EECE.2160: ECE Application Programming

Key Questions

Loops (Lectures 12-14)

QUESTIONS:

1. Explain the basic form of a `while` loop.
2. Describe how and when the conditional test in a `while` loop is evaluated, how the result of that test determines whether or not the loop body repeats, and what happens once the loop condition becomes false.
3. What happens if the loop condition in a `while` loop is false the first time it is tested?
4. What is a sentinel value, and how are sentinel values used to determine when loops end?
5. Describe the basic format of a `do-while` loop. What is the fundamental difference between a `do-while` loop and a `while` loop?
6. In what cases are `for` loops useful? Describe the basic structure of a `for` loop.
7. Describe the operators that allow you to directly modify a variable without writing a full assignment statement.
8. Explain the difference between pre- and post-increment or decrement operators.
9. Describe the characteristics of Program 4.

EXAMPLES:

1. Write a while or do-while loop for each of the following tasks:

a. Print all multiples of 3 between 0 and 100 (including 0)

b. Given two variables, x and y, repeatedly increment x by 1 and decrement y by 1 until x is greater than y. Print the initial values of x and y before the loop starts, and count the number of iterations this loop takes and print it when the loop is done.

c. Repeatedly prompt for and read a single non-space character into a variable, cmd, until the user enters either 'X' or 'x'.

2. What does the following program print?

```
int n = 5;
printf("n = %d\n", ++n);
printf("Now, n = %d\n", n++);
printf("Finally, n = %d\n", n);
```

3. **Example:** What does each of the following print?

a.
```
for (i = 5; i < 40; i += 8)
{
    printf("%d ", i);
}
```

b.
```
for (i = -5; i < -10; i--)
{
  printf("%d ", i);
}
```

c.
```
for (i = 10; i <= 100; i = i+10)
{
    if (i % 20)
        printf("%d ", i);
}
```

d.
```
for (i = 5; i < 10; i += i%2)
{
  printf("%d ", i++);
}
```