Title: **Threads**

Course: **Operating Systems**

Lab No.: **03**

Date: **31 Mar.2016** ***Due:*** **08 April. 2016** ***Time:*** **1 Week**

Assignment:

Write a C++ Multithreaded console application that will calculate the multiplication of two matrices A and B then store the result in a third matrix C as in figure [1]. Use two threads (other than the main thread) to divide the work between the two threads. **Thread 1** will multiply [n/2 x n/2] elements, and **Thread 2** will multiply the other [n/2 x n/2] elements see figure 2 for an example {**red** is thread 1 , **blue** is thread 2. The main thread will only print the result to the screen.

Use any necessary mutex and synchronization methods discussed in the class if needed.

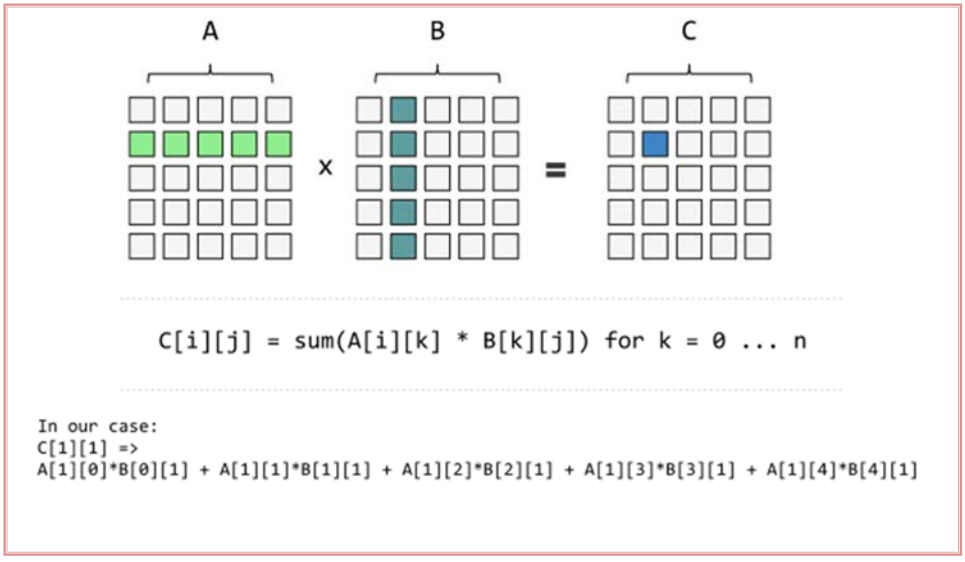

Figure 1

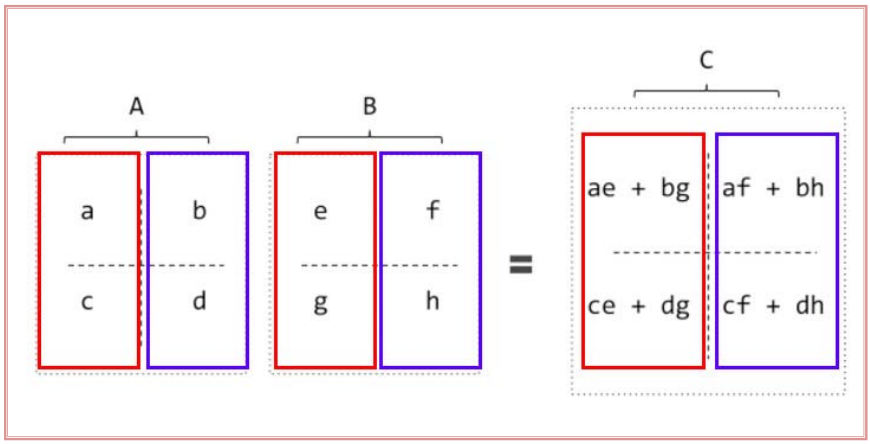

Figure 2

Submission:

Send your project to: ***omar.shaaban@live.co.uk***

Rules:

1- Teams are maximum of 3 students only

2- Comment each line of code and explain what exactly each line represent, non-commented code will lose 25% of the project marks.

Tools used:

1- Microsoft Visual Studio 2012 or later (recommend VS 2013).

2- A cup of coffee with a clear mind.

Bounce: +5

Write a C++ application to compute the matrix multiplication, but this time don't use threads, just normal C++. In addition, measure the execution time for both the normal code and the multithreaded one. Compare the two times and check which one is faster.

Others:

1- GitHub page https://github.com/Omargw/Minia-CSE-OS-CLASS-2016

2- GitHub application for windows users https://github-windows.s3.amazonaws.com/GitHubSetup.exe

References:

1. https://www.youtube.com/watch?v=LL8wkskDlbs&list=PL5jc9xFGsL8E12so1wlMS0r0hTQoJL74M&index=1
2. http://www.codeproject.com/Articles/598695/Cplusplus-threads-locks-and-condition-variables
3. http://www.codeproject.com/Articles/212377/Multithreading-Demystified
4. https://www.youtube.com/watch?v=1MKhigIml3E&list=PLmpc3xvYSk4wDCP5zjt2QQXe8-JGHa4Kt
5. https://www.tutorialcup.com/cplusplus/multithreading.htm
6. http://www.stoimen.com/blog/2012/11/26/computer-algorithms-strassens-matrix-multiplication/

Recommended reading list [books]:

1- C++ Concurrency in Action

2- C++ Primer

3- C++ How to program

4- Structured Parallel Computing