6CS005 Learning Journal - Semester 1 2020/21

Put your name and student number here

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# Parallel and Distributed Systems

## Answer of First Question

## Answer of Second Question

## Answer of Third Question

## Answer of Fourth Question

## Answer of Fifth Question

Include your code using a text file in the submitted zipped file under name Task1.5

## Answer of Sixth Question

# Applications of Matrix Multiplication and Password Cracking using HPC-based CPU system

## Single Thread Matrix Multiplication

* The analysis of the algorithm’s complexity. (1 mark)
* Suggest at least three different ways to speed up the matrix multiplication algorithm given here. (Pay special attention to the utilisation of cache memory to achieve the intended speed up). (1 marks)
* Write your improved algorithms as pseudo-codes using any editor. Also, provide reasoning as to why you think the suggested algorithm is an improvement over the given algorithm. (1 marks)

Paste your algorithm’s pseudo code here

* Write a C program that implements matrix multiplication using both the loop as given above and the improved versions that you have written. (1marks)

Include your code using a text file in the submitted zipped file under name Task2.1

* Measure the timing performance of these implemented algorithms. Record your observations. (Remember to use large values of N, M and P – the matrix dimensions when doing this task). (1 marks)

Insert a paragraph that hypothesises how long it would take to run the original and improved algorithms. Include your calculations.

Explain your results of running time.

## Multithreaded Matrix Multiplication

* Include your code using a text file in the submitted zipped file under name Task2.2
* Insert a table that has columns containing running times for the original program and your multithread version. Mean running times should be included at the bottom of the columns.
* Insert an explanation of the results presented in the above table.

## Password cracking using POSIX Threads

* Include your code using a text file in the submitted zipped file under name Task2.3.1, Task2.3.3, Task2.3.5
* Insert a table of 10 running times and the mean running time.
* Insert a paragraph that hypothesises how long it would take to run if the number of initials were to be increased to 3. Include your calculations.
* Explain your results of running your 3 initial password cracker with relation to your earlier hypothesis.
* Write a paragraph that compares the original results with those of your multithread password cracker.

# Applications of Password Cracking and Image Blurring using HPC-based CUDA System

## Password Cracking using CUDA

* Include your code using a text file in the submitted zipped file under name Task3.1
* Insert a table that shows running times for the original and CUDA versions.
* Write a short analysis of the results

## Image blur using multi dimension Gaussian matrices

* Include your code using a text file in the submitted zipped file under name Task3.2
* Insert a table that shows running times for the original and CUDA versions.
* Write a short analysis of the results