Project 9 Implementation Notes

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- I added an attribute to LinkedBinaryNode called 'count'. This attribute keeps track of the insertion order.
- I created a copy of LinkedHeap called LinkedLIFOHeap.
- LinkedLIFOHeap keeps a counter and sets the count attribute on each node.
- The heapify methods of LinkedFIFOHeap use the count of each node to drive the sorting.
- I had to make sure the heapify methods kept the count attribute of each node intact.
- HeapStack implements the StackADT interface using a LinkedFIFOHeap.

push()

```java
public void push(T element) {
    heap.addElement(element);
}
```

pop()

```java
public T pop() {
    return heap.removeMin();
}
```

heapSort()

```java
public static <T> void heapSort(T data[]) {
    LinkedHeap<T> heap = new LinkedHeap<T>();
    for (T i : data) {
        heap.addElement(i);
    }

    for (int i=0; i<data.length; i++) {
        data[i] = heap.removeMin();
    }

}
```

Driver

```java
import csc205.Sorting;
import jsjf.HeapStack;
import jsjf.LinkedHeap;

public class HeapDriver {

    public static void main(String[] args) {
        HeapStack hs = new HeapStack();
        LinkedHeap mh = new LinkedHeap();
        String[] arr = new String[7];

        arr[0] = "This";
        arr[1] = "is";
        arr[2] = "my";
        arr[3] = "heaps";
        arr[4] = "project";
        arr[5] = "for";
        arr[6] = "CSC205";

        for (int i=0; i<arr.length; i++) {
            hs.push(arr[i]);
            mh.addElement(arr[i]);
        }

        Sorting.heapSort(arr);

        System.out.println("\nRemoving from the Min Heap: \n");
        while (mh.size()>0) {
            System.out.println("\t" + mh.removeMin());
        }

        System.out.println("\nRemoving from the HeapStack: \n");
        while (hs.size()>0) {
            System.out.println("\t" + hs.pop());
        }

        System.out.println("\nReading from the array: \n");
        for (String s : arr) {
            System.out.println("\t" + s);
        }

    }

}
```

Sample Output

```
Removing from the Min Heap:

        CSC205
        This
        for
        heaps
        is
        my
        project

Removing from the HeapStack:

        CSC205
        for
        project
        heaps
        my
        is
        This

Reading from the array:

        CSC205
        This
        for
        heaps
        is
        my
        project
```