CMPUT 229 - Quiz # 2 - Fall 2011

Name:

Question 1 (100 points): Two machines M_A and M_B implement the same instruction set architecture. A computer program, compiled with a compiler C_A, executes in 10 seconds in a machine M_A. The same program, compiled by a different compiler C_B, executes 1.25 times slower in machine M_B. The number of instructions executed in M_B is twice the number of instructions executed in M_A. The clock frequency of M_B is 1.6 faster than the clock frequency of M_A. If the average number of clock per instructions (CPI) of M_B is 2 clocks per instruction, what is the CPI of M_A? Remember that the execution time of a program can be expressed by the following relation:

$$\text{Execution Time} \quad = \quad \#\text{ of instructions} \times \text{CPI} \times \frac{1}{\text{Clock Frequency}}$$