CS 320/CSE 302/ECE 392

Introduction to Parallel Programming for Scientists and Engineers

Machine Problem 1

Assigned: Tuesday, February 8, 2000
Due: Friday, February 18, 2000

The objective of this MP is to transform traditional loops of a Fortran/C program into an equivalent parallel form using the OpenMP extensions.

The development machine is `newton.cse.uiuc.edu.` The OpenMP implementation from KAI may be found in `/home/cse/cse302/cse302/class`. Add the path `/home/cse/cse302/cse302/class/bin` to your PATH environment variable. For convenience add it to your .login (something like: `set path=($path /home/cse/cse302/cse302/class/bin)`). The compiler is called `guidef77/guidec` for Fortran 77 and C respectively. A debugger for OpenMP is also present: `assuref77` (Fortran 77) and `assurec` (C). The manuals can be found in the directory `/home/cse/cse302/cse302/class/docs`. To invoke the compiler/debugger use: <compiler/debugger> <program_file> which will produce an `a.out` file. Further usage can be found in the manuals.

For this MP we shall use the program mp1.f (Fortran)/mp1.c (C) which can be found in `/home/cse/cse302/cse302/class/mp1`. Both represent the same program in two different languages. You can work on whichever version you prefer.

The program is an implementation of the LU decomposition of a matrix (for non-singular matrices) alongwith a permutation matrix. This is then used to find the solution to the standard linear equation $\mathbf{A} \cdot \mathbf{x} = \mathbf{D}$. You have to convert the loops to a parallel form. The credit you receive will be in accordance with the number of loops you parallelize.

Instructions for handing the MP will be posted on the web page shortly.