Lab Preparation Task

**Problem 1.** Write down a program which stores the marks of students in a class (the class contains only 15 students) in programming fundamentals quiz. Your program should compute and print following statistics from the array.

Maximum (the largest number)

Minimum (the smallest number)

Mean marks (the Average of all numbers)

Variance (var) computed according to following formula, where µ refers to the mean (computed in above step) of the numbers, and xi represents the ith number.

sigma i=1 to N of (xi - mu)^2

Mode (which number occurs most of the times. Assumption: although there may be more than one numbers (e.g. in 3, 2, 3, 4, 2) that occur most of the time, you can assume that this never happens)

e.g. in 4 4 7 7 9 8 1 10 7 3

largest = 10,

smallest = 1,

average = 6,

var = (6-4)2 +(6-4)2 +(6-7)2 +(6-7)2 +(6-9)2 +(6-8)2 +(6-1)2 +(6-10)2 +(6-7)2 +(6-3)2 = 4+4+1+9+4+25+16+1+9 = **73**

mode = 7

(**Hint:** For simplicity, use separate loop for computing each statistic. There will be additional credit for computing mode correctly. **Algorithmic Hint:** For computing mode, declare a separate array (say FreqArr) equal in size to maximum number in the original array. Then, store the frequency of each number in the original array at appropriate location in the new array. For example, store the frequency of number 4 at FreqArr[4], which is 2 in the above example. Finally, Find the position of the largest element, which will be the required mode value. )

**Problem 2**. The **X** and **Y** coordinates of 10 different points are entered through the keyboard. Write a program to find the distance of last point from the first point (sum of distance between consecutive points)

**Note:** use the following formula for finding the distance between two points: abs(x2-x1) + abs(y2-y1), where (x1, y1) and (x2, y2) are coordinates of first and second points, respectively and abs(X) means absolute value of X.

**Algorithmic Hint:** declare two arrays (say xArr and yArr). xArr contains x coordinates of 10 points abd yArr contains y coordinates of these points. Inside a loop, for both arrays, compute difference of ith and (i+1)th elementsof the array and find its absolute to find the distance between ith and (i+1)th points. Similarly, compute distances of each all adjacent pairs of the arrays and finally sum them to compute the final distance.