Problem Solving and Programming in Python - Day 4

Date - 14 June 2019

Day Objectives

- Python Data Structures
  - Lists
  - Tuples
  - Dictionaries
  - Basic Problem Set on Data Structures
  - Advanced Problem Set
  - Packages and Modules in Python

```
### Python Data Structures

#### Lists
```

In [55]:

```
li = [123,978,654,239,333,576]

li # accessing the entire list

li[1] ## access an element with index in a list

li[1:len(li)] ## accessing the elements from 2nd to last

li[1:]  ## accessing the elements from 2nd to last

li[-1] ##accessing the last element

li[-1::-1]  ## reverse of a list

li[::-1]  ## copy of a list in reverse

li ## it returns the original list only

li=li[::-1] ## to reverese the original list

li  ## now it returns the reverse of the original list

li=li[::-1]  ## again reversing the list

li  ## returns the original list

li[::2]  ## even index elements in a list

li[1::2]  # odd index elements in a list

# Lists can be accessed, malipulated in two different ways
    # Direct Referencing - [index]
    # Indirect Rferencing - Through Functions

# Indirect Referencing

li.append(3)  # Adding an element to end of the list

li

li.insert(1,111) # adding an element at a particular index

li

li.sort()   # Sort elements in Ascending Order

li

li.pop()  # Remove the last element in the list

li

li.pop(3) # Remove an element at a particular Index

li


```

```
li2 = [444,231,567,890]

li.extend(li2)  # Merge list 2 into list 1

li

sum(li)   # Calculates the sum of all elements in the list

max(li)   # Maximum elements of a list

len(li)  # Length of a list

sum(li)/len(li) # Average of elements in a list

sum(li[::2])/len(li[::2])  # Aerage of all alternate elements at even index

sum(li[1::2])/len(li[1::2])   # Aerage of all alternate elements at even ind

min(li) # returns the minimum of a list
```

Out[55]: 3

In [80]:
```
# Function to identify the nth largest element in a list of unique data

li=[123,234,12,34,678,569]
n=int(input("enter a number"))
def genericLargest(li,n):
    li.sort()
    return li[-(n)]
genericLargest(li,n)
```

```
enter a number6
```

Out[80]: 12

In [9]:

```
# function to search for data in a list--if found --return index else--retur

def linearSearch1(li,key):
    for i in range(0,len(li)):
        if li[i]==key:
            return i
    return -1

def linearSearch2(li,key):
    for element in li:
        if element==key:
            return li.index(element)
    return -1

def linearSearch3(li,key):
    try:
        return li.index(key)
    except:
        return -1

def linearSearch4(li,key):
    if key in li:
        return li.index(key)
    return -1

li=[123,23,4,12,567,345]

key=int(input("enter a key"))

linearSearch1(li,key)

linearSearch2(li,key)

linearSearch3(li,key)

linearSearch4(li,key)
```

```
enter a key4
```

Out[9]: 2

In [37]:

```
# Function to count the occurances of  a character in a string
# "Python Programming" m--> 2

s="Python Programming"
ch=input("enter a char to search:")

def countChar1(s,ch):
    count=0
    for i in range(0,len(s)):
        if(ch==s[i]):
            count+=1
    return count
def countChar2(s,ch):
    count=0
    for c in s:
        if c==ch:
            count+=1
    return count
def countChar3(st,ch):
    return s.count(ch)

def countSubstr(st,substr):
    j=0
    count=0
    while(j<len(substr)):
        for i in range(0,len(st)):
            if st[i]==substr[j]:
                j+=1
                count+=1
        if count==len(substr):
             tot=tot+1
    return tot

st="abcabbabcb"
substr="ab"
countChar1(str,ch)
countChar2(str,ch)
countChar3(str,ch)
countSubstr(st,substr)
```

```
enter a char to search:3

---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
<ipython-input-37-7b6e60bf222c> in <module>
     37 countChar2(str,ch)
     38 countChar3(str,ch)
---> 39 countSubstr(st,substr)

<ipython-input-37-7b6e60bf222c> in countSubstr(st, substr)
     25     while(j<len(substr)):
     26         for i in range(0,len(st)):
---> 27             if st[i]==substr[j]:
     28                 j+=1
     29                 count+=1
```

```
IndexError: string index out of range
```

In [44]:
```
s=input()
li=s.split()
numberList=[]
for i in li:
    numberList.append(int(i))
numberList

```

```
123456
```

Out[44]:
```
[123456]
```

In [ ]:
```

```