Programming Assignment 3: Conversions

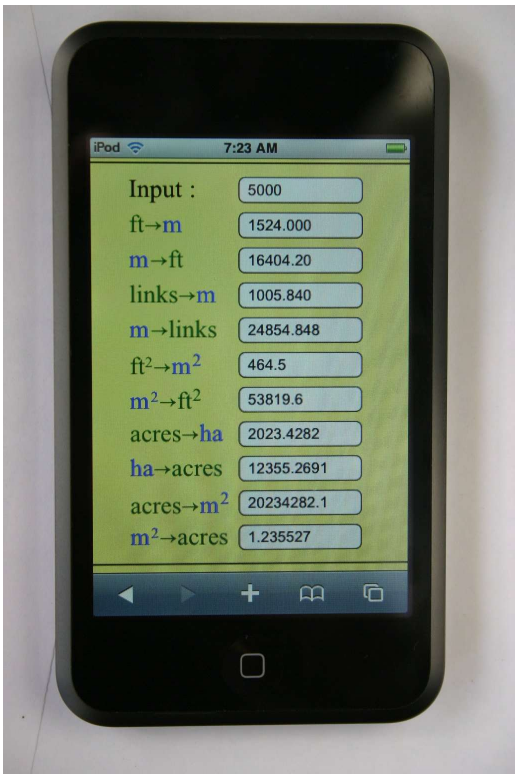
COP 3035 - Fall Term 2019
Point Value: 100 points
Project Due Date: Tuesday 10/8/2019

Learning Objectives

- To utilize looping structures in a Python program
- To implement a *menu* to process interactive user commands
- To perform more sophisticated output, including formatting numeric values

Problem Statement

In this project you will write a menu-driven program which allows a person to type in a command and an English unit of measurement, and convert the measurement to its equivalent in Metric units. This can be quite a useful application to have. Such a program is often incorporated into a small hand-held calculator, just as a foreign language dictionary (word for word translator) can be.



Your program will allow the user to enter commands and convert units according to the following table:

command	*result*	*conversion factors*
1	inches to centimeters	1 in = 2.5400 cm
2	feet to meters	1 ft = 0.3048 m
3	miles to kilometers	1 mi = 1.6094 km
4	pounds to kilograms	1 lb = 0.4536 kg
5	gallons to liters	1 gal = 3.7853 lit
6	quit the program	

Input

All input will be interactive. You must ask the user to enter a command, and a numeric value for the measurement they want to convert. For example, if they enter a 2 for the command, then you would ask them to enter the number of *feet* they wish to convert to *meters*.

The program must allow the user to enter menu commands and numbers to convert, until they choose to stop.

You must use 1, 2, 3, 4, 5 and 6 to represent the commands.

INPUT ERROR CHECKING: It is possible that the user may enter an invalid command, or a negative number of English units. Your program must check for both of these errors, and ask the user to re-enter a value when necessary, until a valid data item is entered.

You should test your program with a wide variety of numeric values, some negative, some zero, and some positive. Also be sure to test all of the possible commands. The graders will also run your program to test it during the grading process. You may assume that the user enters a valid number when asked for a number (i.e. they won't type something which is a non-numeric value).

Output Requirements and a Sample Run

Your output must contain a *menu* - that is, you need to tell the user what the commands are and what they mean. Prompts and error messages should be printed as needed, and of course, the results of the conversion which was performed. Don’t forget titles, headings, blank lines etc. as needed to make your output clear and informative. Print your real numbers to 3 digits of precision.

Here is output from a sample run for your reference:

```
Welcome to the Amazing Conversion Program!
```

```
Please choose an option from the menu below for the type of
conversion you wish to perform. Then enter a non-negative
number and it will be converted for you. Choose the last
menu option (6) to quit.

Choose a number from the menu.
1. Inches to centimeters
2. Feet to meters
3. Miles to kilometers
4. Pounds to kilograms
5. Gallons to liters
6. Quit the program

Enter your choice: 1

Please enter the length in inches: 1
1.000 inch is equivalent to 2.540 centimeters.

Choose a number from the menu.
1. Inches to centimeters
2. Feet to meters
3. Miles to kilometers
4. Pounds to kilograms
5. Gallons to liters
6. Quit the program

Enter your choice: 5

Please enter the volume in gallons: 25.789
25.789 gallons is equivalent to 97.619 liters.

Choose a number from the menu.
1. Inches to centimeters
2. Feet to meters
3. Miles to kilometers
4. Pounds to kilograms
5. Gallons to liters
6. Quit the program

Enter your choice: 3

Please enter the distance in miles: -5

This program does not convert negative values.
Please enter the distance in miles: 5
5.000 miles is equivalent to 8.047 kilometers.

Choose a number from the menu.
1. Inches to centimeters
2. Feet to meters
3. Miles to kilometers
4. Pounds to kilograms
```

```
5. Gallons to liters
6. Quit the program

Enter your choice: -1

Please enter a choice from the menu above: 0

Please enter a choice from the menu above: 10

Please enter a choice from the menu above: 6

Thank you for using the Amazing Conversion Program!
Press any key to continue . . .
```

Miscellanous

Be sure to read and understand the sections in the Course Syllabus handout on general project requirements. Also be sure to study the style, documentation and formatting guidelines discussed in the *Programming Style Guidelines* handout and in the lecture, textbook and recitation sections. Be sure to check *Syllabus* handout for relevant required readings.

What File To Turn In, File Naming Requirements, and How to Turn In Your Work using Canvas

You must turn in your Python program source file which must be named as follows (note that you will have to rename the provided file!):

Use this format: *yourLastNameLowerCase_FSUID_p3.py*
Your FSUID will be unique to you, will typically be your FSU email ID, and will be something like "ab23c." Hence file names will look something like "smith_ab23c_p3.py"

Submit your Python file (.py) to Canvas using the Submit button for this assignment. Be sure to download the file after you submit it in order to check that you submitted the correct program file to Canvas and that it was successfully received by Canvas.

Last Update: A. Ford Tyson 7/25/2019
