OpenMP Homework (Due 2/24, before class)

1.   Simple matrix multiplication (C[N] = A[N][N] x B[N]) (10points)

1.1   This was shared in class. Implement and run your code. Compare with the solution that was provided.

1.1   What is the speedup? Plot the strong scaling (as a function of number of threads) and the weak scaling (as a function of the number of points)

2.   Compute PI (12 points for code, 8 points for writeup)

1.2   In your previous homework, you computed PI using a Monte Carlo approach. Parallelize it using OpenMP. Compare the error with the value of PI (PI = acos(-1.0))

1.3   What is the speedup? Plot the strong scaling (as a function of number of threads) and the weak scaling (as a function of the number of points)

3.   Matrix Multiplication (12 points for code, 8 points for writeup)

2.1   Multiply two NxN matrices. Use the example that I circulated to initialize the matrices. As shown in the example, check your results by comparing the outputs of a serial and a parallel version.

2.2   Plot the strong scaling (as a function of number of threads) and the weak scaling (as a function of the number of points). Use any optimization strategy that you can find, to run your code faster. You are free to use the full openMP API.

4.   Bonus

A 5 point bonus (for problem #2 & #3) will be awarded to the student whose code runs the fastest.