CS150 Intro to CS I

Fall 2015

Chapter 5
Loops & Files

- for loop
- Reading: pp. 247-257 [Section 5.7]
- Good Problems to Work: pp. 257 [5.8, 5.11]

for loop

- The for loop is
  1. a pre-tested loop
  2. a count-controlled loop that executes an exact number of iterations

```
//  initialize      test        update
for (int count = 0; count < 5; ++count)
{
  cout << count << endl;
}
```

Show the flowchart for the above for loop

for loop vs while loop

- Rewrite the following for loop as an equivalent while loop

```
for (int count = 0; count < 5; ++count)
{
  cout << count << endl;
}
```

Practice

- Write a for loop that outputs the odd integers less than 10 and greater than 0.

Practice

- Write a program segment that asks the user to enter a natural number. If the number is not a natural number, print "Illegal Input"; otherwise, output the integers from the integer entered to 1.

- Do this with a for loop
- Do this with a while loop

Practice

- Write a program that computes the factorial of a number. The factorial of a number is given by the formula below. The user will input a value for N.
- N! = N * (N-1) * (N-2) * … * 2 * 1
  - where 0! = 1, 1! = 1, 2! = 2, 3! = 6

Localized Declarations

```
for (int i = 0; i < 10; i++)
{
  cout << i << endl;
}
cout << i << endl; // This will cause an error
```

- i is declared and known ONLY in the loop
- a localized declaration in a for loop is the only place where a single character variable name is acceptable

Practice

- What is the output from executing the following loop?

```
int count;
for (count = 0; count < 5; count++)
{
   cout << count << endl;
   count++;
}
```

Practice

- Write a program that allows the user the ability to enter 20 integers, you should then print out the following:
  1. The sum of all integers inputted
  2. The average of all integers inputted
  3. The largest integer of all integers inputted