In his exalted name

Parallel Programming

Fall 2015

Assignment No. 1

Total Points: 100

Due Date: Monday, November 23, 2015

Problem Statement

In this assignment you are supposed to develop a C/C++ program that implements a parallel version of matrix multiplication using OpenMP. The target parallel platform is a shared memory multiprocessor with few processors. It's highly recommended that you use the sequential version of the program which is provided along this file. No need to mention that simply placing OpenMP directives in the sequential code provided with the document is not acceptable. Try decomposition and mapping techniques to reach the best possible performance (in terms of speed-up) on your platform considering true concurrency of your processor and the way its cache works. Use OpenMP APIs to measure the elapsed time for the report.

Deliverables

Executable files should get 4 command-line parameters as input arguments. Dimensions of operands and number of preferable threads.

E.g. The command below means that the matrices dimensions are (10*20) and (20*30) and the preferable number of threads is 4.

$ ./MatrixMultiplication 10 20 30 4

Report files have a brief description of parallelization methods you used, the results and your analysis of them. The result section has time and speed-up tables for input sizes (size of both matrices – in bytes), (100KB, 1MB, 10MB, 100MB and 1GB) and different thread numbers.

Ex. Speedup table (numbers are fake!)

Average time of 5 runs

Input size	**1MB**	**10MB**	**100MB**	**1GB**
#Threads				
2	**1.81**	**1.85**	**1.93**	**1.94**
4	**3.70**	**3.68**	**3.67**	**3.71**
8	**6.21**	**6.92**	**7.21**	**7.76**

Submission

Upload your source code, executable file(s) along with your report PDF in an archive file to our course webpage, named in the following format:

[Parallel Programming] [HW1] <First Name> <Last Name> - <Student ID>

Ex. [Parallel Programming] [HW1] Ahmad Siavashi – 94131100

The deadline is next Monday, 11:55 PM. There is a delay penalty of -5% per day.

Good Luck ☺