**DOCUMENTATION**

Libraries imported

1. **permutations** function in the itertools module.
   1. Return successive r-length permutations of elements in the iterable.
2. **perm** function in the math module.
   1. Number of ways to choose k items from n items without repetition and with order.
3. **numpy** 
   1. To aid us to perform vectorized operations on an array.
4. **matplotlib**
   1. To provide a visual representation of our results.

**QUESTION 1 A**

Assume you have a site that allows password of length 3 of uppercase letters. How many different passwords can be created.

**ANSWER**

The variable **possible\_combitions** holds the value when you perform that operation. We used the **perm** function from the math module, since its job is to just return **nPr** which is **15600** possible combinations.

Now here you should understand why we were asked to provide a sample of the data. Because we will be unable to print all **15600** possible combinations of the password.

**QUESTION 1 B**

To get a visual representation of our findings, we used a **numpy** array to store the values from **3-15** for the **x\_axis**.

For the **y\_axis**, we wrote a **list\_comprehension**  to perform the permutations of each **i** in the **x\_axis** variable.

Then we plotted.

**QUESTION 1 C**

This also follows the same pattern as QUESTION 1B just that we have a new variable here called

**upper\_and\_lower\_cases** which of course stores the upper and lower cases of the alphabet. They 52 in total.