CS590 homework 3 – Max, and Min Heaps

The due date for this assignment is Friday, Oct 19th, at 11.59pm. This assignment is worth 10% of your final grade.

Any sign of collaboration will result in a 0 and being reported to the Graduate Academic Integrity Board. Late submission policy described in the syllabus will be applied.

Questions (100 points)

1. You are given the design of two classes for the max, and min heap structures in the files *minHeap.h*, and *maxHeap.h*. Provide the implementation of these two classes in files *minHeap.cpp*, and *maxHeap.cpp* in order to satisfy all the required functionalities defined in the header files for each one of the functions. Note, that you cannot use any additional headers than the ones already included in the code provided.

2. Assume that you are given a stream of random numbers that you have to store. You are asked to find, and maintain the median value of these numbers, as new values are generated. The solution to this problem can be achieved with using two heaps, a min heap, and a max heap. The implementation of the heaps from problem 1 will be used. The outline of the code you will have to write for this, is provided in the *medianHeaps.h* file. Provide the implementation of this header file in the file *medianHeaps.cpp*. A test case has been provided in the *main.cpp* file, but feel free to write additional test cases to make sure your code works. (Additional test cases are not requested, and will not be graded). Note, that you cannot use any additional headers than the ones already included in the code provided.

Remarks:

- You are not allowed to use code from online resources. Your submission will be tested against that, and will receive a 0, and a report to the Graduate Academic Integrity Board if it is detected.
- No additional libraries are allowed to be used, besides the ones already included in the source code shared with you.
- Makefiles are provided for both problems to build the code in LinuxLab.
- The programming, and testing will take some time. Start early.
- Feel free to use the provided source code for your implementation. You have to document your code.