EECE.2160: ECE Application Programming
Key Questions
Bitwise operators (Lectures 35 & 36)

QUESTIONS:

1. Describe how to represent decimal values in binary (base 2) and hexadecimal (base 16) and how to convert between those bases.

2. Describe the C bitwise operators.

3. Explain C bit shift operators and their uses.

4. Describe how, in general, you perform the operations below on a bit or range of bits:
    a. Setting bit(s) (desired bit(s) = 1, all others unchanged)
    b. Clearing bit(s) (desired bit(s) = 0, all others unchanged)
    c. Flipping bit(s) (desired bit(s) change from 0→1 or 1→0, all others unchanged)

5. Describe how to extract a group of bits from a larger value.

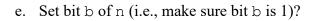6. Describe how to print hexadecimal values.

EXAMPLES:

1. Evaluate each of the following expressions if you have the following `unsigned int`
   variables: `A = 7, B = 10,` and `C = 0xFFFFFFFF`

a. `A & B`

b. `A | ~B`

c. `A ^ C`

d. `A << 4`

e. `B >> 5`

f. `A | (B << 2)`

2. Given an `unsigned int`, n, and a number, b, how would you:
a. Clear all bits of n?

b. Clear the lower 16 bits of n (mask out lower bits)?

c. Flip all bits of n?

d. Flip bit b of n?

e. Set bit b of n (i.e., make sure bit b is 1)?

f. Clear bit b of n (i.e., make sure bit b is 0)?