HOMEWORK 2
DUE SEPT 6th 2018
(submit all 10 .py files as a single .zip file to the Wolfware course site)

1) Take a list, say for example the defined as below:

   a = [1, 11, 2, 3, 5, 8, 13, 10, 21, 34, 55, -1]

   a) Write a program that prints out all the elements of the list that are less than 10.
   b) Write the above program in one line code statement.
   c) Instead of printing them, copy the contents of this list to a new list and then print out the new list.
   d) Ask the user for a number and return a new list that contains only elements from the original list that are greater than the number given by the user. Print the new list.

2) Write a program to count total number of alphabets, digits and special characters in a string. Example

Input:
www.ncsu4all.edu

Output:
Number of Alphabets: 13
Number of Digits in String is: 1
Number of special characters is: 2

3) Write a program to check whether a given substring is present in the given string and number of times it appears.

Input Text:
The world is round. We live in it. But perhaps the world is flat!

Enter Search Text:
is

Output
The number of times ‘is’ appears is: 2

4) Write a function to find if a number is a prime number or not by accepting user input. Accepts input from user and display it on the console. Modify the above code using function to accept a range from a user and the code prints all prime numbers till that value.

5) Write a Fibonacci series algorithm with a limit specified by the user. Display the generated numbers in a list and display the contents of the list to the user.

6) Ask the user for a string and print out whether this string is a palindrome or not. (A **palindrome** is a string that reads the same forwards and backwards.) Be as efficient as possible with minimal number of lines of code to achieve the desired output.

7) Take two lists, say for example the two lists below:
   a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
   b = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 78, 21]

and write a program that returns a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.

8) Let's play Rock, Paper and Scissors. Devise a program that lets the user play the game with the Computer for a specified number of attempts. For each attempt, the user inputs his/her hand and the computer randomly picks one from the list. If you know the game – Rock beats Scissors; Paper beats Rock; Scissors beats Paper. The algorithm should also track the score for the user and the Computer until the end of the game. Write the program using functions whenever possible. A sample I/O is shown as follows:

   Input:
   Enter number of attempts: 5
   Enter your name: Binil

   Input:
   Attempt 1: Show your Hand: Rock

   Output
   Sorry, you lost. Computer picked Paper.
   Score: User: 0; Computer: 1

   Input
   Attempt 2: Show your Hand: Paper
   Output
   Sorry, you lost: Computer picked Rock
   Score: User: 0; Computer: 2

   ..
   ..

   (After the 5 attempts are over, the algorithm should display who won the game)

   Output:
   Congratulations Computer, you won the game! Sorry, Binil, you lost.

   Final Score: Binil - 2; Computer - 3

9) Write the following functions. Each of these functions should have a single parameter -- accepting a string as an argument. The function should **only** do what is specified:
   1. Write a function that counts and returns the number of vowels in the string (A, E, I, O, U, a, e, i, o, u)
   2. Write a function that counts and returns the number of consonants in the string.
   3. Write a function that converts the string to all lowercase.
   4. Write a function that converts the string to all uppercase.

Write a main program that performs the following steps:

1. Prompt the user to enter a string, and let them type it in. This could be an entire sentence, with the newline indicating the end of the string.

2. Display the following menu:
   A Count the number of vowels in the string
   B Count the number of consonants in the string
   C Convert the string to uppercase

D Convert the string to lowercase
E Enter another string

M Display this menu
X Exit the program

3. Enter a loop, allowing the user to type in a menu choice from above each time. Loop should continue until the user enters the command to exit. Upper and lowercase letters should be allowed for the menu choices.
    - When the A or B commands are entered (counting vowels or consonants), call the corresponding function, then print the result
    - When the C or D commands are chosen, just call the appropriate function to convert the string and print on the console.
    - When E is chosen, allow a new string to be typed -- this will replace the previous one.
    - The menu should only be displayed once at the start, and then again whenever the M option is selected

10. Erin plays a lottery game called – “Choose a number and win $’, in which the player must first select a number, N and she will then be awarded money, M in $ based on the N selected. She is only allowed to choose from 1 to 100. The pattern goes as follows:

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	..
M	3	2	1	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	24	23	22	..

For example, if Erin chooses, 12, from the table she gets $10. She has 5 attempts. After the 5th attempt, display the total money won by Erin.

Write a program that will first generate the dictionary as shown above. Confirm if the dictionary has been generated correctly based on the pattern seen above.

Present a user input choice to allow Erin to enter 5 numbers between 1 and 100. Check if the user inputs are between 1 and 100. If not, ask the user to input again.

Then display the total $ won by Erin based on the 5 input numbers