EE 2720, Spring 2012

Homework #1

Due Monday, February 6, 2012, in class.
Problem 1: Find the value of the unsigned binary number $11010101.0112$

Problem 2: Convert into octal the following binary number: $01110101.112$

Problem 3: Convert into binary the following octal number: $7645.328$

Problem 4: Convert into hexadecimal the following binary number: $01110101.112$

Problem 5: Convert into binary the following hexadecimal number: $7FA.B9_{16}$

Problem 6: Convert $139.375_{10}$ into binary.

Problem 7: Convert $0.7_{10}$ into binary. What do you observe?

Problem 8: What is the Dynamic Range (DR) of a 10-bit integer binary unsigned system?
Problem 9: Compute \( X + Y \) where \( X \) and \( Y \) are the following 6-bit binary unsigned numbers:
\[
X = 101011_2 = 43_{10} \quad Y = 010010_2 = 18_{10}
\]
When you do the addition show all the carries. Do you have an overflow in this case? Justify your answer.

Problem 10: Repeat problem 9 with
\[
X = 101111_2 = 47_{10} \quad Y = 010111_2 = 23_{10}
\]

Problem 11: What is the Dynamic Range (DR) of a 10-bit integer binary signed-magnitude system?

Problem 12: What is the Dynamic Range (DR) of an 8-bit integer binary two's-complement system?

Problem 13: Using the lemma on page 13 of handout #2 find the value of the following two's-complement number:
\[
X = 10011101_2
\]
Problem 14: Find the two’s-complement of the number $X = 01010101_2$

Problem 15: Using the two's-complement system perform $X - Y$ where $X = 101001_2 = -23_{10}$ and $Y = 000110_2 = +6_{10}$. 