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CMPS 109 - Karim Sobh

Assignment 2 - Due: Feb 6

Problem 3 Report

How to build:

Either use the Makefile provided to create an .exe or use the following command to build and run the program:

```
g++ problem3.cpp Heap.cpp
```

Implementation:

To allow use of the copy constructor, Heaps are declared and initialized like

```
Heap heapName(maxSize);
```

This way we can use the copy constructor by doing:

```
Heap destHeap(srcHeap);
```

The copy constructor provides a complete copy of the source heap to the destination heap. This means that the source heap and destination heap are identical and changes to the source heap will not affect the destination heap.

For operator+ with two heaps, I assumed that adding the two heaps would concatenate them. This means that $\text{heap3.MaxSize} = \text{heap1.MaxSize} + \text{heap2.MaxSize}$ and heap3 contains all elements from heap 1 and heap2. For operator+ with an integer, I assumed that this was a simple insert on the heap.

For operator[], it should correctly return the kth Largest item in the heap. If using heap[0], it will return the largest item in the heap.

Heap assignments, or `operator=`, work similarly to the copy constructor where the heap will be the exact same as the other but is separate from each other.

`Operator+=` with heaps adds the other heap's contents to the current heap but does not change the size of the current heap. `Operator+=` with an integer is a simple insert into the heap. `Operator<<` prints the heap with the format: "Heap array = {item1, item2, ... , itemN}".

To assist me with the operators, I added three functions: `getMaxSize()`, `getNel()`, and `getArray()`. Each function does as they are named.

Unusual Things

When performing `operator+` or `operator+=` with integers, the insert does not properly shuffle the elements around.