CSCE312: Computer Organization

Texas A&M University
Computer Science & Engineering Department

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Assignment 1

Submission Instructions:

We will have two phases for submission.

- **First, you have to submit the scan-copy of your solution in canvas.**
- **Second, you will be given the solution set and you have to grade your submission by yourself with red ink pen, and have to submit the scan-copy (self-graded) on the day of quiz (3-5 days after submitting the scan copy).**

Details: You should start working on chapter-1 and chapter-2 this week, even ahead of class. Next week chapter-3 will be covered in the class.

Problems:

1. Suppose we enhance a machine to make all floating-point instructions run five times faster. If the execution time of some benchmark before the floating-point enhancement is 20 seconds, what will speedup be if half of the 20 seconds is spent executing floating-point instructions? (5 pts)

2. Suppose you have a machine which executes a program consisting of 60% floating point multiply, 20% floating point divide, and the remaining 20% are from other instructions.

a) Management wants the machine to run 5 times faster. You can make the divide run at most 3 times faster and the multiply run at most 8 times faster. Can you meet management's goal by making only one improvement, and if so, which one? (5 pts)

b) EJ has now taken over the company removing all the previous managers. If you make both the multiply and divide improvements, what is the speed of the improved machine relative to the original machine? (5 pts)

Do the following Exercise questions from textbook (*Digital Design, 2nd Ed, by Frank Vahid, Wiley publication, 2010*)

Chapter 1: 1.8, 1.15, 1.18, 1.22, 1.32

Chapter 2: 2.12, 2.18, 2.24, 2.28, 2.33, 2.39, 2.52, 2.58, 2.66, 2.70, 2.71, 2.75

Chapter 3: 3.2, 3.4, 3.10, 3.12, 3.21, 3.30, 3.40, 3.43