Friday, 28 August 2020

1 Random List (15 mins)

1.1 Objectives

1. Be familiar with list comprehension
2. Know the **random** library
3. Can write a little bit complex but simple program

1.2 Description

Assume that there is a list containing random integers range from 0 to 10, $[0, 10]$. Find the frequency of all numbers.

For example, if a list is `[0,1,1,3,10,9,8,1,3]`, the result should be:

```
0: 1
1: 3
2: 0
3: 2
4: 0
5: 0
6: 0
7: 0
8: 1
9: 1
10: 1
```

1.3 Procedure

Given a line that creates a start list.

```
1 import random
2
3 data=[random.randint(0,10) for i in range(50)]
```

The **random.randint(a,b)** will generate a random number range from a to b inclusive. So the statement

```
data=[random.randint(0,10) for i in range(50)]
```

will create a list of 50 random integers range from 0 to 10 inclusive.

1.4 Sample Output Screen

```
0: 4
1: 5
2: 6
3: 7
4: 6
5: 2
6: 3
7: 5
8: 2
9: 7
10: 3
```

2 Count All Hashtags (15 mins)

2.1 Objectives

1. Learn to use Counter from collections
2. Can use the function **append**
3. Can use the function **split**
4. Can use functions of the String

2.2 Description

Read the CH3Thailand Posts.csv which stores message of posts collected from CH3Thailand facebook page. Store all hashtags in a new list and print the frequency of each hashtag using the **Counter** class from the library **collection**. Below is an example of the **Counter** class.

```python
import random
from collections import Counter

data=[random.randint(1,1000) for i in range(50000)]
print(Counter(data).most_common())
```

2.3 Procedure

Read all lines from the CH3Thailand Posts.csv. Separate each word using the **split()** function. Then, iterate through all tokens of the line. If tokens starts with #, append those tokens in a new list. Finally, apply the **most_common()** to print the list of hashtags sorted by number of occurrence.

2.4 Sample Output Screen

```
[('#Ch3Thailand', 1549), ('#ช่อง33', 760), ('#ทองเอกหมอยาท่าโฉลง', 133), ('#ช่อง28', 130), ('#ซีรีส์ลูกผู้ชาย', 123), ('#ช่อง13', 117), ('#กรงกรรม', 117), ('#ช่อง3', 96), ('#บุพเพสันนิวาส', 65), ('#ปัทม์', 56), ('#สายธารหัวใจ', 52), ('#กลลวงทวงหนี้รัก', 46), ('#ขั้วโมงต้องมนต์', 46), ('#บ่วงบรรจถรณ์', 44), ('#อังกอร์', 42), ('#เพชร', 36), ('#ตุ๊กตาผี', 36), ('#ลิขิตรักTheCrownPrincess', 33), ('#พ่อยุ่งลุงไม่วาง', 33), ('#ภูผา', 31), ('#ผังรายการช่อง13', 30), ('#ch3thailand', 30), ('#รากนคร', 28), ('#ระเริงไฟ', 28), ('#ผังรายการช่อง28', 27), ('#เดือนประดับดาว', 27), ('#เพลงประกอบละครช่อง3', 26),
```

3 Sorted PM2.5 (15 mins)

3.1 Objectives

1. Be able to use the function `append`
2. Be able to use the function `sort`

3.2 Description

Read all pm2.5 value from the file. Print the sorted value of pm2.5.

Hint You can use the parameter `reverse=True` to sort a list descending as shown below.

```
import random

data=[random.random() for i in range(100)]
print(sorted(data,reverse=True))
```

3.3 Sample Output Screen

```
120
117
116
110
109
109
...
```

4 Show a graph and find the intersection(15 mins)

4.1 Objectives

1. Be able to plot a simple line graph using `matplotlib.pyplot`
2. Can iterate through all elements in a list

4.2 Description

Show lines of $y_1 = 3x^3 + 2x^2 - x + 5$ and $y_2 = 2x^2 - 1.5x - 10$. Find the value of x that gives the lowest $abs(y_1 - y_2)$

4.3 Sample Output Screen

```
-1.7000000000000117
```