Last Name: First Name:

Computer Science
C.Sc. 342
Optimization of multiplication of two matrixes with vector instructions
Take Home TEST No. 4
CSc   or   CPE

Submit report and ready to demo 5:00PM, April 19, 2017

Objective:
The objective of this take home test is to optimize compiler generated code to compute matrix-matrix multiplication using vector instructions.
Tasks to perform:
1. *Use CPUID instruction to determine your processor vector processing capabilities*
2. *Write C++ function to compute Matrix-Matrix multiplication in Visual Studio environment. Matrix sizes should be powers of 2 (e.g. 16x16, 32x32, 64x64, ...512x512). Disable Automatic Parallelization, /Qpar, and Automatic Vectorization, /arch.*
    Use QueryPerformanceCounter function to measure execution time.
    Plot graph: time versus matrix size.
3. Compile code in §2. *Enable Automatic Parallelization, /Qpar, and Automatic Vectorization, /arch.*
    Use QueryPerformanceCounter function to measure execution time.
    Plot graph: time versus matrix size.
    Inspect compiler generated assembly code. Try to optimize compiler generated code. Based on compiler generated assembly code (or your optimized code) create an inline assembly code for matrix-matrix multiplication function (in the same way you did for "clear-array project").
    Use QueryPerformanceCounter function to measure execution time.
    Plot graph time versus matrix size.
4. *USE DPPS instruction to Improve performance of vector assembly code in §2.*
    Use QueryPerformanceCounter function to measure execution time.
    Plot graph: time versus matrix size.
5. Compare all plots in one figure.
6. Submit a detailed report and complete source code listing. If requested be ready to demo working project.
7. You may perform this test in LINUX using gcc.