CSC325 – Advanced Data Structures **Program #4 - Heapsort**

In this assignment you are to write a Python program to implement heapsort algorithm & apply it on a provided list.

You are provided with the template in which you must:

(1) implement Phase II of a heapsort algorithm:

(1.1) function that sifts down the value of the heap root to a correct position, and

(1.2) function that finds the largest child of a given heap node.

Your program must:

- take a file containing input list of values as a command line argument and print the original list,
- create a heap form a given list of values and print created heap,
- **sort given list using heapsort algorithm (1),** and print sorted list.

Following is the output of the program run applied on a provided test file:

```
>python heapsort.py test.txt

Original list: [10, 30, -100, 50, 20, 30, -40, 70, 5, 50]

Heapified list:
       Heap size: 10.
       Heap capacity: 10.
       Elements of heap:
              Value: 70 at index: 0
              Value: 50 at index: 1
              Value: 30 at index: 2
              Value: 30 at index: 3
              Value: 50 at index: 4
              Value: -100 at index: 5
              Value: -40 at index: 6
              Value: 10 at index: 7
              Value: 5 at index: 8
              Value: 20 at index: 9

Sorted list: [-100, -40, 5, 10, 20, 30, 30, 50, 50, 70]
```

Together with your source code include a separate file *Namingformat.py* with your **information** as the **values** of the following variables:

```
myName = 'first_name last_name'
myTechID = '0000000'
myTechEmail = 'abc123' #only your email id omit @latech.edu
```

You must properly cite the sources if you use **any help** from peers or **any code/ideas** from online resources. **Failure to do so will be treated as a plagiarism.** Properly citing the sources should be done as a **comment** in your code. Some examples:

```
# found this code at: <source url>
# used idea from: <source url>
# <peer name> helped me with this part
```