What is Data structure?

- Data structures are used to store a collection of data
- we have four built-in data structures in python -list,tuple,dictionary and set

List

- It is a collection of different data types.
- It is mutable(changeable).
- It allows duplicate items or members
- In python lists are written with square brackets.

In [64]:

```
lst = ['spmvv',20,40,45.7,'apssdc',13]
print(lst)
```

```
['spmvv', 20, 40, 45.7, 'apssdc', 13]
```

In [2]:

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

Out[2]:

```
'spmvv'
```

In [7]:

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

```
6
```

In [13]:

```
print(lst[0:6])  # to print all list elements
print(lst[1:6:2])
```

```
['spmvv', 20, 40, 45.7, 'apssdc', 13]
[20, 45.7, 13]
```

In [18]:

```
print(lst[1:3])
print(lst[2:5])
```

```
[20, 40]
[40, 45.7, 'apssdc']
```

In [65]:

```
print(lst[-1:-6:-1])
print(lst[-3:-6:-1])
```

```
[13, 'apssdc', 45.7, 40, 20]
[45.7, 40, 20]
```

In [68]:

```
lst2 = ['CSE',12.8,9.0,60,[13,12.4,'ece',],'mech',9.0]
print(lst2)
print(len(lst2))
```

```
['CSE', 12.8, 9.0, 60, [13, 12.4, 'ece'], 'mech', 9.0]
7
```

In [28]:

```
lst2[4]
```

Out[28]:

```
[13, 12.4, 'ece']
```

In [76]:

```
print(lst2[-1:-7:-1])
print(lst2[-3][-1::-1])
```

```
[9.0, 'mech', [13, 12.4, 'ece'], 60, 9.0, 12.8]
['ece', 12.4, 13]
```

In [38]:

```
print(lst2[4][1])
```

```
12.4
```

In [66]:

```
lst = [1,2,[3,4,5,[6,7,8,9],10,'cse'],9.88,16]
print(lst)
print(len(lst))
```

```
[1, 2, [3, 4, 5, [6, 7, 8, 9], 10, 'cse'], 9.88, 16]
5
```

In [46]:

```
lst[2:5]
```

Out[46]:

```
[[3, 4, 5, [6, 7, 8, 9], 10, 'cse'], 9.88, 16]
```

In [67]:

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

```
[16, 9.88, [3, 4, 5, [6, 7, 8, 9], 10, 'cse'], 2, 1]
```

In [47]:

```
1 lst[2]
```

Out[47]:

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

In [48]:

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

Out[48]:

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

In [49]:

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

Out[49]:

```
8
```

In [56]:

```
1 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 [3]:

```
1 lst = [2,7,'cse',9.0,'civil',8.5,71,14]
2 lst[4] = 'mech'    # civil is replaced by  mech  i.e, mutable(changeable)
```

In [4]:

```
1 print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14]
```

In [5]:

```
# append()
lst.append('civil')   # append is used to add elements at the end of list
lst.append(24)
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24]
```

In [6]:

```
# copy()
lst2 = lst.copy()
print("list2 = ",lst2)  # copy is used to copy a list to another
print("list1 = ",lst)
```

```
list2 =  [2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24]
list1 =  [2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24]
```

In [7]:

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

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24, 'cse']
```

In [8]:

```
# copy()
print(lst.count('cse'))   # count is used to count the elements
print(lst.count(7))
```

```
2
1
```

In [9]:

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

Out[9]:

```
0
```

In [10]:

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

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24, 'cse', 'a', 'b']
```

In [11]:

```
lst.append(['c','d'])
print(lst)
```

```
[2, 7, 'cse', 9.0, 'mech', 8.5, 71, 14, 'civil', 24, 'cse', 'a', 'b', ['c',
'd']]
```

In [12]:

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

Out[12]:

```
8
```

In [13]:

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

Out[13]:

```
2
```

In [15]:

```
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 = 71
7 = 14
8 = civil
9 = 24
10 = cse
11 = a
12 = b
13 = ['c', 'd']
```

In [18]:

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

```
2
10
```

In [ ]:

```

```