16.216: ECE Application Programming

Summer 2014

Lecture 9: Key Questions June 17, 2014

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

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2. Describe the C bitwise operators.

3. Explain C bit shift operators and their uses.

4. **Example:** Evaluate each of the following expressions if you have the following unsigned int variables: A = 7, B = 10, and C = 0xFFFFFFFF a. A & B

- 5. **Example:** 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)?

- 6. 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 $0 \rightarrow 1$ or $1 \rightarrow 0$, all others unchanged)

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

8. Describe how to print hexadecimal values.