Class CMPS 261
Section 001
Problem Programming Assignment #2
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I. Requirements Documentation

I.1 Description of the Problem

Name: Generic Templated Minimum Heap Class
Problem Statement: A generic templated minimum heap needs to be implemented, with functions that allow the insertion of items as well as the removal of the minimum item from the heap.
Problem Specification: The program will create several minimum heaps to test the correctness of the implementation. Each heap will be instanciated using the default constructor, creating empty minimum heaps of a predetermined size. Each heap will be filled with a unique series of numbers and then the removeMin function will be used until no more elements can be removed from the heap. There will be no user input into the program, it is simply used to test this implementation. The output of the program will show what size of minimum heap will be created; the number set that will be inserted into the heap; and the numbers in order of removal.

I.2 Input Information

I.2.1 Input Streams

Name: N/A
Description: N/A
Format: N/A
Size: N/A
Sample: N/A

I.2.2 Input Items

Description: N/A
Type: N/A
Range of acceptable values: N/A

I.3 Output Information

I.3.1 Output Streams

Name: cout
Description: Used to output the testing of the minHeap implementation.
Format: Displays what is currently happening such as “Creating a minHeap object of size…” in addition to the size of the minHeap object being created. A printout of the

number set that will be inserted is also displayed, as well as the numbers that have been removed from the heap. Lastly, a line waiting for user input (a pause function) is displayed.
Size: About 9 lines.
Sample:
Creating a minHeap object with a size of 10.
Inserting the following elements into the heap:

    10 9 8 7 6 5 4 3 2 1

Removing all elements from the heap:

    1 2 3 4 5 6 7 8 9 10
Press ENTER.

I.3.2 Output Items

Description: N/A
Type: N/A
Range of acceptable values: N/A

I.4 User Interface Information

I.4.1 Description

The program will not allow the user any options aside from pressing “enter” to continue the run of the program. The program will run without a menu and simply test the integrity of the implementation of the minimum heap. The program will create an empty minimum heap and fill it up with a set of numbers. Then the program will remove the minimum element (via removeMin) repeatedly until the heap is empty (has no more elements to be removed). The program will pause for the user. The program will repeat the previous steps until a total of six number sets have been tested. The program will pause before exiting.