

EE 3755, Spring 2005

Homework # 1

Due Friday February 25

in class

HW #1

①

Please do the following problems:

1] Perform the addition $X+Y$ where X and Y are the following 6-bit sign magnitude numbers:

$$X = (011100)_2 = (+28)_{10}, \quad Y = (111110)_2 = (-30)_{10}.$$

2] Using the Booth algorithm that relies on examining three bits at a time, perform the signed multiplication with multiplier $(-27)_{10}$, multiplicand $= (-22)_{10}$ and length $n=6$

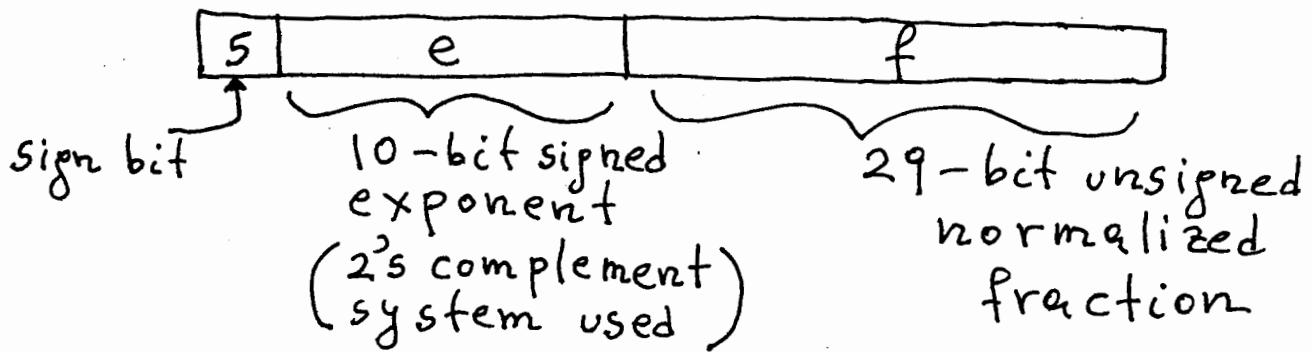
3] Using the shift-subtract/add division algorithm, perform the division of the 10-bit dividend $A = (0000001101)_2$ by the 5-bit divisor $B = (00101)_2$.

4] Using the shift-subtract/add division algorithm, perform the division of the 10-bit dividend $A = (0000010001)_2$ by the 5-bit divisor $B = (00011)_2$.

HW#1

(2)

5 Compute the Dynamic Range for a floating point system based on the 40-bit binary FLP format shown below:



6 Consider the following two floating point numbers with 4-bit exponents in biased form and 8-bit unsigned normalized fractions

A_1 :

| | | |
|-------|-------|----------|
| s_1 | e_1 | f_1 |
| 0 | 0111 | 11110000 |

A_2 :

| | | |
|-------|-------|----------|
| s_2 | e_2 | f_2 |
| 1 | 1001 | 10010010 |

Compute the summation $A_3 = A_1 + A_2$. Return the result A_3 in a form consisting of a normalized fraction and exponent in biased form.

Problem 7

Refer to the handout #8 (the Carry Lookahead Adder). Refer to Figure 2 on page 9.

Now answer the following questions:

(a) Write the equation by which the appropriate BCLA unit computes

$$C_5^*$$

(b) Write the equation by which the appropriate BCLA unit computes

$$P_6^*$$

(c) Write the equation by which the 8-bit CLA unit computes C_{23} .

(d) Write the equation by which the appropriate BCLA unit computes C_{26} .