Studies in Parallel and Distributed Systems

Details

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Course structure

This is a course on parallel computation. Note the word "parallelism" here is used in a different context to "concurrency" which is concerned mainly with operating systems. This course will be heavily lab oriented. Writing your own programs is the best way to learn about parallel programming. We will look at the following 3 paradigms of achieving parallelism: cluster computing, multi-core systems, and General Purpose Graphics Processing Units (GPGPU).

There will be 5 programming assignments that will each involve one (or more) of these paradigms. Each assignment is to be accompanied by a brief write-up describing how you implemented your solution together with an assessment and evaluation of the performance of your program. Further details will be given when the assignments are set. You are welcome to discuss the programming problems with each other, but the write ups are to be done individually.

Your final grade will be determined from the 5 programming assignments. There is no exam.

Learning outcomes

- Ability to analyze a computation problem and program a solution in the DMM, SMM, and GPU environments.

- Ability to performance analyze your programs

- Demonstrate understanding of the various parallel programming paradigms and the relevant computing architecture.

Lectures

The course will be delivered by "guided instruction". Classes will be a mix of formal lectures, discussion, and hands-on tutorials.

Course material

Recommended reading

B. Wilkinson and M. Allen, *Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers*, Prentice Hall.

D. B. Kirk and W. W. Hwu, *Programming massively parallel processors*, Elsevier

Further online material and recommended reading will be presented during the course, and placed on the Stream site.