Activity 14.5 Structuring Data

In this activity we're going to structure some data and then do some analysis of the data. The data will be entered by the user and stored in a dictionary. Examine the output from the exercise below:

```
● ● ●                        Python — bash — 80×42
Marks-MacBook-Pro:Python marklassoff$ python gpasLab.py
Please enter the list of student names and corresponding GPAs.
Student Name [X to exit] :Lassoff
Student GPA: 3.45
Student Name [X to exit] :Hobbs
Student GPA: 2.78
Student Name [X to exit] :Locke
Student GPA: 3.25
Student Name [X to exit] :Rosseau
Student GPA: 3.645
Student Name [X to exit] :Einstein
Student GPA: 2.10
Student Name [X to exit] :Epstein
Student GPA: 2.99
Student Name [X to exit] :Barbarino
Student GPA: 3.27
Student Name [X to exit] :Chips
Student GPA: 3.44
Student Name [X to exit] :X
Class GPA List
Barbarino : 3.27
Rosseau : 3.645
Locke : 3.25
Hobbs : 2.78
Epstein : 2.99
Einstein : 2.1
Lassoff : 3.45
Chips : 3.44
Average GPA:   3.115625
Highest GPA:   3.645
Lowest GPA:   2.1
Median GPA:   3.26
Marks-MacBook-Pro:Python marklassoff$ ▊
```

Notice first the user is prompted to enter a list of student names and corresponding GPAs. When the user enters 'X' to exit the data entry module of the program, each name and GPA is listed back. The average, highest GPA, lowest GPA and median GPA are also calculated.

Your goal in this lab is to create a program that creates the same output as the previous screenshot. This is a challenging lab!

Previously, the exercises were designed solely to help you develop syntactical skills— writing code correctly and finding and debugging issue. This exercise will help you build syntactical skills, but also algorithmic skills. Algorithms are the process developed by programmers to solve programming problems.

Break the activity down into several smaller problems. For example, first figure out how to write the loop to do data entry. Next, work on simply echo the names and gpas back to the user. Then work on calculating the average, highest, lowest and median scores.

If you get stuck, take a peek at the suggested answer. Don't copy it line by line— Instead examine the code, understand it and try to rewrite it on your own.

A couple of hints:

1) You're going to want to import the numpy library (Numbers in Python). It contains a median function used like this:

   numpy.median(list)

   The function above will return the median value in a list.

2) To loop through a dictionary use a structure like this:

   for key,value in studentGPAs.items():

   In each loop iteration the key from the dictionary item will be assigned to the variable "key" and the value assigned to the variable "value".

3) You can create an empty dictionary like this:

   myDictionary = {}

Good luck!