ADSA-2021 **Lab Assignment - 1 Duration: 3 Hrs (**Time:2PM to 5PM **)**

INSTRUCTIONS

1. ALL THREE PROBLEMS are COMPULSORY
2. Carefully read all assignment problems.
3. Write only a single main function. You can call the required functions from the main function. Print the list of elements wherever necessary.
4. Name the file as follows: **S2020xxxxx A01.c**
5. DO NOT zip. Upload a single .c file directly to your submission in the common Google classroom.
6. Don't share or copy the codes. If malpractice is found, you will be awarded Zero.

QUESTION 1: **3-Points**

You have been given an array *A* of size *N* . You need to sort this array non-decreasing order using bubble sort. However, you do not need to print the sorted array . You just need to print the number of swaps required to sort this array using bubble sort

Input Format

The first line consists of a single integer *N* denoting the size of the array. The next line contains *N* space separated integers denoting the elements of the array.

Output Format

Print the required answer in a single line

Constrains

$1 \le N \le 100$

$1 \le A[i] \le 100$

Sample Input	Sample Output
5 1 2 3 4 5	0

Question-2 3-points

You are running a library catalog. You know that the books in your collection are almost in sorted ascending order by title, with the exception of one book which is in the wrong place. You want the catalog to be completely sorted in ascending order. In this scenario, which of the following sorting algorithms takes minimum time and also write a c program for the problem with the chosen algorithm.

1. Insertion Sort
2. Merge Sort
3. Radix Sort
4. Heap Sort
5. Counting Sort

QUESTION-3 4-Points

N boys are sitting in a circle. Each of them has some apples in their hand. You find that the total number of the apples can be divided by N. So you want to divide the apples equally among all the boys. But they are so lazy that each one of them only wants to give one apple to one of the neighbors at one step. Calculate the minimal number of steps to make each boy have the same number of apples (**Note: solve by considering heap sort algorithm**).

Input Format

The first line of input is an integer N. 2 <= N <= 10000 The second line is N integers indicating the number of apples of the ith boy. Each integer is positive and no more than 10^9.

Output Format

A single line contains the minimal number of steps to make each boy have the same number of apples.

Sample Input	Sample output
4 1 3 9 7	8