

EE 2720, Spring 2012

Homework #1

Due Monday February 6, 2012, in class.

Note: Please STAPLE your homework

Problem 1: Find the value of the unsigned binary number  $11010101.011_2$

Problem 2: Convert into octal the following binary number:  $0111010101.11_2$

Problem 3: Convert into binary the following octal number:  $7645.32_8$

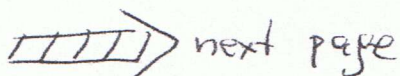
Pr4: Convert into hexadecimal the following binary number:  $0111010101.11_2$

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?

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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

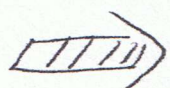
$$X = 101111_2 = 47_{10}; \quad Y = 010111_2 = 23_{10}$$

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:

$$X = 10011101_2$$

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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  $Y = 000110_2 = +6_{10}$ .