CS/CYCS1110 (Python) –Fall 2021
Programming Project #1

Due Date (One-week Project) 100 points	
Wednesday Labs	**9/?/21 @ 11:59pm**
Tuesday Lab	**9/?/21 @ 11:59pm**

Project Objectives

- Use the IPO problem-solving approach to translate the project description here into an algorithm.
    - Use the input and print functions along with some simple mathematics for conversion.
- Design processing block as a series of small steps rather than one/several big arithmetic expressions.
- Convert algorithm to working Python code using incremental development.
- Use IDLE as the IDE to create/run/test the application as a stored program (a "script").
- Design the program for maintainability.
- For testing, use specific input data values to hand-calculate the predicted program output, before completing the program.
- For debugging, use print statements to determine the correctness of various intermediate steps.
- Learn the skills needed to work on Codio.

Python language elements:

- Declare variables and named constants, and initialize them.
- Input data values from user, converting their data types, as needed.
- Print output report to console using proper formatting (so it's exactly as shown in the sample output in the specs here).
- Use arithmetic operators, assignment operator, data types & conversions (if needed)
  – Be aware of operator precedence.

Project Overview

Your program will prompt the user for a floating point number which stands for gallons of gasoline. You will reprint that value along with other information about gasoline and gasoline usage:

- Number of liters
- Number of barrels of oil required
- Equivalent energy amount of ethanol gallons
- Price in US dollars

Constants Data

The conversions of the above measures:

- 1 gallon = 3.7854 liters
- 1 barrel of oil produces 19.5 gallons of gas. Hint: a barrel is 42 gallons.
- 1 gallon of gas produces 115,000 BTU (British Thermal Units). 1 gallon of ethanol produces 75,700 BTU.
- Price in US dollars = $4.00/gallon

Deliverables

The deliverable for this assignment is the following file:
proj01_LastName.py

Project Notes

1. To clarify the project specifications, sample output is appended to the end of this document.
2. The input function is used to accept a response from the user. The function accepts a string (a sequence of characters between quotes) as a prompt to display to the user. It then waits until the user types a response (terminated by the user touching the Enter key). Finally, the function returns the user's response as a string.

   If the user's response is supposed to be processed as a numeric value, the returned string must be converted into a number. When working with floating point values, a string is converted into a floating-point number using the float function. The function accepts a string as its argument and returns the floating-point number, which the string represents. A typical interaction would be something like:

   ```
   num_str = input( "Please enter a number: " )
   num_float = float( num_str )
   ```

3. The print function is used to display any combination of variables, values and strings in the output window. Each item to be displayed must be separated from another item by a comma. All the items will be displayed together, followed by a new line. For example:

```
num_int = 21
print( num_int, " times two is ", num_int*2 )
```

Three items will be displayed when the print function is called: the value of the variable num_int, the string " times two is ", and the result of the calculation. Then, the output will be:

```
21 times two is 42
```

Getting Started

- Solve the problem using pencil and paper first. You cannot write a program until you have figured out how to solve the problem.
- Use IDLE as the IDE to create a new program. Use the required file name (proj0_LastName.py).
- Write a simple version of the program, e.g. input the number of gallons of gasoline and print it. Run the program and track down any errors.
- Cycle through the steps to incrementally develop your program:
  - Edit your program to add new capabilities.
  - Run the program and fix any errors.
- Use Codio to develop your code.

FINAL REPORT - print to the "console"

See a sample report below. Use the EXACT format/wording/spacing/labeling/… shown in sample.

First Sample Interaction (use EXACT format – and NO HARDCODING of the data itself)

```
**********
Please enter the number of gallons of gasoline: 100
The number of gallons you entered is: 100.0

100.0 gallons of gasoline = 378.54 liters
100.0 gallons of gasoline requires 5.128205128205129 barrels of oil.
100.0 gallons of gasoline has an energy = 151.91545574636723 gallons of ethanol
100.0 gallons of gasoline requires 400.0 US dollars

**********The End**********
```

Second Sample Interaction

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

Please enter the number of gallons of gasoline: 390000000
The number of gallons you entered is: 390000000.0

390000000.0 gallons of gasoline = 1476306000.0 liters
390000000.0 gallons of gasoline requires 20000000.0 barrels of oil.
390000000.0 gallons of gasoline has an energy = 592470277.4108323 gallons of ethanol
390000000.0 gallons of gasoline requires 1560000000.0 US dollars

**********The End**********