CS150 Intro to CS I

Fall 2014

Chapter 5
Loops and Files

- Reading: Chapter 5 (5.2 pp. 232-238)

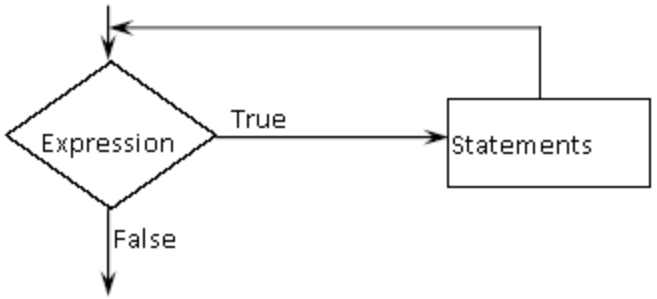
Loops

- A loop is a section of code that repeats
- C++ has three looping control structures:
  1. while
  2. for
  3. do-while
- The difference in these structures is how the repetition is controlled

while loop

- pre-tested loop
- General format

```
while (expression)
{
   // statements
}
```



while Loop Example

- Let the user determine how many times to run the loop.

```
int theCounter = 0;    // initialize the counter
int maxValue;

cout << "How many times should we run the loop? ";
cin >> maxValue;

while (              )    // test the counter
{
  cout << "theCounter : " ;
  cout << theCounter << endl;
                          // update the counter

}
```

Practice

- Write a snippet of code that will ask the user for an integer. Print the integers from 0 to the square of the number (inclusive) the user supplied.

Running Totals

- Write a snippet of code using a while loop that will calculate the sum of all the integers from 0 to 10.

- Write a snippet of code that will ask the user for a number. Print the *sum* of all the integers from 0 to the number the user supplied.

Example

- How many inches of rain did we get last week?

```
const int DAYS_IN_A_WEEK = 7;
int currentDay = 1;                    // initialize the counter
double totalRain = 0.0;                // initialize the total
double currentRain;

// loop for each day in a week
while (currentDay <= DAYS_IN_A_WEEK)   // test the counter
{
  cout << "How much rain fell on day " << currentDay << ": ";
  cin >> currentRain;
  totalRain += currentRain;

  ++currentDay;                        // update the counter
}
cout << "The total rainfall last week was ";
cout << fixed << setprecision(2) << totalRain;
```

Practice

- Write a snippet of code that will ask the user for a number. Print the sum of all the *even* numbers from 0 to the square of the number the user supplied.

Practice

- Write a snippet of code that will ask the user for an integer. Print all the integers from 0 to the number the user supplied as well as the running total of the integers.

```
Enter a number: 3
counter running total
      0             0
      1             1
      2             3
      3             6
```

Practice

- Write a snippet of code that will ask for a student's exam score and then print the appropriate letter grade (A,B,C,D,F).
- Continue asking for exam scores and printing letter grades until the user enters a negative exam score

```
double examScore;
```