

# CSIT-230 HW-1\_Corrections

1. (40 pts) Binary to decimal ... and back (Need to show all steps )

(a) Convert the following unsigned binary number to decimal:

$$(111111)_2 = (?)_{10}$$

$$32 \ 16 \ 8 \ 4 \ 2 \ 1 = 63$$

(b) Convert the following unsigned binary number to decimal:

$$(0.111111 \dots 1)_2 = (?)_{10}$$

$$X = \frac{1/2}{1-1/2} = 1$$

(c) Convert the following decimal number to binary:

$$\begin{array}{r} 1010 \\ (1111.111)_{10} = (?)_2 \\ 10001010111.000111000110 \end{array}$$

(d) Convert the following hexadecimal number to binary, then the binary to decimal:

$$(FFFF)_{16} = (?)_2 = (?)_{10}$$

$$1111 \ 1111 \ 1111 \ 1111 \ (2) =$$

$$32768 \ 16384 \ 8192 \ 4096 \ 2048 \ 1024 \ 512 \ 256 \ 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 = 65535 \ 2.$$

(20 pts) Perform the following (subtraction) operation (Need to show all steps):

$$\bullet (1 - 11)_{10}$$

Using signed binary, 8-bit 2's complement arithmetic.

$$A = 1 \ B = 11$$

$$A = 00000001 \ B = 00001011$$

$$B = 11110100$$

$$B = 11110100$$

$$+ 1$$

$$= 11110101$$

$$00000001 + 11110101 = 11110110$$

00001001  
 +1  
 =00001010 = 10  
 -10

**3.** (40 pts) 32-bit FPN (IEEE 754) to decimal and back (Need to show all steps)

**(a)** Convert the following 32-bit FPN (IEEE 754) to decimal number: 1 10000000

110010000000000000000000

$$2 + 1 + .5 + .0625 = 3.5625$$

-3.5625

**(b)** Convert the following decimal number to 32-bit FPN (IEEE 754)

number:  $(-3.125)_{10}$

$$3.125 = 11.001$$

$$11.001 = 1.1001 \times 2^1$$

100100000000000000000000

$$1 + 127 = 128 = 10000000$$

$$-3.125 = 1 \ 10000000 \ 100100000000000000000000$$