PSA – Assignment 5

Parallel Sorting

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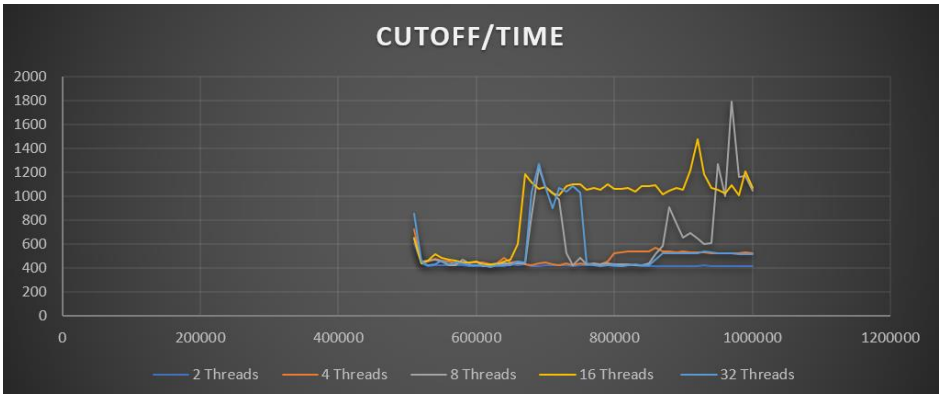
- **Relationship: -**
  Enhancing the cutoff value makes the sorting process faster, which is apparent from the graph. Also, increasing the number of threads used in the sorting process also results in reduced sorting time. However, the time required to sort the array increases with its size due to the O(nlogn) time complexity of parallel merge sort. Thus, to optimize parallel merge sort's efficiency, it's crucial to carefully examine these factors and adjust the cutoff value and thread numbers to ensure efficient sorting of arrays with different sizes.

- **Graphs: -**

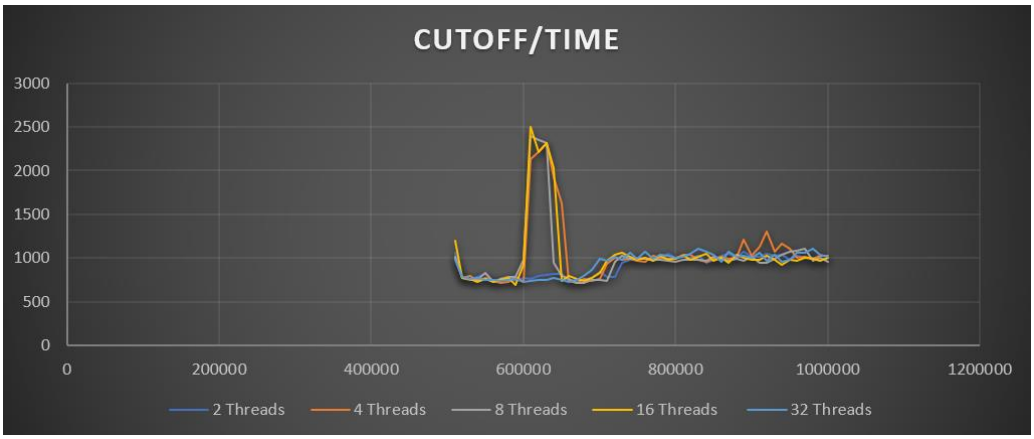
  Array Size = 1000000

Cutoff	2 Threads	4 Threads	8 Threads	16 Threads	32 Threads
510000	607	722	651	649	856
520000	441	451	456	439	453
530000	420	454	461	463	428
540000	422	481	472	516	435
550000	421	466	456	486	464
560000	422	454	428	471	436
570000	422	440	427	464	449
580000	423	445	470	448	443
590000	416	447	438	449	421
600000	419	451	453	459	422
610000	419	446	416	432	425
620000	422	431	422	431	411



Array Size = 2000000

Cutoff	2 Threads	4 Threads	8 Threads	16 Threads	32 Threads
510000	1064	1000	1021	1206	983
520000	775	776	775	778	782
530000	763	794	756	760	766
540000	783	739	756	728	779
550000	820	779	833	759	749
560000	745	736	734	726	752
570000	757	719	765	754	738
580000	778	731	788	770	753
590000	745	782	784	695	768
600000	776	733	984	928	724
610000	760	2137	2401	2497	745
620000	797	2217	2348	2212	750



Array Size = 4000000

Cutoff	2 Threads	4 Threads	8 Threads	16 Threads	32 Threads
510000	2018	2069	1794	1961	1891
520000	1679	1752	1650	1643	1624
530000	1604	1722	1552	1673	1565
540000	1630	1758	1672	1648	1625
550000	1626	1701	1616	1709	2708
560000	1670	1782	1608	1657	5227
570000	1553	1645	1581	1792	4737
580000	1656	1771	1572	2153	5029
590000	1613	1745	1671	2081	2811
600000	1610	1938	1655	2145	1688
610000	1649	2312	2211	2191	1656
620000	1673	4171	2179	2133	1694