ASSIGNMENT 5
HPC1 Fall 2014

Due Date: ***Tuesday, November 25***
(please submit your report electronically via email, in one PDF file named *hw5-yourUBITname.pdf*)

Problem 1: Start with your code from Assignment 4 that used Jacobi iteration to solve Laplace's equation on the unit square.

a. Now write a parallel solver using MPI. Note that there is some helpful discussion of how to break up the grid (domain decomposition) in an old MPICH tutorial at

www.mcs.anl.gov/research/projects/mpi/tutorial/mpiexmpl/src/jacobi/C/main.html

(I would recommend that you use a similar simple 1D decomposition)

b. Examine (and plot) the performance of your message-passing solver in terms of parallel speedup and efficiency. You should target at least 64 MPI tasks to see representative performance (128 would be better, and use a large enough mesh to justify a large process count)

c. [Optional - extra credit] Now combine both approaches by utilizing **OpenMP** directives in addition to your **MPI** solver. Obtain maximum performance and compare the parallel speedup with that of part **b**.