CSD204 - OS - Lab04

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Question 01

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..D204-OS/lab04
~/devEnv/snu/CSD204-OS/lab04  main ?2
❯ make run q01_1
1 calculated accurate sum in 2130µS
2 calculated accurate sum in 1087µS
4 calculated accurate sum in 672µS
6 calculated accurate sum in 705µS
8 calculated accurate sum in 652µS
10 calculated accurate sum in 782µS
12 calculated accurate sum in 715µS
14 calculated accurate sum in 805µS
16 calculated accurate sum in 842µS
make: 'q01_1' is up to date.
```

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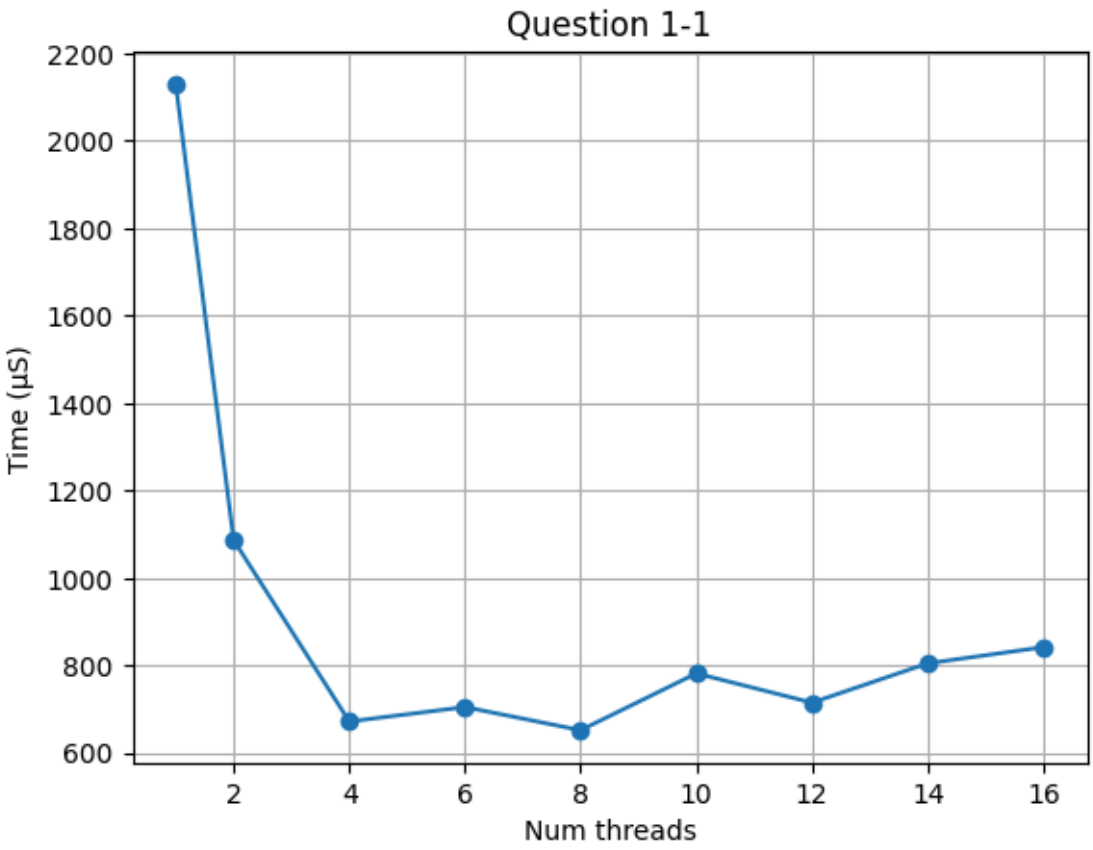
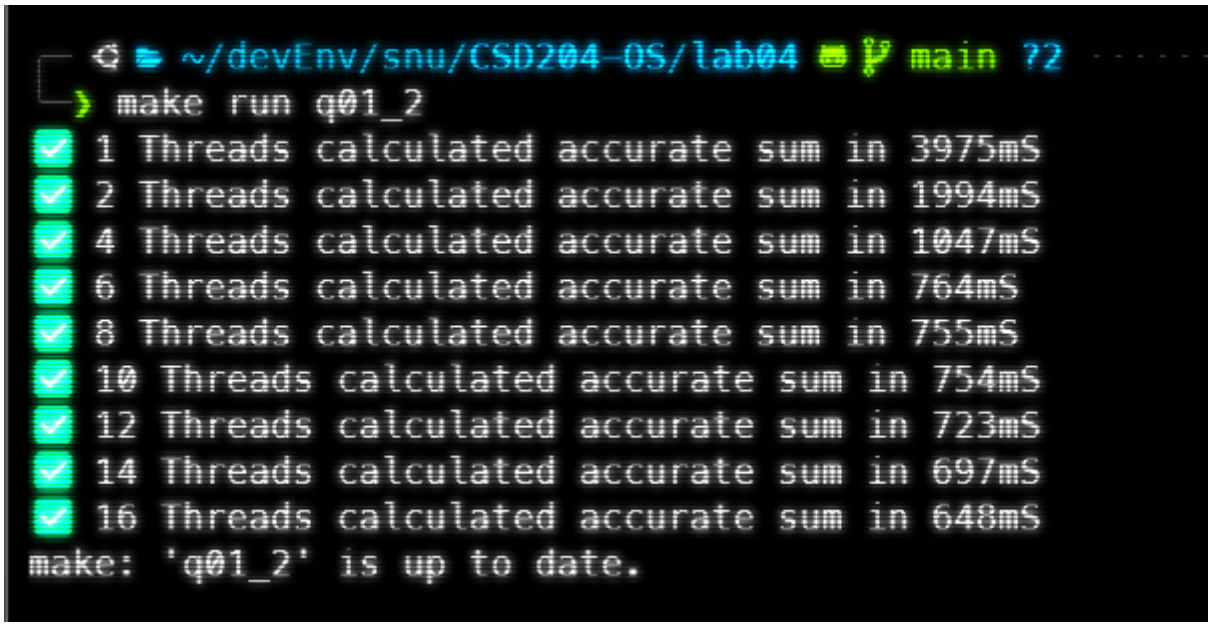
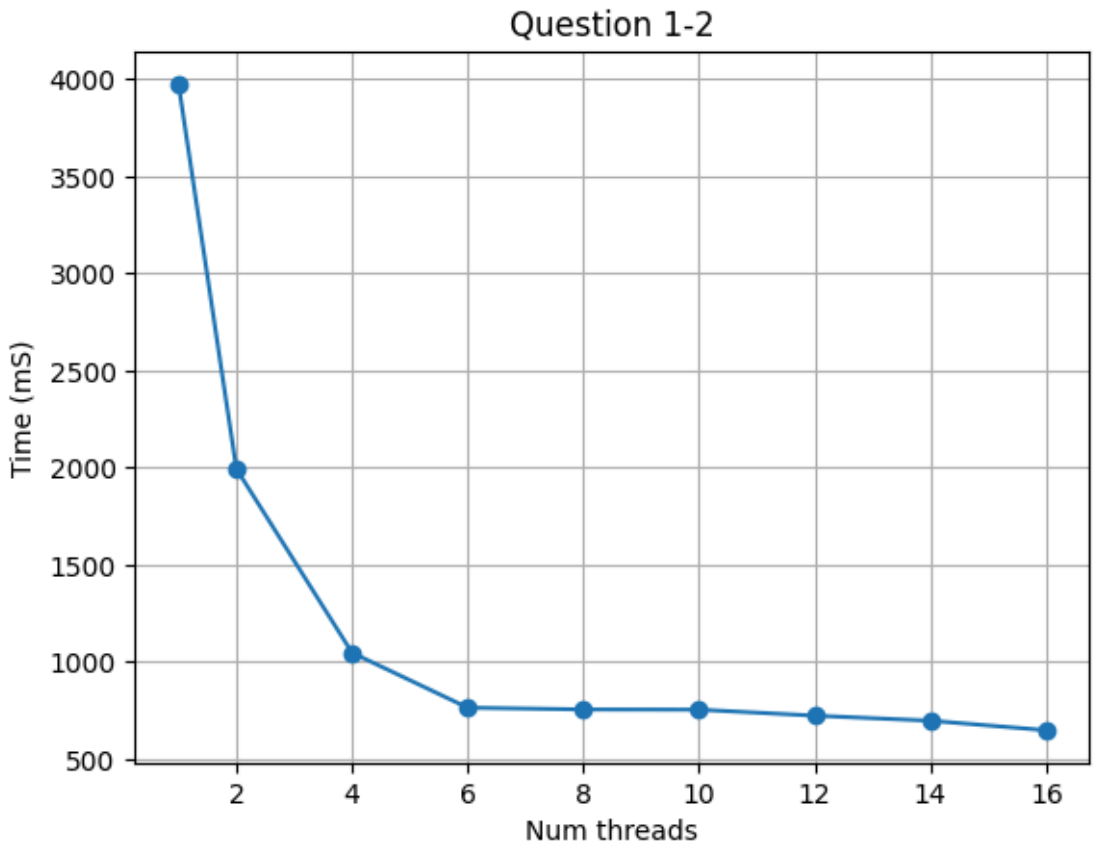


Here we can see that while a greater number of threads results in lower execution times, theres a limit to this. Due to the overhead of creating more threads, the execution time rises when more threads are created after a certain point. To better visualize the effect of more threads, I wrote another program that sums up numbers from 0 to 10^{15}. Here is the output for the same:

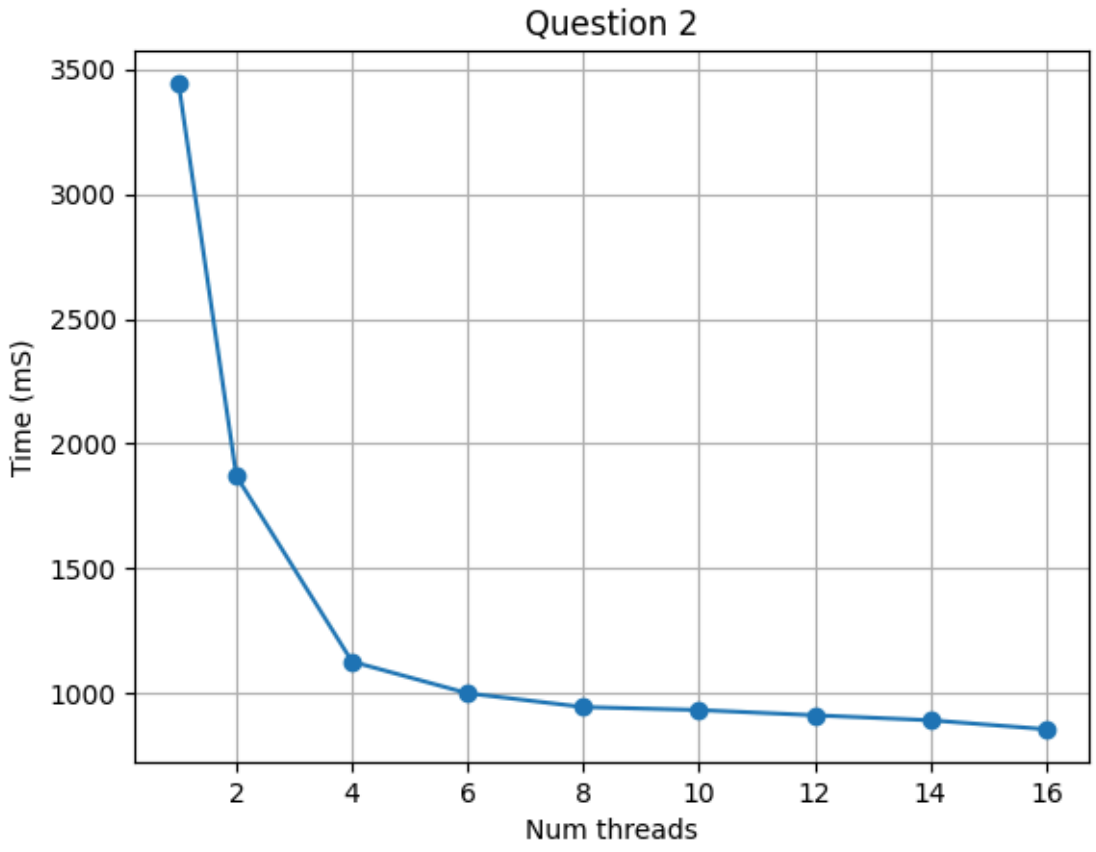




Now we can clearly see the decrease in execution time with an increase in number of threads.

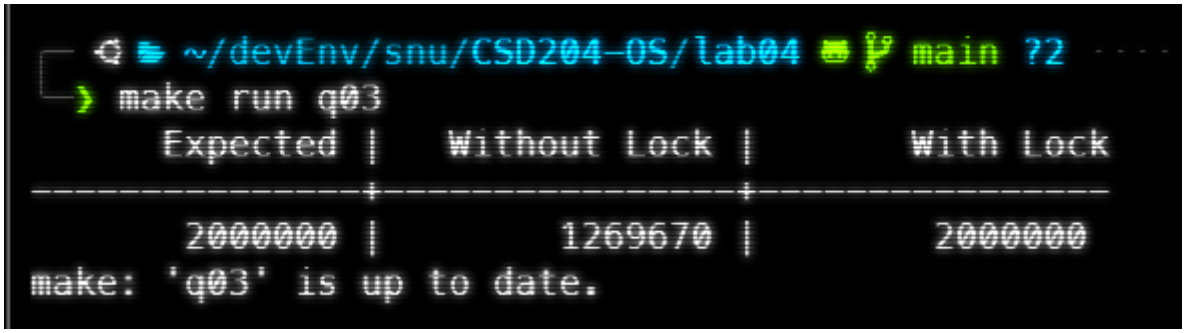
Question 02

```
~/devEnv/snu/CSD204-OS/lab04  main ?2
make run q02
 1 Threads successfully sorted array in 3445mS
 2 Threads successfully sorted array in 1870mS
 4 Threads successfully sorted array in 1126mS
 6 Threads successfully sorted array in 999mS
 8 Threads successfully sorted array in 944mS
 10 Threads successfully sorted array in 932mS
 12 Threads successfully sorted array in 911mS
 14 Threads successfully sorted array in 891mS
 16 Threads successfully sorted array in 855mS
make: 'q02' is up to date.
```



The size of the array I am sorting is 10,000,000 (10 million) to avoid the same problem as in question1. We see the exact thing we expect, which is a decrease in execution times when the number of threads increases.

Question 03



The output is clear, a lack of mutex locks leads to wildly inaccurate results while a proper usage yields a perfect output.