CPS 5401   Fall 2012
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Homework 6 – Performance Modeling and Benchmarking
Due November 8, 2012

For this assignment, we will use the single-node PolyBench benchmarks at
www.cse.ohio-state.edu/~pouchet/software/polybench and the Griffin cluster. You
may choose to use either Fortran or C. You may choose any two kernel benchmarks
to work with or construct your own kernel benchmark by modifying one of those in
PolyBench. Read Hager and Wellein Chapter 3 for background. See also Samuel
Williams, Andrew Waterman, and David Patterson. 2009. Roofline: an insightful
visual performance model for multicore architectures. *Commun. ACM* 52, 4 (April
2009), 65-76.

1. Determine the machine characteristics of a Griffin node from processor
specifications and/or low-level benchmarks.

2. Construct analytical models for your kernel benchmarks based on an analysis of
their computational intensity and use the models to predict performance on Griffin.

3. Run your kernel benchmarks for different size problems and measure the results.
Discuss possible reasons for differences from your predicted performance and
refine your analytical models if possible.

4. Construct run-time performance models of your kernel benchmarks using
hardware counters and compare with your analytical models.