CS 211 Project 1

1. Register Reuse

Part #1.

Q: How long it will take for your computer to finish the following algorithm dgemm0 and dgemm1 respectively for n=1000?

A:

Dgemm0: For every inner loop(k loop), there will be 3 loads from memory to register and 1 store from register to memory. The statement in the loop has less than 4 float point computation so it can be done in 1 cycle. We must repeat this loop for n^3 times. So the final cost of dgemm0 is:

n^3 \* 401

If n=1000, the cost is

4.01 \* 10^11

Given the clock frequency is 2GHz, the time is 200.5 seconds. It wastes 400/401 of total time to access operands from memory, which is 200 seconds.

Dgemm1: n^2 times for load and store c. n^3 times for load a and b and compute a\*b. Thus, the cost can be presented by:

n^2 \* 200 + n^3 \* 201

Given the n=1000 and frequency=2GHz, the time is 100.6s. The time spent on accessing operands from memory is 200.1s.