CS 613 (01) Homework 3 Spr 13

due Feb. 6, 2013

1. (8 pts.) Complete problem A.1 from the textbook. Show all work.

2. (10 pts.) Complete problem A.7.a from the textbook. Describe all steps of your approach and results.

3. (6 pts.) Complete problem A.8.a from the textbook. Describe all steps of your approach and explain your answers.

4. (10 pts.) Complete problem A.13 from the textbook. You are to use computers in the CS Department's Laser Lab, which has Core i7 machines in it—the problem must be done using one of the i7 machines there. In your work, you will do the matrix multiply for 25 by 25 matrices. Although the problem says to try multiple compilers, you will only use one for this exercise. You must try at least two different optimization settings in your experiments. You must record the name of the machine and run your experiments when the machine is not loaded. If you do your work under linux, that platform provides a system-level command called time that will report CPU time for the execution of the your program. You should see the man page in Section 1 of the machine to learn about use of time.

5. (6 pts.) The XYZ CPU runs one benchmark in 25 seconds. The designers of the CPU are considering a new version of the CPU which would be able to run that benchmark in 10 seconds due to an optimization that allows floating point instructions to execute 4 times faster. Half of that run time (i.e., on the new CPU) will be spent on floating point instruction execution. What is the fraction enhanced?