**Week 2 – Day One**

**(Functions – Lists – Tuples) + Revision**

**1.** Python allows you to repeat a string by multiplying it by an integer.

For example, 'Hi' * 3 will give 'HiHiHi'.

Write a function named repeat that accepts a string and an integer as arguments.

The function should return a string of the original string repeated the specified number of times.

For example, repeat('Hi', 3) should return 'HiHiHi'.

**2.** The month of February normally has 28 days. But if it is a leap year, February has 29 days.

Write a program that asks the user to enter a year. The program should then display the number of days in February that year. Use the following criteria to identify leap years:

 Determine whether the year is divisible by 100, and divisible 400.

For example, 2000 is a leap year, but 2100 is not.

 Determine whether the year is not divisible by 100, and divisible by 4.

For example, 2008 is a leap year, but 2009 is not.

**Here is a sample run of the program:**

**Enter a year: 2008**

**In 2008 February has 29 days.**

**3.** Write a function that estimates the value of the mathematical constant e by using the formula below: $\boldsymbol{e} = \frac{\mathbf{1}}{\mathbf{1}!} + \frac{\mathbf{1}}{\mathbf{2}!} + \frac{\mathbf{1}}{\mathbf{3}!} \ldots$

Terminate the loop after 10 iterations.

**4.** Design a program that asks the user to enter a store's sales for each day of the week. The amounts should be stored in a list. Use a loop to calculate the total sales for the week and display the result

**5.** Write a program to merge two lists to a third list.

**6.** Write a function to compute Combinations using Factorials. A combination of two numbers n and k is defined as $C(n, k) = \frac{n!}{k!(n-k)!}$

**7.** Design a program that uses a loop to build a list named valid_numbers that contains only the numbers between 0 and 100 from the numbers list below. The program should then determine and display the total and average of the values in the valid_numbers list.

numbers = [74, 19, 105, 20, −2, 67, 77, 124, −45, 38]

**8.** Write a program to create a list containing the squares of the elements of a list.

**9.** Create a function that receives a list and returns a list containing only the unique values in sorted order. **Test** your function with a list of numbers and a list of strings.

**10.** Write a program to delete an element from a list at specified position.

**11.** Assume list1 is a list of integers. Write a statement that uses a list comprehension to create a second list containing the elements of list1 that are even numbers.

**12.** Write a program to add two matrices.

In order to be added, the two matrices must have the same dimensions.

The program adds these two matrices, saves it in another matrix and displays it on the screen.