Lab 2: SI Units

This lab is intended to give you some practice working with conditional statements (if, else, elif). It will also refresh your memory regarding SI units, and possibly improve your grades in other science classes.

The program

SI Units use prefixes such as milli or pico in order to designate the size compared to a base unit. So for example, a kilometer is 1000 meters. This system is often considered easy to use compared to alternatives such as the English system. However, for those of us who live in countries which do not regularly utilize metric units, remembering the prefixes can be difficult. We will write a computer program to enable easy conversion of units based on the prefix.

There is a list of prefixes here:
http://en.wikipedia.org/wiki/Metric_prefix

The program will take as input a starting prefix and an ending prefix, and output a conversion factor to move from one prefix to the other. For example, if the starting prefix is kilo and the ending prefix is mega, the conversion factor is 1,000, because 1,000 times the number of kilo-anything is the number of mega-anything. For reductions, the prefix will be small. For example, if the starting prefix is micro, and the ending prefix is nano, the conversion factor is 0.001. For no prefix, assume the user will enter "none".

I recommend structuring this program similar to the "units.py" example. Specifically, I would recommend the following sections:

1. Input (collect both prefixes from the user)
2. Starting prefix to base
3. Base to final prefix
4. Multiply the conversion factors from #2 and #3 to obtain the final conversion factor

To give a concrete example, if converting from deca to hecto, section #2 from the list above will produce a conversion of 0.1 (deca to base unit), and section #3 will produce a conversion factor of 100 (base unit to hecto). Multiplying these will produce 10, the correct conversion factor.

Each section except possibly the last will cover multiple lines, quite a few in the case of sections #2 and #3. Later in the semester, we will cover dictionaries, which will allow this sort of program to be much shorter. If you want to skip ahead on your own, chapter 14 of the textbook explains this in depth.

Turning in the assignment

When you have finished the assignment, ask your TA to check your work. If the program is satisfactory, you will receive full credit. If there is enough time remaining and your assignment is not complete, you will be given time to finish it.