BIT 1400 – Computers and Programming – Winter 2017

OPTIONAL Assignment 6 – Movie Statistics

Deadline: April 7, 2017, 10pm

*This is an **optional, extra assignment**. If you complete this assignment, it will replace your lowest assignment grade (granted that you get a better grade in A6 than you did in your lowest assignment).*

The objective of this assignment is to calculate movie statistics. This will make you practice pointers and functions.

In this assignment, you must write a program that can be used to gather statistical data about the number of movies university students see in a month (in the theater or at home). The program should perform the following steps:

1) Ask the user how many students were surveyed. (You don't need to actually survey students, just make up numbers!)
2) Allow the user to enter the number of movies each student saw into the array
3) Display the values entered
4) Sort the values, and display the sorted values.
5) Calculate and display the average, median, and mode of the values entered.

Calculations

- **Average**: The average of a set of values is calculated by the total of the values divided by the number of values.
- **Median**: The media is the middle value of an ordered set of values, or the average of the two middle values if there is no exact middle value.
- **Mode**: The mode of a set of values is the value that occurs the most often, or with the greatest frequency.

Requirements – Variable Types

- You must use a **dynamically allocated pointer array** to record the number of movies seen by each student.
- You can choose the variable type for the other variables in your program.
- You must use memory allocation for any pointer used.

Requirements – Functions

- You must create **6 functions** (beyond the main function): to read the values from the user and populate your dynamic array, to display the array, to sort the array, to calculate the average, to calculate the median, to calculate the mode.
- You should ask how many students were surveyed in the main, then pass that information to each function, as necessary.
- You should not output information in your functions, except
    - In the function to read the input from the user (you can ask how many movies each student saw)
    - in the function to display the array
- The sort function can be taken from the lecture – make sure to correctly identify it
- Select appropriately how each argument will be passed (by value, by reference, by pointer) and what value will be returned. If passed by reference or by pointer, determine whether you need to make this parameter constant.
- In the header comment of each function (i.e. in a comment you write before each function), justify the choice of how you pass each argument. For instance:

```
/* Function: swap
   Description: This function swaps two parameters
   Parameter: a: passed by reference as we want to modify the non-pointer argument.
              b: passed by reference (idem)
   Return:    no return value
*/
void swap(int &a, int &b) {
   int temp = a;
   a = b;
   b = temp;
}
```

Mark breakdown

- The assignment is graded out of 100 Marks and is worth 5% of your final grade
- The breakdown of marks is as follows:
    - Overall Working Executable: **5 Marks**
    - Correct use of pointers including memory allocation/deallocation: **15 Marks**
    - Read Input function: **10 marks**
    - Display function: **5 mark**
    - Sorting function: **5 Marks**
    - Average function: **10 Mark**
    - Median function: **15 Marks**
    - Mode function: **15 Marks**
    - Justification for passing arguments: **10 marks**
    - Good programming practices: **10 Marks**

Submission

- Your submission should consist of one file, the .cpp file created. Do not submit the whole project.
- Submission files must have the *course name*, the *assignment number*, and the *student name* as the first part of filename. For instance:
    - BIT1400_A6_AudreyGirouard.cpp
- Your assignment should be submitted to cuLearn before 10pm on the submission date
- Due to the differences between the cuLearn server and your computer it is advisable to submit your assignment at least 5 minutes before the deadline
- Remember transfer times can be slow, especially during heavy use periods; please take account of this for your submission.
- There is no late submission acceptable for this assignment.

Reminder

- Assignments are individual and thus should not be submitted as a group
- You are not permitted to copy code from a tutorial, a colleague, or the web; it should be written and constructed by you, with the exception of the sort function, which needs to be clearly attributed.