Zuyue Xie (002198575)

**Program Structures & Algorithms  
  
Fall 2021**

**Assignment No. 5**

* Get familiar with the java concurrency programming, future class, completablefuture, forkjoinpool etc. And with that, trying to test parallel sorting(merge sort) algorithm with different array size, different number of thread with different cutoff value(where to optimize the merge sort with insertion sort);
* The cut off value increase with the size of the array and general speaking, with fixed cut off value, with more thread, better the performance.
* I get this conclusion based on the graph and data show below, I think the reason behind this is with more thread(worker) doing a thing, the better the performance, though with too much thread, there are probably will be some problem, but forkjoinpool forbidden me to have a lot of thread. With cut off value it actally surprised me since I think cut off value should be finxed, but it turns out with more element, the higher the cut off value in the parallel sorting.

1.Output (Snapshot of Code output in the terminal)

Table

Description automatically generated with medium confidence

2.Graphical Representation (Observations from experiments should be tabulated and analyzed by plotting graphs (usually in excel) to arrive on the relationship conclusion)

Chart

Description automatically generated

With same cut off value and increasing number of thread.

A picture containing text, window

Description automatically generated

3.Unit tests result:(Snapshot of successful unit)