Intro to Python – Lesson 13 and 14

Today we are going to expand our control structures. We started with **Sequence** – statements are executed in order one after the other, then we looked at **Selection** – using the IF Statement to execute one block of code or another, and finally we are going to look at **Iteration** – setting up a loop to repeat a block of statements. Start by viewing the following video – the video does include Collections which we will look at after loops but is easy to follow. It also looks at a couple of shortcuts for calculations that you may find useful.

https://www.youtube.com/watch?v=WPF5M_Ic6Fc&t=1198s

Try a few of these examples and we will discuss in class.

- Prepare a loop that will execute 10 times. Each time the loop executes, print the number. The output of the program will appear as follows:

```
1
2
:
9
10
```

- Edit the program above so that for each number, display the number, the square of the number, and the cube of the number. Change the loop to execute 25 times? 100 times?

- Allow the user to enter 5 values between 0 and 10. Display a graph using the 5 values so that a * is printed to represent each number. The graph may appear as follows:

```
***
********
**
******
****
```

- Write a program that will process temperatures in Celsius between -20 to +30. For each Celsius temperature, calculate the temperature in Fahrenheit using the formula F = 9 / 5 * Celsius + 32. Print the temperature in Celsius and the temperature in Fahrenheit. Include a heading for the two columns at the beginning. Output will appear as follows:

```
Celsius   Fahrenheit
-------------------------
 -20          13.8
 -19          14.8
        :
  29          84.2
  30          86.0
```

- Expanding on a previous program: Write a temperature conversion program that will process Celsius temperatures from -100 degrees to 100 degrees. For each temperature the program will calculate the corresponding temperature in Fahrenheit using the formula F = (9/5)C + 32, and the corresponding temperature in Kelvin using the formula K = C + 273.15. If the temperature in Celsius is -90 degrees, a message will read "Lowest Recorded Temperature", if the temperature in Celsius is 0 degrees, a message will read "Freezing Point of Water", if the temperature in Celsius is 20 degrees, a message will read "Average Room Temperature", and if the temperature in Celsius is 100 degrees, a message will read "Boiling Point of Water". No message will be assigned for the other temperatures. Display all values to the screen including the temperature in Celsius, Fahrenheit, Kelvin, and the message.

```
Temperature Conversion Chart

Celsius Fahrenheit Kelvin         Message
-----------------------------------------------
  100     212.0     373.2  Boiling Point of Water
                         :
                         :
```

- Prepare a program that will allow the user to enter a loan amount, and the reason for the loan. Create a loop that will execute for the number of Years between 1 and 10. For each year, calculate interest using the equation I = PRT where P is the amount of the loan, R is the interest rate, and T is the number of years. Add the interest to the loan amount for the total amount to be repaid. Finally, calculate the monthly payment by dividing the amount to be repaid by the number of months (years multiplied by 12). Print the year, the loan amount, the total to be repaid, and the monthly payment for each year. Use a standard interest rate of 6.5% per year.

```
Loan Options for 10 Years on $#,###.##

Years   Interest  Total Amt  Mon Payment
---------------------------------------
  #    $#,###.##  $#,###.##    $#,###.##
                     :
  #    $#,###.##  $#,###.##    $#,###.##
 ---------------------------------------
```

A program can also be set up to repeat until the user has finished and wants to end.

- Write a program that allows the user to enter an employee name, and a yearly salary. For each employee, calculate the weekly gross pay (divide the yearly salary by 52), and display their name, yearly salary, and weekly gross pay. **The program will repeat until the user enters the word "END" for the employee's name**.

OR

- Write a program that allows the user to enter an employee name, and a yearly salary. For each employee, calculate the weekly gross pay (divide the yearly salary by 52), and display their name, yearly salary, and weekly gross pay. **Prompt the user "Do you want to continue (Y/N):". If the user enters a "Y" you continue, and an "N" you will end the program.**