see the right face, so the answer is 0.

In the last query America can see the back, bottom and left face, so the answer is $1 + 2 + 1 = 4$

Problem D. Brothers

Source file name:	brothers.c, brothers.cpp, brothers.java, brothers.py
Input:	Standard
Output:	Standard
Author(s):	Jorge Teran Pomier - Bolivia

Three brothers Juan, Jose, Ernesto , are computer scientists and traveled for work to different countries. They are very close to each other. Because the nature of their work the only time they have to talk is in the morning from 8 to 9, at lunch time from 13 to 14 and at night from 17 to 22.

You will be given the time zone in which they are located. Please find in what hour they can meet.

For example, if the time zone where are is +12, -4 +1, for Juan, Jose, Ernesto respectively Juan must connect at 9, Jose at 17, and Ernesto at 22. For this reason the answer is 9, 17, and 22 as shown in the example.

In the second example, there are many more hours when they can meet. All are reported.

Input

The input consists on multiple test cases. The first line has the number of test cases. Each test case consists of three numbers that are the time zone in which each brother is located. The time zone numbers are in the range [-24,24].

Output

For each test case write three numbers representing the time at which each of the brothers should meet. Each test case should start with the frase *Case:* followed by a number.

Example

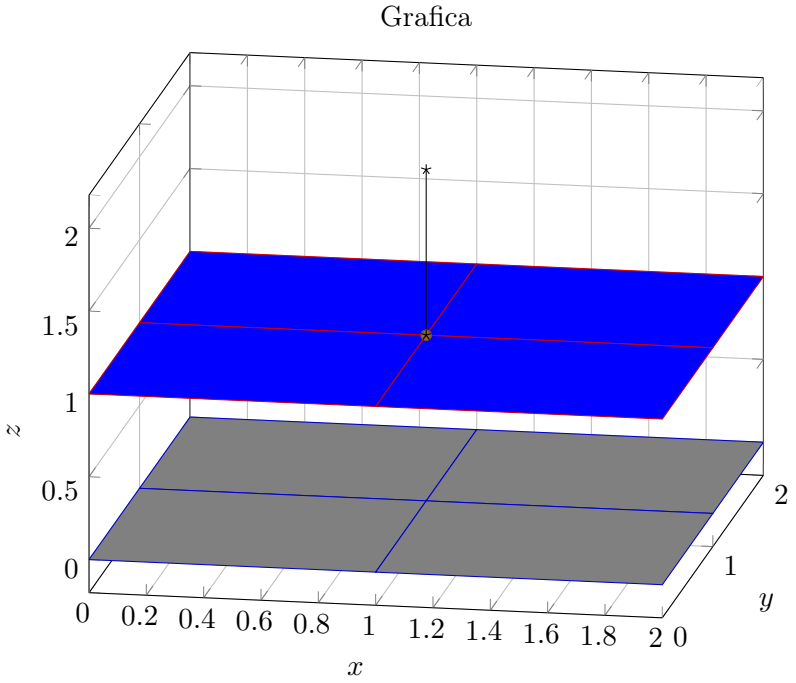
Input	Output
2 12 -4 1 2 2 2	Case: 1 9 17 22 Case: 2 8 8 8 9 9 9 13 13 13 14 14 14 17 17 17 18 18 18 19 19 19 20 20 20 21 21 21 22 22 22

Use fast I/O methods

Problem E. Simple Toy

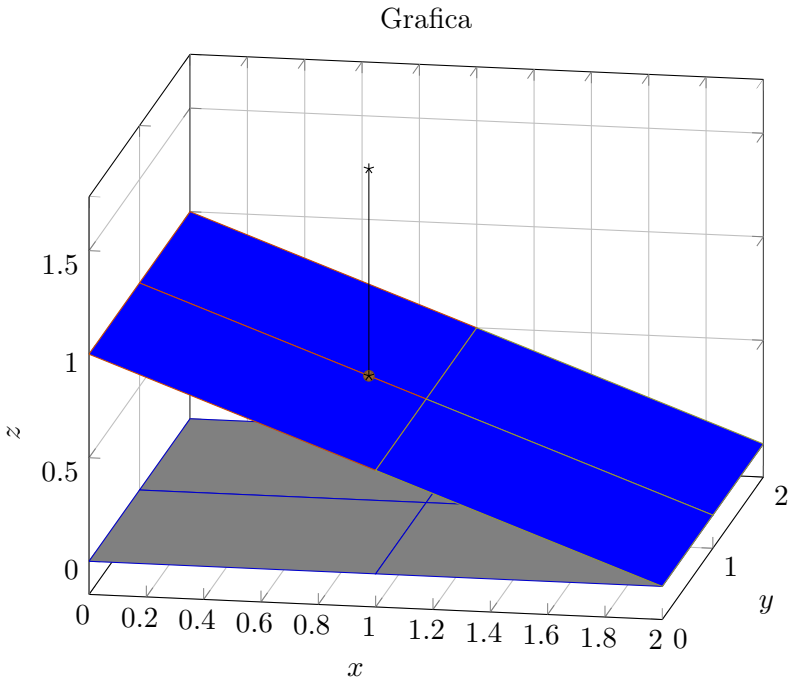
Source file name:	toy.c, toy.cpp, toy.java, toy.py
Input:	`Standard`
Output:	`Standard`
Author(s):	`Eddy Cael Mamani Canaviri - Universidad Tecnica de Oruro`

Ailin is playing with pieces of metal cutting them in some pieces. She discover that some pieces have a interesting point. For example she has a piece like this: (the gray image represents the ground in the graphics)



You can see that the piece is been in equilibrium when you hang it from the red point.

But if you choose another point, the metal piece twist and the piece is not more interesting.



The problem is find this point for any polygon.

Input

There are several test cases. Each test case contains the number N, the number of points of the polygon. Next N lines contains the coordinates x_i, y_i of the N points making the polygon. The input is given in counterclockwise order. Is guaranteed that the polygon has a positive area.

$3 \leq N \leq 10000$

$0 \leq |x_i, y_i| \leq 100000$

Output

For each test case, print the coordinates of the interesting point truncated to exactly five places.

Example

Input	Output
4 0 0 4 0 4 2 0 2 3 0 0 4 0 2 2	2.00000 1.00000 2.00000 0.66666

Use fast I/O methods