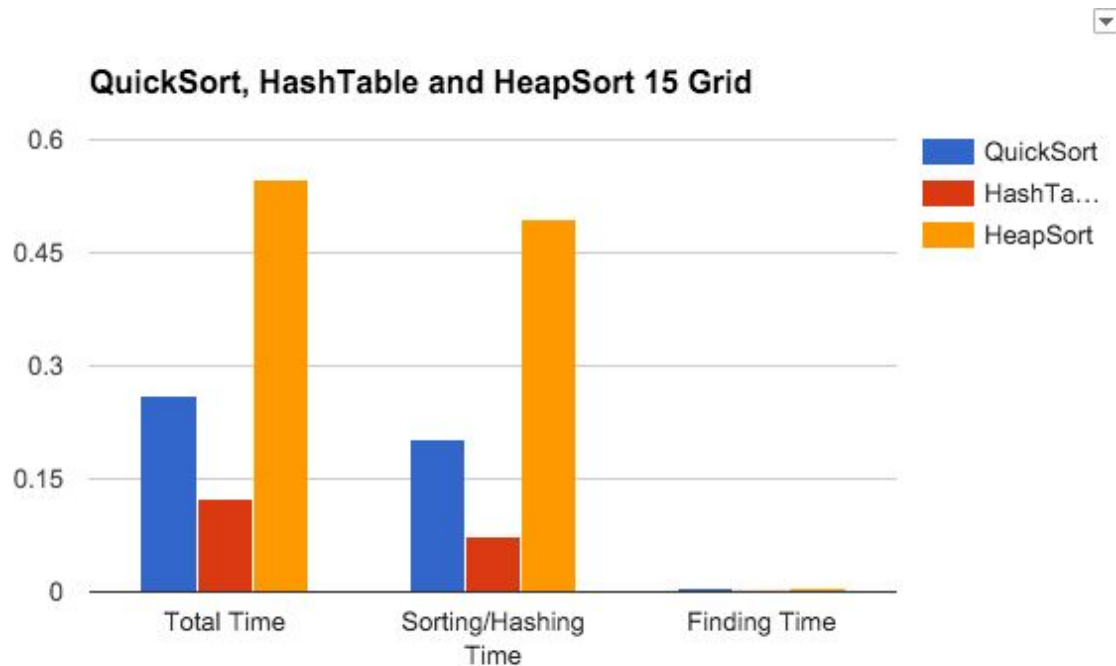
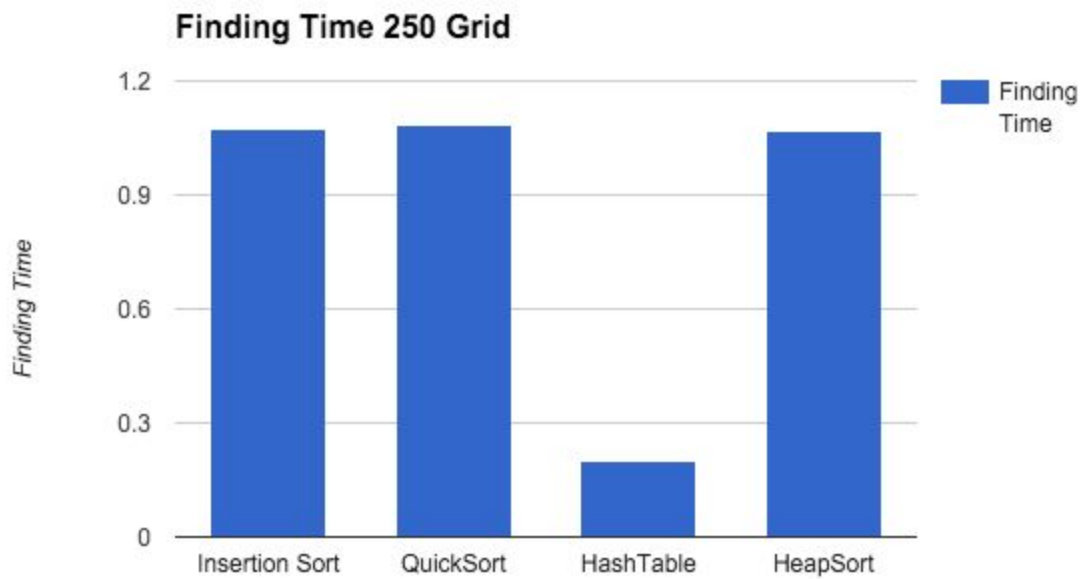
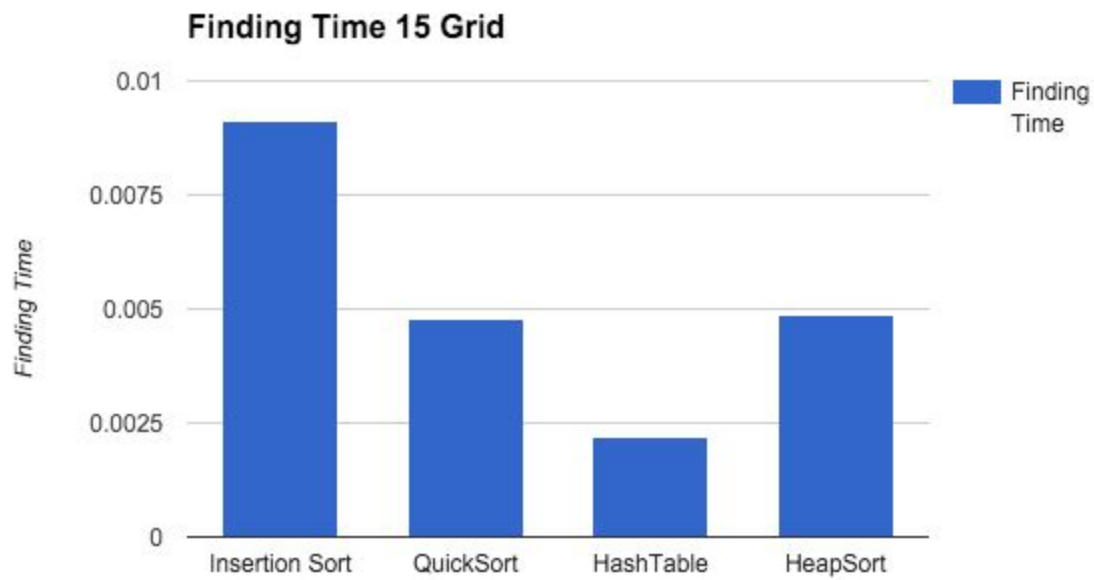


For our algorithms, insertion sort was significantly slower than the other sorting algorithms, consistently lasting over four minutes to finish sorting. HeapSort, QuickSort, and HashTable took less than a second to finish sorting or hashing. HashTable was the fastest algorithm, taking less than 0.1 seconds to finish tabling. It also had the shortest finding time, since it only had to execute a few comparisons to find a given word. Quicksort was the second fastest. Heapsort had on average approximately double the sorting time of QuickSort. The finding time for Quicksort and Heapsort was similar, since both used Binary Search. We think that heapsort is slower than quicksort because heapsort requires copying and quicksort is done in place.

## Graphs





## Raw Data

### Insertion Sort - Grid 15

Total time in seconds: 202.811

Sorting time in seconds: 202.747

finding time in seconds: 0.00912

Clock time: 202856789

### Quicksort - Grid 15

Total time in seconds: 0.261472  
Sorting time in seconds: 0.203495  
finding time in seconds: 0.004801  
Clock time: 297828

### HashTable - Grid 15

Total time in seconds: 0.124724  
Sorting time in seconds: 0.07483  
finding time in seconds: 0.002177  
Clock time: 446944

### HeapSort - Grid 15

Total time in seconds: 0.547379  
Sorting time in seconds: 0.495224  
finding time in seconds: 0.00487  
Clock time: 1013233

### Quicksort - Grid 30

Total time in seconds: 0.256484  
Sorting time in seconds: 0.191083  
finding time in seconds: 0.015736  
Clock time: 1292999

### HashTable - Grid 30

Total time in seconds: 0.143895  
Sorting time in seconds: 0.092355  
finding time in seconds: 0.004976  
Clock time: 1461407

## HeapSort - Grid 30

Total time in seconds: 0.593464  
Sorting time in seconds: 0.516579  
finding time in seconds: 0.015764  
Clock time: 2076849

## Quicksort - Grid 50

Total time in seconds: 0.27846  
Sorting time in seconds: 0.188873  
finding time in seconds: 0.041707  
Clock time: 2375414

## HashTable - Grid 50

Total time in seconds: 0.142433  
Sorting time in seconds: 0.084102  
finding time in seconds: 0.010256  
Clock time: 2543736

## HeapSort - Grid 50

Total time in seconds: 0.585534  
Sorting time in seconds: 0.497331  
finding time in seconds: 0.041488  
Clock time: 3148422

## Quicksort - Grid 250

Total time in seconds: 1.32461  
Sorting time in seconds: 0.193258  
finding time in seconds: 1.0841  
Clock time: 4497821

## HashTable - Grid 250

Total time in seconds: 0.325732  
Sorting time in seconds: 0.071462

finding time in seconds: 0.201294  
Clock time: 4849169

## Heap Sort - Grid 250

Total time in seconds: 1.6329  
Sorting time in seconds: 0.512422  
finding time in seconds: 1.06715