16.216: ECE Application Programming Fall 2012

Lecture 8: Key Questions September 21, 2012

1. a.	Example: Given an unsigned int, n, and a number, b, how would you: 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)?

- 2. 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)

3. Explain the basic form of an if statement.

4. Describe how the expression in if (<expression>) is evaluated and show how conditions are evaluated, including multiple conditions in the same expression.

5. Describe how the statement—the actual code to be executed if the condition is true—is written for an if statement.

6. Show how multiple if statements can be nested together (if/else if/else).

7. **Example:** What does the following code print?

```
int main() {
  int x = 3;
  int y = 7;

if (x > 2)
    x = x - 2;
  else
    x = x + 2;

if ((y % 2) == 1)
  {
    y = -x;
    if ((x != 0) && (y != -1))
        y = 0;
  }
  printf("x = %d, y = %d\n", x, y);
  return 0;
}
```

8. Discuss how to use if statements to check that a value falls within a desired range.

9. **Example:** Write a short code sequence that does each of the following:

a. Given int $\,\mathbf{x}$, check its value. If \mathbf{x} is more than 5 and less than or equal to 10, print $\,\mathbf{x}$

b. Prompt for and read temperature as input (type double). If temp is 90 or higher, print "It's too hot!" If temp is 32 or lower, print "It's freezing!" In all other cases, print "It's okay"

c. Read 3 int values and print error if input problem

- Values are separated by a comma
- If fewer than 3 values read, print error message with number of values
- Example: Error: only 2 inputs read correctly