UCF

School of Computer Science

CGS 3269 Computer Architecture

Summer 2005

DUE 6/2/05

1. Using 4 bit numbers(for example $(5)_{10} = (0101)_2$
   Write all positive numbers and all negative numbers that can be represented with four bits in sign-magnitude, one's complement, and two's complement.
   (20 points)

2. Using binary numbers of 8 bits(i.e. $(28)_{10} = (0001\ 1100)_2$).
   Write the numbers from $(1)_{10}$ to $(20)_{10}$ in binary, octal, and hexadecimal.
   (15 points)

3. Convert: (10 points)
   a) from $(18)_{10}$ to $(?)_2$
   b) from $(10011100011)_2$ to $(?)_{16}$
   c) from $(10011100011)_2$ to $(?)_8$
   d) from $(10011100011)_2$ to $(?)_{10}$

4. Convert to binary and solve the following arithmetic operations using one's complement representation : (15 points)
   a) $(18)_{10} + (13)_{10}$
   b) $(18)_{10} - (13)_{10}$
   c) $-(18)_{10} - (13)_{10}$

5. Convert to binary and solve the following arithmetic operations using two's complement representation : (15 points)

   a) $(18)_{10} + (13)_{10}$
   b) $(18)_{10} - (13)_{10}$
   c) $-(18)_{10} - (13)_{10}$

6. Using the assembly language explained in class, write a program that computes the following expression: z ← (a + b) * (c – d). The computer will read in the input values (a, b, c, and d) from the keyboard, and all the input values and the final result (z) have to be printed out on the printer. In addition, every time an input value is read in, it must be displayed on the screen. Remember that the instruction set does not have an instruction to execute multiplication. Use the instructions IN <value>, to input a value from the keyboard into the accumulator, SCREEN <A> to display the content of the accumulator on the screen, and PRINT<A> to send the content of the accumulator to the printer.(25 points)