# CS 150 Lab 6
## Loops Loops Loops

You are to solve **ANY TWO** of the following four labs. The problems are listed from easy to hard. If you want more of a challenge, pick later labs. If you are struggling with loops a little, pick the earlier labs. If the solution calls for a count controlled loop, make sure you use a for loop in the solution.

- Be sure your output looks exactly like the specified output.
- Be sure to submit the completed project to CS150-02 Lab when you are done.
- Be sure to use the program skeleton and add comments to your code!

Show the instructor or TA your solution to each problem before submitting.

## Lab 6.1
The conversion of kilometers per hour (KPH) to miles per hour (MPH) is given by the formula mph = kph * 0.6214. Write a C++ program in a project named **6_1_Speed** that produces a table of values based on input given by the user. The speeds are to be shown in increments of 10 kph. As this is a count controlled loop, the main loop must be a for loop.

```
*******************************
*          Speed Table        *
*******************************

Enter starting KPH value: 60
Enter ending KPH value: 100

      KPH       MPH
      ---       ---
     60.0      37.3
     70.0      43.5
          ...
```

## Lab 6.2
The first few fibonacci numbers are 1 1 2 3 5 ... After the first two fibonacci numbers, each subsequent number is found by adding the previous two numbers. Write a C++ program in a project **6_2_Fibonacci** that prints a table of fibonacci numbers as follows:

```
*******************************
*         Fibonnaci Table      *
*******************************

Enter number of fibonacci's: 5

      Fibonnaci Numbers
      -----------------
                   1
                   1
                   2
                   3
                   5
```

## Lab 6.3

An approximation of pi is:

$$\pi = 4 \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} = 4 \left( \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + - \cdots \right) = \cfrac{4}{1 + \cfrac{1^2}{2 + \cfrac{3^2}{2 + \cfrac{5^2}{2 + \cdots}}}}$$

http://en.wikipedia.org/wiki/Approximations_of_%CF%80

Write a C++ program in a project **6_3_Pi** that asks the user to input the number of terms to use in the approximation of pi. Using the specified number of terms, output the approximation of pi.

```
*******************************
*       Pi Approximation      *
*******************************

Enter number of terms in pi approximation: 1000

Approximation of pi is: x.xxxxx
```

## Lab 6.4

Write a C++ program in a project **6_4_Digits** that asks the user to input an integer number. You are to output the number of digits in the integer entered by the user.

```
*******************************
*       Fibonnaci Table       *
*******************************

Enter a positive integer: 5417

Number of digits in 5417 is 4
```

Note1: The projects you select are to be added to your Labs solution **PUNetIDLabs**.

Once your projects are complete, place your solution PUNetIDLabs into the CS150-02 Drop folder on Turing. Your solution is to have all previous projects completely working and correct.