CS 429 Homework 1

Name: _____ Section #: _____

Instructions: The proctors will be circulating more information on the file format they require.

1. Perform the following number conversions:
   (a) 0xABC0F1 to binary _____
   (b) Binary 110000011001111 to hexadecimal _____
   (c) Binary 110000011001111 to octal (base 8) _____
2. Convert between decimal and hexadecimal:
   (a) 147 to hexadecimal _____
   (b) 0xAE to decimal _____
3. Solve directly in hexadecimal: 0xB75D + 0x8AF

4. Perform the following operations on x = 0xA5 and y = 0x2C (answer in hex):
   (a) `x & y` _____
   (b) `x && y` _____
   (c) `~x & !(y | (x ^ y))` _____
5. Perform the following shift operations on the byte x = 0xB9 (answer in hex):
   (a) `x << 3` _____
   (b) `x >> 1`, logical _____
   (c) `x >> 3`, arithmetic _____

6. Write out and sum the non-zero powers of two for the two functions shown. Express output in decimal:

   (a) $B2U_5$(0x2E) _____

   (b) $B2T_5$(0x2E) _____

7. Apply the function $T2U_5$ to the two following decimal values. Express the answer as a decimal number.

   (a) -7 _____

   (b) 12 _____

8. Assuming an 8-bit machine that uses 2's complement arithmetic, apply the appropriate casting and express the result as a relational value (true or false):

   (a) `-127 == 127U` _____

   (b) `-127-1U == 127` _____

   (c) `-1U < 128U` _____

   (d) `255U == -128` _____

9. Express x*K using on only the specified number of operations:

   (a) K = 7, using 1 shift and 1 Add/Sub _____

   (b) K = -13, using the fewest possible shifts and Add/Subs _____

10. Write C expressions that evaluate to 1 when the following conditions are true and to 0 when they are false. Assume x is of type int.

    (a) Any bit of x equals 1. _____

    (b) Any bit of x equals 0. _____

    (c) Any bit in the least significant byte of x equals 1. _____