Programming Assignment 3

ECE 759, Prof. TW Huang

Sai Tadinada

GitHub link to programming tasks:
https://github.com/phantom3012/repo759/tree/main/HW03

1 Question 1

1.a

matmul.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/matmul.cpp

1.b

task1.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/task1.cpp

1.c

Scaling analysis reveals an exponential decrease in time. See Figure 1

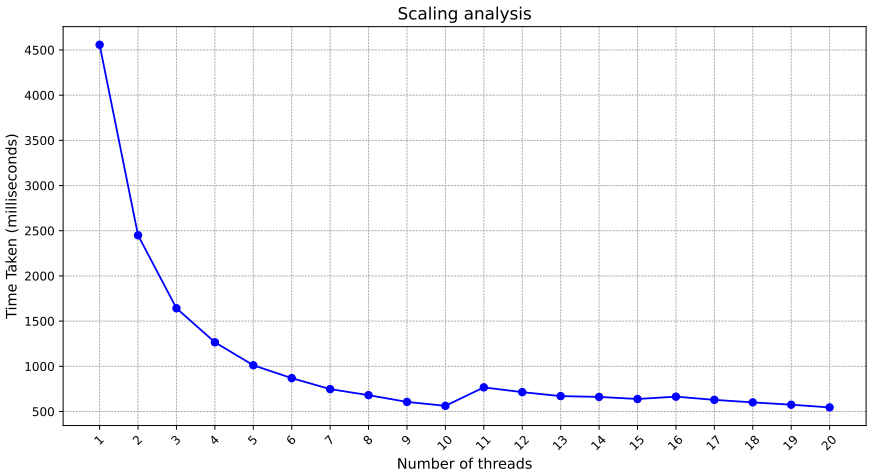

Figure 1: Time taken for matrix multiplication with varying number of threads

2 Question 2

2.a

convolution.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/convolution.cpp

2.b

task2.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/task2.cpp

2.c

Scaling analysis reveals an exponential decrease in time. See Figure 1
The time taken after a certain number of threds essentially remains the same because of other bottleneck factors like memory access time, etc.

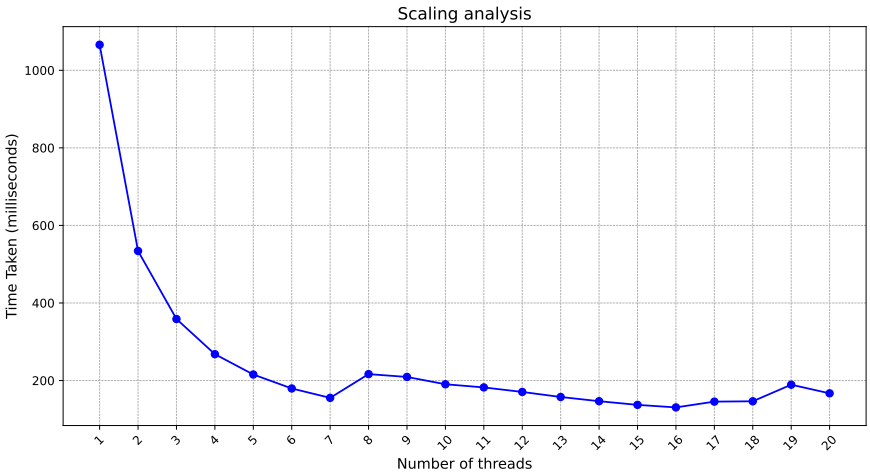

Figure 2: Time taken for matrix multiplication with varying number of threads

3 Question 3

3.a

msort.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/msort.cpp

3.b

task3.cpp can be found at https://github.com/phantom3012/repo759/blob/main/HW03/task3.cpp

3.c

3.c.1

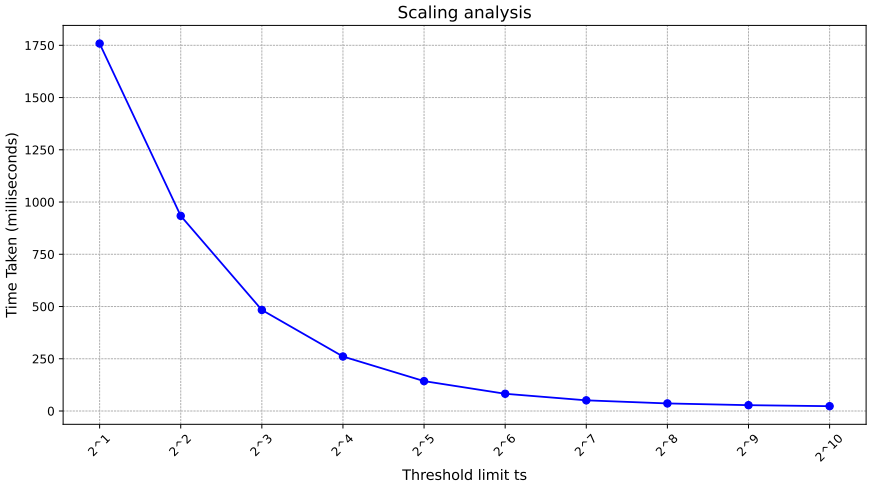

Figure 3: Time vs threshold size ts for 8 threads

3.c.2

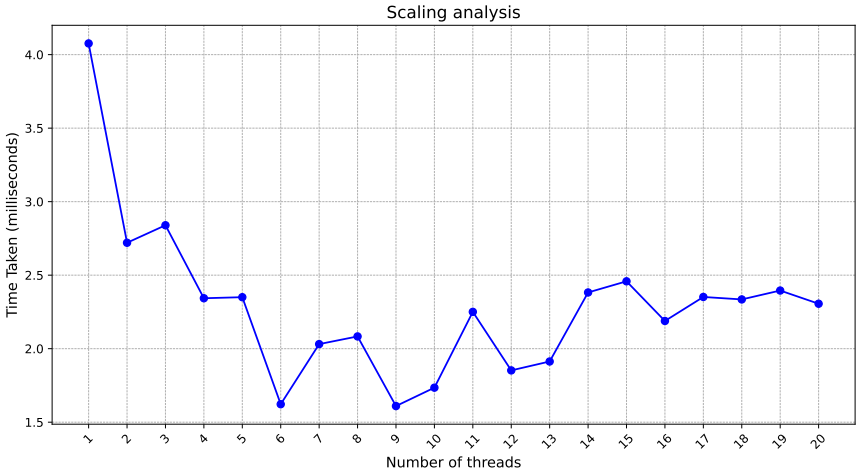

Figure 4: Time vs threads for ts = 256