In [1]:

```
"""
Created on Mon Aug 22 16:47:53 2022

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DAN 862 Fall 2022

Week 1 Homework 1
"""
```

Out[1]:

```
'\nCreated on Mon Aug 22 16:47:53 2022\n\n@author: Brandon Botzer - btb5103\n\nDAN 862 F
all 2022\n\nWeek 1 Homework 1\n'
```

In [2]:

```
#Question 1

#Run the code provided to generate the list L1
import numpy as np

L1 = []

np.random.seed(56)

for i in np.random.randint(0, 100, 10):

    L1.extend([i] * np.random.randint(0, 100, 1)[0])

np.random.shuffle(L1)

print("Question 1: \n")

#What are the unique values? (5pts)
print("What are the unique values? (5pts)")

#Generate the set of numbers
L1_Unique = set(L1)
#Print the set
print(L1_Unique)
```

```
Question 1:

What are the unique values? (5pts)
{64, 34, 14, 15, 55, 22, 87, 85, 57, 90}
```

In [3]:

```
#How many unique values?  (5pts)
print("How many unique values?  (5pts)")
#Find the length of the L1_Unique set
print(len(L1_Unique))
```

```
How many unique values?  (5pts)
10
```

In [4]:

```
#Create a dictionary with the unique items in L1 as dictionary keys
#and their count as the dictionary values (20pts)

#use the count for a list then make a dict
```

```
#Make a list of the unique items so I can index them
unique_List = list(L1_Unique)

countsList = []

#Iterate over this and zip the dicts together
for i in range(0, len(unique_List)):

    #add the number of times a value appears into the count list
    counts = L1.count(unique_List[i])

    countsList.append(counts)

#build a tuple by zipping the unique List and the number of times each unique
#shows up

zippedUp = zip(unique_List, countsList)

unique_Dict = dict(zippedUp)

print("The Dictionary of the unique values and the number of times they appear:")
print(str(unique_Dict))
```

```
The Dictionary of the unique values and the number of times they appear:
{64: 66, 34: 43, 14: 11, 15: 12, 55: 31, 22: 33, 87: 80, 85: 24, 57: 89, 90: 10}
```

In [5]:

```
#Which values appears most freqeuntly?  Don't do this by hand... (10pts)

#This could be done in one line but I show it here in 3 for clarity

#Find the max appearances
mostShows = max(countsList)

#find the index of the most shows
indmostShows = countsList.index(mostShows)

#Use this index in the dict, list, tuple
print("The value which appears most frequently is: " + str(unique_List[indmostShows]))
print("It appears a total of " + str(mostShows) + " times!")
```

```
The value which appears most frequently is: 57
It appears a total of 89 times!
```

In [6]:

```
print("\n\n\nQuestion 2: \n")
#Question 2



L2 = [879, 394, 235, 580, 628, 81, 206, 238, 927, 853, 622, 603, 110, 143, 824, 324, 34

#copied into L3 so I can use L2 again
L3 = L2.copy()

#Use a while loop to calculate the sum of the even numbers in L2 (10 pts)

#Declare x to store the sum of the evens
x = 0

#While L2 does not equal an empty list
while L3 != []:
    y = L3.pop()
    #Test the pop'd value for even
    if y % 2 == 0:
        #Add the pop'd value to the running total
        x += y

print("The sum of the even numbers in L2 is: " + str(x))
```

```
Question 2:

The sum of the even numbers in L2 is: 9418
```

In [7]:

```
#Write a function to caculate the mean of a list.  Use this function to
#calculate the mean of L2 (10 pts)


def meanMean(L):

    #Declare total
    total = 0

    #Add up all of the elements
    for i in range(0, len(L)):
        total += L[i]

    #Divide the total by the number of elements

    result = total / len(L)

    return result

#Print the answer with a call to meanMean()
print("The mean of L2 is: " + str(meanMean(L2)))
```

```
The mean of L2 is: 534.2666666666667
```

In [8]:

```
#Calculate the sum for elements in L2 which ARE larger than 500 (10 pts)


#copied into L3 so I can use L2 again
L3 = L2.copy()

#Declare x to store the sum of the evens
x = 0

#While L2 does not equal an empty list
while L3 != []:
    y = L3.pop()
    #Test the pop'd value for even
    if y > 500:
        #Add the pop'd value to the running total
        x += y

print("The sum of the numbers larger than 500 in L2 is: " + str(x))
```

```
The sum of the numbers larger than 500 in L2 is: 12466
```

In [9]:

```
print("\n\n\nQuestion 3: \n")

#Question 3

#Write the power function.  Don't use **


#There are two ways to do this.  If n is an integer, you can loop through
#And multiply x by itself.  This requries you to check for 'n' being
#an int as well as taking the absolute value of 'n' for the loop.  However,
#you'll be unable to solve with non-integer values of 'n'

#Instead, I will do this for n being any real value and use log rules
#with numpy's exponent and log features (standard base is for ln)


def botz_Pow(x, n):

    y = np.exp(n * np.log(x))

    return y

print("Two to the power of 10 is: " + str(botz_Pow(2,10)))

print("Three to the power of negative 3 is: " + str(botz_Pow(3,-3)))
```

```
Question 3:

Two to the power of 10 is: 1024.0
Three to the power of negative 3 is: 0.037037037037037035
```