

Homework 001

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Abstract

A computer architect should be able to analyze performance and present quantitative measurements that represent that performance. To that end, this assignment should provide a number of opportunities to compare the performance of a variety of computer systems. In particular, this assignment will focus on memory subsystems including caches.

1 Vectorized Speedup

Do problem 1.14 from the book.

2 Amdahl's Law

Do problem 1.15 from the book.

3 Matrix Transpose Cache

Do problems 2.1 and 2.2 from the book.

4 Cache Identification

Do problems 2.4 and 2.7 from the book.

5 Cache Experimentation

Do either problem 2.8 (using the CACTI tool <http://quid.hpl.hp.com:9081/cacti/>) or write a program to generate a memory trace based on a given LXRE assembly file (or assembled image) as input. CACTI is a tool that is often used to estimate sizes for caches and other memories, and is very good at the tasks it was designed to accomplish.

If you decided to generate a memory trace, recall that a memory trace is a list of the memory addresses that are accessed by the program as it executes. That means that you will need to actually simulate the behavior of the code executing to correctly print the trace. You may use any programming language or environment you choose to accomplish this, and should include one trace in your homework document. If the trace is longer than one page, please only include one page of the trace.