Programming Project #1

Assignment Overview

This assignment involves coding and testing of a program based on the "Hello World" program from the first lab.

The basic design of the first programs that you construct in this class consists of a prompt for information, receiving information, processing that information then producing a display of the results.

This assignment is worth 10 points (1% of course grade), and must be completed before 11:59 PM on Monday, January 14th. Projects are typically due on Mondays.

Background

This programming project will use the `raw_input` and `print` functions along with some simple mathematics for rate conversion. The important part of the project is to learn the skills needed to access the class web site to download a project description, create a new program in Python and finally to hand it in.

Program Specifications

Your program will prompt the user for an floating point value representing miles/hour. You will reprint that value along with the value converted to the following values:

- barleycorns/day
- furlongs/fortnight
- Mach number
- percentage of the speed of light

You can find these measures on the web (try wikipedia), but just in case:

- a barleycorn is a (very old) English measure of length. 1 meter is equal to 117.647 barleycorns
- a furlong is measure of distance, 220 yards
- a fortnight is a measure of time, 2 weeks
- the mach number is a measure of speed, the percentage of the speed of sound. Mach 1 is a speed equal to the speed of sound in air, which is 1130 feet/second. Mach 1.5 would be 1.5 times the speed of sound.
- PSL is a speed, the percentage of the speed of light in a vacuum. The speed of light is 299,792,458 meters/second.

Deliverables

    proj01.py -- your source code solution (remember to include your section, the date, project number and comments).

1. Please be sure to use the specified file name, i.e. "proj01.py"
2. Save a copy of your file in your CS account disk space (H drive on CSE computers).

3. Electronically submit a copy of the file.

Assignment Notes:

To input the numbers it is necessary to use the `raw_input` function. The `raw_input` function takes a string, a sequence of characters between quotes, as a prompt to print to the user. It then waits until the user types a response, terminated by the user typing the Enter key. A string, again as a sequence of characters, is returned.

The returned string must be converted to a number. In this assignment we are strictly working with floating point numbers, a string is converted to an float using the `float` function. The `float` function takes as an argument a single string and returns the floating point number the string represents. A typical interaction would be something like:

```
numStr = raw_input('Please enter a number: ')
floatVar = float(numStr)
```

`print` is a command that will print on the output window any combination of variables, values and strings. Each item to be printed must be separated from other items by a comma. All the items will be printed together, followed by a new line. For example:

```
billsFloat = 3.14159
print 'The number ',billsFloat,' times two is ', billsFloat*2
```

This command has 4 items to print: a string ('The number '), the value in the variable billsFloat (3.14159), another string (' times two is ') and the result of an expression (6). What it will print is:

```
The number 3.14159 times two is 6.28318
```

Look at the program numberInput.py in the proj01 directory as an example of using `raw_input, print` and `float`

Once converted to numbers, the operations on these numbers are, respectively: + (sum), - (difference), * (product), / (division) and % (remainder). The last two deserve special comment.

In Python, if an integer is divided by another integer, the result is an integer. Thus the result of **6/4** is **1** (not 1.5). That is, the "/" operation results in the integer **quotient**. The result of **6%4** is the integer remainder of the division, thus **2** (6 divided by 4 is 1 with a remainder of 2). *Play around with the quotient and remainder operators in the Python shell window until you get comfortable with how it works.*

To clarify the problem specifications, we provide at the end of this document a snapshot of interaction with the already written program.
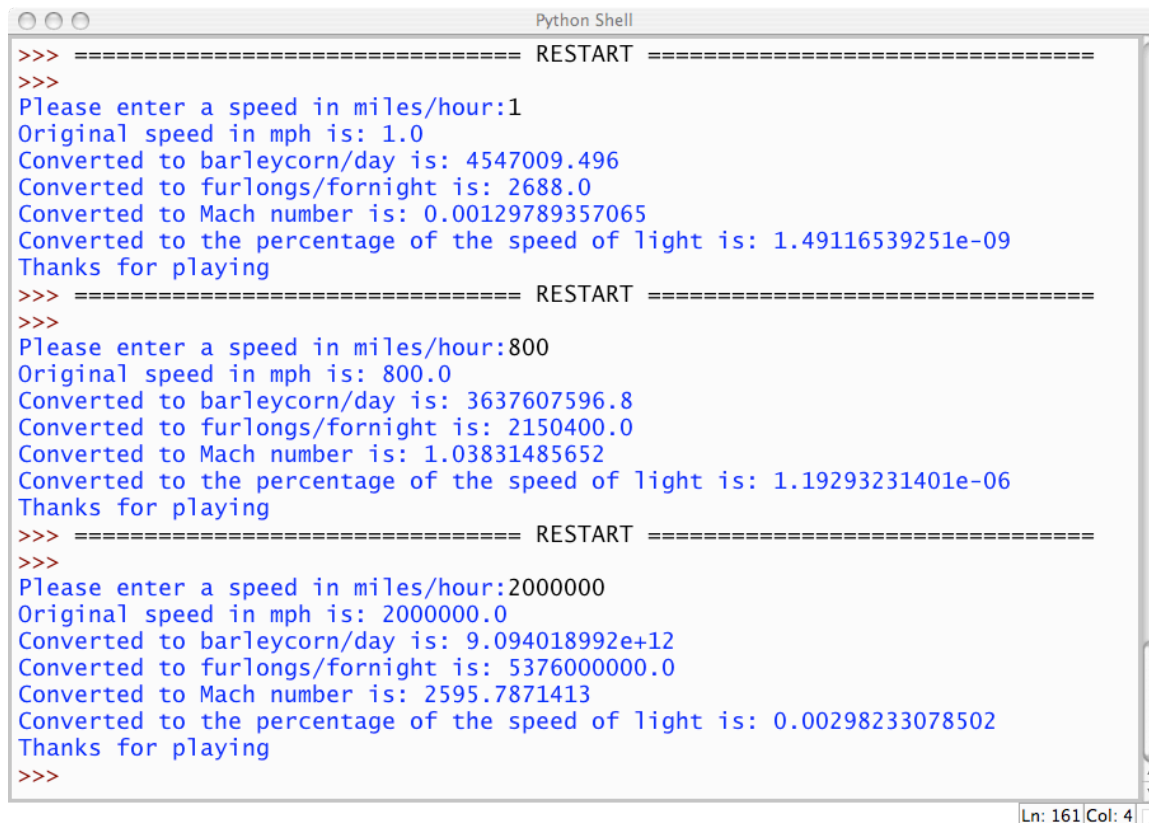
Getting Started

1. Using IDLE create a new program.
2. If you are in a CSE lab, select the H: drive as the location to store your file
3. Save the name of the project: proj01.py
4. Using the example from numberInput.py, write the code. Track down any errors (shouldn't be any at first).
5. Run the program
6. Use the web site to hand in the program (to make sure you can do it)
7. Edit the program
8. Now you enter a cycle of edit-run to incrementally develop your program.
9. Hand in your final version.

Questions for you to consider (not hand in)
1. What happens when you try to divide by zero when you run your program?
2. What happens when you enter a letter instead of a number at the prompt?

Sample Interaction

```
○ ○ ○                         Python Shell
>>> ============================= RESTART =================================
>>>
Please enter a speed in miles/hour:1
Original speed in mph is: 1.0
Converted to barleycorn/day is: 4547009.496
Converted to furlongs/fornight is: 2688.0
Converted to Mach number is: 0.00129789357065
Converted to the percentage of the speed of light is: 1.49116539251e-09
Thanks for playing
>>> ============================= RESTART =================================
>>>
Please enter a speed in miles/hour:800
Original speed in mph is: 800.0
Converted to barleycorn/day is: 3637607596.8
Converted to furlongs/fornight is: 2150400.0
Converted to Mach number is: 1.03831485652
Converted to the percentage of the speed of light is: 1.19293231401e-06
Thanks for playing
>>> ============================= RESTART =================================
>>>
Please enter a speed in miles/hour:2000000
Original speed in mph is: 2000000.0
Converted to barleycorn/day is: 9.094018992e+12
Converted to furlongs/fornight is: 5376000000.0
Converted to Mach number is: 2595.7871413
Converted to the percentage of the speed of light is: 0.00298233078502
Thanks for playing
>>>
                                                              Ln: 161 Col: 4
```