COMP 2401 – Assignment #3
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1.
    a. 1101 0101 =
       $2^7 + 2^6 + 2^4 + 2^2 + 2^0$ =
       128 + 64 + 16 + 4 + 1 = 213
    b. 1101 0101 =
       0010 1010 + 1 =
       0010 1011 =
       $2^5 + 2^3 + 2^1 + 2^0$ =
       32 + 8 + 2 + 1 = -43

2.
    a. -342.265625 =
       $2^8 + 2^6 + 2^4 + 2^2 + 2^1 + 2^{-2} + 2^{-6}$ =
       -101010110.010001 =
       $-1.01010110010001 \times 2^8$
       Sign bit = 1
       e = 8 + 127 = 135 = $2^7 + 2^2 + 2^1 + 2^0$ = 1000 0111
       f = 01010110010001

       1 10000111 01010110010001000000000

    b. 1 01111100 00110000000000000000000
       Sign bit = 1
       e = 0111 1100 = $2^6 + 2^5 + 2^4 + 2^3 + 2^2$ = 124 – 127 = -3
       f = 1.0011×2^{-3} = 0.0010011
       $2^{-3} + 2^{-6} + 2^{-7}$ = 0.1484375

       -0.1484375

3. x = 0xa3   y = 0x0b
    a. $10 \times 16^1 + 3 \times 16^0$ = 160 + 3 = 163
       163 – 128 – 32 – 2 – 1 = 0
       $2^7 + 2^5 + 2^1 + 2^0$
       1010 0011
       char not unsigned char so…
       0101 1100 + 1 = 0101 1101
       $2^6 + 2^4 + 2^3 + 2^2 + 2^0$ =
       64 + 16 + 8 + 4 + 1 = 93
       x = -93

b. $0*16^1 + 11*16^0 = 0 + 11 = 11$
   $11 - 8 - 2 - 1 = 0$
   $2^3 + 2^1 + 2^0$
   0000 1011

c.   1010 0011   (x)
   & 0000 1011   (y)
      0000 0011
   $2^1 + 2^0 = 2 + 1 = 3$
   x & y = 3

d.   1010 0011   (x)
   | 0000 1011   (y)
      1010 1011
      0101 0100 + 1 = 0101 0101
   $2^6 + 2^4 + 2^2 + 2^0 =$
   64 + 16 + 4 + 1 = 85
   x | y = -85

e. 0000 1011 << 3 =
   0101 1000
   $2^6 + 2^4 + 2^3 = 64 + 16 + 8 = 88$
   y << 3 = 88

f. 1010 0011 >> 1
   1101 0001
   0010 1110 + 1 = 0010 1111
   $2^5 + 2^3 + 2^2 + 2^1 + 2^0 =$
   32 + 8 + 4 + 2 + 1 = 47
   x >> 1 = -47