**CS 3173 Assignment 6 14 points**

**chapter 9**

**Due 10/12**

**Email your homework to me at** [**harringp@nsuok.edu**](mailto:harringp@nsuok.edu)

**Problem Solving: Type your answers (11 points):**

1. For a binary number, what does it indicate if the least significant bit is a 1 or a 0? **– If the LSB is one, the number is odd, it represents an odd integer, and if it is 0 it represents an even integer.**
2. Solve the following bitwise AND operation on the following binary numbers: 0110 AND 1010 **– 0010**
3. Solve the following bitwise XOR operation on the following binary numbers: 0110 XOR 1010 **– 1100**
4. Use a bitwise odd/even mask on the following binary number: 1010 **– 1010 AND 0001 = 0000**
5. Use a bitwise lower nibble mask to isolate the lower four bits (lower nibble) of the following binary number: 10100111 **– 10100111 AND 00001111 = 00000111**
6. Use a bitwise shift and lower nibble mask to isolate the upper four bits (upper nibble) of the following binary number: 10100111 ­**– Shift: 10100111 > 00001010; Mask: 00001010 AND 00001111 = 00001010**
7. Use bitwise OR with a bitwise mask to set bits 3 and 4 to one in the following binary number: 10100111 **– 10100111 OR 00011000 = 10111111**
8. Use bitwise XOR with a bitwise mask to toggle bits 0 and 2 in the following binary number: 10100111 **– 10100111 XOR 00000101 = 10100010**
9. Use the 1’s complement checksum to calculate the resulting value to check for errors in the following binary number: 10100111 **– 10100111 + 01011000 = 11111111**
10. Use the 2’s complement checksum to calculate the resulting value to check for errors in the following binary number: 10100111 **– 10100111 + 01011001 = (1)00000000**
11. State the bitwise operation that gives the same result as bitwise addition as well as bitwise subtraction. **– Bitwise XOR**

**Part 2: Java Programming (3 points):**

Write a Java program to toggle all the bits on any eight-bit binary number (change the 1’s to 0’s and 0’s to 1’s) by using a for-loop and if-else statements. Use a string to simulate the binary number and another string with string concatenate for the new binary number.