**CS010C Quiz 3: Chapters 4 & 5 Practice Quiz**

*Note: This quiz is much longer than the actual quiz to provide you with various problems for you to practice and understand.*

**Runtime Analysis**

*Please write the runtime using big O notation and justify why the notation is correct.*

1. Enqueue on a Max Heap
2. Dequeue on a Max Heap
3. Highest Value on Max Heap
4. Smallest Value on Max Heap
5. Given random list of elements, convert into a Max Heap

*For Problems 6 - 8, assume you have a list of 100 student identification numbers (9 digits) that you want to sort numerically using the specified sorting algorithm*

1. Quicksort
2. Mergesort
3. Radix Sort
4. Heap Sort
5. 2-3 B-Tree Node Insertion
6. 2-3 B-Tree Node Removal
7. 2-3 B-Tree Node Search

**Coding Questions**

*Provided the given class, please code the following functions:*

* Enqueue
* Dequeue
* Highest

class MaxHeap {  
 private:

int[10] heap;

int size = 0;

public:

// trickle index up/down until valid heap

void trickle\_up(int index);

void trickle\_down(int index);

// get parent/right/left index given current index

int parent(int index);

int right(int index);

int left(int index);

// methods to implement

void enqueue(int);

void dequeue();

int highest();

}

1. Highest

int highest(){

}

1. Dequeue

void dequeue(){

}

1. Enqueue

int enqueue(int val){

}

*The following questions 16 - 19 require you to visually draw the 2-3-4 B-Tree after inserting the specified element given the respective trees. DO NOT WRITE ANY CODE. ONLY DRAW/BOX THE RESULTING TREE.*

1. Insert 15



1. Insert 25



1. Insert 45

