# Loops

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## Let the user control the Loop

- 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
}
```

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## 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.

## Last week we Solved

- Write a C++ program segment that allows the user the ability to input an integer from the keyboard.

- If the integer is positive, increment a variable **posCount** by 1. If the integer is **negative**, increment a variable **negCount** by 1. If neither, increment **zeroCount** by 1

```
int posCount=0, negCount=0, zeroCount=0;
```

- **How can we modify the program so that the user inputs 20 integers and the program outputs the number of positive integers, the number of negative integers, and the number of zeros that the user entered?**

## Practice

- Write a piece of code that will ask the user for two integers and display them to the screen. If the sum of the two integers is less than 100, repeat the above action.

## Running Totals

- Write a snippet of code that will calculate the sum of all the integers from 0 to 5.

- 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?

```cpp
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
```

## Exercise

- 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;
```