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Class: CSS 362

**Solution**

1. Convert 11000100 to decimal assuming the number is stored in each of the following representations:
   * + 1. Unsigned: 197
       2. Signed: -69
       3. One’s Compliment: -59 (a negative one is added to make a two’s compliment).
       4. Two’s Compliment: -60
2. Convert -13332 from decimal to each of the following

a. 16-bit signed magnitude : 111010000010100

b. 16-bit one’s complement:100101111101011

c. 16-bit two’s complement:100101111101100

1. Using the 14-bit floating point representation from chapter 2 (figure 2.2) where exponents are represented using excess-16, convert the following

a. 01011011000011 to decimal:

b. -14.375 to binary:

c. 10111010101000 to decimal:

d. 1.9 to binary:

1. Given the binary number 11100000, provide the results of the following as an 8-bit value. a. Left shift by 1 bit:

b. Right shift by 2 bits:  
c. Arithmetic right shift by 1 bit:

1. Perform the operation 01010101 – 00110011 by converting the second number to its two’s complement negation and adding. Show your work.
2. Do the following binary multiplication and division problems. Use the **tabular approach** (as covered in class, see the sample problems on the web site and power point notes). If you do not show the work via the tabular approach, you will get no credit. For a, d & e, the numbers are unsigned magnitude. For b & c, the numbers are two’s complement. The multiplication problems use 5-bit numbers and the division problems use 6-bit numbers.

a. 10111 \* 11001 (use the unsigned multiplication algorithm) b. 01011 \* 11001 (use Booth’s algorithm)  
c. 11010 \* 10110 (use Booth’s algorithm)  
d. 111100 / 000101 (use the unsigned division algorithm)

e. 101101 / 001101 (use the unsigned division algorithm)