

Department of Computer Science
National Tsing Hua University
CS5100 Advanced Computer Architecture
Spring, 2017

Homework 1

Deadline: 2017/03/08 in class

In this homework, you will work on the *gem5* simulator to evaluate the performance of three computer configurations.

1. Please follow the instructions in the accompany slide file “Installing and Running Gem5” to install *gem5* and the benchmark executables.
2. Use the default configuration of *gem5* for the ALPHA ISA as the baseline computer. Now, you want to compare the performance of three different enhancement strategies:
 - (1) Increase the CPU clock of the baseline computer by X%.
 - (2) Increase the L1 cache size of the baseline computer by Y%.
 - (3) Increase the L2 cache size of the baseline computer by Z%.

Select three benchmark programs from the five released benchmarks in *gem5* that are compiled for ALPHA ISA. Run the benchmarks through *gem5* and obtain their execution times on the baseline computer and using the three enhancements, respectively. Summarize and compare the performance of the enhancements using arithmetic mean, arithmetic mean of ratios, and geometric mean. Report your results and comment on your findings.

Note: The cache size must be power of two.