Fall 2006 CS 432/632 Parallel Computing
Homework-4

Individual work only. 200 points. Due Dec 5, 2006.

1. Implement the parallel version of the Jacobi method to solve a system of linear equations using 2-D data distribution. First write the sequential program using the pseudo code provided in the text book. Compile and test it, and then use the driver program provided (at http://www.cis.uab.edu/cs632/software/pjacobi.c) to develop the parallel version. Test the program for matrix size 5000x5000 and 10000x10000 for the following process grid layouts: 1x1, 2x2, 3x3, 4x4, 5x5, 6x6, 7x7, and 8x8. Develop plots for speedup and efficiency. Complete the following table:

Process Grid Layout	Time Taken (seconds)	
	5000x5000	10000x10000
1x1		
2x2		
3x3		
4x4		
5x5		
6x6		
7x7		
8x8		

2. Generate scaled-speedup plots for the above parallel algorithms for the following process grid layouts and problem sizes:

Process Grid Layout	Problem Size	Time Taken (seconds)
1x1	1000x1000	
2x2	2000x2000	
3x3	3000x3000	
4x4	4000x4000	
5x5	5000x5000	
6x6	6000x6000	
7x7	7000x7000	
8x8	8000x8000	

General Comments:

You must implement and test these programs on the CIS cluster (Olympus) and use MPI for communication. Instructions for using the CIS cluster and submitting jobs to SGE can be found at: http://www.cis.uab.edu/cs632/fall2006/OlympusInstructions.html.

Submission:

Email the source code along with any Makefile and scripts as a single tar file attachment to afgane@uab.edu with the subject "CS 432/632 Homework-4." After submission, do not make any changes to your source code on Olympus, you will be asked to demonstrate your program on Olympus and the timestamp of the files will be used to determine late submissions.