Assignment 2: Priority Queues and their Applications.

Due: Sept 24, 4:30 PM

Note: Absolutely no late submissions will be accepted.

This assignment is designed to demonstrate to you the benefit of using more advances structures such as heaps for implementing priority queues.

You are required to write three programs, each of which has the same function, but a different underlying algorithm. The programs take as input a file, containing a list of household salaries. The first entry in the file indicates the number of families, followed by the household income of each of these families (each of these entries is seperated by a newline). The program reads this file and asks for an input integer k, less than the total number of salaries. The program then outputs the k lowest salaries in ascending order.

The three programs implement this functionality in the following three ways:

- The first program makes a sorted list (an array) of the numbers and extracts the k lowest numbers by picking the minimum, one at a time and compacting the array.
- The second program makes a heap of the numbers by inserting the numbers one at a time into the heap and removing the k minimum numbers from the heap (while maintaining the heap).
- The third program builds a heap bottom up and removes the k minimum numbers from the heap (while maintaining the heap).

Implement these three algorithms in three different programs. Test these programs on sample input from `http://www.cs.purdue.edu/homes/ayg/CS251/code/test.dat` Note the time for each of the program executions and include the timings as a separate file with your code for submission.