ISD: Coursework 1

For your first coursework you are to write a program that accepts integer numbers from the keyboard and displays the result of an operation chosen by the user. The program first asks how many numbers the user wishes to enter, it will then prompt the user to enter that amount of numbers and read them from the input.

The program should record these numbers in an array and be able to perform each of the following operations.

1. Calculate the sum of the numbers.
2. Find the largest and the smallest numbers.
3. Find the indices of the largest and the smallest numbers. Note, there may be more than 2 occurrences of these numbers, in this case all the indices must be returned.
4. Count the number of distinct values. For example, if the numbers entered are 1 2 2 1 10 then the number of distinct values is 3.

The program should prompt the user to choose one of the above operations by entering a number from 1 to 4. Your program should then display the result of the selected operation and exit. Each of these operations should be implemented as a separate method.

Note, the last operation is more challenging than the others. It will be useful to first sort the array into ascending order. Then, in order to count the number of distinct values, you will just have to explore the array and count the number of times a number is followed by a greater number. As a simple sorting routine, you can use the following one.

```
for(int i=0;i<n-1;i++) {
 for(int j=i+1;j<n;j++) {
  if(A[i]>A[j])
   { //swapping A[i] and A[j]
     int d=A[i];
     A[i]=A[j];
     A[j]=d;
   }
 }
}
```

In the above program fragment n is assumed to be the array length and A is the array itself. You are, of course, free to choose other names for the variables.

The marking scheme is the following.

- **20 marks.** Style, this includes the following:
  - Comments.
  - Indentation.
  - Appropriate variable, method and argument names.
- **20 marks.** For your program being able to successfully input the data.
- **16 marks.** For each of the first 3 operations.
- **12 marks.** For the last operation (operation 4).

Submitting the assignment:

1. Always keep backup copies of all assignments. If your assignment gets lost, a backup copy will make things easier for you.
2. Include comments in your source code.
3. Include in a comment at the top of each source code file, your name, the name of the programme you are taking (e.g., MSc IT, etc.), and the submission date.
4. When you submit, we don't want you to upload more than one file; so to submit multiple files, please zip them and submit the zipped file.
5. Your zip file should contain the .java file you develop.
6. To submit your file, follow the Upload Submission for Coursework 1 link on the ISD Moodle page.