Parallel Computing and Visualization Workshops

Parallel Program Development (Shared Memory)

Instructor: **Dr. Edmund Sumbar**
Time and Place: **Monday 16 June 2003, 09:00 – 16:30, Physics 145**

This is an introduction to the concepts of OpenMP programming. OpenMP is a way of exploiting the parallel code generation capabilities of existing high performance compilers (FORTRAN and C/C++). OpenMP is not the only parallel programming technique available for shared-memory multiprocessor computers, nor is it guaranteed to produce the best results. However, when compared to the alternatives such as Pthreads and MPI, it is arguably the easiest to use. Moreover, because OpenMP is a standard, you can easily port your programs to any platform that supports OpenMP. We'll become acquainted with the most common OpenMP directives/pragmas through a series of simple worked examples. We'll discuss OpenMP programs in the context of UNIX processes and virtual memory. We'll then discover how these concepts map to the physical hardware on an SGI Origin 3000 computer.

Parallel Program Development (Distributed Memory)

Instructor: **Dr. Masao Fujinaga**
Time and Place: **Tuesday 17 June 2003, 09:00 – 16:30, Physics 145**

This presentation is intended for those people having little or no prior experience with parallel programming. The focus is on distributed-memory programming with the Message Passing Interface (MPI), using a few simple examples in Fortran and in C. MPI requires you to design a program specifically for parallel processing. As one controls the sharing of data by explicit message passing, one has a very clear idea of how the program will function. In contrast to using OpenMP, an MPI program can be run on either a shared memory or a distributed memory machine. There will also be some discussion of the differences between MPI and PVM, another message passing programming library.

Visualization Techniques and Packages

Instructor: **Dr. Jon Johansson**
Time and Place: **Wednesday 18 June 2003, 09:00 – 12:00, Physics 145**

This course presents principles and methods for visualizing data resulting from scientific measurements and computations. The emphasis is on using 2D and 3D graphics to gain insights into multidimensional data sets. We discuss basic principles of scientific visualization and aspects of successful visualizations.

We will discuss 2d, 3d and multi-dimensional visualization techniques such as color mapping, data representation, volume rendering, surface extraction, rendering, glyphs for high dimensional data sets, visualization of gaseous and fluid information (scalar fields), isolines and isosurfaces, coloring, particle tracing and animation, as well as some vector field (pathline, streamline, streakline) and stereo visualization as time permits. In addition we will provide an example of single frame animation and mpeg encoding using freely available tools. We also discuss some of the visualization software available through campus computing and some useful packages available free for download.

Instructors

Dr. Edmund Sumbar holds a PhD in electrical engineering. He is currently a member of the HPC support team at the University of Alberta. His previous research interests include finite element modeling of electromagnetic heating phenomena in soils.

Dr. Masao Fujinaga is a member of the Research Computing Support team at the University of Alberta. He has a Ph. D. in biochemistry from the University of Alberta. He has used various high performance computers in the fields of crystallography and computational chemistry. He is currently using parallel computers and genetic algorithms for a crystallographic optimization problem.

Dr. Jon Johansson holds a Ph.D. in nuclear physics from the University of Alberta. He is a member of the Research Computing Support Team at CNS. Jon is interested in computer graphics, scientific visualization and the analysis of large data sets.

Registration Form

Name:_____

Department or Company _____

Address :

_____

_____

_____

_____

Phone ( ) _____

Fax ( ) _____

E-Mail: _____

Check the courses which you will attend. Prices include GST.

Parallel program development (shared memory)	_ $53.50 academic	_ $107 commercial
Parallel program development (distributed memory)	_ $53.50 academic	_ $107 commercial
Visualization techniques and packages	_ $53.50 academic	_ $107 commercial

Method of Payment

_ Cash (in person)

_ Cheque (enclosed)

_ U of A Indent or Purchase Order Number _____

_ Visa # _____ Expiry Date: _____

_ MasterCard # _____ Expiry Date: _____

Signature _____

_____

Please send or deliver this to:

Robin Hebert, 302 General Services Building, University of Alberta, Edmonton, Alberta T6G 2H1

fax (780) 492-1729

e-mail: robin.hebert@ualberta.ca