UCR CS161, Fall 2007

Design and Architecture of Computer Systems

Prof. Harry Hsieh

Homework #1

Read "Computer Organization and Design: The Hardware/Software Interface" Chapters 1 & 2

Due Date: Monday, October 8th, 2PM on moodle.
No late homework will be accepted

You may work in group, but if you do so, please turn in only one copy of the homework, and put all the names on the first page.

1. (2 points) What does bit stand for?
2. (2 points) What is the Moore's Law?
3. (2 points) What takes up the most area on a Pentium Cores 2 Duo chip?
    a. Instruction fetch unit
    b. Pipelining control
    c. Cache memory
    d. Branch prediction
4. (2 points) The fastest growing segment of computer market in terms of number sold is:
    a. Supercomputer
    b. Embedded computer
    c. Server
    d. Laptop/Desktop
5. (2 points) What is instruction set architecture?
6. (2 points) Since words are aligned in MIPS architecture, what are the least 2 significant digit of a word address?
7. (5 points) What are the design principles behind MIPS architecture design?
8. (45 points) COAD (Computer Organization and Design) question 1.1 through 1.45.
9. (5 points) Given a CISC machine and a RISC machine, assume that a certain task needs 1000 CISC instructions or 2500 RISC instructions, and that one CISC instruction takes 100ns and one RISC instruction takes 20ns. Under this assumption, which machine is faster, by how much?
10. (5 points) COAD question 1.54
11. (2 points) COAD question 2.2
12. (2 points) COAD question 2.3
13. (2 points) COAD question 2.4
14. (5 points) Comment the following code and say what it does (hint: it should be no more than 2 lines of C code. You are to assume $s3 contains i, $s5 contains k, and $s6 contains address to save[0].)

```
Loop: sll  $t1, $s3, 2       #
      add  $t1, $t1, $s6     #
      lw  $t0, 0($t1)        #
      bne  $t0, $s5, Exit    #
      addi  $s3, $s3, 1      #
      j Loop                 #
Exit:
```

15. (5 points) COAD 2.29
16. (8 points) COAD 2.30
17. (4 points) COAD 2.31