Assignment 3

- Please write your code in a Jupyter Notebook file (.ipynb) and submit it on Blackboard
- Make sure to label your answer of each question clearly and add comments to make it readable.
- You are allowed to discuss with other students (up to three) or the instructor. Please put all the names of students that you discussed with. However individual students must write their own solutions.
- Copying a program, or letting someone else copy your program, is a form of academic dishonesty
- Maximally leverage Piazza to benefit other students by your questions and answers.
- Try to be updated by checking notifications in both Piazza and the class webpage.

1. Dice probability distribution simulation (20 points)

You roll the dice **10,000** times. Each time you get one of six sides with a probability of 1/6. You need to generate the total number of occurrences for each side, store them in a dictionary.

For example: If you roll the dice 10 times. Assume the number of occurrences for each side is this:

Sides	1	2	3	4	5	6
occurrences	3	0	2	1	1	3

Then the output is: {**1**:3, **2**:0, **3**:2, **4**:1, **5**:1, **6**:3}

Hint: This rolling is equal to choosing a random number in [1,2,3,4,5,6]. You need to use *random.ranint(start, stop)* to generate an integer between 1 and 6.

2. Sentence comparison (20 points)

You receive two sentences as inputs from the keyboard and compare them. The output is the number of common unique characters in two sentences. It should be case insensitive.

For example:

sentence 1: "I like Python programming"

sentence 2: "I like java"

Then the output is: 6. (they are: i, l, k, e, a, and space).

Hint: To convert a string to a lowercase string, use *s.lower()*

>>> x = 'HELLO'

>>> print(x.lower())

Hello

3. Sentence split (30 points)

You receive one sentence and **two** delimiters from the keyboard. Then you separate all strings in that sentence.

For example:

sentence: "I like computer programming, including Python, Java, and C/C++"

delimiters: , /

Then the output list will be:

['I like computer programming', 'including Python', 'Java', 'and C', 'C++']

Hint: One suggestion is to use variable length arguments. You can also consider *split()* function for strings.

4. Sort dictionary (30 points)

Write a program that can sort a given dictionary either by key or value in ascending order. The program allows users to choose operations (1: sort by key, 2: sort by value). If the given dictionary is: $d = \{'x': 7, 'y': 2, 'a': 3, 'm': 2\}$, the running output is following.

```
please select operation: (1: sort by key, 2: sort by value) 1
a , 3
m , 2
x , 7
y , 2
please select operation: (1: sort by key, 2: sort by value) 2
y , 2
m , 2
a , 3
x , 7
```

Hint: For "sort by value", consider the function *sorted()*. Tutorial of *sorted()* function:
https://towardsdatascience.com/sorting-a-dictionary-in-python-4280451e1637
https://careerkarma.com/blog/python-sort-a-dictionary-by-value/
https://www.geeksforgeeks.org/python-sort-python-dictionaries-by-key-or-value/