



CS150 Intro to CS I

Fall 2012

Chapter 5

Loops and Files

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

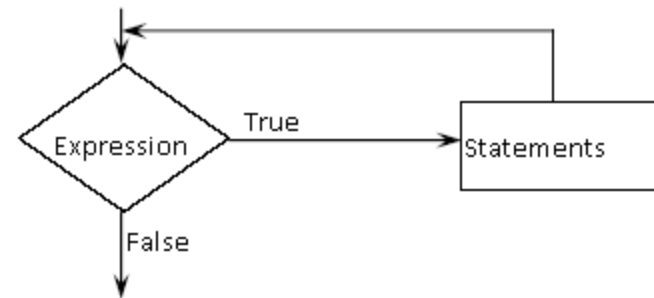
Loops

- 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 the user supplied.

Practice

1. Write a piece of code that will ask the user for two integers and display them to the screen with the smallest value displayed first.
2. If the sum of the two integers is less than 100, repeat the above action.

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;
```