**2021 NYCU OS HW3 report**

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| Question | Answer |
| Q1.  Briefly describe your design for the sorting algorithm, merge function, the thread management.  Also, describing the number of sort threads and number of merge threads in the Multi-thread program. | Sort演算法我是採用最簡單的bubble sort。merge則是與merge sort 的merge部分類似，不斷比較兩個sorted部分的數字大小，再去更改vector中的數字。Thread部分使用了7個(best)與3個(worst)，分別是 best: 4(sort)+3(merge)與worst: 2(sort)+1(merge)。 |
| Q2.  Show the fastest time acceleration between single-thread and multi-thread. (Take screenshots of the time between single-thread and multi-thread) | ST:  MT-best:  MT-worst:  2085.7/310.719=6.712  MT-best比ST快約6.712倍。 |
| Q3.  You need a brief description of the best multi-threads and worst multi-threads methods.  The content includes the number of threads used and the way of partitioning, comparing the difference in time, and taking the screenshot between two multi-thread results. | Best部分我是將其分為四等分，分給4個thread做sort，最後由3個thread去將其兩兩merge，最後得出答案。  Worst部分則是分為兩等分，利用2個thread去做sort，再用1個thread將兩個部分merge，最後得出答案。  1113.9/310.719=3.585  截圖在Q2部分，可以看見best比worst快了約3.6倍。 |
| Q4.  What did you learn from doing hw3? | 我學到如何運用上課學到的pthread api，並且實際體驗了使用multi-thread的好處，還有運用big-O估計程式執行時間與加速倍率。 |