16.216: ECE Application Programming

Spring 2012

Lecture 8: Key Questions
February 8, 2012

1. What are the basic binary arithmetic operators supported by C?

2. Explain the modulus operator (%).

3. What determines the type of a binary operation's result?

4. What is the difference between division of integers and floating-point types?

5. Explain the operation of the unary negation operator (e.g., `-x`).

6. **Example:** Evaluate each of the following expressions, including the type (`int` or `double`) in your answer.

a. `19/3`

b. `3/19`

c. `19%3`

d. `3%19`

e. `5 + 7/2`

f. `5.0 + 7/2`

g. `5 + 7.0/2`

h. `5 * 3 % 3 / 6 + 14 + 10 / 2`

i. `5 * (3 % 3) / 6 + 14.0 + 10/3`

7. Describe the C bitwise operators.

8. Explain C bit shift operators and their uses.

9. What is the order of operations for C operators?

10. **Example:** Evaluate each of the following expressions if you have the following unsigned ints: `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)`

11. **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?