CS2610: Computer Organization and Architecture Lab
Assignment #5

Due Date: 18th Mar

Objective: To know, how to use perf tool for analyzing programs.

Problem Statement:
Consider three square matrices A, B, and C of size 1024x1024. Fill A and B with random integers ranging from 0 to 10. Write a C program to perform matrix multiplication of A and B and store the result in C. Assume that matrix C is not initialized and any initialization to elements in C should also be counted in runtime calculations. Compile the code with gcc compiler (-O3 optimization) and run the program 10 times and report the average runtime (in milliseconds), cpu-cycles, number of instructions, branch-instructions, cache-references, cache-misses, L1-dcache-loads, L1-dcache-load-misses, dTLB-loads, dTLB-load-misses, LLC-loads, and LLC-load-misses across the 10 runs for each configuration. Use **gettimeofday( )** for calculating the runtime and **perf tool** to measure the other events.

For the above problem, consider the following scenarios:

- Scenario #1: Both A and B matrices are in row major order.
- Scenario #2: Matrix A is in row major order and matrix B is in column major order.

Use the following template for reporting the results.

System Configuration	Processor type; Processor frequency; Memory Hierarchy; etc.
Scenario #	
Event	Value
Average runtime	
CPU-Cycles	

Write a pdf report by comparing the above implementations. Upload the report and source files in proper format, details are given on course moodle page.

Perf Tool:
https://perf.wiki.kernel.org/index.php/Tutorial#Live_analysis_with_perf_top