

# 2019 NCTU OS HW3 report

| Question   | Answer   |
|--|--|
| Q1.<br>Briefly describe your design for the sort and merge function and the thread management in the Multi-thread program. | <p>我用 bubble sort 來做 brute-force sort, 每個 thread 做 1/4 個 array, merge sort 的部份是先做 1/2, 再全部做一次。</p> <p>而 thread management 則用 exit 離開建立的 thread, 再用 join 同步。</p>  |
| Q2.<br>Show your thread information screenshot while running the Single-thread/Multi-thread program.                       | <p>Single-thread</p> <pre>PID USERNAME   THR PRI NICE   SIZE    RES STATE  C  TIME    WCPU COMMAND 58716 poyliu1025    1  91    0     17M   4636K CPU2   2  0:11   97.64% 0616223 ST</pre> <p>multi-thread</p> <pre>PID USERNAME   THR PRI NICE   SIZE    RES STATE  C  TIME    WCPU COMMAND 58742 poyliu1025    5  49    0     18M   5000K uwait   0  0:08   380.16% 0616223 MT</pre>   |
| Q3.<br>Show the time speedup between Single-thread and Multi-thread.   | <p>Single-thread</p> <pre>bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- g++ -Wall -o 0616223_ST 0616223_ST.cpp bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- time ./0616223_ST &lt; input1.txt &gt; output1_ST.txt 0.389u 0.007s 0:00.41 92.6% 10+5125k 1+110 0pf+0w bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- time ./0616223_ST &lt; input2.txt &gt; output1_ST.txt 42.585u 0.015s 0:42.63 99.9% 10+5045k 0+1110 0pf+0w</pre> <p>multi-thread</p> <pre>bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- g++ -Wall -o 0616223_MT 0616223_MT.cpp -lpthread bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- time ./0616223_MT &lt; input1.txt &gt; output1_MT.txt 0.122u 0.007s 0:00.06 200.0% 11+5627k 1+110 0pf+0w bsd1 [/u/cs/106/0616223/OS/HW3] -poyliu1025- time ./0616223_MT &lt; input2.txt &gt; output1_MT.txt 10.026u 0.000s 0:02.64 379.5% 10+5058k 0+1110 0pf+0w</pre> |
| Q4.<br>What did you learn from doing hw3?  | <p>如何使用 pthread 以及平行處理常會遇到的問題(害我 debug 的時候想說怎麼那麼離譜...)</p>   |