Math-454 Parallel Computing and Pthreads Solving n-queens puzzle on GPU

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Abstract

Using GPU for scientific computing has become very popular. For many problems, the massive parallelism the GPU offers, can give magnificent speedups compared to normal CPU's. In this paper I have investigated if GPU is usable for solving puzzles. TODO: Rewrite when project is done. Add summarizing result.

1 Introduction

The puzzle I will try to solve is the n-queens puzzle [1]. It is a simple and well documented puzzle. The puzzle is to place n queens on an $n \times n$ chess board without any queen attacking another queen. The approach I will use is a state-space search with backtracking. This approach relies on random searches with very variable running times. By using GPU, we can run multiple searches in parallel and by then, have a greater chance of finding a solution faster than on a CPU.

2 The Algorithm

TODO: Write pseudo code for the general algorithm. Explain.

3 Implementation on GPU

TODO: How did you implement in on GPU? Differences from general algorithm? Issues? Memory, etc.? Random number generation issues?

4 Results

TODO: Add some nice graphs and tables with running times of CPU vs GPU.

5   Conclusion

TOOD: CPU vs GPU best when solving puzzles with state-space search approach? Advantages, disadvantages? What needs to be done to solve this kind of problems on GPU's?

References

[1] `http://en.wikipedia.org/wiki/Eight_queens_puzzle`