CIS 125 Principles of Programming Logic
Homework #4: *Repetition Structures in Python*
100 points (each program worth 20 points)

Directions:

- Create the following programs in Python that perform the purpose described and produce the sample output (with user input where applicable).
- Include at least three lines of comments/remarks in each program, including your name, the date, and a description of the program.
- Upload your .py Python program to our Moodle web site for each of the following programs.
- Be sure to adhere to the college and course academic honesty policy.

1. Simple for loop

Create a Python program named hw4-1.py.

- Ask the user for a **maximum number**.
- Create a **for loop** that runs from 1 to that maximum number and outputs a message for each number that is divisible by 3 as shown in the same run below. This loop/program can be written several ways – chose either.

Sample run (with 19 as the user input):

```
Please enter number of times to loop: 19
3 is divisible by 3
6 is divisible by 3
9 is divisible by 3
12 is divisible by 3
15 is divisible by 3
18 is divisible by 3
```

2. While loops with input validation

Create a Python program named **hw4-2.py** that is a modification of the following program from our Loops handout in Moodle so that it does the following:

a) Keep both the outer and inner while loops to provide the user the ability to run the program again and provide input validation of the user input.
b) Instead of calculating BMI (Body Mass Index) change the program so that it:
    i. Asks the user to enter MPH (Miles Per Hour). Allow float to be entered.
    ii. Converts and displays the MPH and its value converted to KPM (Kilometers Per Hour). Look the formula up online. Display KPH as a whole number/no decimals.
    iii. Make your program run and display as my sample run below does.

```
choice = "Y"
yes_list = ("Y","y","yes","Yes","YES")
all_list = ("Y","y","yes","Yes","YES", "N", "n", "no", "No", "NO")
while choice in yes_list:
    weight = float(input("\nHow much do you weight? "))
    height = float(input("How tall are you in inches? "))
    bmi = 703 * (weight / (height * height))
    print ("Your BMI is: %.2f" % bmi)
    choice = input("Would you like to make another BMI calculation (Y/N)? ")
    while choice not in all_list:
        choice = input("Invalid choice.  Enter a Y or N? ")
```

Sample run:

Enter MPH: 66
66.0 MPH = 106 KPH
Would you like to make another MPH calculation (Y/N)? ct
Invalid choice. Enter a Y or N? y

Enter MPH: 55
55.0 MPH = 89 KPH
Would you like to make another MPH calculation (Y/N)? n

3. Home Value Forecast

Create a Python program named **hw4-3.py** that does the following:

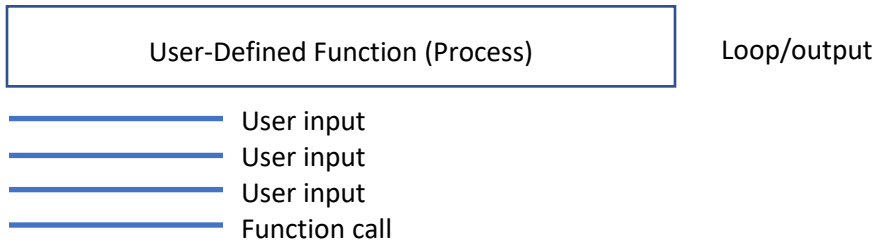
- Asks the user for three user inputs in the main part of the program:
  - Price of a home (house) (float)
  - Percentage (%) increase the home value is expected to go up in value each year (float, e.g. .02)
  - How many years (integer) to calculate out the home value into the future
- Call a user-defined function and pass these three values into it
- The function will then display the current price of the house as well as the future value of the house based on the percentage increase entered by the user extending out the number of years entered by the user.
  - Use a loop to accomplish this, i.e. do not use multiple print lines for each future year – use only one print line/command.
- See sample run below.
- Be sure to format the value of the house output with commas as shown

Sample run (100000 .02 and 4 were user input)

Please enter house price: 100000
Please enter percentage of increase (e.g. .02): .02
Please enter number of years for forecast: 4

Current price is: $100,000.00
Price will be $102,000.00 in year 1
Price will be $104,040.00 in year 2
Price will be $106,120.80 in year 3
Price will be $108,243.22 in year 4

Code Organization Diagram (one function: three data in/no data out)



Below are a few **hints**:

- When you **call the function** and pass the three values in, the code for this may look like this:

  housePrice(price,increase, years)

- The **formula** you will use inside the loop to calculate the price of the house the next year may look like this:

  price = price * (1 + increase)

- Here is some **pseudocode** for the program (i.e. an outline)

  Function (pass three values in)
  Output current price of house
  Run loop number of years entered
  Calculate new house price
  Display new house price

  Get house price from user
  Get % increase from user
  Get number of years to forecast house price from user
  Call function (pass three values to it)

4. Table Creator Program

Creating tables to organize data is common not only MS Word and MS Excel, but computer and programming languages such as HTML and Python. Create a Python program named **hw4-4.py** that will create a table as shown below where the user can specify by user input how many rows and columns to display.

```
Enter how many columns you want your table to have:4
Enter how many rows you want your table to have:3
Row 1 Column 1      Row 1 Column 2      Row 1 Column 3      Row 1 Column 4

Row 2 Column 1      Row 2 Column 2      Row 2 Column 3      Row 2 Column 4

Row 3 Column 1      Row 3 Column 2      Row 3 Column 3      Row 3 Column 4
```

- The **main part of the program** should do three things:
    - Accept in user input how many columns the user wants
    - Accept in user input how many rows the user wants
    - Call a **user-defined function** (module) passing in these two parameters.
- The function will then print a table using a **nested loop** as shown above. Use two tabs (\t\t) between each "Row x Column x".
- You will have to search online to find out how to not have a print command start a new line. Then, start a new line after each row.

5. HelpDesk Program

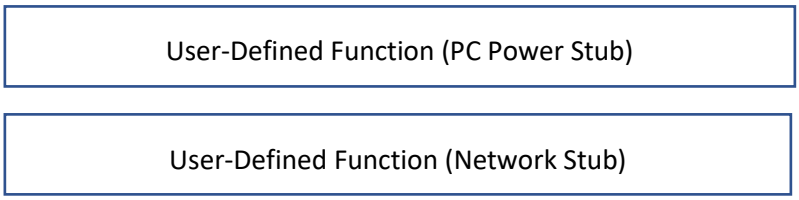
Create a Python program that simulates a HelpDesk software system. Name the program: **hw3-5.py**

Below is a sample run. It should run like this. Our Loops Handout in Moodle as a program that will help you write this one.

Steps:

- Create a user-defined function named diagnosePower no data needs to come in or out
    - This function will merely be a stub (no actual functionality yet).
    - Just add an input() command into that tells the user they are in the Diagnose PC Power stub and to press [Enter] to continue. This functionality can be added later.
    - After the input() and message, return the user to the main menu.
- Create a user-defined function named diagnoseNetwork no data needs to come in or out
    - This function will merely be a stub (no actual functionality yet).
    - Just add an input() command into that tells the user they are in the Diagnose Network Problem stub and to press [Enter] to continue. This functionality can be added later.
    - After the input() and message, return the user to the main menu.
- In the main area of the program:
    - Present the user with the menu shown in the sample run below, i.e. the 4 heading lines, then the menu options 1-3
    - Then, prompt the user for a menu choice.
    - If the user does not enter a value option (i.e. not 1 through 3), display an appropriate error message and then re-display the menu and re-ask for user input as shown.
    - If the user enters 1, call/run the diagnosePower function
    - If the user enters 2, call/run the diagnoseNetwork function
    - If the user enters 3, display **Goodbye** to the user and end the loop

Code Organization Diagram (two function – no data in or out)



Loop
- Menu
- User Input
- Decision Statement (IF-ELIF-ELIF-ELSE)

Sample run:

```
METOPOLITIAN MEDICAL CENTER
   IT Services HelpDesk
    Diagnostic Utility
------------------------------
1.Diagnose PC Power Problem
2.Diagnose Network Problem
3.Exit

What would you like to do? dog

 Not Valid Choice Try again

 METOPOLITIAN MEDICAL CENTER
   IT Services HelpDesk
    Diagnostic Utility
------------------------------
1.Diagnose PC Power Problem
2.Diagnose Network Problem
3.Exit

What would you like to do? 4

 Not Valid Choice Try again

 METOPOLITIAN MEDICAL CENTER
   IT Services HelpDesk
    Diagnostic Utility
------------------------------
1.Diagnose PC Power Problem
2.Diagnose Network Problem
3.Exit
```

```
What would you like to do? 1

 Diagnose PC Power.  This is a stub. Press [Enter] to continue.

 METOPOLITIAN MEDICAL CENTER
    IT Services HelpDesk
     Diagnostic Utility
------------------------------
1.Diagnose PC Power Problem
2.Diagnose Network Problem
3.Exit

What would you like to do? 2

 Diagnose Network Problem.  This is a stub. Press [Enter] to continue.

 METOPOLITIAN MEDICAL CENTER
    IT Services HelpDesk
     Diagnostic Utility
------------------------------
1.Diagnose PC Power Problem
2.Diagnose Network Problem
3.Exit

What would you like to do? 3

Goodbye
```