

Two-phase Merge Sort

System Configuration -

Processor – Intel Core i5 8250U 8th Gen

Processor Speed – 3.40 GHz

Processor Count - 4

RAM Size – 8 Gb

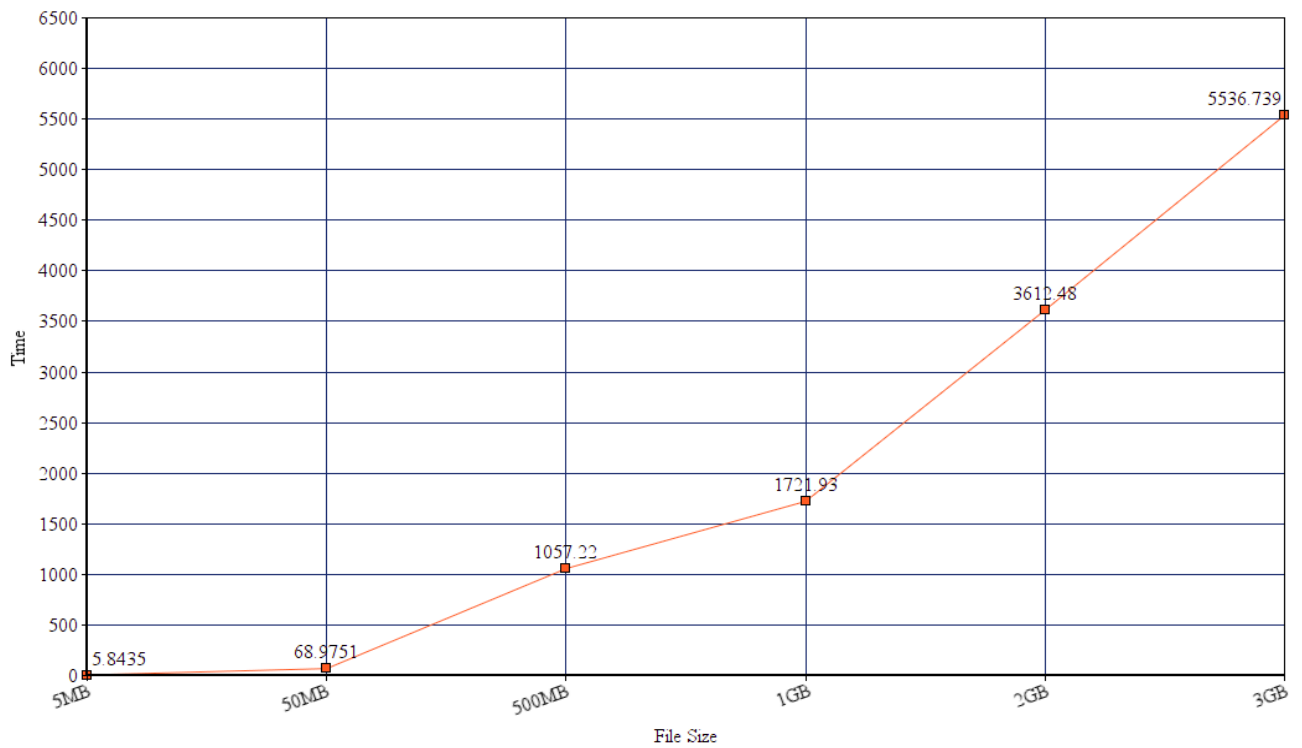
Memory Technology - DDR4

Hard Drive Size – 1 TB

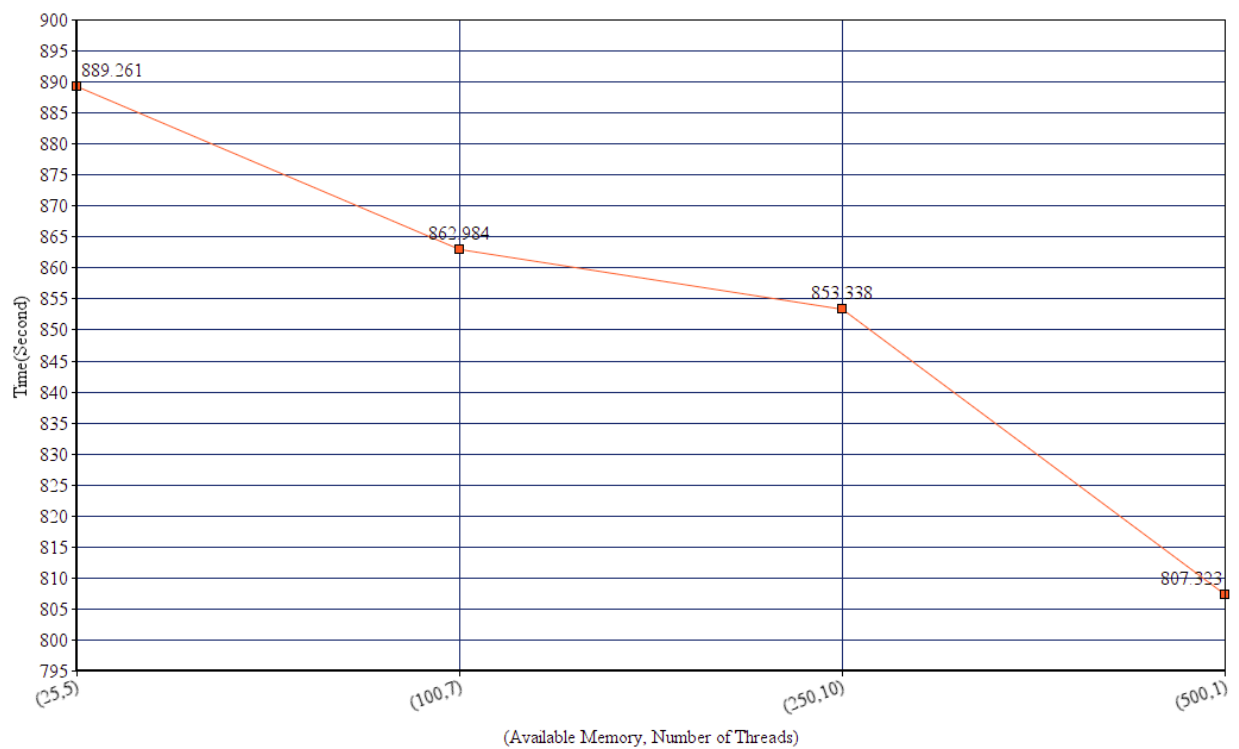
Experiments -

File Size	Size of available Memomry (MB)	Number of Threads	Time Taken (Second)
5 MB	100	1	5.8435
50 MB	100	1	68.9751
500 MB	100	1	1057.22
1 GB	100	1	1721.93
2 GB	100	1	3612.48
3 GB	100	1	5536.739
500 MB	25	5	889.261
500 MB	100	7	862.984
500 MB	250	10	853.338
500 MB	500	1	807.323

The following graph represents the relation between file size and time taken to sort using only single thread.



The following graph represents relation between (Available memory, number of threads) and time taken to sort using 500MB input file.



Explanation -

With keeping available memory fixed and number of threads same, if the file size increases, time taken for sorting takes increases.

For same file if available memory is same, then if number of threads increases the time taken for sorting decreases because threads run parallelly and do sorting parallelly.

For same file if available memory and number of threads keep on increasing then time taken for sorting decreases because the more file can be sorted parallelly with less context switching time.