

## 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 [1]: 1 li = [123,978,654]
        2 li # Access the entire List
        3
        4 li[1] #Access the element with index in a list
        5
        6 li[1:] #Access all the elements second element to last element in the list
```

Out[1]: [978, 654]

```
In [5]: 1 #Reverse the List
        2 li = [123,978,654]
        3 li = li[::-1]
        4 li
```

Out[5]: [654, 978, 123]

```
In [6]: 1 li = [123,978,654]
        2 li[::2] #Access even index elements
```

Out[6]: [123, 654]

```
In [7]: 1 li = [123,978,654]
        2 li[1::2]
```

Out[7]: [978]

```
In [9]: 1  #Lists can be accessed in two different ways
        2      # Direct referencing - [index]
        3      #Indirect referencing - through functions
        4
        5  li = [123,978,654]
        6
        7  #Adding an element to end of the list
        8
        9  li.append(345)
       10  li
```

Out[9]: [123, 978, 654, 345]

```
In [13]: 1  li = [123,978,654]
        2  li.append(345)
        3
        4
        5  #Adding an element at a particular index
        6  li.insert(1,245)
        7  li
        8
        9
       10  li.sort() #Sort elements in ascending order
       11
       12  li
       13
```

Out[13]: [123, 245, 345, 654, 978]

```
In [16]: 1  li = [123,978,654]
        2
        3
        4  #Remove the last element in the list
        5
        6  li.pop()
        7
```

Out[16]: 654

In [27]:

```
1  #remove an element at paticular index
2  li =[123, 245, 345, 978]
3
4  li.pop(1)
5  li
6
7  li2 = [234,567,678]
8  li.extend(li2)  #Merge the second list to first
9  li
10
11
12
13  sum(li)  # Sum of all elements in a list
14
15
16  max(li)  # Maximum element in a list
17
18
19  len(li)# Number of elements in a list
20
21  #Average of llist elements
22
23  sum(li)/len(li)
24
25  #Average of all alternate elements
26  sum(li[1::2])/len(li[1::2])
27
28
29  min(li)
30
31  max(li)-1
32  try:
33      li.index(10000)
34  except:
35      print(-1)
```

Out[27]: 123

```
In [32]: 1  #Function to identify the second largest element in a unique list
2          #Sort the data and select the second last element
3          #Sort the data in reverse order, and select the second element
4          #Remove the max element and then get the max of the new list
5
6  def secondLargest(li):
7      li.sort()
8      return li[-2]
9
10
11
12  #Function that returns nth Largest
13  def genericLargest(li,n):
14      li.sort()
15      return li[-n]
16
17  secondLargest(li)
18  genericLargest(li,5)
```

Out[32]: 234

```
In [41]: 1  # Function to search for data in a list
2
3  def linearsearch(li,key):
4      for index in range(0,len(li)):
5          if li[index] == key:
6              return index
7      return -1
8
9  def linearsearch2(li,key):
10     for element in li:
11         if element == key:
12             return li.index(element)
13     return -1
14
15  def linearsearch3(li,key):
16     if key in li:
17         return li.index(key)
18     return -1
19
20
21  linearsearch(li,234)
22  linearsearch2(li,234)
23  linearsearch3(li,123)
```

Out[41]: 0

```
In [42]: 1 # Function to count the occurrences of the character in a string
2
3 # "Python Programming" m --> 2
4
5
6 def countOccurrences(s,subs):
7     count=0
8     for ch in s:
9         if ch == c:
10             count +=1
11     return count
12
13 def countCharOccurrences2(s,c):
14     return s.count(c)
15
16 countCharOccurrences2("Python Programming", 'Py')
```

Out[42]: 1

```
In [5]: 1 #Function to find the number of occurrences of a substring "abcabcddcba", "a
2 string = "abcabcddcba"
3
4
5 print(string.count("ab"))
6
```

2

```
In [ ]: 1
```

```
In [4]: 1 # Array elements
2
3 s= "1 2 3 4 5 6"
4 li = s.split()
5 numberlist = []
6 for i in li:
7     numberlist.append(int(i))
8
9 numberlist
10
```

Out[4]: [1, 2, 3, 4, 5, 6]

```
In [ ]: 1
```