

EE 2310 Homework #1 Solutions – Number Conversions

1. Convert the following positive decimal numbers to binary (byte form; take the binary point of non-exact fractions to at least 2x the decimal number of places):

126	0111 1110	99	0110 0011	0.125	0.001
8.1875	1000.0011	23.57	10111.1001	63.06	111111.0001(1)

2. Convert the following positive binary numbers to decimal:

1110 0011	227	0.110001	0.765625	1 1111.0101	31.3125
1.1101 01	1.828125	0.101111	0.734375	1010.0101	10.3125

3. Convert the following binary numbers to hexadecimal (prefix the hexadecimal number with “0x,” which is the symbolic notation meaning “hexadecimal number”).

1111 1100	0x fc	111 1110	0x 7e	1010 1111	0x af
101.1011 01	0x 5.b4	1 0001.101	0x 11.a	11 1101.10111	0x 3d.b8

4. Convert the following hexadecimal numbers to binary (byte form):

0x d6	1101 0110	0x 0.e7	0.1110 0111	0x 0.ac	0.1010 11
0x 34.f4	11 0100.1111 01	0x af.f8	1010 1111.1111 1	0x b5.c	1011 0101.11

5. Convert the following numbers to decimal:

0x51	0x a4.d	0x 0.9e	0x d7.32	0x 8c.ff
81	164.8125	0.6172	215.1953	140.9961

6. Convert the following numbers to hexadecimal:

256	81	0.5	0.38	144.375	117.125
0x 100	0x 51	0x 0.8	0x 0.614	0x 90.6	0x 75.2

Homework #1 (Continued) Number Conversions

7. Convert the following two's complement binary numbers to hexadecimal and decimal (prefix the hexadecimal number with "0x"). Note: The leading zeros are required for two's complement numbers below to show the correct sign.

0011 1111 0x3f, 63 1001 1111 -0x61, -97 1010 1111 -0x51, -81
 1110 1111 -0x11, -17 0110 1000 0x 68, 104 1111 0001 -0xf, -15

8. Convert the following hexadecimal numbers to signed binary numbers, using the 2's complement sign convention:

0x 5a 0101 1010 -0x24 1101 1100 -0xa 1111 0110 -0x6f 1001 0001
 -0x52 1010 1110 -0x79 1000 0111 0x4a 0100 1010 -0x78 1000 1000

9. Convert the following decimal numbers to signed binary numbers, using the 2's complement sign convention:


75 0100 1011 -101 1001 1011 -84 1010 1100
 -33 1101 1111 -40 1101 1000 -96 1010 0000

10. Perform the indicated math operation (numbers are positive binary [i.e., NOT 2's complement]):

$\begin{array}{r} 1100\ 1000 \\ -0001\ 1001 \\ \hline 1010\ 1111 \end{array}$	$\begin{array}{r} 1100\ 1101 \\ +0010\ 1111 \\ \hline 1111\ 1100 \end{array}$	$\begin{array}{r} 1000\ 0001 \\ +11\ 1111 \\ \hline 1100\ 0000 \end{array}$	$\begin{array}{r} 1010\ 1111 \\ -11\ 1001 \\ \hline 111\ 0110 \end{array}$
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11. Perform the indicated math operation (numbers are two's complement binary). Write the decimal value of the answer below the binary answer.

$\begin{array}{r} 1110\ 0111\ (-25) \\ +0111\ 1100\ (124) \\ \hline 0110\ 0011 \\ +99 \end{array}$	$\begin{array}{r} 0011\ 1000\ (56) \\ -1011\ 1010\ (-[-70]) \\ \hline 0111\ 1110 \\ +126 \end{array}$	$\begin{array}{r} 0100\ 1000\ (72) \\ +1000\ 0111\ (-121) \\ \hline 1100\ 1111 \\ -49 \end{array}$	$\begin{array}{r} 1110\ 1011\ (-21) \\ +0111\ 0111\ (119) \\ \hline (1)\ 0110\ 0010 \\ +98 \end{array}$
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 "Thrown away"