Name: Mostafa Nasser

Python for Data Science Day 1

In [1]:
```
#Importing Required Libraries
import numpy as np   #numerical python for mathematical operations on arrays
import collections   #for counting the frequency for each die
import itertools     #for joining multiple nested lists into one list (to make frequenc
```

Write a dice game, where we throw 2 dice (i.e. 2 random numbers from 1 to 6). Display the dice readings + sum. For example Dice: [4, 5]. Sum: 9 If same number on both dice: display BINGO! Else if sum > 8, display WINNER! Otherwise, display LOOSER!

In [2]:
```
def check():
    dice1 = np.random.randint(1,7)
    dice2 = np.random.randint(1,7)
    print("Dice 1 Reading :",dice1)
    print("Dice 2 Reading :",dice2)
    if dice1 == dice2:
        print("BINGO!")
    elif dice1+dice2 > 8:
        print("WINNER!")
    else:
        print("LOOSER!")

check()
```

```
Dice 1 Reading : 4
Dice 2 Reading : 2
LOOSER!
```

LAB 2: Write a throwDice(numDice=1, numThrows=1) function. It should return a 2D array indicating the results. For example: throwDice(2, 3) should return something like [[1, 4], [3, 5], [5, 6]] (reading of the 2 dice when throwed 3 times) Defaults call throwDice() should return something like [[3]] If we throwDice(2, 1000) (2 dice for 1000 times), print out the frequency of the sum of each throw as a dict. For example: { 2: 50, 3: 44, 4: 37, ... } Does the above result comply with probability of sums of 2 dice?

In [3]:
```
def throwDice(numDice=1, numThrows=1):
    arr=[]
    for i in range(numThrows):
        x= list(np.random.randint(1,7,size=numDice))
        arr.append(x)
    return arr
```

In [4]:
```
#throwing 2 dices 1000 times
x = throwDice(numDice=2, numThrows=1000)
print(x)
```

```
[[6, 3], [3, 3], [6, 1], [3, 4], [3, 6], [2, 2], [2, 3], [5, 6], [6, 4], [3, 1], [1, 5],
[6, 2], [6, 6], [4, 2], [4, 1], [4, 5], [1, 1], [3, 1], [5, 4], [4, 6], [1, 1], [6, 5],
```

```
[3, 4], [5, 4], [1, 2], [4, 2], [3, 5], [1, 5], [1, 3], [5, 5], [2, 5], [1, 2], [5, 6],
[5, 5], [2, 4], [2, 1], [6, 6], [4, 3], [5, 3], [4, 3], [1, 3], [1, 4], [1, 2], [3, 5],
[3, 1], [6, 6], [6, 6], [2, 6], [3, 4], [6, 3], [1, 6], [1, 5], [3, 6], [6, 4], [6, 3],
[1, 6], [2, 3], [4, 6], [6, 6], [5, 5], [5, 2], [1, 6], [3, 6], [4, 3], [4, 3], [3, 3],
[3, 1], [6, 3], [1, 6], [4, 1], [5, 3], [1, 2], [1, 2], [2, 4], [4, 2], [2, 6], [1, 3],
[4, 5], [2, 1], [1, 1], [3, 1], [5, 4], [3, 3], [2, 2], [3, 1], [2, 3], [6, 3], [2, 2],
[1, 5], [1, 3], [2, 2], [4, 2], [3, 3], [2, 5], [2, 1], [1, 3], [5, 1], [2, 6], [6, 1],
[3, 4], [6, 4], [2, 3], [6, 3], [2, 4], [4, 1], [2, 1], [1, 2], [5, 5], [3, 2], [3, 6],
[4, 1], [5, 6], [1, 5], [4, 4], [6, 3], [2, 2], [1, 2], [6, 3], [1, 2], [6, 6], [1, 6],
[4, 3], [1, 2], [4, 4], [1, 4], [6, 4], [5, 3], [4, 6], [3, 3], [5, 2], [4, 3], [1, 3],
[6, 3], [2, 5], [2, 6], [2, 4], [6, 6], [4, 5], [6, 4], [4, 2], [4, 6], [2, 6], [6, 4],
[2, 1], [3, 5], [1, 2], [1, 2], [6, 2], [2, 6], [1, 6], [2, 5], [2, 3], [3, 1], [1, 2],
[2, 3], [3, 1], [4, 1], [6, 6], [3, 6], [3, 1], [3, 1], [4, 3], [4, 1], [3, 4], [2, 1],
[1, 6], [3, 2], [2, 2], [2, 2], [4, 5], [4, 4], [5, 5], [5, 4], [4, 2], [5, 1], [4, 4],
[2, 4], [1, 4], [1, 5], [3, 6], [2, 6], [2, 4], [2, 1], [1, 6], [4, 4], [4, 6], [1, 3],
[2, 5], [5, 1], [2, 1], [2, 4], [6, 3], [5, 2], [1, 4], [2, 1], [5, 2], [1, 6], [3, 6],
[3, 2], [2, 4], [5, 3], [3, 4], [4, 4], [2, 1], [4, 4], [1, 4], [4, 4], [2, 3], [4, 4],
[5, 5], [5, 3], [1, 3], [4, 4], [6, 3], [1, 4], [3, 2], [4, 4], [6, 5], [1, 1], [6, 6],
[3, 1], [4, 5], [3, 2], [5, 4], [4, 2], [2, 2], [6, 1], [3, 1], [6, 5], [4, 2], [4, 1],
[1, 2], [5, 4], [3, 1], [3, 1], [3, 5], [2, 2], [5, 4], [2, 6], [3, 4], [2, 3], [4, 2],
[6, 3], [4, 4], [1, 5], [5, 1], [5, 3], [1, 1], [3, 5], [5, 4], [3, 4], [2, 5], [2, 2],
[6, 4], [2, 2], [6, 2], [3, 4], [2, 3], [2, 6], [2, 1], [1, 3], [3, 3], [3, 5], [2, 1],
[1, 3], [1, 5], [1, 2], [2, 6], [4, 3], [4, 5], [2, 6], [2, 6], [5, 1], [3, 6], [1, 2],
[4, 5], [2, 3], [2, 5], [4, 3], [4, 3], [2, 2], [6, 6], [5, 4], [5, 4], [2, 4], [6, 2],
[4, 4], [4, 5], [5, 4], [6, 5], [3, 2], [6, 2], [2, 1], [1, 1], [4, 6], [2, 6], [3, 2],
[5, 2], [5, 2], [4, 4], [1, 6], [3, 4], [5, 6], [2, 4], [4, 6], [3, 3], [1, 1], [3, 6],
[6, 3], [5, 3], [2, 5], [1, 1], [6, 6], [2, 1], [4, 2], [2, 5], [1, 4], [6, 6], [6, 2],
[2, 6], [2, 5], [3, 1], [5, 3], [1, 4], [2, 1], [2, 4], [5, 6], [4, 4], [6, 6], [2, 6],
[3, 3], [6, 1], [3, 6], [4, 5], [6, 5], [1, 6], [4, 5], [6, 5], [4, 5], [6, 6], [4, 6],
[4, 2], [6, 2], [6, 5], [6, 1], [5, 6], [6, 5], [2, 4], [3, 2], [5, 5], [1, 3], [1, 3],
[2, 5], [5, 4], [5, 2], [4, 5], [2, 3], [3, 6], [5, 1], [4, 1], [2, 3], [2, 1], [4, 5],
[4, 5], [5, 1], [6, 4], [2, 6], [5, 5], [3, 1], [3, 1], [4, 2], [4, 5], [1, 3], [4, 6],
[1, 5], [4, 4], [1, 5], [4, 3], [2, 4], [5, 5], [3, 2], [3, 6], [4, 5], [1, 3], [4, 6],
[4, 4], [2, 2], [1, 3], [6, 1], [1, 2], [4, 2], [3, 4], [1, 6], [4, 2], [2, 6], [2, 5],
[3, 3], [6, 5], [6, 1], [5, 6], [4, 5], [6, 4], [4, 2], [6, 3], [3, 5], [2, 3], [3, 1],
[1, 1], [6, 4], [5, 2], [1, 5], [3, 2], [4, 3], [1, 3], [5, 5], [4, 1], [1, 1], [1, 3],
[6, 6], [6, 4], [5, 2], [2, 6], [1, 6], [2, 2], [4, 2], [2, 3], [5, 2], [2, 2], [2, 4],
[5, 1], [4, 1], [4, 5], [5, 6], [4, 2], [3, 2], [5, 4], [2, 4], [6, 3], [2, 1], [5, 1],
[4, 5], [4, 5], [6, 4], [6, 2], [4, 4], [3, 6], [5, 1], [3, 6], [6, 5], [4, 3], [2, 1],
[6, 3], [1, 5], [2, 5], [1, 2], [3, 3], [3, 6], [3, 4], [1, 1], [2, 5], [5, 3], [2, 2],
[5, 2], [1, 6], [1, 1], [4, 3], [2, 6], [5, 3], [6, 3], [2, 5], [6, 4], [2, 5], [1, 3],
[6, 5], [6, 4], [6, 5], [5, 2], [1, 3], [2, 5], [2, 1], [2, 5], [1, 5], [4, 2], [2, 3],
[5, 4], [6, 2], [1, 5], [1, 6], [5, 6], [1, 6], [4, 2], [2, 4], [2, 4], [5, 1], [1, 2],
[6, 3], [3, 4], [1, 2], [3, 3], [4, 4], [4, 5], [3, 4], [5, 2], [2, 4], [2, 1], [6, 4],
[1, 5], [6, 1], [2, 2], [6, 4], [5, 3], [5, 5], [4, 3], [4, 4], [1, 1], [1, 1], [4, 3],
[4, 6], [4, 2], [6, 6], [4, 4], [6, 1], [3, 2], [4, 6], [3, 5], [6, 3], [6, 5], [2, 5],
[4, 2], [4, 2], [4, 4], [1, 3], [6, 3], [5, 6], [5, 5], [5, 3], [1, 5], [1, 5], [2, 4],
[4, 2], [4, 5], [4, 6], [4, 1], [4, 4], [6, 6], [4, 3], [6, 3], [3, 2], [2, 4], [1, 4],
[3, 4], [2, 5], [1, 3], [5, 1], [6, 5], [6, 5], [5, 5], [3, 2], [4, 5], [3, 4], [5, 3],
[3, 1], [5, 2], [4, 5], [2, 2], [3, 5], [6, 2], [1, 2], [2, 4], [2, 3], [6, 2], [3, 5],
[5, 4], [4, 2], [2, 1], [5, 1], [4, 2], [3, 2], [2, 2], [3, 3], [3, 3], [5, 5], [5, 1],
[3, 4], [3, 2], [5, 1], [2, 3], [6, 5], [2, 4], [6, 6], [3, 1], [3, 2], [1, 6], [4, 6],
[1, 1], [5, 1], [2, 3], [3, 2], [2, 5], [4, 1], [5, 5], [3, 3], [6, 3], [6, 2], [4, 2],
[2, 5], [4, 1], [2, 5], [6, 5], [1, 3], [4, 1], [5, 6], [1, 6], [3, 4], [3, 5], [2, 5],
[2, 5], [1, 3], [6, 4], [3, 3], [4, 5], [1, 4], [5, 6], [5, 3], [2, 6], [4, 2], [5, 1],
[3, 6], [4, 4], [6, 4], [6, 4], [4, 6], [2, 3], [2, 5], [3, 2], [2, 6], [3, 6], [2, 5],
[2, 3], [5, 2], [5, 4], [5, 2], [1, 3], [4, 6], [2, 5], [1, 2], [4, 4], [3, 4], [2, 1],
[5, 1], [1, 6], [5, 5], [4, 6], [1, 3], [3, 2], [5, 2], [5, 2], [1, 1], [3, 5], [3, 3],
[1, 1], [2, 5], [5, 6], [5, 4], [4, 3], [5, 3], [1, 5], [3, 5], [2, 3], [2, 5], [5, 6],
[4, 3], [3, 4], [3, 1], [1, 2], [5, 2], [6, 1], [2, 1], [6, 5], [1, 4], [5, 4], [2, 2],
[3, 2], [2, 3], [1, 4], [6, 4], [6, 1], [6, 5], [6, 4], [1, 5], [5, 3], [5, 1], [6, 5],
[4, 6], [5, 4], [2, 4], [1, 5], [3, 1], [1, 1], [1, 1], [1, 2], [1, 4], [4, 2], [1, 3],
[6, 3], [4, 1], [1, 4], [1, 3], [3, 1], [6, 5], [4, 3], [3, 4], [6, 2], [6, 4], [3, 2],
[1, 5], [1, 5], [4, 2], [2, 2], [3, 4], [1, 3], [1, 6], [2, 4], [5, 5], [1, 6], [3, 2],
[3, 6], [1, 1], [4, 3], [6, 1], [2, 3], [5, 1], [6, 1], [6, 2], [2, 4], [3, 5], [2, 2],
```

```
[4, 1], [3, 2], [3, 2], [6, 2], [3, 4], [6, 2], [2, 5], [1, 2], [5, 6], [3, 1], [5, 1],
[6, 1], [5, 1], [6, 3], [4, 5], [4, 5], [1, 4], [4, 4], [1, 3], [6, 1], [3, 6], [4, 3],
[1, 4], [5, 5], [1, 4], [6, 3], [4, 2], [3, 4], [4, 5], [4, 1], [6, 3], [2, 4], [2, 6],
[1, 1], [2, 6], [1, 6], [3, 4], [5, 4], [2, 5], [4, 2], [5, 6], [6, 5], [6, 5], [2, 5],
[5, 6], [2, 3], [2, 6], [3, 6], [2, 5], [6, 5], [1, 1], [2, 3], [2, 5], [1, 2], [1, 2],
[2, 1], [6, 1], [6, 3], [3, 6], [5, 4], [4, 6], [1, 4], [6, 6], [2, 4], [4, 5], [3, 3],
[5, 1], [1, 4], [2, 6], [2, 5], [3, 6], [5, 2], [6, 5], [3, 4], [1, 4], [3, 4], [5, 1],
[4, 2], [6, 3], [1, 6], [4, 5], [1, 1], [2, 6], [3, 1], [5, 4], [5, 1], [6, 6], [6, 4],
[5, 1], [3, 5], [6, 5], [3, 1], [6, 3], [1, 6], [5, 3], [4, 5], [2, 1], [5, 2], [2, 4],
[5, 1], [4, 3], [1, 3], [5, 5], [3, 3], [1, 6], [6, 6], [4, 4], [2, 2], [3, 4], [1, 4],
[3, 5], [3, 2], [6, 2], [2, 1], [4, 3], [2, 1], [6, 2], [2, 4], [3, 5], [5, 5], [1, 4],
[3, 2], [3, 2], [6, 4], [2, 5], [1, 2], [1, 2], [1, 1], [3, 1], [2, 1], [2, 1], [5, 6],
[4, 4], [2, 6], [2, 6], [3, 2], [2, 6], [3, 6], [6, 1], [5, 4], [3, 2], [1, 3], [1, 2],
[3, 5], [1, 4], [4, 5], [2, 5], [6, 5], [2, 6], [2, 5], [6, 5], [4, 5], [6, 6], [5, 1],
[4, 6], [3, 5], [4, 3], [3, 3], [2, 3], [1, 6], [3, 3], [5, 6], [3, 6], [2, 5], [6, 6],
[2, 2], [3, 2], [5, 2], [2, 5], [1, 6], [2, 6], [4, 4], [1, 6], [2, 5], [1, 3], [2, 5],
[5, 1], [4, 2], [6, 1], [6, 3], [3, 1], [1, 6], [1, 6], [4, 1], [5, 2], [3, 2], [6, 2],
[6, 1], [4, 5], [3, 1], [1, 6], [2, 3], [3, 1], [5, 1], [5, 2], [5, 5], [2, 4], [1, 2],
[5, 5], [3, 2], [4, 3], [4, 3], [6, 6], [3, 3], [4, 5], [5, 2], [3, 3], [5, 1], [4, 4],
[6, 1], [3, 1], [6, 3], [5, 2], [5, 6], [4, 3], [3, 1], [5, 5], [3, 5], [3, 4], [4, 4],
[2, 6], [1, 4], [5, 3], [4, 6], [6, 3], [2, 5], [3, 3], [6, 1], [2, 4], [6, 6], [1, 6],
[2, 1], [6, 3], [2, 2], [6, 4], [3, 4], [5, 2], [2, 6], [2, 4], [1, 1], [5, 4], [5, 2],
[6, 3], [1, 4], [2, 4], [4, 5], [1, 1], [1, 6], [6, 5], [2, 6], [5, 6], [6, 5], [1, 2],
[5, 2], [4, 6], [3, 2], [5, 1], [6, 1], [3, 3], [2, 3], [1, 6], [2, 3], [1, 4]]
```

In [5]:

```
#joining list of lists in one list to operate frequency
big_list = list(itertools.chain.from_iterable(x))
```

In [6]:

```
#calculating frequency
for i in big_list:
    counter=collections.Counter(big_list)
print(counter)
```

```
Counter({2: 366, 4: 337, 1: 331, 3: 329, 5: 322, 6: 315})
```

In [7]:

```
frequency = {4: "381", 3: "354", 2: "342", 5: "320", 6: "309", 1: "294"}


for key, value in frequency.items():
    print("probability of key:",key,"is", int(value)/100,"%")
```

```
probability of key: 4 is 3.81 %
probability of key: 3 is 3.54 %
probability of key: 2 is 3.42 %
probability of key: 5 is 3.2 %
probability of key: 6 is 3.09 %
probability of key: 1 is 2.94 %
```