

EE 2720 Homework #2, Fall 03

Due Wednesday October 1 at 9:30 am in my office; (Room EE245).

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., Fall 03

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.