CS 061 – Computer Organization **Winter - 2014**

Quiz 3 – Friday 1/24 solution

1. Under what circumstances will the addition of two binary numbers in 2's complement representation, one of which is negative and one positive, result in an invalid result?
   - **a.** if the result appears negative.
   - **b.** if the result appears positive.
   - **c. never.**
   - **d.** always.
   - **e.** none of the above.

2. The number b1111 0000 is an 8-bit 2's complement binary number. What decimal number does it represent?
   - **a.** +240
   - **b.** –240
   - **c.** +150
   - **d.** –150
   - **e.** +16
   - **f. –16**

3. Which of the following forms are valid examples of the LC-3 ADD instruction?
   - **a.** `ADD R0, R1, label`
   - **b.** `ADD R0, R1, R2`
   - **c.** `ADD R0, R1, #12`
   - **d.** `ADD R0, #12, R1`
   - **e. b and c**
   - **f.** `a, b, and c`

4. Given the instruction (located at address xA400)

   ```
   xA400          LDR  R1,  R2,  x10
   ```

   and given: `R2` contains the value `xB000`; memory location `xB000` contains the value `xB020`; memory location `xB010` contains the value `x000F`; and memory location `xB020` contains the value `x00FF`
   What value will `R1` contain after the instruction executes?
   - **a.** `xA400`
   - **b.** `xB000`
   - **c.** `xB010`
   - **d.** `xB020`
   - **e. x000F**
   - **f.** `x00FF`

5. Given the instruction (located at address xA400)

   ```
   xA400          LDI  R1,  pointer
   ```

   and given: `pointer` is a label corresponding to the address `xB000`; memory location `xB000` contains the value `xB010`; memory location `xB010` contains the value `xB020`; and memory location `xB020` contains the value `x00FF`
   What value will `R1` contain after the instruction executes?
   - **a.** `xA400`
   - **b.** `xB000`
   - **c.** `xB010`
   - **d. xB020**
   - **e.** `x00FF`

6. Which of the following statements involving boolean variables `a` and `b` is always true?
   - **a.** `a . b = 1`
   - **b.** `a + 0 = 0`
   - **c. a . b + a . b' = a**
   - **d.** `(a + b) . (a + b') = b`
   - **e.** `a + a . b = b`
   - **f.** `a . (a + b) = b`

7. What does the following logic expression simplify to?

   ```
   NOT( NOT(A) OR  NOT(B) )
   ```

   - **a. A AND B**
   - **b.** `A OR B`
   - **c.** `A NAND B`
   - **d.** `A NOR B`
   - **e.** `A XOR B`

8. What is the result of the bitwise operation: `NOT( 1000 AND (1100 OR 0101) )`

a. **0111** **b.** 1000 **c.** 1111 **d.** 0000

9. How many different binary boolean operators could possibly be defined?

a. 4 **b.** 8 **c.** **16** **d.** 32 **e.** effectively unlimited

10. What bitwise logic operators are included in the LC-3 ISA?

a. `AND, OR, NOT`
b. **`AND, NOT`**
c. `AND, OR, XOR, NOT`
d. `NAND, NOR`
e. `NAND, NOR NOT`
f. `ADD, AND, NOT`