# 2022 NYCU OS HW2 Report

| Question | Answer |
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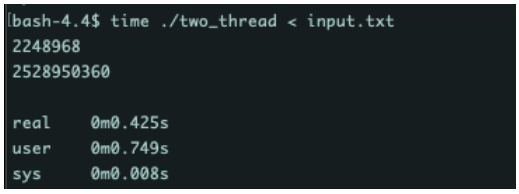
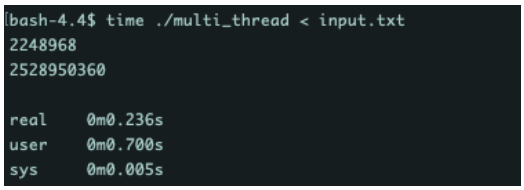
| Q1. (5pts)<br>Briefly describe your design for the add, multiple function of matrix, the thread management.<br>Also, describe the number of threads in the Multi-thread program. | I utilized 4 threads in my multi-thread program. This number of threads performs the best since there are only 4 cores on my hardware. If I add more threads (more than 4), the performance will not improve.<br><br>My design splits the 500 rows into 4 partitions. Each thread handles one partition in parallel. To be more specific, thread 1 adds up row 1 to 125 and generates the multiplication product in row 1 to 125 at the same time. And the same goes with thread 2, 3 and 4. |
| Q2. (15pts)<br>Try at least 3 kinds of number of threads, and compare the difference in time. (Take screenshots of the time of each case)<br>Also, explain the results. | 2 Threads<br>Since only two cores can run in parallel, the time spent would be longer than using 4 threads.<br><br>  <br><br><br>4 Threads<br>Using 4 threads can achieve a shorter time comparing to using two threads since there are 4 processors.<br><br>  <br><br><br>10 Threads<br>Since there are only 4 processors, although there are ten threads, only 4 cores can run in parallel. Therefore, the time is quite similar to using 4 processors. |

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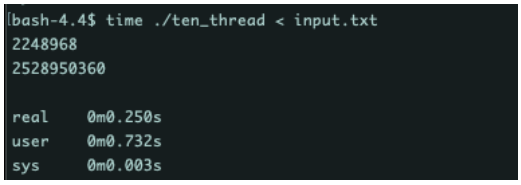
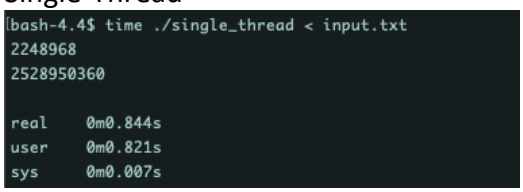
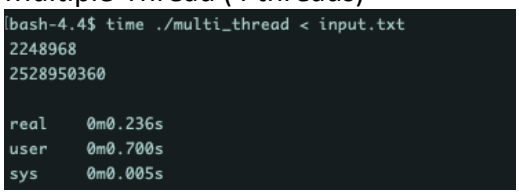
| |  |
| Q3. (10pts)<br>Show the best speedup between multi-thread and single-thread. (Take screenshots of the time of single-thread and multi-thread)<br>Also, explain why multi-thread is faster. | Single-Thread<br>  <br>Multiple-Thread (4 threads)<br>  <br>Speed-Up<br>0.844 / 0.236 = **3.576**<br><br>Explanation<br>Using 4 threads can allow more calculations to be done in parallel so the time spent would be shorter. |