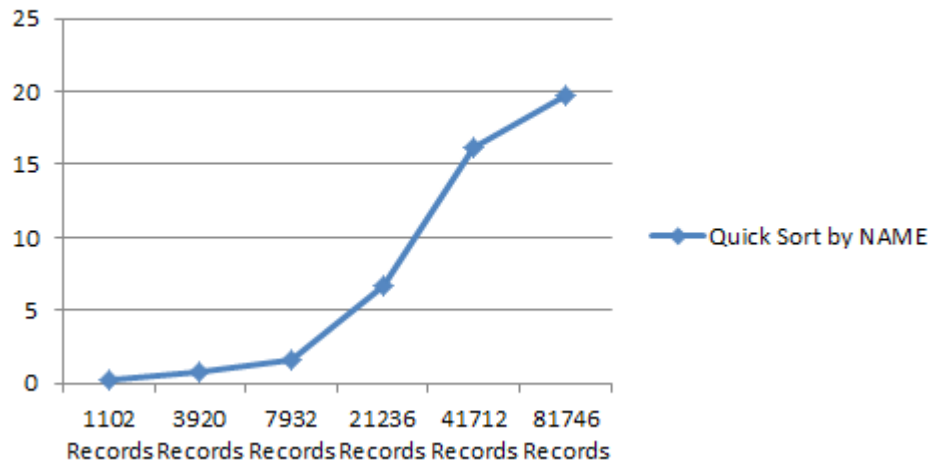


When I started this project I thought I understood the sorts quite well, but once I delved completely into this assignment I realized that applying the sorts to different mediums had its own set of challenges. I started by recreating the psuedocode, but found that I had to do more research online. I ended up comparing the psuedocode with several online resources and in the end it helped me understand what I was having issues with. I ran in to an issue with seg faults because my original random generator was picking a number that it had already chosen resulting in a NULL index, but the end the default random generator fixed that. I never realized just how slow insertion sort could be and on the other hand realized how fast merge sort is. The report was difficult until I realized I did not need to copy and paste from VIM and could instead use redirection to write to a text file. Overall this was a semi-interesting project that taught me quite a bit about the several different sorts and their different, or very similar implementations.

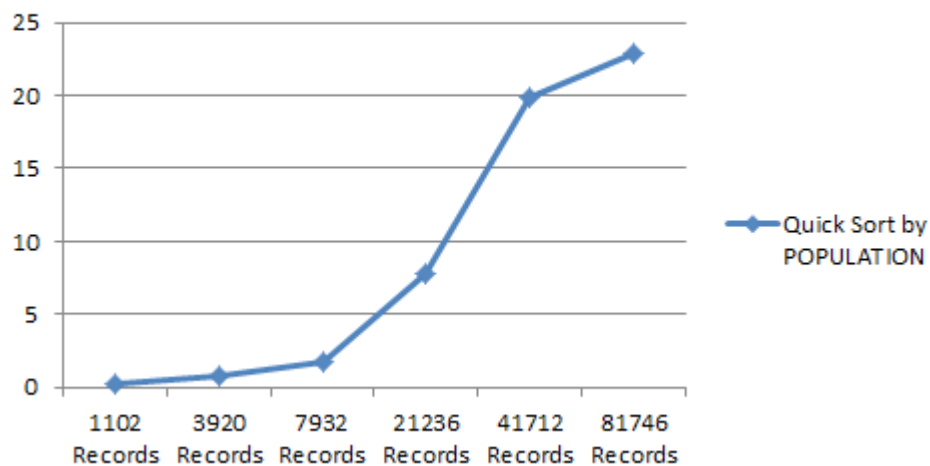
| Quick Sort by NAME | | | | | | |
|--------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.219471 | 0.875655 | 1.68073 | 7.27007 | 21.3057 | 20.9334 |
| 2 | 0.225156 | 0.780657 | 1.66617 | 6.70533 | 21.4004 | 20.4047 |
| 3 | 0.219679 | 0.797198 | 1.67418 | 7.73086 | 16.2315 | 20.4692 |
| 4 | 0.305708 | 0.766959 | 1.8592 | 7.89599 | 21.303 | 19.7918 |
| 5 | 0.223566 | 0.774892 | 3.23306 | 7.62319 | 17.2746 | 19.6821 |
| Lowest | 0.219471 | 0.766959 | 1.66617 | 6.70533 | 16.2315 | 19.6821 |

Quick Sort by NAME



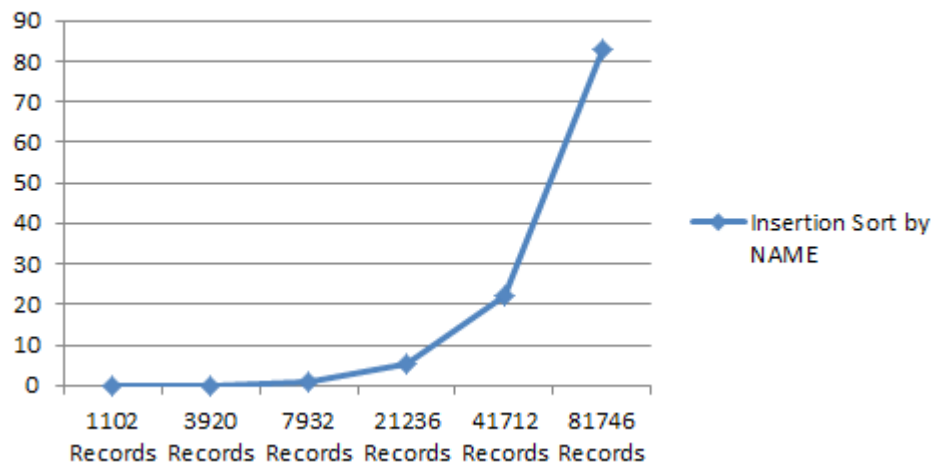
| Quick Sort by POPULATION | | | | | | |
|--------------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.22854 | 0.914925 | 2.76023 | 8.39989 | 19.8059 | 30.1832 |
| 2 | 0.28448 | 0.877999 | 1.74845 | 11.3189 | 24.8227 | 24.3873 |
| 3 | 0.232062 | 0.904619 | 2.07735 | 8.91117 | 20.4091 | 23.7845 |
| 4 | 0.231312 | 0.839749 | 1.86307 | 8.16457 | 23.9622 | 22.8746 |
| 5 | 0.22677 | 0.822235 | 2.93138 | 7.82085 | 23.9402 | 25.7464 |
| Lowest | 0.22677 | 0.822235 | 1.74845 | 7.82085 | 19.8059 | 22.8746 |

Quick Sort by POPULATION



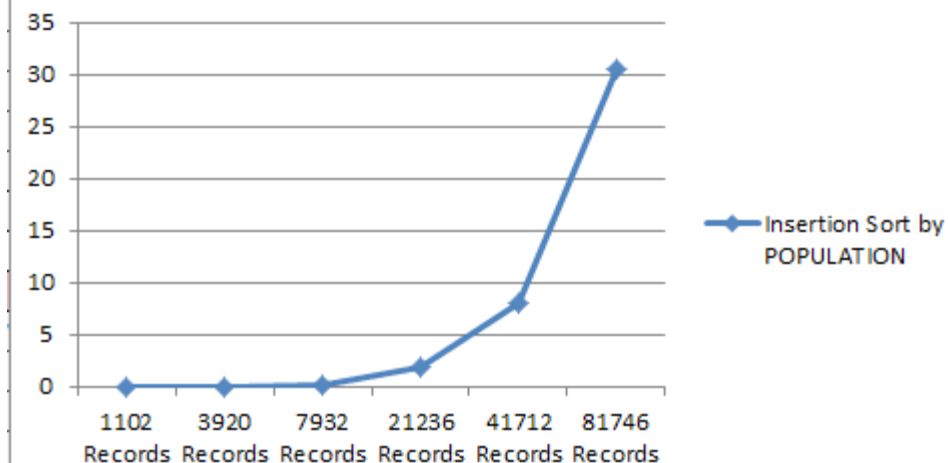
| Insertion Sort by NAME | | | | | | |
|------------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.0181853 | 0.380987 | 0.708661 | 5.62445 | 23.8144 | 82.8316 |
| 2 | 0.0177314 | 0.384219 | 0.722486 | 6.09826 | 22.3967 | 125.228 |
| 3 | 0.0292999 | 0.352431 | 0.706109 | 5.55697 | 22.8323 | 105.049 |
| 4 | 0.0271841 | 0.157574 | 0.696949 | 5.57792 | 22.7712 | 89.1753 |
| 5 | 0.0274065 | 0.15713 | 0.915964 | 5.56643 | 21.9409 | 99.71 |
| Lowest | 0.0177314 | 0.15713 | 0.696949 | 5.55697 | 21.9409 | 82.8316 |

Insertion Sort by NAME

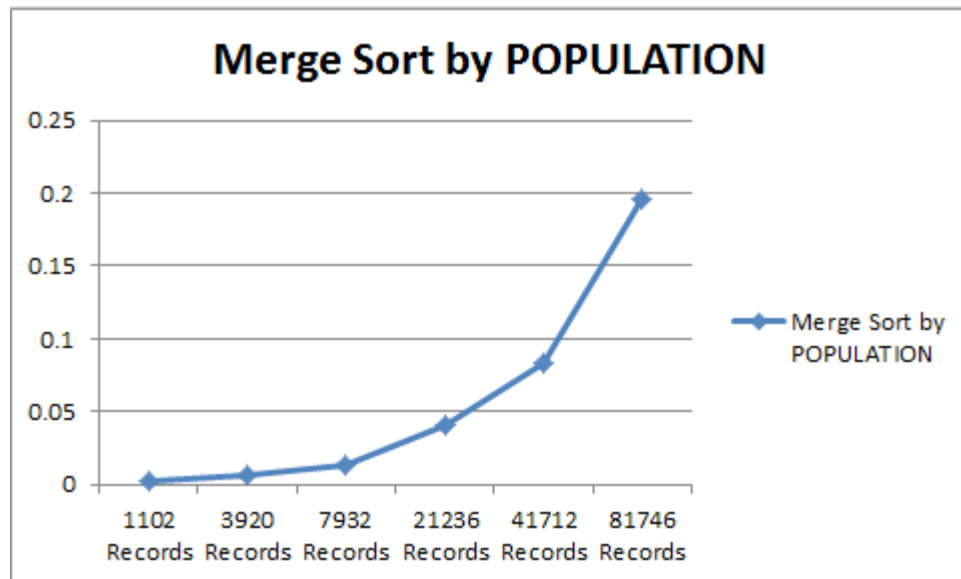


| Insertion Sort by POPULATION | | | | | | |
|------------------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.00326296 | 0.0785718 | 0.196131 | 1.97413 | 8.06474 | 33.0783 |
| 2 | 0.00324029 | 0.0772388 | 0.195275 | 1.92013 | 8.41629 | 30.6015 |
| 3 | 0.0032304 | 0.0755092 | 0.188783 | 1.90183 | 8.05973 | 30.6437 |
| 4 | 0.00766509 | 0.0401951 | 0.189287 | 1.93234 | 8.53386 | 31.1094 |
| 5 | 0.00760855 | 0.0321365 | 0.28559 | 1.92066 | 7.83194 | 30.5194 |
| Lowest | 0.0032304 | 0.0401951 | 0.188783 | 1.90183 | 8.05973 | 30.6015 |

Insertion Sort by POPULATION



| Merge Sort by POPULATION | | | | | | |
|--------------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.00185521 | 0.0165501 | 0.0140854 | 0.0433307 | 0.0853518 | 0.201337 |
| 2 | 0.00189329 | 0.0160447 | 0.0138353 | 0.041078 | 0.0874011 | 0.224036 |
| 3 | 0.00181811 | 0.0148421 | 0.01402 | 0.0413359 | 0.0853408 | 0.195617 |
| 4 | 0.00438712 | 0.00670588 | 0.0140764 | 0.0409336 | 0.083767 | 0.340761 |
| 5 | 0.00439926 | 0.00687366 | 0.0138288 | 0.0418667 | 0.0860253 | 0.347671 |
| Lowest | 0.00181811 | 0.00670588 | 0.0138288 | 0.0409336 | 0.083767 | 0.195617 |



| Merge Sort by NAME | | | | | | |
|--------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| Run # | 1102 Records | 3920 Records | 7932 Records | 21236 Records | 41712 Records | 81746 Records |
| 1 | 0.00209472 | 0.0189858 | 0.0173289 | 0.0557275 | 0.109623 | 0.555134 |
| 2 | 0.00209844 | 0.0187461 | 0.0165791 | 0.051645 | 0.1144 | 0.274968 |
| 3 | 0.00206915 | 0.0175611 | 0.0166403 | 0.0518546 | 0.121941 | 0.521657 |
| 4 | 0.00486174 | 0.00787744 | 0.01648 | 0.0510445 | 0.108689 | 0.365374 |
| 5 | 0.00488759 | 0.00786472 | 0.0174027 | 0.0508707 | 0.111396 | 0.360301 |
| Lowest | 0.00206915 | 0.00786472 | 0.01648 | 0.0508707 | 0.108689 | 0.274968 |

