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**Program Structures & Algorithms**

**Fall 2021**

**Assignment No. 5**

**Experiment**

I did experiments on My Macbook pro 2017, which has 4 cpu cores, 8 gb memory. I tested by changing these parameters: number of cutoff, number of thread, and size of array. I assume range of experimental cutoff is from 200,000 to 1,000,000.

1. The number of threads: 2; The size of array: 2,000,000

2. The number of threads: 4; The size of array: 2,000,000

3. The number of threads: 8; The size of array: 2,000,000

4. The number of threads: 16; The size of array: 2,000,000

5. The number of threads: 64; The size of array: 2,000,000

6. The number of threads: 4; The size of array: 4,000,000

7. The number of threads: 8; The size of array: 4,000,000

8. The number of threads: 16; The size of array: 4,000,000

9. The number of threads: 64; The size of array: 4,000,000

10. Changing the number of threads: 2, 4, 8, 16, 64; The size of array: 2,000,000; The cutoff is fixed in 250,000

11. Changing the number of threads: 2, 4, 8, 16, 64; The size of array: 2,000,000; The cutoff is fixed in 500,000

**Conclusion**

From these scatter plots, It seems that we can cost shortest time to complete multiple threading sorting if we set the value of `cutoff` to equal to around (25% \* size of array) and 64 threads based on data collected from my machine.