

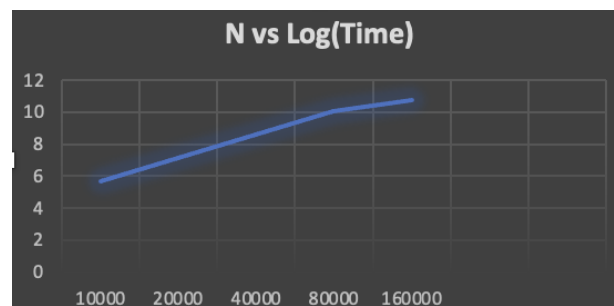
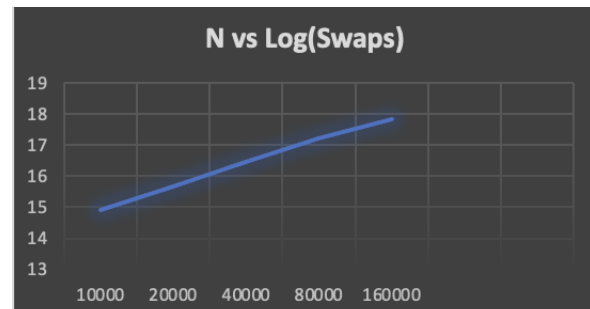
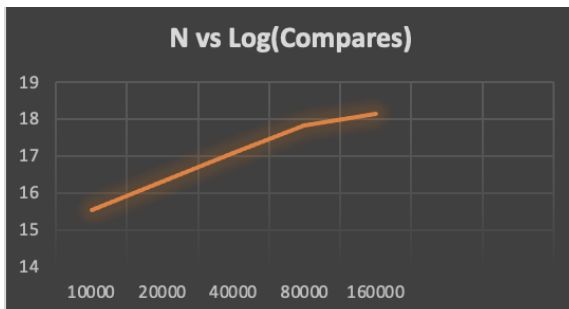
ASSIGNMENT-6

6.1 HEAP-SORT

I have run this heap sort for 20 runs and these are my results.

Array Size	Compares	Log(Compares)	Swaps	Log(Swaps)	Hits	Time (ns)	Log(Time)
10000	5611727	15.54036907	3010268	14.91753967	23264526	299.799294	5.70311323
20000	12151730	16.3129821	6485735	15.68511571	50246400	1295.6194	7.16674416
40000	26156587	17.07961161	13911666	16.44823833	107959838	5596.9936	8.62998488
80000	56017321	17.8411715	29678848	17.20594516	230750034	22901.0073	10.0389362
160000	76017433	18.14647325	55178848	17.82609025	510750034	45901.0073	10.7342423

Statistics taken from excel:

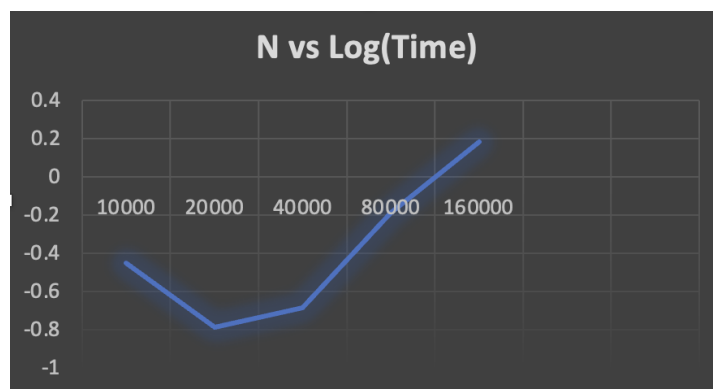
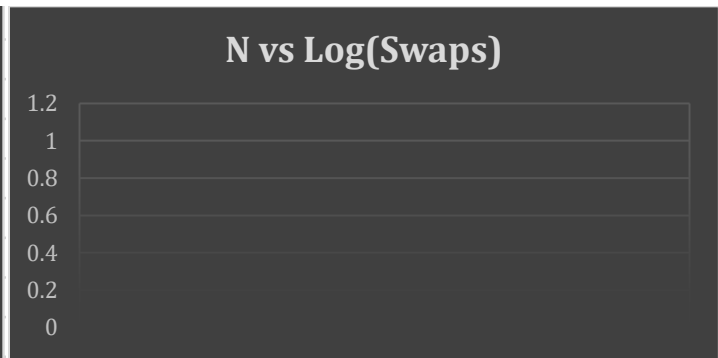
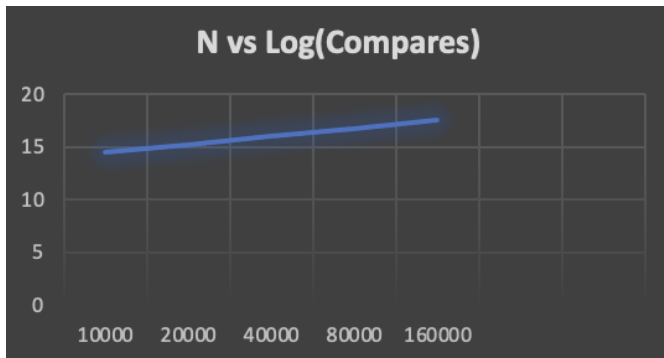


6.2 MERGE-SORT

Here is the merge sort code for 20 runs.

Array Size	Compares	Log(Compares)	Swaps	Log(Swaps)	Hits	Time (ns)	Log(Time)
10000	1946347	14.48146484	9715	9.181426362	5223632	0.6358375	-0.4528123
20000	4147890	15.23811033	19514	9.878887436	11327556	0.45551875	-0.7863184
40000	8987454	16.01134016	39071	10.57313578	24415274	0.50321875	-0.6867303
80000	19247359	16.77288441	78148	11.26635974	52350546	0.82983125	-0.1865329
160000	41054999	17.53042316	156348	11.95983957	111740906	1.2005625	0.1827902

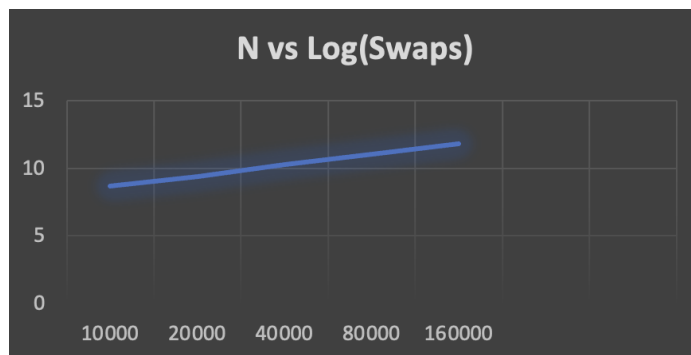
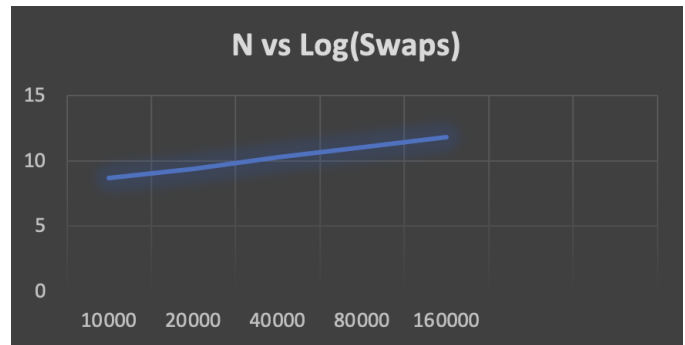
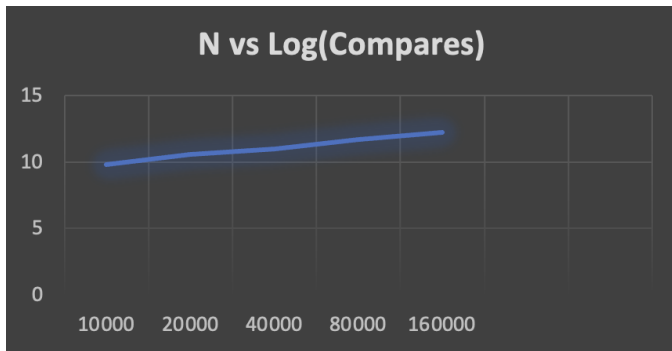
Statistical graphs taken from excel:



6.3 QUICK-SORT(DUAL PIVOT)

Array Size	Compares	Log(Compares)	Swaps	Log(Swaps)	Hits	Time (ns)	Log(Time)
10000	18607	9.831293133	5861	8.676075516	42054	1.36486875	0.31105827
20000	38570	10.56023005	11688	9.366317953	85325	6.9749271	1.94232188
40000	58759	10.98119961	29901	10.3056472	178366	7.48161875	2.01244918
80000	117292	11.67242183	61434	11.02571871	363029	15.6632646	2.75131814
160000	203279	12.2223347	135547	11.81707372	745468	96.0446979	4.56481369

Statistical graphs taken from excel :



6.4 CONCLUSION

The study compared Merge Sort, Quick Dual Pivot sort, and Heap Sort by analyzing their performance on arrays of different lengths. The study measured the number of compares, swaps, and execution time for each sorting technique. The study found that the number of compares is the most accurate predictor of execution time based on the analysis of Log-Log graphs of N vs. T and N vs. compares. On the other hand, the Log-Log graph of N vs. T and N vs. Swaps showed different results for all three sorting techniques, indicating that comparisons are the most reliable indicator of execution time among the three sorting methods.