

# CS150 Intro to CS I

Fall 2017

# Chapter 5

## Loops and Files

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

# Loops

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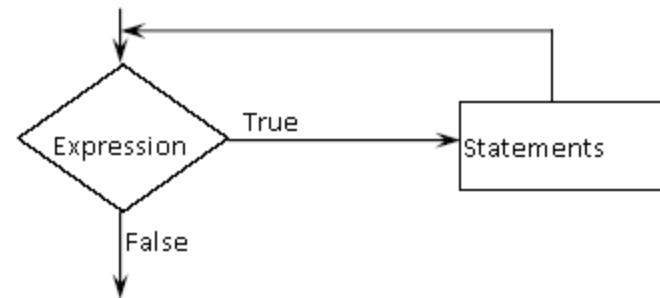
- A loop is a section of code that repeats
- C++ has three looping control structures:
  1. while
  2. for
  3. do-while
- The difference in these structures is how the repetition is controlled

# while loop

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- pre-tested loop
- General format

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



# while Loop Example

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- 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

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- 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

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- 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

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- 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 = totalRain + currentRain;

    currentDay = currentDay + 1; // update the counter
}
cout << "The total rainfall last week was ";
cout << fixed << setprecision(2) << totalRain;
```



# Practice

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- 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

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- 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

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- 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;
```