

### Problem 1.

The boss of Providence company asks you to write a program to solve the following problem:

First, you must read  $n$  records and create each record that contains the following:

1. **Index:** This index will not be given to you from the input, but you have to record it yourself. In other words, this index is starting from 1, which represent the first record of the input data. This means that when you read the  $k$ th record, its index will be  $k$ . **The smaller index has the highest priority.**
2. **Admin level:** The value of admin level is from 0 to 999. **The smaller admin value has the highest priority.**
3. **License number:** It is an integer value, **the smaller has the highest priority.**

You must sort the record according to admin level, license number, then index. In other words, the record is sorted by admin level as the first key, secondary key will be license number, and the third key is index.

#### Input

The first line contains an integer  $n$ , indicates the number of records to be read.

Where  $n$  is not greater than  $10^5$ . Then, each line contains two integers admin level and license number. Where  $0 \leq \text{admin level} \leq 999$  and  $1 \leq \text{license number} \leq 10^9$ .

#### Output

Output are the sequence number of index after sorting according your boss requirement, each is separated by a space.

Note that there should be no space after the last number, but a '\n'.

#### Sample input

```
5
6 60
1 20
999 1000000
1 40
0 20
```

#### Sample output

```
5 2 4 1 3
```

## Problem 2

Develop class BigInteger. The length of an integer can be 50-digits length. The internal representation of a BigInteger is a signed bit and an array of digits, where each digit contains a value between 0 to 9.

Develop a complete class containing proper constructor and destructor functions as well as set and get functions. The class should also provide the following overloaded operator capabilities:

- Overload the addition operator (+) to add two BigInteger.
- Overload the subtraction operator (-) to subtract two BigInteger

Input

First line is the arithmetic operator and the next two line are two BigIntegers. Assume that the given input calculation will not cause the arithmetic calculation to overflow, so that you don't need to check for the overflow. When the # sign is reached, it means there is no more input data.

### Sample input

[illegible]

## Sample output

223456789002345678901234567002  
-19  
30770  
28183

### Problem 3

Design a class named **RECTANGLE** with two private data members: *length* and *width*. Define constructors and a destructor for the class and write member functions to find the perimeter and area of a rectangle. Then define a class named **CUBOID** (representing a box) that inherits from the class Rectangle with an extra data member: *height*. Then write constructors and a destructor for the CUBOID class, and write member functions to find the **surface** and **volume** of the CUBOID objects.

The formula for computing volume and surface area of cuboid are the following:

**The volume of a cuboid = width × length × height**

**Surface area of cuboid = 2(length x width + width x height + height x length)**

#### Input

The input can contain different test cases.

The first line of the input T indicates the number of test cases. For each test case, there is a line with 3 numbers: length, width, and height for a cuboid.

#### Output

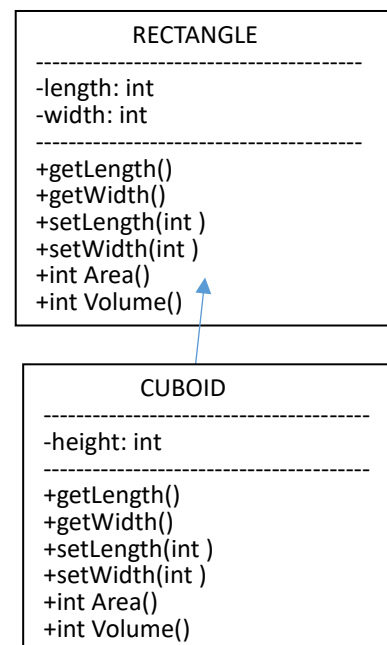
For each test case, a correspondence Area and volume of a cuboid will be output with a space in between.

#### Sample input

```
3
100 140 20
32 30 50
59 20 40
```

#### Sample output

```
#1
Volume:280000
Surface:37600
#2
Volume:48000
Surface:8120
#3
Volume:47200
Surface:8680
```



## Problem 4

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Boss of the Providence University asks you to write a program to solve the derivative of a Polynomial. You have to evaluate the values of polynomial

$$a_0X^n + a_1X^{n-1} + a_2X^{n-2} + \dots + a_{n-1}X + a_n$$

In this problem you should evaluate its derivative. Remember that derivative is defined as

$$a_0nX^{n-1} + a_1(n-1)X^{n-2} + a_2(n-2)X^{n-3} + \dots + a_{n-1}$$

### Input

Your program should accept an even number of lines of text. Each pair of lines will represent one problem. The first line will contain one integer - a value for x. The second line will contain a list of integers  $a_0, a_1, \dots, a_{n-1}, a_n$ , which represent a set of polynomial coefficients. Input is terminated by <EOF>.

### Output

For each pair of lines, your program should evaluate the derivative of polynomial for the given value x and output it in a single line.

### Sample Input

7

1 -1

2

1 1 1

### Sample Output

1

5

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7  
1 -1  
2  
1 1 1  
2  
1 -3 -1  
0  
-3 -4 3 -2  
3  
1 -2 3  
2  
-1 4 -4  
-3  
-4 -3  
5  
-5 3 -2  
2  
1 -4 5  
6  
8 5 -4  
-3  
-1 1 -4  
-1  
-5 -1 8 -7 0 9 -9 9 -6 -4 6  
2  
-5 4 -3 5 1 4  
6  
-4 5 -3 -1 -3 -1 3 -3  
-4  
-6 -2 -1 3 2 1  
3  
-1 -7 1 5 -1  
6  
-10 -3 -6 -5 2  
-3  
-7 7 -4 -2 -9 -1 -8  
2  
-1 1 7 1 -10 3

5  
7 -1 1 10 11 -5 -6 -1 -2 -6 -8 1  
-2  
-2 -9 6 -11 6 -12  
-6  
-6 7 4 3 10 5 1 -9 -3 -1 -10  
-1  
-11 4 3 8 13 4 2  
-1  
1 -8 -5 0 -6 -6 5 6 -1 1 2 10 -10 10 2 -10 3 -8 11 6 11 -  
4 -9 -11  
7  
7 6 7 -5 11 8 7 -9 -6  
11  
10 -14 6 -6 -2 2  
-3  
-7 -9 -4 -14 13 7 -7 -2 -9 1 11  
2  
8 -5 -12 -10 -1 14 14 8 5 -15 -1 -7 3 12  
3  
-2 -4 -9 -16 -14 -13

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## Output:

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1  
5  
1  
3  
4  
0  
-4  
-47  
0  
101  
7  
44  
-287  
-1093725  
-7238

-286  
-9041  
13472  
30  
743277407  
250  
702063431  
76  
-26  
51721892  
659558  
829549  
136459  
-1595

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