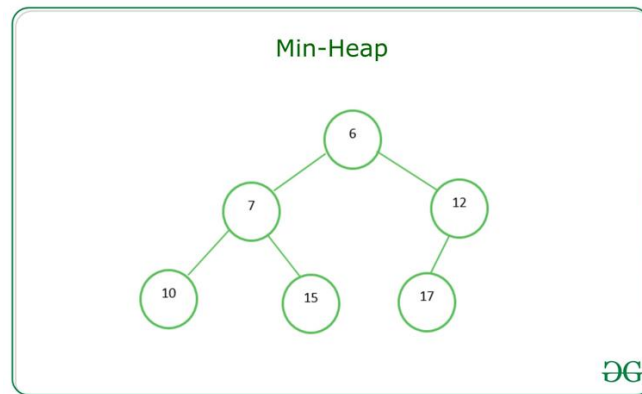


## COMP 203 Lab 10

### Array Implementation of Min Heap (100pt)

Implement Min Heap abstract data structure using array data structure. Your array stores only values and comparison will be made based on this value.

Example:



Your array stores the elements of this Min Heap in the array as follows. Don't forget array data structure has indices starting from 0 to n-1 where n is the size of the array.

6, 7, 12, 10, 15, 17

Implement the following classes and methods in java:

1. Implement MinHeap class for Min Heap with its class variables and constructor with `int maxsizeofArray`. **(5pt)**  
**Hint:** MinHeap class has `int[] Heap`, `int sizeofHeap`, `int maxsizeofArray` variables.
2. `leftChild(int pIndex)` that returns the index of the left child of the parent with the given index *pIndex*. **(5pt)**
3. `rightChild(int pIndex)` that returns the index of the right child of the parent with the given index *pIndex*. **(5pt)**
4. `parent(int cIndex)` that returns the index of the parent child of the children with the given index *cIndex*. **(5pt)**
5. `insert(int element)` that inserts the *element* into Min Heap. **(10pt)**
6. `upHeap(int index)` that reorders the min heap from leaf to the root of Min Heap. **(10pt)**
7. `downHeap(int index)` that reorders the min heap from root to the leaf of Min Heap. **(10pt)**
8. `Remove()` that removes the minimum element in Min Heap and the returns the removed value. **(10pt)**
9. `Min()` returns the minimum value in Min Heap. **(5pt)**
10. `Size()` that returns the size of Min Heap. **(5pt)**

11. PrintMinHeap() that prints the values in the min heap. **(10pt)**

Output should look like this for the following min heap:

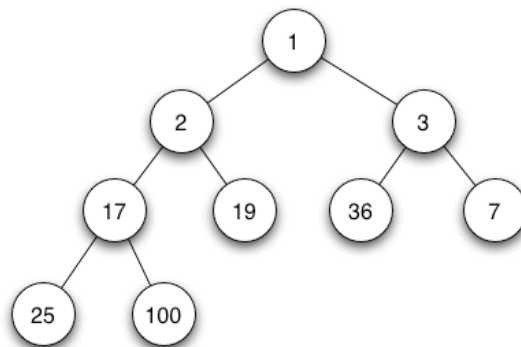
PARENT : 1 LEFT CHILD : 2 RIGHT CHILD :3

PARENT : 2 LEFT CHILD : 17 RIGHT CHILD :19

PARENT : 3 LEFT CHILD : 36 RIGHT CHILD :7

PARENT : 17 LEFT CHILD : 25 RIGHT CHILD :100

12. Test your methods in the main by creating the following min Heap. (Creating the given min Heap:**10 pt**, testing 10 methods: **10x1=10 pt**)



**Include comments of your code for each method and class.**

**Submit MinHeap.java to Canvas as a single java file. No other file types will be accepted.**