Python Lists

- Lists are collection of elements referred by a name
- A list is enclosed in square brackets
- The elements in the list can of different types

In [3]:
```
num = [1,3,2,5,8,3]
mixnum =[1,3.6,6,7.7]
numname=[10,'Ashok',4.5]
listinlist = [10, 20,[14,50]]
listwithlist = [num,numname]
print(num)
print(mixnum)
print(numname)
print(listinlist)
print(listwithlist)
```

```
[1, 3, 2, 5, 8, 3]
[1, 3.6, 6, 7.7]
[10, 'Ashok', 4.5]
[10, 20, [14, 50]]
[[1, 3, 2, 5, 8, 3], [10, 'Ashok', 4.5]]
```

Accessing elements of a list

- Lists have indices starting from 0(first index) or -1(last index)

In [6]:
```
print(num[0])
print(numname[1])
print(listwithlist[-1])
```

```
1
Ashok
[10, 'Ashok', 4.5]
```

Creating sublists using slicing

In [10]:
```
lst = [10,20,30,40,50]
l1 = lst[0:]
l2 = lst[1:3]
l3 = lst[-3:]
l4 = lst[-5:-3]
print(l1)
print(l2)
print(l3)
print(l4)
```

```
[10, 20, 30, 40, 50]
[20, 30]
[30, 40, 50]
[10, 20]
```

In [11]:
```
# A new list can be created by adding two lists
l5 = l1+l2
print(l5)
```

```
[10, 20, 30, 40, 50, 20, 30]
```

In [13]:
```
#Accessing elements of a sublist
x = ['Ashok','Arjun']
print(x[0][1])
print(x[1][3])
```

```
s
u
```

In [14]:
```
#Accessing elements of a sublist
z = [[1,2,3,4],[5,6,7,8]]
print(z[1][3])
```

```
8
```

In [5]:
```
#Changing print interval with third index
m = [1,2,3,4,5,6,7,8]
print (m[0:6:2])
```

```
[1, 3, 5]
```

Functions with list

- append() Adds an element at the end of the list
- clear() Removes all the elements from the list
- copy() Returns a copy of the list
- count() Returns the number of elements with the specified value
- extend() Add the elements of a list (or any iterable), to the end of the current list
- index() Returns the index of the first element with the specified value
- insert() Adds an element at the specified position
- pop() Removes the element at the specified position
- remove() Removes the item with the specified value
- reverse() Reverses the order of the list

In [8]:
```
m = [10,30,40,50,60]
m.append(80) # Adding 80 to the end of the list
print('After append',m)
m.insert(1,50) # inserting an element at a given index
print('After insert', m)
m.pop(1) # Removing an element available at given index
print('After pop', m)
m.append(30)
print(m)
m.remove(30) # Removing the first occurance of an element
print('After remove', m)
n = list(m) # Creating a list using list constructor
m.sort() # Sorting in asscending order
n.sort(reverse=True) # Sorting in descending order
print(m)
print(n)
m.clear()#REmoving all elements from list resulting in empty list
print(m)
```

```
After append [10, 30, 40, 50, 60, 80]
After insert [10, 50, 30, 40, 50, 60, 80]
After pop [10, 30, 40, 50, 60, 80]
[10, 30, 40, 50, 60, 80, 30]
After remove [10, 40, 50, 60, 80, 30]
[10, 30, 40, 50, 60, 80]
[80, 60, 50, 40, 30, 10]
[]
```

Using del command

In [3]:
```
m = [10,20,30,40]
n = [50,60]
m.extend(n)
print(m)
m.reverse()
print(m)
x = m.copy()
print(x)
m.reverse()
print(x)
print(m)
```

```
[10, 20, 30, 40, 50, 60]
[60, 50, 40, 30, 20, 10]
[60, 50, 40, 30, 20, 10]
[60, 50, 40, 30, 20, 10]
[10, 20, 30, 40, 50, 60]
```

In [8]:
```
m = [10,20,30,40]
del m[1] # will delete 20 from the list
print(m)
del m
# We cannot print the list since it is not existing
```

```
[10, 30, 40]
```

Deleting using slice

In [13]:
```
m = [10,20,30]
del m[0:]
print(m)
```

```
[]
```

In [ ]:
```
#Given the following list
m = [10,20,30,40]
# What is the difference between the following statement
x = m # Both x and m points to the same list in memory
n = m.copy() # Both n and m are two seperate lists
```

In [26]:
```
m = [10,20,20,40, 50,60,10]
print(m.count(10))
print(len(m))
print(sum(m))
print('Mean of the list:', sum(m)/len(m))
print(m.index(20))
```

```
2
7
210
Mean of the list: 30.0
1
```

In [31]:
```
m = [10,20,40,50,30]
for x in m:
    print(x, end=' ')
print('\n')
for i in range(len(m)-1, -1, -1):
    print(m[i], end=' ')
```

```
10 20 40 50 30

30 50 40 20 10
```

In [2]:
```
m = [10,20,30,50]
i = 0
while i < len(m):
    print(m[i], end=' ' )
    i = i+1
print('\n')
i = len(m)-1
while i >= 0:
    print(m[i],end=' ')
    i = i-1
```

```
10 20 30 50

50 30 20 10
```

In [2]:
```
#printing elements with even and odd values
m = [2,7,8,3,5,9,10]
for x in m:
    if x % 2 == 0:
        print(x, end =' ')
print('\n')
for x in m:
    if x % 2 != 0:
        print(x, end =' ')
```

```
2 8 10

7 3 5 9
```

In [4]:
```
#Searching an element in a list
m = [2,4,5,7,8,2,6,8,10]
search = int(input('Enter an element to search:'))
find = False
for x in m:
    if x == search:
        find = True
        break
if find == True:
    print('Element found')
else:
    print('Element not found')
```

```
Enter an element to search:12
Element no found
```

In [6]:
```
#Finding the mean of a list
sum1 = 0
count = 0
m = [2,5,6,8,10]
for x in m:
    sum1 = sum1 + x
    count = count + 1
mean=sum1/count
print(mean)
#alternate method
print(sum(m)/len(m))
```

```
6.2
6.2
```

In [1]:
```
m = list() # Declaring an empty list using a list constructor
# n = []  Second method of declaring an empty list
limit = int(input('enter the number of elements for the list:'))
for i in range(limit):
    m.append(int(input('Enter an element:')))
print(m)
```

```
enter the number of elements for the list:5
Enter an element:10
Enter an element:20
Enter an element:30
Enter an element:40
Enter an element:50
[10, 20, 30, 40, 50]
```

In [5]:
```
#Write a program to declare a python list and change
#the contents of the list by adding 10 to all even
#elements and adding the value of next element to all odd elements.
#If the last element is odd there should not be any change to that.
m = [3,4,6,7,11]
for i in range(len(m)):
    if m[i] % 2 == 0:
        m[i] = m[i] + 10
    else:
        if i == len(m) - 1:
            m[i] = m[i]
        else:
            m[i] = m[i] + m[i+1]
print(m)
```

```
[7, 14, 16, 18, 11]
```

In [7]:
```
#Write a program to reverse a list without using reverse function
m = [10,20,30,40,50]
j = len(m)-1
for i in range(0,len(m)//2):
    temp = m[i]
    m[i] = m[j]
    m[j] = temp
    j = j - 1
print(m)
```

```
[50, 40, 30, 20, 10]
```

In [5]:
```
#Finding sum of each row in 2 dimensional list
m = [[1,2,3,4],[5,6,7,8],[9,10,11,12]]
for i in range(len(m)):
    sum = 0
    for j in range(len(m[i])):
        sum = sum + m[i][j]
    print(sum, end=' ')
```

```
10 26 42
```

In [9]:
```
# m = [1,2,3,4,5] should become [5,1,2,3,4]
m = [1,2,3,4,5]
j = len(m)-1
for i in range(0,4):
    temp = m[i]
    m[i] = m[j]
    m[j] = temp
print(m)
```

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

In [6]:
```
# m = [1,2,3,4,5] should become [5,1,2,3,4]
m = [1,2,3,4,5]
i = len(m)-1
temp = m[i]
for i in range(i,0,-1):
    m[i]=m[i-1]
m[0] = temp
print(m)
```

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

In [1]:
```
# Declaring and printing 2 dimensional list
m = [[1,2,3,4],[5,6,7,8],[9,10,11,12]]
for i in range(len(m)):
    for j in range(len(m[i])):
        print(m[i][j],end=' ')
    print('\n')
```

```
1 2 3 4

5 6 7 8

9 10 11 12
```

In [3]:
```
# Finding sum of elements of 2 dimensional list
m = [[1,2,3,4],[5,6,7,8],[9,10,11,12]]
sum = 0
for i in range(len(m)):
    for j in range(len(m[i])):
        sum = sum + m[i][j]
print(sum)
```

```
78
```

In [1]:
```
# Shuffling a list
import random
lst = [1,2,3,4,5,6]
random.shuffle(lst)
print(lst)
```

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

In [2]:
```
#Taking a randon slice
import random
lst = [1,2,3,4,5,6]
x = random.sample(lst,  3)
print(x)
```

```
[2, 3, 5]
```