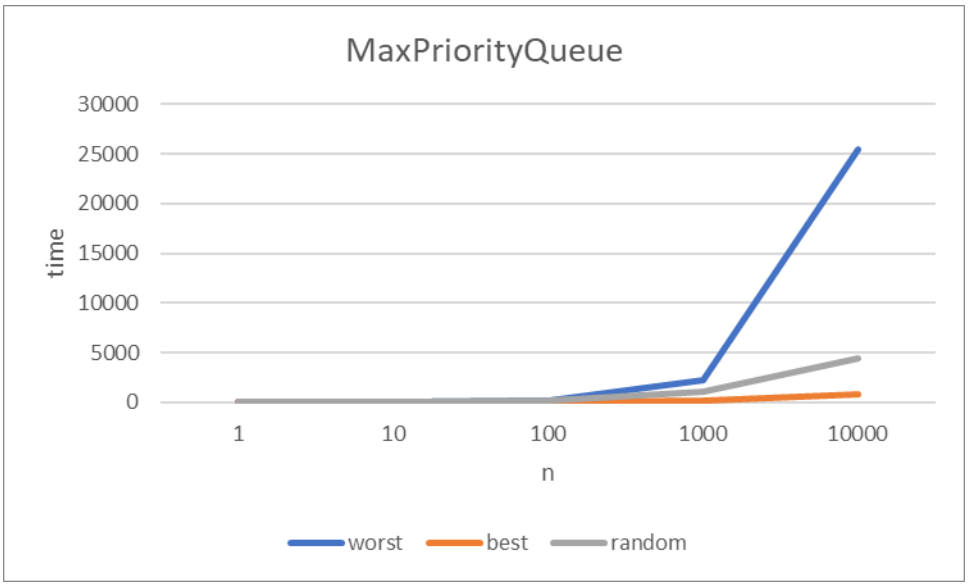
HW2

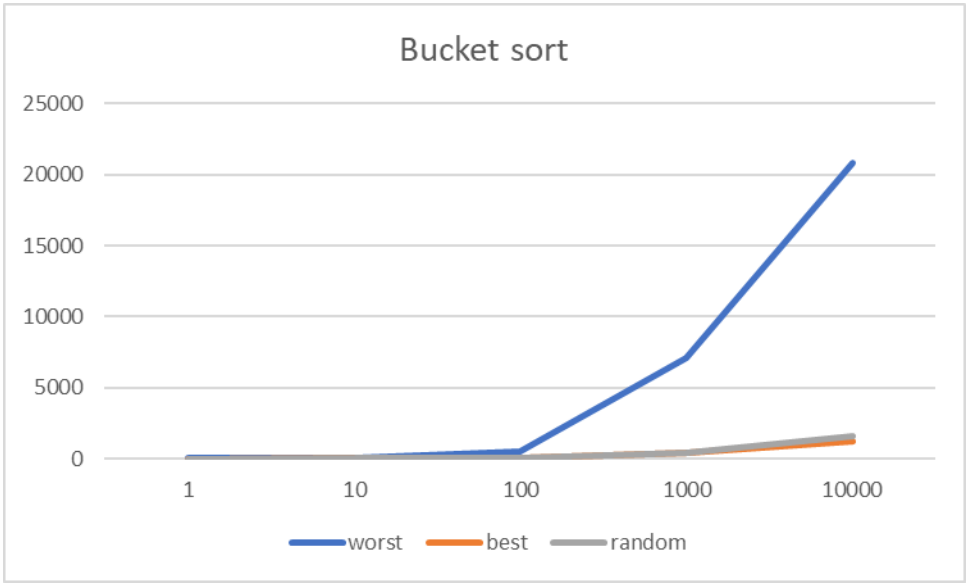
Miguel A. Montoya Z. (A01226045)

September 9, 2017

1. Indicator Variable Exercises
2. Priority Queue
   (a) insert has a worst case of $\mathcal{O}(nlog\,n)$. After testing the code (MaxPriorityQueue.cpp) with best input (Elements in descending order), worst input (Elements in ascending order) and random input (Uniform distribution).

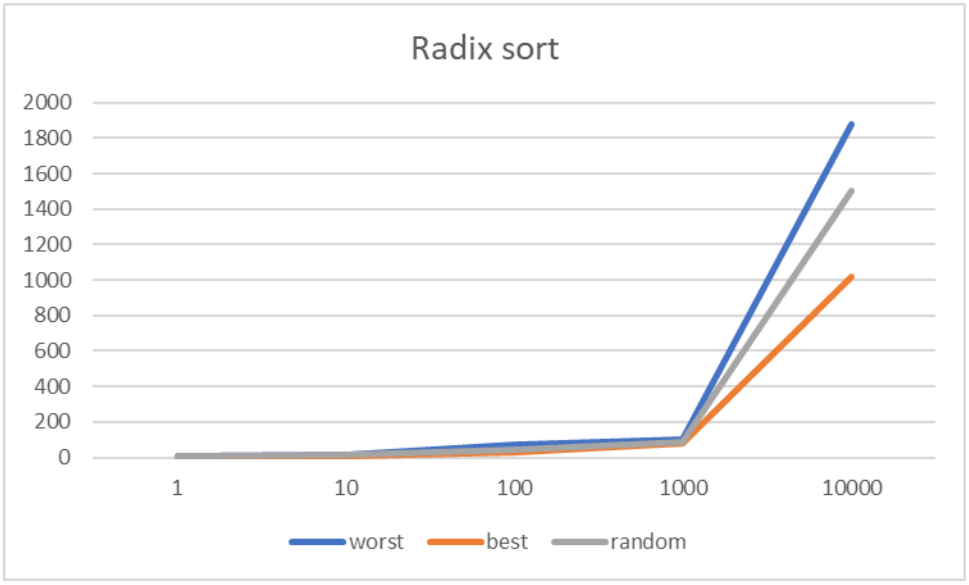


3. Linear Sorting
   (a) Bucket Sort.
      i. After testing (BucketSort.cpp) for best input (Elements are distributed equally in each bucket), worst input (Elements are distributed in 1 bucket), and random (Uniforms distribution), the plot resembles the complexity in Cormen (Linear complexity for best and average, n squared for worst).



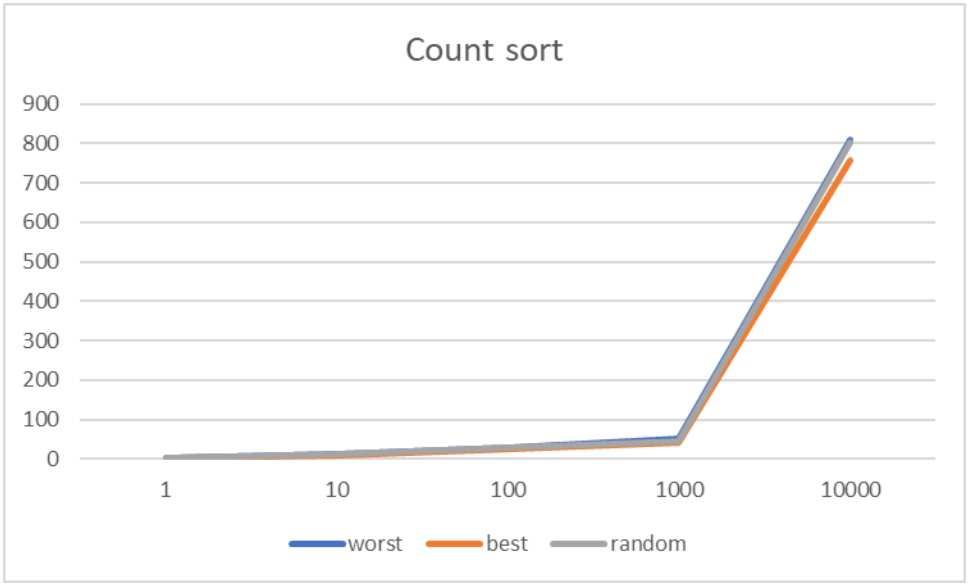
(b) Radix Sort

i. After testing for worst input, best input and random (Using uniform distribution), we found that the sorting performs as described in the Cormen (Linear complexity)



(c) Count Sort

i. Count sort follows the same rules as radix sort.



4. Hash Table

   (a) Division, multiplication and matrix hash functions were implemented and tested (HashTable.cpp). Graphing the results for several alphas got almost constant values. We can say that the complexity holds for the search.