Data Structures

--- used to store a collection of related data

we have built -in data structures in python

- List
- Tuple
- dictionary
- set

1.list concept in data structures

- it is a collection of different data types
- it is a mutable(changable)
- it allows duplicate values or members
- in python,lists are written with square brackets

In [3]:

```
lst = ["spmvv",12,23,30.8,"apssdc",20]
print(lst)
```

```
['spmvv', 12, 23, 30.8, 'apssdc', 20]
```

In [4]:

```
#indexing or slicing
lst[0]
```

Out[4]:

```
'spmvv'
```

In [5]:

```
print(len(lst))
```

```
6
```

In [6]:

```
print(lst[0:6])
```

```
['spmvv', 12, 23, 30.8, 'apssdc', 20]
```

In [7]:

```
print(lst[0:6:2])
```

```
['spmvv', 23, 'apssdc']
```

In [8]:

```
print(lst[1:3])
```

```
[12, 23]
```

In [9]:

```
# [12, 30.8, 20]
lst[1:6:2]
```

Out[9]:

```
[12, 30.8, 20]
```

In [17]:

```
lst2 = ['cse',5.8,14,18,[13,15.3,'ece'],'mech',9.0]
print(lst2)
```

```
['cse', 5.8, 14, 18, [13, 15.3, 'ece'], 'mech', 9.0]
```

In [18]:

```
print(len(lst2))
```

```
7
```

In [19]:

```
lst2[4]
```

Out[19]:

```
[13, 15.3, 'ece']
```

In [20]:

```
lst2[4][1]
```

Out[20]:

```
15.3
```

In [36]:

```
lst = [1,2,[3,4,5,[6,7,8,9],10,'cse'],9.8,13]
print(len(lst))
```

```
5
```

In [37]:

```
lst[2:6]
```

Out[37]:

```
[[3, 4, 5, [6, 7, 8, 9], 10, 'cse'], 9.8, 13]
```

In [38]:

```
1 lst[2]
```

Out[38]:

```
[3, 4, 5, [6, 7, 8, 9], 10, 'cse']
```

In [39]:

```
1 lst[2][3]
```

Out[39]:

```
[6, 7, 8, 9]
```

In [42]:

```
1 lst[2][3][3]
```

Out[42]:

```
9
```

In [48]:

```
1 lst = ["spmvv",12,23,30.8,"apssdc",20]
2 lst[-1::-1]
3
```

Out[48]:

```
[20, 'apssdc', 30.8, 23, 12, 'spmvv']
```

In [49]:

```
1 lst = ["spmvv",12,23,30.8,"apssdc",20]
2 lst[-1:-7:-1]
3
```

Out[49]:

```
[20, 'apssdc', 30.8, 23, 12, 'spmvv']
```

In [50]:

```
1 lst[-3:-6:-1]
```

Out[50]:

```
[30.8, 23, 12]
```

In [54]:

```
1 lst2 = ['cse',5.8,14,18,[13,15.3,'ece'],'mech',9.0]
2 lst2
```

Out[54]:

```
['cse', 5.8, 14, 18, [13, 15.3, 'ece'], 'mech', 9.0]
```

In [55]:

```
print(lst2[-1:-8:-1])
```

```
[9.0, 'mech', [13, 15.3, 'ece'], 18, 14, 5.8, 'cse']
```

In [64]:

```
# ['ece',15.3,13)
print(lst2[-3][-1::-1])
```

```
['ece', 15.3, 13]
```

In [67]:

```
print(lst2[-3])
```

```
[13, 15.3, 'ece']
```

In [27]:

```
print(dir(list))
```

```
['__add__', '__class__', '__contains__', '__delattr__', '__delitem__', '__di
r__', '__doc__', '__eq__', '__format__', '__ge__', '__getattribute__', '__ge
titem__', '__gt__', '__hash__', '__iadd__', '__imul__', '__init__', '__init_
subclass__', '__iter__', '__le__', '__len__', '__lt__', '__mul__', '__ne__',
'__new__', '__reduce__', '__reduce_ex__', '__repr__', '__reversed__', '__rmu
l__', '__setattr__', '__setitem__', '__sizeof__', '__str__', '__subclasshook
__', 'append', 'clear', 'copy', 'count', 'extend', 'index', 'insert', 'pop',
'remove', 'reverse', 'sort']
```

In [69]:

```
# list is mutable
lst = [2,7,'cse',9.0,'civil',8.5,13,17]
lst[4] = 'mech'
```

In [70]:

```
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17]
```

In [71]:

```
# append()
lst.append('civil')
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil']
```

In [72]:

```
# copy()
lst2=lst.copy()
print("List2 =",lst2)
print("List1 =",lst)
```

```
List2 = [2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil']
List1 = [2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil']
```

In [73]:

```
lst.append('cse')
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil', 'cse']
```

In [74]:

```
# count()
lst.count("cse")
```

Out[74]:

```
2
```

In [75]:

```
lst.count(7)
```

Out[75]:

```
1
```

In [76]:

```
lst.count('apssdc')
```

Out[76]:

```
0
```

In [77]:

```
# extend
lst.extend(['a','b'])
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil', 'cse', 'a', 'b']
```

In [78]:

```
lst.append([1,2,3])
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 13, 17, 'civil', 'cse', 'a', 'b', [1, 2, 3]]
```

In [79]:

```
# index()
lst.index('civil')
```

Out[79]:

```
8
```

In [80]:

```
lst.index('cse')
```

Out[80]:

```
2
```

In [84]:

```
for i in range(len(lst)):
    print(i)
```

```
0
1
2
3
4
5
6
7
8
9
10
11
12
```

In [82]:

```
for i in range(len(lst)):
    print(i ,"=",lst[i])
```

```
0 = 2
1 = 7
2 = cse
3 = 9.0
4 = mech
5 = 8.5
6 = 13
7 = 17
8 = civil
9 = cse
10 = a
11 = b
12 = [1, 2, 3]
```

In [83]:

```
for i in range(len(lst)): #
    if(lst[i]== 'cse'): # 2 == 'cse',7 == 'cse','cse' == 'cse'
        print(i)
```

```
2
9
```