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) $\bar{x} & ! (y \mid (x \bar{y}))$

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 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.