

CS 3304 Data and Information Structures

Lab – Chapter 13

This lab is for Chapter 13.

Write a heapsort program that generates random numbers and insert them in heap. The program then performs heapsort to sort the numbers in ascending order. Implement the heap using an array and compare its performance to STL heap implementation.

Requirements:

1. Use random number generator to generate integers numbers in range [0..1000]. Your program should prompt the user for the total number of numbers to generate. A listing of the generated numbers should be printed on screen in the order they are generated. Allocate a dynamic array to store the numbers.
2. Construct the heap by performing the heapify algorithm.
3. Once the heap is constructed, perform heapsort algorithm and display the sorted list on screen.
4. Use STL heap algorithms to redo Steps 1-3. Take the times of both implementations. However, exclude the times for printing numbers on screen. Display the times of both implementations on screen.
5. Prompt the user whether he/she wants to work on another list of numbers and repeat Step 1-4 if the user answers “Yes”.
6. Write a C++ program and use Visual Studio 2012 to test your program. When testing your program, use “general” application and “empty” project, and make sure all output are properly displayed on screen.
7. Submit the C++ source files (.cpp and .h files) in Blackboard by the due date.