Computer Organization

Cache Simulation

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INTRODUCTION

A cache has been simulated that operates with 48 bit addresses, an L1 instruction, L1 data, L2 cache and Main Memory.

RESULTS

An initial way to view the performance of the Traces with specific Configurations is to look at the execution times for those Configurations. Fig. 1 shows each Trace and its execution time for each Configuration in relation to all the other traces.
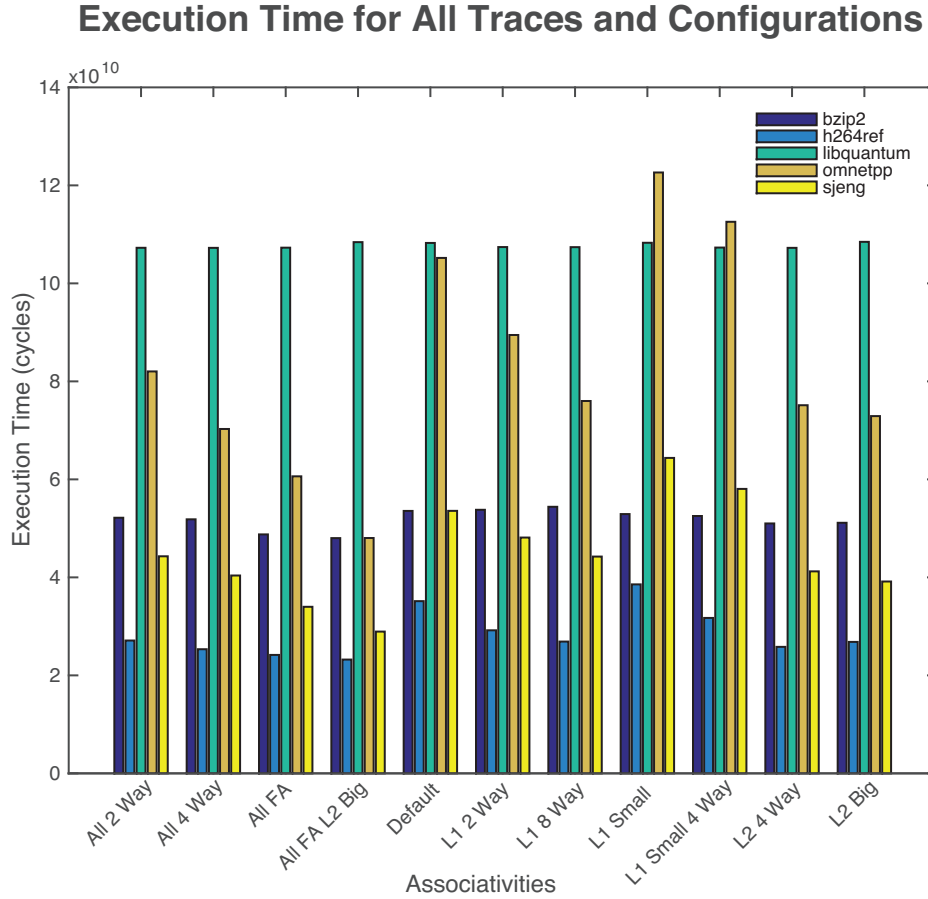

Figure 1: Execution times of all Traces with correspondence to all Configurations

The execution time for some traces varies very little with changes in cache configuration while other traces are largely effected by the cache configuration. As seen in Fig. 1, libquantum has a very steady execution time which does not seem to depend on cache configuration. A trace like omnetpp however, is very dependent on the cache configuration. The execution times range from 40 billion cycles to 120 billion cycles.

Another way to compare the performance of each trace is to look at the Cycles per Instruction (CPI). This is plotted in Fig. 2.
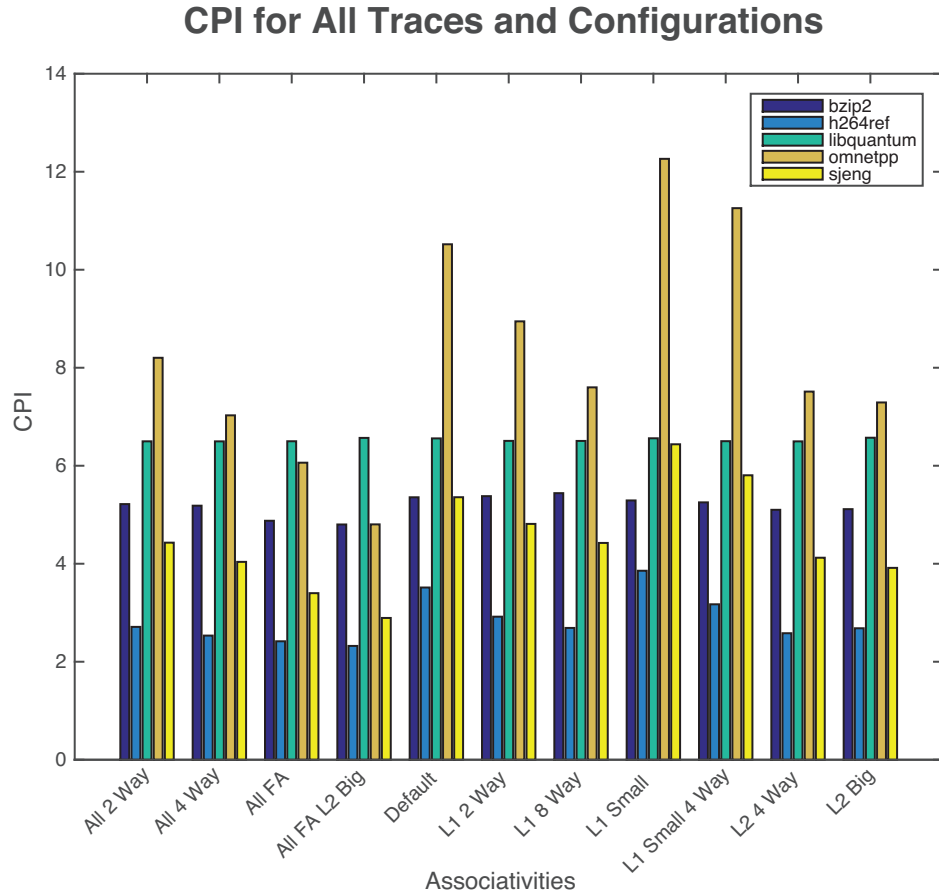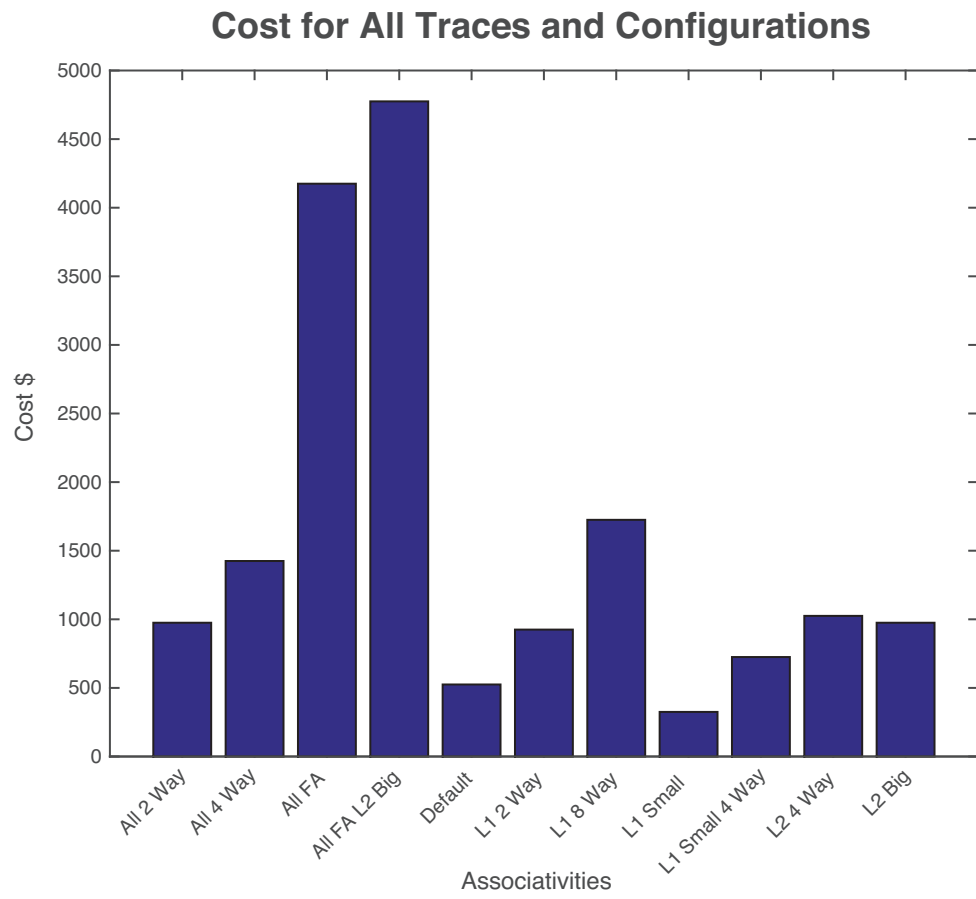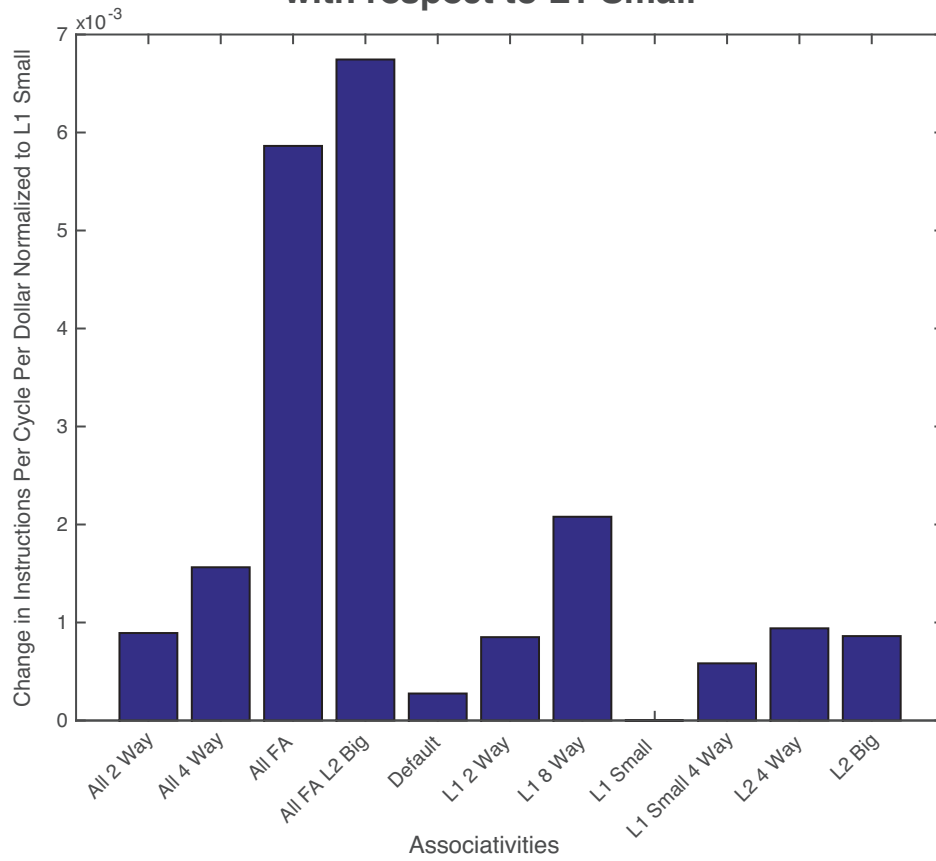

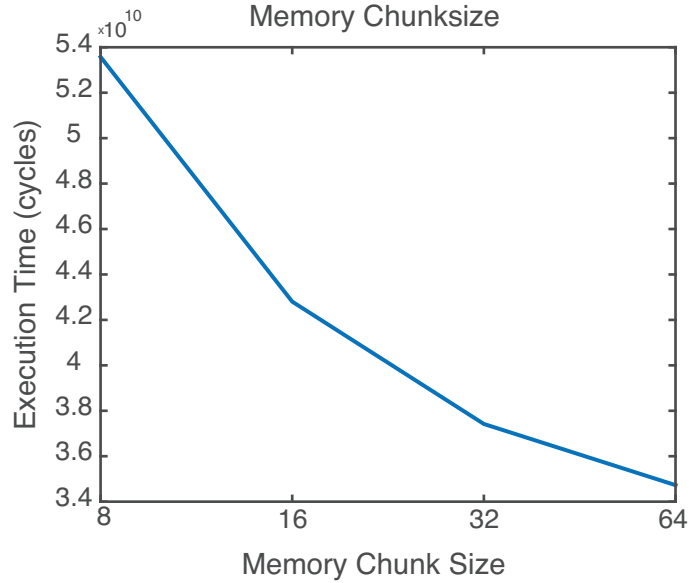Figure 2: CPI of all Traces with correspondence to all Configurations

Similar to the execution times in Fig. 1, Fig. 2 shows that the configuration of the cache can dramatically effect the CPI.

Cost for All Traces and Configurations

Cost Progression of Performance with respect to L1 Small

Execution Time in Relation to Memory Chunksize

DISCUSSION