LAB 3 REPORT

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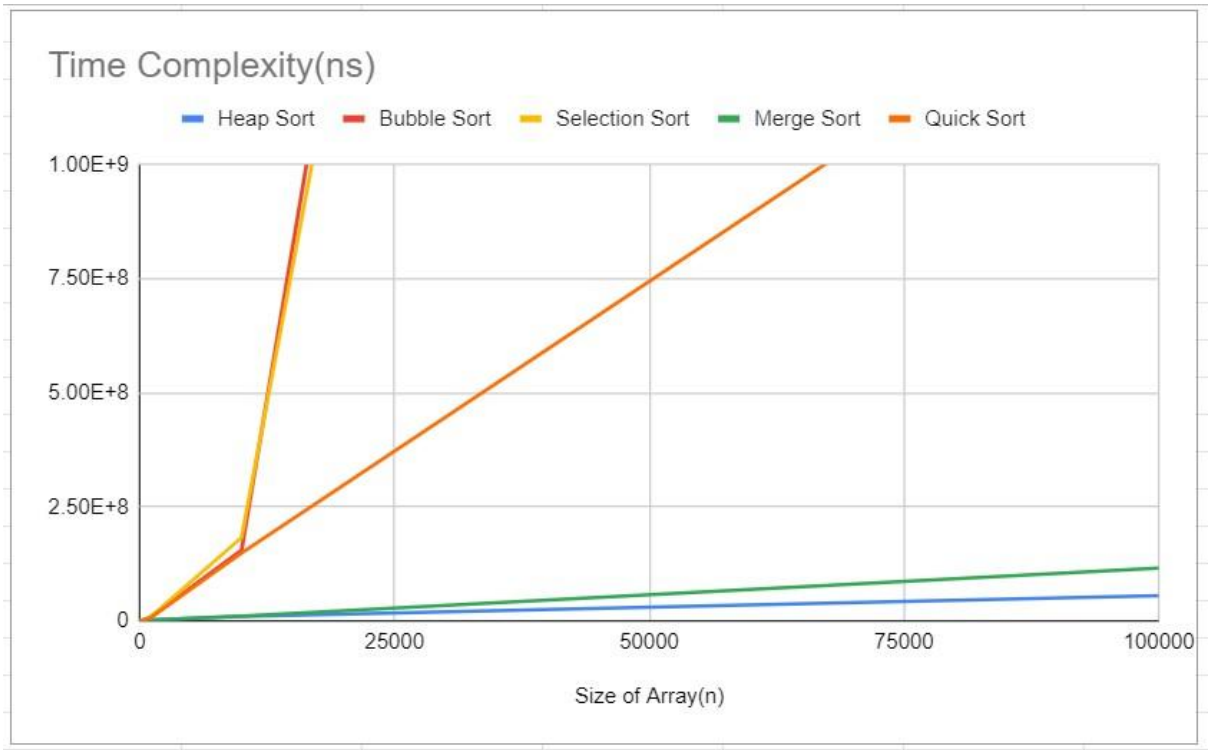
Time analysis of heap sort:



- The time complexity of heap sort is O(n . logn) as we use the method buildMax Heap() which takes a whole array and implement method heapifyDown() on array elements from index = array.length / 2 -1 to 0 with complexity O(n) and then loop over the array elements and extract max element which is the root of the heap and put on the array index = array.length with complexity O(n . log n)

- Conclusion: complexity = n + n . log n = O(n . logn)

Sample Run :

```
maxHeap.insert( element: 4);
maxHeap.insert( element: 1);
maxHeap.insert( element: 3);
maxHeap.insert( element: 2);
maxHeap.insert( element: 16);
maxHeap.insert( element: 9);
maxHeap.insert( element: 10);
maxHeap.insert( element: 14);
maxHeap.insert( element: 8);
maxHeap.insert( element: 7);

maxHeap.displayHeap();
```

```
Parent Node -> 16 Left Child Node -> 14 Right Child Node -> 10
Parent Node -> 14 Left Child Node -> 8 Right Child Node -> 7
Parent Node -> 10 Left Child Node -> 3 Right Child Node -> 9
Parent Node -> 8 Left Child Node -> 1 Right Child Node -> 4
Parent Node -> 7 Left Child Node -> 2
```