Homework 1

- Due 09/30 23:59 pm est
- Following instructions provided in **Homework submission instructions**

Problem 1

Data sets are frequently provided as a CSV file. We want to "open" that file in our script and put the data in a Python list. The function `open()` gives you a file object.

In [1]:
```
f = open('data.csv')
```

There are all sorts of methods you can give to files.

- `f.close()` - Closes the file. Just like **File -> Save**.
- `f.read()` - Reads the contents of the file. You can assign the result to a variable.
- `f.readline()` - Reads just one line of a text file.
- `f.write(stuff)` - Writes stuff to the file.

These are the important methods you need to know for now. Some of them take parameters, but we don't really care about that.

(a) 5 pts

Open the **data.csv** file, read the contents, and assign it to a variable called **contents**. Type **contents** to see what is the output. What is the type of the variable?

(b) 5 pts

In a string, an escape character is a character that takes on an alternative meaning in a string. Many programming languages use the \ (backslash) as an escape character. For example, **\n** indicates new line (white spaces until next line), **\t** means tab, and so on.

As we discussed in the lecture, we can apply the `.split()` function to **str** typed object splits a string into a list of strings after breaking the given string by the specified delimiter. If the delimiter is not provided, any white space is a separator. Use the `.split()` method and print the returned list.

(c) 5 pts

We've imported the CSV file into Python as a list, but the values are strings, not floats. We can coerce a variable to a specific type (not always). For example, `fake_pi = '3.141592'` is a string, but it can be coerced to a float by running `real_pi = float(fake_pi)` . Use the `float()` function in a list comprehension to coerce all elements to floats.

List comprehension syntax

In [ ]:
```
['expression involving item' for item in List if condition == True]
```

Problem 2

Define 2 lists such that

`L1 = list(range(1, 101))`

`L2 = [2, 3, 3, 4, 4, 5, 5, 5, 6, 6, 6]`

(a) 5 pts

Using list index to get all the even number from L1 in decreasing order.

(b) 5 pts

Use dictionary to generate a frequency table of **L2**. Each number as the key and its corresponding frequency as the value, i.g. {3:2} means number 3 appears 2 times.

(c) 5 pts

If randomly select a number from L2, what is the probability that the number is even?

(d) 5 pts

Use list compression to create a list that contains the keys with highest frequency from the dictionary in part (b)

Problem 3

(a) 5 pts

Create a list that contains all the integers between 501 to 600 that are divisible by 5.

(b) 5 pts

Create a list that contains all the integers between 501 to 600 that are divisible by 3.

(c) 5 pts

Create a list that contains all the integers between 501 to 600 that are divisible by both 3 and 5.

(d) 15 pts

Create a function called **FizzBuzz** that takes 3 arguments n, a, b as input. The function should satisfy the followings:

- Set the default values for a = 3 and b = 5.
- If n is divisible by a, return string "Fizz".
- If n is divisible by b, return string "Buzz".
- If n is divisible by both a and b, return string "FizzBuzz".
- If none of the above is true, return n.

Pick some numbers from the lists you created above, verify your function.

Problem 4

(a) 5 pts

Write a function called **my_mean** that takes a list of numbers as input and return their mean (Do not import any module).

(b) 10 pts

Write a function called **my_median** that takes a list of numbers as input and return their median (Do not import any module).

(c) 10 pts

Write a function called **my_mode** that takes a list of numbers as input and return their mode. In the case of multiple modes, return the smallest among them (Do not import any module).

(d) 10 pts

Use the functions in the previous part, write a function called **my_stat** that takes a list of numbers as input and return a dictionary with key:value pairs corresponding to the mean, median, mode of the input list (Do not import any module).