

Name:

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**ICS 233, Term 072**

**Computer Architecture & Assembly Language**

**Quiz# 7**

Date: Saturday, May 10, 2008

- Q.1.** Consider two different implementations, M1 and M2, of the same instruction set. There are three classes of instructions (A, B, and C) in the instruction set. M1 has a clock rate of 6 GHz and M2 has a clock rate of 3 GHz. The CPI for each instruction class on M1 and M2 is given in the following table:

| Class | CPI on M1 | CPI on M2 | C1 Usage | C2 Usage |
|-------|-----------|-----------|----------|----------|
| A     | 2         | 1         | 40%      | 60%      |
| B     | 3         | 2         | 40%      | 15%      |
| C     | 5         | 2         | 20%      | 25%      |

The above table also contains a summary of the usage of instruction classes generated by two different compilers: C1 and C2. Assume that each compiler generates the same number of instructions for a given program. **Which computer and compiler combination give the best performance?**

- Q.2.** A benchmark program runs for 100 seconds. We want to improve the speedup of the benchmark by a factor of 3. We enhance the floating-point hardware to make floating point instructions run 6 times faster. How much of the initial execution time would floating-point instructions have to account for to show an overall speedup of 3 on this benchmark?