

CS/COE 0447 Fall 2009
Homework 1
Due Date: September 21, 2009

You should turn in a hard copy of this assignment at the beginning of class on Monday, September 21, 2009.

1. (5 pts) How many different values can be represented in 11 binary digits (bits)?
2. (5 pts) How many different values can be represented in 13 hex digits?
3. (5 pts) Convert the following binary numbers to hexadecimal numbers:
1011100001011010, 11100101011000, 1000111111001110, 110011010101010, 100011001000011.
4. (5 pts) Convert the following hexadecimal numbers to binary numbers:
23FF, 7C13, F277, 5F64, F573.
5. (10 pts) Translate the following MIPS instructions to machine code (binary). What is the format of each instruction?
add \$t0, \$t0, \$zero
addi \$t1, \$t2, 15
6. (10 pts) Translate the following machine code instructions to MIPS assembly. What is the format of each instruction?
1010 1110 0000 1011 0000 0000 0000 0100
1000 1101 0000 1000 0000 0000 0100 0000
7. (10 pts) Write MIPS code that subtracts the constant 27 from register \$t1 and puts the result in register \$t2.
8. (10 pts) Write MIPS code for the following computation. Assume that variable A is in register \$t0, B is in register \$t1, C is in register \$t2, D is in register \$t3, E is in register \$t4 and F is in register \$t5.
 $F = E - (A + ((B - C) + D))$
9. (10 pts) Write down the names of at least 10 devices you see every day that have processors inside.
10. (10 pts) Give a brief explanation of what an assembler does.
11. (10 pts) Explain briefly what an immediate operand is. Why are immediate operands in MIPS always the same size (16 bits)?
12. (10 pts) Why is there no need of a “subtract immediate” instruction?