CS 210 Homework 1

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DUE: Monday, April 9, 2012

Solve the following problems. Show all of your work. Clearly indicate your final answers (e.g., by boxing them).

1. Convert the following binary numbers to decimal:

   (a) $(10101101)_2$

   (b) $(1011001000)_2$

   (c) $(101.1001001)_2$

2. Convert the following decimal numbers to binary:

   (a) $(111)_{10}$

   (b) $(853364)_{10}$

   (c) $(3141.9)_{10}$

3. Convert the decimal number $(175.175)_{10}$ to

   (a) base 3

   (b) octal

   (c) hexadecimal

4. Convert the hexadecimal number $(\text{DEADBEEF})_{16}$ to

   (a) binary

   (b) octal

5. Perform subtraction with the following unsigned binary numbers using addition and the 2's complement of the subtrahend.

   (a) $11010 - 10000$

   (b) $11010 - 1101$

   (c) $100 - 110000$

   (d) $1010100 - 1010100$

6. The binary numbers listed have a sign in the leftmost position and, if negative, are in 2's complement form. Perform the arithmetic operations indicated and verify the answers.

   (a) `101011 + 111000`

   (b) `001110 + 110010`

   (c) `111001 − 001010`

   (d) `101011 − 100110`

7. Decode the following ASCII code:

   `1000100 1101111 1101110 100000 1001011 1101110 1110101 1110100 1101000`

8. Show the bit configuration that represents the decimal number $(867)_{10}$ in

   (a) binary

   (b) BCD

   (c) ASCII