

EE 2720, Fall 05

HW #2

Due Friday Sept. 30, 05  
at 9:30 am in my  
office; (Room 62245)

## EE 2720 Homework #2

Note: Please **STAPLE** your homework

**Problem 1:** What is the Dynamic Range (DR) of a 6-bit integer binary signed-magnitude system?

**Problem 2:** Provide a 6-bit signed-magnitude representation for the number  $+27_{10}$ . Your 6-bit representation must be given in binary.

**Problem 3:** Provide a 6-bit binary signed-magnitude representation for the number  $-20_{10}$ .

**Problem 4:** Find the 10's complement of the number  $35865_{10}$ . Use both ways for finding the 10's complement of a number provided in handout #2.

**Problem 5:** What is the Dynamic Range (DR) of an 8-bit integer binary two's-complement system?

**Problem 6:** Using the lemma on page 13 of handout #2 find the value of the following two's-complement number:  $11011011_2$ .

**Problem 7:** find the two's-complement of the number X where  $X=11011010_2$ .

**Problem 8:** Using the two's-complement system perform  $X-Y$  where  $X=101010_2 = -22_{10}$  and  $Y=000101_2 = +5_{10}$ .

**Problem 9:** Using the two's-complement system perform the addition of the 6-bit numbers X and Y where  $X=011001_2 = +25_{10}$  and  $Y=011011_2 = +27_{10}$ . Do you have an overflow or underflow in this case? Justify your answer.

**Problem 10:** Using the two's-complement system perform the addition of the 6-bit numbers X and Y where  $X=101100_2 = -20_{10}$  and  $Y=110001_2 = -15_{10}$ . Do you have an overflow or underflow in this case? Justify your answer.

**Problem 11:** Find the 9s'-complement of the number  $85357_{10}$ . Use both ways for finding the 9s'-complement of a number provided in handout #3.

**Problem 12:** What is the Dynamic Range (DR) of a 7-bit integer ones'-complement system?

## EE 2720 Homework #2 Cont

**Problem 13:** Using the lemma on page 8 of handout #3 find the value of the following ones'-complement number:  $101110_2$ .

**Problem 14:** Find the ones'-complement of the number X where  $X=11011010_2$ .

**Problem 15:** Using the ones'-complement system perform X-Y where  $X=101010_2 = -21_{10}$  and  $Y=000101_2 = +5_{10}$ .

**Problem 16:** Using the ones'-complement system perform the addition of the 6-bit numbers X and Y where  $X=011001_2 = +25_{10}$  and  $Y=011011_2 = +27_{10}$ . Do you have an overflow or underflow in this case? Justify your answer.

**Problem 17:** Using the ones'-complement system perform the addition of the 6-bit numbers X and Y where  $X=101100_2 = -19_{10}$  and  $Y=110001_2 = -14_{10}$ . Do you have an overflow or underflow in this case? Justify your answer.

**Problem 18:** Perform the addition X+Y where X and Y are the following 6-bit signed-magnitude numbers:  $X=010101_2 = +21_{10}$  and  $Y=111111_2 = -31_{10}$ . Follow the same procedure as the one of the example on pages 23-24 of handout #3.

**Problem 19:** Perform the unsigned binary multiplication with multiplicand  $X=1100_2 = 12_{10}$  and multiplier  $Y=1111_2 = 15_{10}$ .

**Problem 20:** Perform the signed two's-complement binary multiplication with multiplicand  $X=1001_2 = -7_{10}$  and multiplier  $Y=1010_2 = -6_{10}$ .

**Problem 21:** Perform in BCD the addition  $8+7$ .

**Problem 22:** Perform in BCD the addition  $3+4$ .

**Problem 23:** Starting from the 3-bit Gray code that I provided on page 12 of handout #4, construct a 4-bit Gray code.