

# Homework Set 1(A)

**DUE: Friday, October 12, 2001, 3:30 pm (beginning of quiz section)**  
**(A few more problems may follow by Monday, due with the rest of this set).**

**No CAD tools or calculators should be used on this homework set (unless a problem says otherwise), because you won't be allowed to use them on quizzes or tests. Please show *all* of your work. Solutions do not have to be typeset, but may be if desired. In any case, your solutions must be clear and legible.**

- 1) Perform the following conversions (assume all unsigned numbers):
  - a)  $10101001111_2$  to base 10 (decimal)
  - b)  $999_{10}$  to base 2 (binary)
  - c)  $D56B_{16}$  to base 2 (binary) and to base 10 (decimal)
  - d)  $581_{10}$  to base 8 (octal) and to base 16 (hexadecimal)
- 2)  $A=011110_2$ ,  $B=100001_2$ ,  $C=111010_2$ , and  $D=1101_2$  are unsigned binary numbers. Calculate:
  - a) The sum,  $A+B+C+D$
  - b) The difference,  $B-A$
  - c) The product,  $A \times D$
- 3) Using the 2's complement system, convert the following positive numbers to negative numbers of the same absolute value and same number of bits:
  - a)  $010010_2$
  - b)  $000011_2$
- 4) What is the decimal (base 10) value of  $10111$  when read as
  - a) An unsigned binary number
  - b) A sign-magnitude binary number
  - c) A 1's complement binary number
  - d) A 2's complement binary number
  - e) A hex (base 16) number
- 5) The upcoming generation of CPUs is "64 bit", meaning datapaths are 64 bits and the CPU can crunch 64-bit integers. What are the decimal (base 10) values of the largest and smallest binary numbers (integers) that can be expressed using the following. *Note: you may use a calculator for this question.*
  - a) 64 bits with no sign bit
  - b) 64 bits as signed-2's complement
- 6) Re-express the following 4-bit 2s complement numbers as 8-bit 2s complement numbers with the same value:
  - a) 0110
  - b) 1011
- 7) Draw a circuit diagram to implement the following logic function:  $\overline{A}BC + B\overline{C} + A(\overline{B}\overline{D})$

## WEB TREASURE HUNT!

- 8) Why doesn't Prof. Dickey have a leisurely lunch 11:30-12:30 on Mondays?
- 9) When do your TAs have office hours??
- 10) Randy Katz, the author of our textbook, is a professor at what institution?
- 11) I have subscribed to the cse370 mailing list. (T/F)
- 12) Who was the author of the 2<sup>nd</sup> message sent to the mailing list this quarter?
- 13) Somewhere, there's a page with 8 tips about Designworks. Which tip (by number) explains the symbol "Z"? What does it say about "Z"?