Sree Achyutha Varma Penmetcha (002960283)

INFO 6205 Program Structures and Algorithms

Section 8

Assignment 4: Parallel Sorting Observations

Github Link: https://github.com/Varma-PA/INFO6205

Task:

* Giving the minimum cutoff time and the number of threads, find the best combination of them such that it’ll take less time to sort to merge the arrays in merge sort.

My Observation:

Optimal cutoff: ~ ¼ (ArraySize)

Optimal number of threads: 8

1. Provided an array of different sizes (20,000; 200,000 ; 2,000,000) and slowly incremented the thread count by the factor of 2.
2. Provided the cutoff value
3. Stored the average amount of time took into the list and printed the minimum cutoff value, time and average overall time took for number of threads

The optimal cutoff value is of the quarter of the total array size. For example, if we look at the output down below for the array of size 20,000, we can observe that multiple number of the minimum cutoff is around 5,000 (i.e., approximately around 20,000 / 4). Same can be observed for 200,000 as well as 2,000,000 units as well.

Coming to the number of threads, from the graphs mentioned below, we can see the average time is slowly declining in proportion to the number of threads used. However, the time has been stagnated when the thread count has reached around 8. For threads more than 8, i.e., 16 and 32, the average time is more or less equal to the average time took with the threads 8

Output:

Threads and avg time:

Array Size: 20,000













Chart, bar chart

Description automatically generated

Array Size: 200,000













Chart, bar chart

Description automatically generated

Array Size: 2,000,000

















Chart, bar chart

Description automatically generated