TK1114 Computer Programming

Lab 6

Array & Array Processing I

Problem Solving

7 – 9 November 2016

Name : _____

Matric Number : _____

6A	COCONUT *KELAPA*	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : problem solving

Problem Description

Ali Wali owns a coconut plantation and a number of monkeys for bringing down coconuts. Every day, Ali would record the number of coconuts brought down by his monkeys. At the end of a certain time period, he would determine from the data recorded, the lowest and the highest number of coconuts as well as their number of occurrences. Write a program to help Ali carry out this task.

Input

The first line of input is ***T*** (1 <= ***T*** <= 100) which is the number of cases. This is followed by ***T*** lines of input. Each of those lines of input represents a case. It starts with ***X*** (***X*** <= 100) which is the length of the time period (in days). This is then followed by a list of ***X*** data which is the number of coconuts for each day in that time period.

Output

The output produced consists of ***T*** lines, one line for each case. Each line contains two pairs of numbers. The first pair consists of the minimum number of coconuts and the number of its occurrences. The next pair consists of the maximum number of coconuts followed by the number of its occurrences.

Sample Input Output

Sample Input	Sample Output
2 3 23 25 27 5 89 85 85 89 85	23 1 27 1 85 3 89 2

6B	BIRTHDAY GRAPH	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : problem solving

Problem Description

Everyone loves to be celebrated on their birthdays. Birthday celebration can encourage positive social interaction among co-workers, foster friendship among classmates or even strengthen bond between families.

Birthday graph can be display in many forms. It can a creative drawing consists of cupcakes, balloons, candles with names, or it can be in the form of simple bar chart to indicate the birthday frequency for the month.

Birthday graph apps will come handy to tabulate birthdates by month especially for a large group. Your task is to write a program that reads a list of birthdates and display the birthday graph as shown in the sample output below.

Input

The input consists of a few test cases. For each test case, the first line of input is a positive integer N ($N \leq 100$) which indicates the number of data in the test case. Each of the following N lines contains a valid date representing birthdays formatted as `dd mm yyyy`. Input is terminated by a test case where N is 0.

Output

For each test case, output a line in the format `"Case #x:"` where `x` is the case number (starting from 1), follow by the monthly birthday graph as shown in the sample output.

Sample Input Output

Sample Input	Sample Output
15 26 06 2007 27 09 2012 08 08 1995 02 01 2008 07 04 1999 25 10 2006 26 04 1995 09 02 2006 06 01 2010 05 02 2012 07 01 2014 12 05 2009 22 04 1997 24 08 2005 05 05 2006 10 15 12 2000 13 10 1997 29 06 1998 19 06 1996 03 01 1997 05 11 2000 18 02 1999 12 05 2000 29 11 1995 22 04 1998 0	Case #1: Jan:*** Feb:** Mar: Apr:*** May:** Jun:* Jul: Aug:** Sep:* Oct:* Nov: Dec: Case #2: Jan:* Feb:* Mar: Apr:* May:* Jun:** Jul: Aug: Sep: Oct:* Nov:** Dec:*

6C	THE HERBAL SALESMAN	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : problem solving

Problem Description

Ahmad Nisfu owns a direct selling company and a number of salesmen for selling a number of herbal products. The salesmen would travel from town to town and everyday Ahmad Nisfu would record the number of products sold by his salesmen. At the end of certain period, he would determine from the data recorded, the lowest and the highest number of sales as well as the number of frequencies. Write a program to help Ahmad Nisfu to carry out this task.

Input

Input the first line of input is $\boldsymbol{T}$ ($1 \leq \boldsymbol{T} \leq 100$) which is the number of cases. This is followed by T lines of input. Each of those lines of input represents a case. It starts with $\boldsymbol{X}$ ($1 \leq \boldsymbol{X} \leq 100$) which is the length of the time period (in days). This is then followed by a list of $\boldsymbol{X}$ data which is the number of product sales for each day in that time period.

Output

The output produced consists of T lines, one line for each case. Each line contains two pairs of numbers. The first pair consists of the minimum number of product sales and the number of its frequency. The next pair consists of the maximum number of sales followed by the number of its frequency.

Sample Input Output

Sample Input	Sample Output
2 3 23 25 27 5 89 85 85 89 85	Case #1: 23 1 27 1 Case #2: 85 3 89 2

6D	ABOVE AVERAGE	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : simple problem solving

Problem Description

Understanding how to interpret test scores is a valuable skill for every teacher. That's because test score interpretation enables teachers to understand how their students' performance for each tests of the course.

Average test score is one of the indicators to determine the class performance for the test. For each test, we need to calculate the average score and determine the percentage of students who's score is more than the average score.

Input

First line of input is an integer $\boldsymbol{T}$ ($1 \leq \boldsymbol{T} \leq 100$) that represents the number of test case, followed by $\boldsymbol{T}$ test cases. For each test case there will be a set of integers $\boldsymbol{x}$ ($0 \leq \boldsymbol{x} \leq 100$) that represent the student's mark for the test, which ends with -1. Maximum number of students in the class is 100. There might be cases where some of the students did not take the test, hence the number of marks in the test case may be less than the maximum number of student.

Output

For each test case, the output contains a line in the format "`Case #x: A P%`", where x is the case number (starting from 1) and `A` represent the average mark for the test and `M` is the percentage of student above the average mark.
Note: `A` and `P` is rounded to the nearest integer value using `Math.round(double a);`

Sample Input Output

Sample Input	Sample Output
2 34 87 48 45 70 12 10 100 45 80 -1 28 11 62 43 78 1 36 81 70 31 37 71 -1	Case #1: 53 40% Case #2: 46 42%

6E	INNER PRODUCT	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : problem solving

Problem Description

The inner product (also known as the *dot product* or *scalar product*) of the elements of set ***A*** and the elements of set ***B*** of size ***N*** is defined as the sum of the products of corresponding terms.

For example, given set ***A*** as the array {2, 3, 4, 5, 6, 7, 8, 9} and set ***B*** as {6, 5, 4, 3, 2, 7, 8, 9}, then the inner product of ***A*** and ***B*** is

(2*6) + (3*5) + (4*4) + (5*3) + (6*2) + (7*7) + (8*8) + (9*9) = 264.

Input

First line of input is an integer ***T*** ($1 \leq T \leq 100$) that represents the number of test case, followed by ***T*** test cases. Each test case will start with an integer ***N*** ($1 \leq N \leq 20$) in a single line that represents the set size. For each of the following two lines there will be ***N*** integers representing data in set ***A*** and ***B*** respectively.

Output

For each test case, the output contains a line in the format "`Case #x: IP`", where `x` is the case number (starting from 1) and `IP` is the inner product for the test case

Sample Input Output

Sample Input	Sample Output
2 8 2 3 4 5 6 7 8 9 6 5 4 3 2 7 8 9 4 2 1 4 1 6 5 8 3	Case #1: 264 Case #2: 52

6F	6-SIDED DIE ROLL	
	Input	Standard input
	Output	Standard output
	Topic	1D Array : problem solving

Problem Description

In the real world, dice (the plural of die) are polyhedra made of plastic, wood, ivory, or other hard material. Each face of the die is numbered, or marked in some way, so that when the die is cast onto a smooth, flat surface and allowed to come to rest, a particular number is specified.

Mathematically, we can consider a die to be a random variable that takes on only finitely many distinct values. Usually, these values will constitute a set of positive integers 1, 2, ..., n; in such cases, we will refer to the die as n-sided. The most common die in many board games is a 6-sided die.

In this problem you are required to determine the frequency of a 6-sided die rolling simulation.

Input

First line of input is an integer T ($1 \leq T \leq 100$) that represents the number of test case, followed by T test cases. For each test case there will be a set of integers x ($1 \leq x \leq 6$) that represent the face of the die rolled, which ends with -1. The number of rolls for each test case should not be more than 200 times.

Output

For each test case, the output contains a line in the format "`Case #x:`", where `x` is the case number (starting from 1). The following 6 lines is the frequency of the die roll as shown in the sample output.

Sample Input Output

Sample Input	Sample Output
2 2 2 3 5 6 5 1 3 1 6 4 3 2 2 2 2 2 1 2 6 -1 4 6 5 6 5 5 1 5 2 5 4 3 5 2 1 6 2 4 2 5 6 5 6 5 5 -1	Case #1: Face 1:3 Face 2:8 Face 3:3 Face 4:1 Face 5:2 Face 6:3

	Case #2: Face 1:2 Face 2:4 Face 3:1 Face 4:3 Face 5:10 Face 6:5