EE 2720, Spring 05

Homework #2

Due Monday February 28 2005 at 12:00 noon in my office; (Room EE 245).

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Note: Please STAPLE your homework.

Problem 1: what is the Dynamic Range (DR) of a 7-bit integer binary signed-magnitude system?

Problem 2: Provide a 7-bit binary signed-magnitude representation for the number $+51_{10}$.

Problem 3: Provide a 7-bit binary signed-magnitude representation for the number -45_{10}.

Problem 4: Find the 10's complement of the number $57,932_{10}$. 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 a 10-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: 1010110011_2

Problem 7: Find the two's-complement of the number $X = 10101011_2$.

Problem 8: Using the two's-complement system perform $X - Y$ where $X = 1011010_2 = -38_{10}$ and $Y = 0000110_2 = +6_{10}$.

Problem 9: Using the two's-complement system perform the addition of the 7-bit numbers $X = 0111001_2 = +57_{10}$ and $Y = 0010010_2 = +18_{10}$. 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 7-bit numbers $X = 1000111_2 = -57_{10}$ and $Y = 1101110_2 = -18_{10}$. Do you have an overflow or underflow in this case? Justify your answer.

Problem 11: Find the 9's'-complement of the number 59725_{10}. Use both ways for finding the 9's'-complement of a number provided in handout #3.

Problem 12: What is the Dyuamic Rauge (DR) of a 9-bit iuteger ones'-complement system?

Problem 13: Usiug the lemma on page 8 of handout #3 find the value of the following ones'-complement number: $10101110_1{}_2$

Problem 14: Find the ones'-complement of the number $X = 10110110_1{}_2$

Problem 15: Usiug the ones'-complement system perform $X-Y$ where $X = 1010010_2 = -45_{10}$ and $Y = 0000110_2 = +6_{10}$.

Problem 16: Usiug the ones'-complement system perform the addition of the 7-bit numbers $X = 0111001_2 = +57_{10}$ and $Y = 0010010_2 = +18_{10}$. Do you have an overflow or underflow in this case? Justify your answer.

Problem 17: Usiug the ones'-complement system perform the addition of the 7-bit numbers $X = 1000111_2 = -56_{10}$ and $Y = 1101110_2 = -17_{10}$. 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: $X = 010100_2 = +20_{10}$ and $Y = 111101_2 = -29_{10}$. 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 $X = 10101_2 = 21_{10}$ and multiplier $Y = 10111_2 = 23_{10}$.

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 9+8.

Problem 22: Perform in BCD the addition 4+5.

Problem 23: Starting from the 3-bit Gray code that I provided on page 12 of handout #4, construct a 5-bit Gray code.