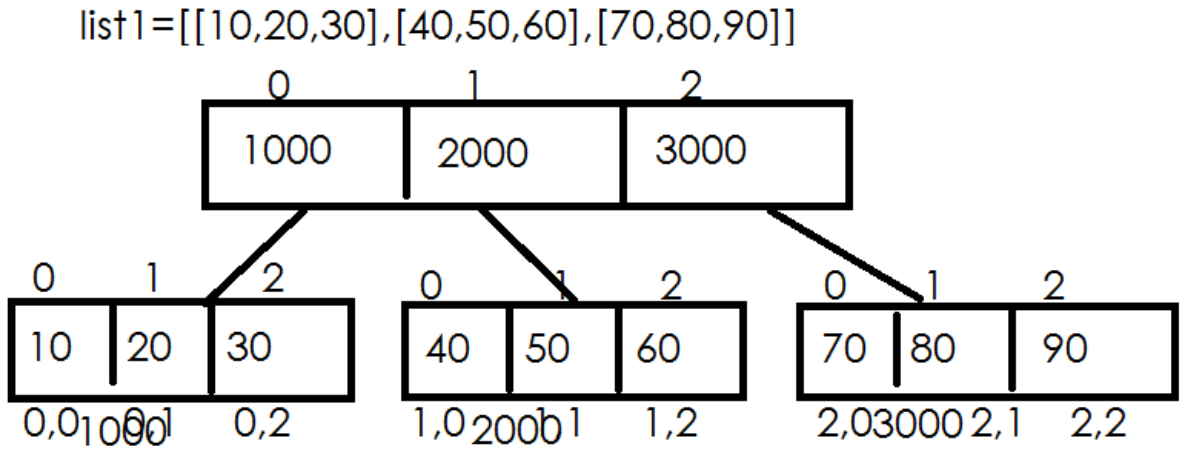
Nested List
A list within list is called nested list
Representing a list as an element inside list is called nested list
Nested list can be represented as matrix
Syntax:
[[ele,ele,..],[ele,ele,..],..]




```
print(list1[0]) ==> [10,20,30]      print(list1[0][0]) ==> 10
print(list1[1]) ==> [40,50,60]      print(list1[0][1]) ==> 20
print(list1[2]) ==> [70,80,90]      print(list1[0][2]) ==> 30
```

```
# representing details of 3 students and each student is having
# rollno,name,course
students=[[1,'naresh','python'],[2,'suresh','java'],[3,'kishore','c']]
for i in range(len(students)): # 0 1 2
    for j in range(len(students[i])): # 0 1 2
                print(students[i][j],end=' ')
    print()

for stud in students:
    for value in stud:
        print(value,end=' ')
    print()
```

Output:
1 naresh python

2 suresh java
3 kishore c
1 naresh python
2 suresh java
3 kishore c

Example:

```
# write a program to read 3x3 matrix and display
matrix=[]
for i in range(3):
    row=[]
    for j in range(3):
        ele=int(input("enter any element"))
        row.append(ele)
    matrix.append(row)

for row in matrix:
    for col in row:
        print(col,end=' ')
    print()

print(matrix)
```

Output:

```
enter any element1
enter any element2
enter any element3
enter any element4
enter any element5
enter any element6
enter any element7
enter any element8
enter any element9
1 2 3
4 5 6
7 8 9
[[1, 2, 3], [4, 5, 6], [7, 8, 9]]
```

Example:

```
# write a program to read m students n subject marks and display
```

```
m=int(input("How many students?"))
n=int(input("How many subjects?"))
students=[]
for i in range(m):
    stud=[]
    for j in range(n):
        s=int(input("Marks:"))
        stud.append(s)
    students.append(stud)

print(students)
for stud in students:
    for s in stud:
        print(s,end=' ')
    print()

for stud in students:
    print(f'{stud}\t{sum(stud)}\t{sum(stud)/n:.2f}')
```

Output:

```
How many students?2
How many subjects?3
Marks:60
Marks:70
Marks:80
Marks:80
Marks:99
Marks:89
[[60, 70, 80], [80, 99, 89]]
60 70 80
80 99 89
[60, 70, 80]	210	70.00
[80, 99, 89]	268	89.33
>>>
```

Displays

Displays for lists, sets and dictionaries

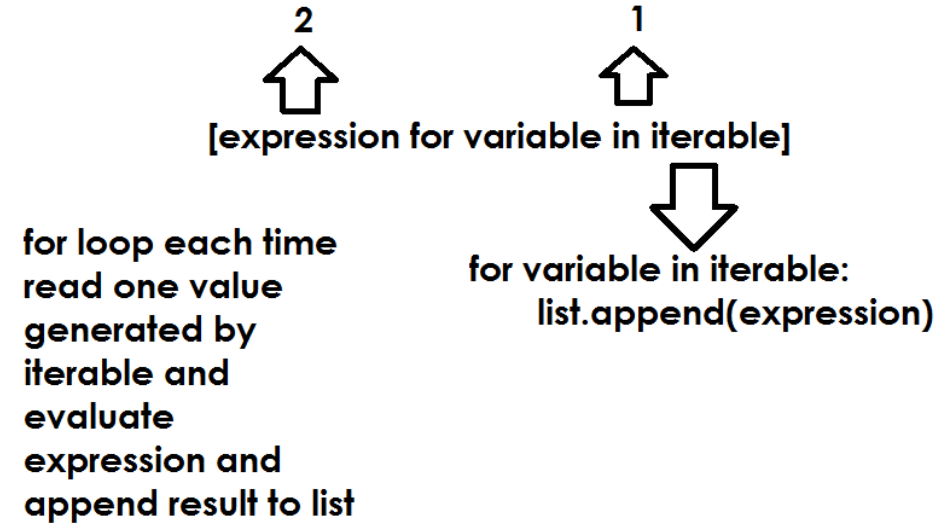
For constructing a list, a set or a dictionary Python provides special syntax called “displays”, each of them in two flavors:

- either the container contents are listed explicitly, or

- they are computed via a set of looping and filtering instructions, called a *comprehension*.

Syntax of list comprehension
Syntax-1: [expression for variable in iterable]
Syntax-2: [expression for variable in iterable if test]

Syntax-1: [expression for variable in iterable]



Example:
 # create a list with sqr all the numbers from 1 to 50

```
list1=[]
for num in range(1,51):
    list1.append(num**2)

print(list1)

list2=[num**2 for num in range(1,51)]
print(list2)
```

Output:

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324,
361, 400, 441, 484, 529, 576, 625, 676, 729, 784, 841, 900, 961, 1024,
1089, 1156, 1225, 1296, 1369, 1444, 1521, 1600, 1681, 1764, 1849, 1936,
2025, 2116, 2209, 2304, 2401, 2500]
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324,
361, 400, 441, 484, 529, 576, 625, 676, 729, 784, 841, 900, 961, 1024,
```

1089, 1156, 1225, 1296, 1369, 1444, 1521, 1600, 1681, 1764, 1849, 1936, 2025, 2116, 2209, 2304, 2401, 2500]

Example:

```
# input n values in list
# without comprehension
list1=[]
n=int(input("enter the value n"))
for i in range(n):
    ele=int(input("enter element"))
    list1.append(ele)

print(list1)

list2=[int(input("enter element")) for i in range(n)]
print(list2)
```

Output:

```
enter the value n5
enter element1
enter element2
enter element3
enter element4
enter element5
[1, 2, 3, 4, 5]
enter element1
enter element2
enter element3
enter element4
enter element5
[1, 2, 3, 4, 5]
>>>
```

Example:

```
# write a program to 3x3 matrix and display
# without comprehension
matrix=[]
for i in range(3):
    row=[]
    for j in range(3):
```

```
        row.append(int(input("enter value")))
    matrix.append(row)

print(matrix)

matrix1=[[int(input("enter value")) for j in range(3)] for i in range(3)]
print(matrix1)
```

Output:

```
enter value1
enter value2
enter value3
enter value4
enter value5
enter value6
enter value7
enter value8
enter value9
[[1, 2, 3], [4, 5, 6], [7, 8, 9]]
enter value1
enter value2
enter value3
enter value4
enter value5
enter value6
enter value7
enter value8
enter value9
[[1, 2, 3], [4, 5, 6], [7, 8, 9]]
>>>
```

 # adding two matrices

```
print("First Matrix")
matrix1=[[int(input()) for j in range(2)] for i in range(2)]
print("Second Matrix")
matrix2=[[int(input()) for j in range(2)] for i in range(2)]
matrix3=[[matrix1[i][j]+matrix2[i][j] for j in range(2)] for i in range(2)]
print(matrix1)
print(matrix2)
print(matrix3)
```

Output:
First Matrix
1
2
3
4
Second Matrix
5
6
7
8
[[1, 2], [3, 4]]
[[5, 6], [7, 8]]
[[6, 8], [10, 12]]
>>>