Assignment 1

Deadline:	5pm, Friday 7th August 2015
Evaluation:	10 marks – which represents 4% of your final grade
Late Submission*:*	1 mark per day late
Teams*:*	The assignment can be done individually or in teams of up to four people (one assignment per team submitted including all student names in the source code).
Purpose:	Practice with basic C++ input and output.

Problem to solve:
Write a C++ program that manipulates a data file *data.txt* to find the sum, average, standard deviation, maximum and minimum values.

Requirements:
The file consists of a series of real numbers (double type) and comments. The first entry in the file holds an integer to signal the number of lines that follow in the file. A comment for this data file format is a line where the first character is `'#'`. The series of real numbers should be saved in memory using an array. Since the size of the array is not known at compilation time you should use a pointer. Your program should display to the screen the final statistics for the file you read.

1. Total number of records read
2. The actual sum of all records
3. The average of the records
4. The standard deviation of the records
5. The highest three values found (in order)
6. The lowest three values found (in order)

EXAMPLE input file *data.txt*:

```
11
# this is a comment in the file
1.000
1.002
0.99999
1.067896777E01
1.0000000000
1
0.99999999999
# another comment
#8.90876   # this data has been commented out
0.987
```

**** FILE AUDIT RESULTS ***

```
Total records: 8
Sum: 17.668
Average of the records: 2.2085
Standard Deviation of the records: 3.4226
Highest three values found: 10.679 1.002 1
Lowest three values found: 0.987 0.99999 1
```

Hints:

1. Think about what would be involved in reading the data how to get the number of lines.
   a. You could read the record into a string, and then if it's not a comment convert it to a double before writing to the array.
   b. Think about how you can convert the characters in a line to a double value.
2. Think about the steps involved in developing this program. What steps should you do first, second and so on? Start with one step and add others.
3. You can assume the input file (if it exists!) is in the same directory as your program source file. DO NOT ask the user to type-in the file name use the explicit file name "data.txt" in your program.
4. How are you going to detect and deal with error conditions?

You **must** follow the next three specifications in **each and every assignment for this course**

1. Place the following comments at the top of your program code and **provide the appropriate information**:

```
// Family Name, Given Name, Student ID, Assignment number, 159.234
/* explain what the program is doing . . . */
```

2. Create the function *displayInfo* as shown below and **provide the appropriate information**:

```
void displayInfo() {
   cout << "----------------------------------------" << endl;
   cout << "Assignment 1 Semester 2 2015"             << endl;
   cout << " Submitted by: Mouse, Mickey, 12345678"   << endl;
   cout << "          and  Duck,  Donald, 98765432"   << endl;
   cout << "----------------------------------------" << endl;
   cout << endl;
}
```

The *displayInfo* should be the first thing that you display on the screen. If I supply the *main()* then you are responsible only for the implementation of the function *displayInfo* and I will call it in my *main()*.

3. **DO NOT** use any function to clean the screen at any stage of a program, for any assignment in this course.

Hand-in: Submit **a1.cpp** electronically on stream.

Marks will be allocated for: correctness, completeness, no code duplication, use of C++ tools, documentation, clear on-screen output display**…**

If you have any questions about this assignment, please ask the lecturer.