Date : 17/12/2025
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To-Do:
- Loops
- Data Structures

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LOOPS in Python :

We use loop to repeat a block of code for specific times.

1. **FOR loop**

For loop is used when the number of iteration is fixed.

Syntax: iterating over a list

```
for variable in sequence:
Statement
```

Example:

```
Colors = [“red”,”green”,”blue”,”purpel”]
For color in Colors:

        print(color)  # here color is variable that will iterate the
Colors list
```

Syntax: iterating over a string

```
for variable in str:
Statement
```

Example:

```
For x in “MAHEK”:
        print (x) #each letter will be printed separately
```

➔ **Range() Function:**

The range() function is used to generate a sequence of numbers.

Syntax	**Description**
● **range(n)**	**0 to n-1**

- **range(start,stop) start to stop-1**
- **range(start,stop,iteration) start and iterate then stop-1**

➔ **Nested for loop:**
A nested for loop is a loop inside another for loop.
The inner loop executes completely for every single iteration of the outer loop.

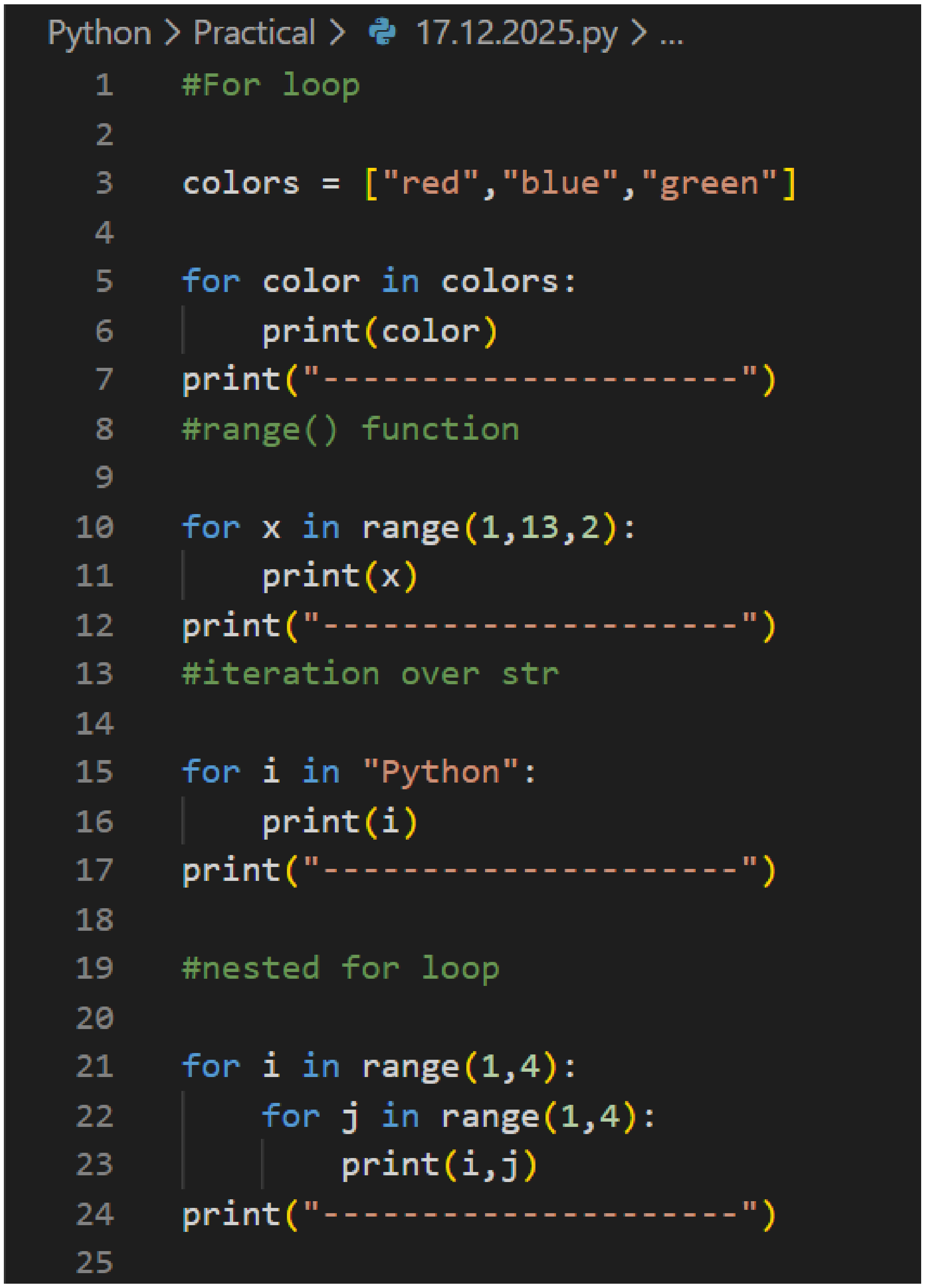
Mostly used in working with rows& columns, patterns, to handle tables

Syntax:

```
For outer_var in sequence:
    For inner_var in sequence:
        statement
```

Example:

```
For i in range(1,4):
    For j in range(1,4):
        print(i,j)
```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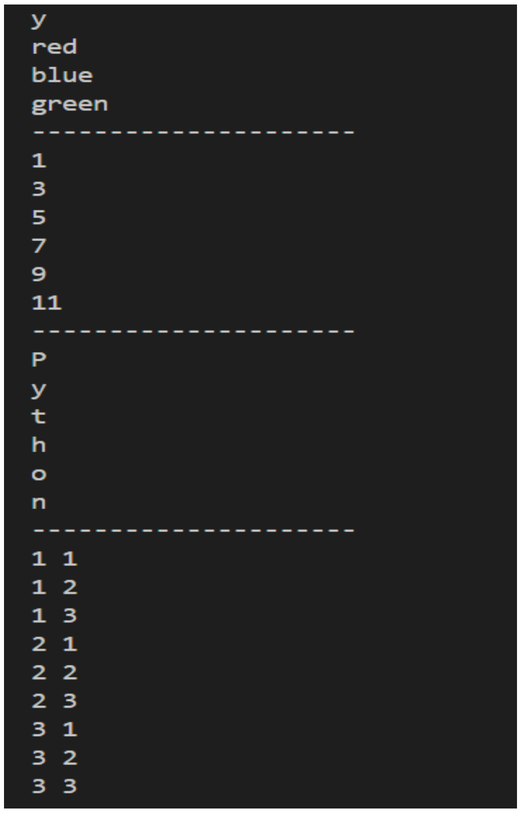
```python
#For loop

colors = ["red","blue","green"]

for color in colors:
    print(color)
print("--------------------")
#range() function

for x in range(1,13,2):
    print(x)
print("--------------------")
#iteration over str

for i in "Python":
    print(i)
print("--------------------")

#nested for loop

for i in range(1,4):
    for j in range(1,4):
        print(i,j)
print("--------------------")

```



```
y
red
blue
green
---------------------
1
3
5
7
9
11
---------------------
P
y
t
h
o
n
---------------------
1 1
1 2
1 3
2 1
2 2
2 3
3 1
3 2
3 3
```

2. **WHILE loop**
   A while loop executes a block of code until the given condition is true
   We use while loop when the iterations are not known.

   Syntax:

   ```
   While condition:
           statement
   ```

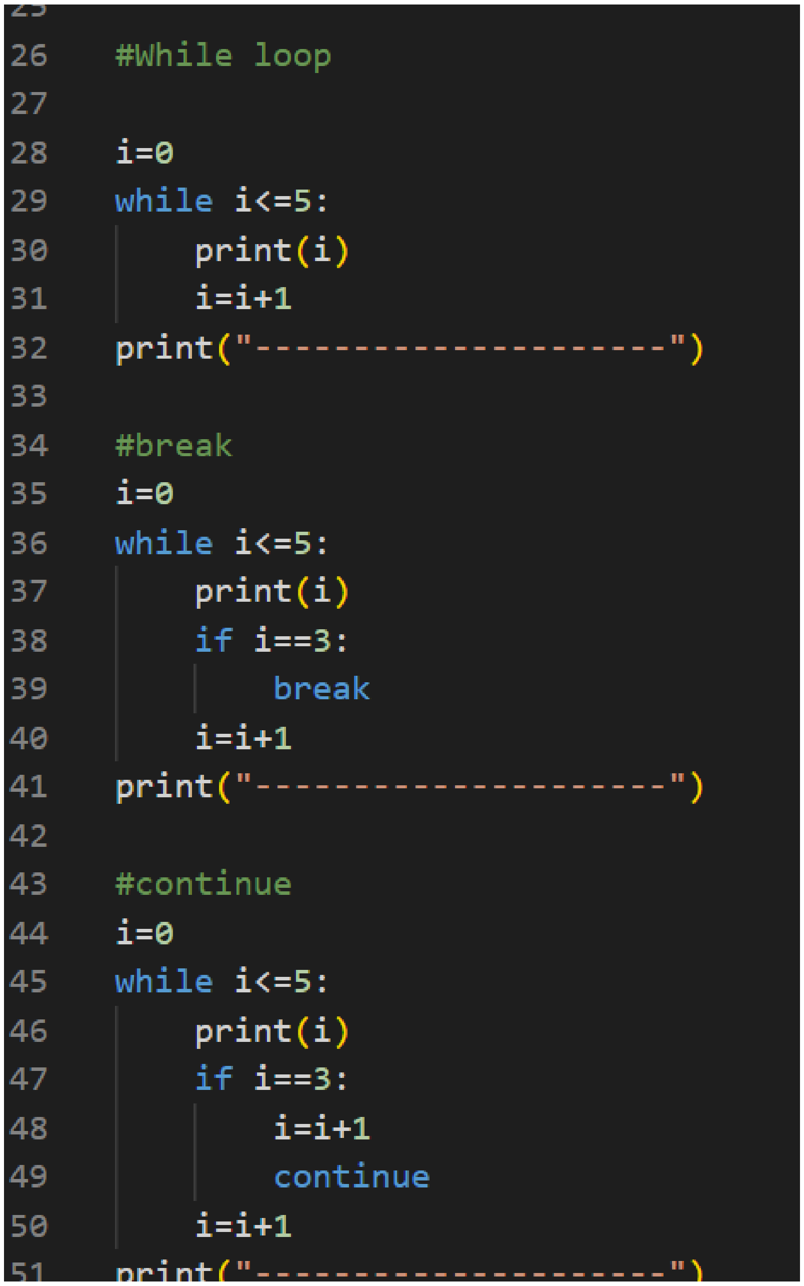
   Example:

   ```
   i=1
   While i<=5:
           print(i)
           i=i+1
   ```

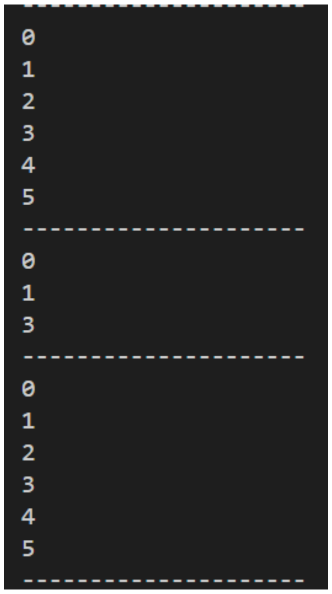
3. **LOOP CONTROLS**

   ➔ **Break: this statement is used to terminate the loop immediately(usually put inside a if)**
   ➔ **Continue: this statement skip the current iteration and moves to the next iteration of the loop(again usually put inside a if)**

➔ **Pass: this statement is used as a placeholder where a statement is syntactically required but no action is needed**



```python
#While loop

i=0
while i<=5:
    print(i)
    i=i+1
print("---------------------")

#break
i=0
while i<=5:
    print(i)
    if i==3:
        break
    i=i+1
print("---------------------")

#continue
i=0
while i<=5:
    print(i)
    if i==3:
        i=i+1
        continue
    i=i+1
print("---------------------")
```



```
--------------------
0
1
2
3
4
5
--------------------
0
1
3
--------------------
0
1
2
3
4
5
--------------------
```

DATA STRUCTURES of Python:

➔ **LIST:**

ordered(elements have index position)
Mutable (can make changes)
Allows duplicate values
Isko print karne for loop lagega coz indexed hai

Syntax:

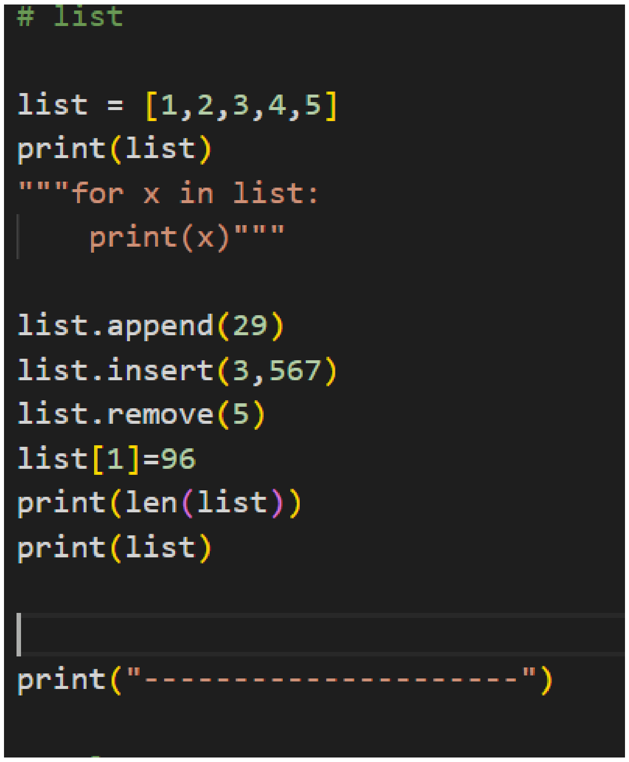
list_name= [element1, element2, element3]

Example:

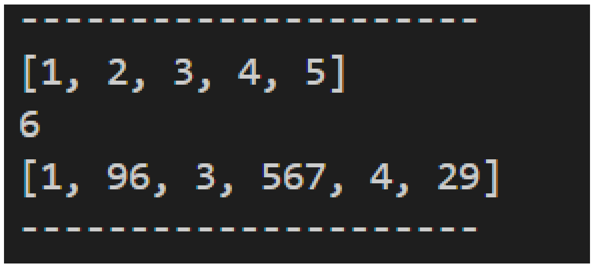
fruits=[“orange”,”apple”,”mangooo”]

Common Functions:

fruits.append(“pomogranet”) #add element at end of list
fruits.insert(2,“banana”) #adds at specific position
fruits.remove(4) #removes element
fruit[3] = “grape” #modify
len(fruits) # length of the list



```
# list

list = [1,2,3,4,5]
print(list)
"""for x in list:
    print(x)"""

list.append(29)
list.insert(3,567)
list.remove(5)
list[1]=96
print(len(list))
print(list)


print("--------------------")
```



```
---------------------
[1, 2, 3, 4, 5]
6
[1, 96, 3, 567, 4, 29]
---------------------
```

➔ **TUPLE:**

Ordered

Immutable(no changes can be made, therefore NO function here)
Allows duplicate values
Faster and more efficient than list
Isko print karne for loop lagega coz indexed hai

Syntax:

tuple_name=(element1, element2)

Example:

Vehicle = (“car”,”bike”,”truck”)

- **SET:**

Unordered
Mutable
Does not allow duplicate values
No indexing
Isko direct print kar sakte coz indexing ni hai

Syntax:

set_name= {ele1, ele2, ele3}

Example:

S ={1 ,2 ,3 ,3 ,5}
print(s)

Common Operations:

s.add(4) # this will add the elements, aur indexing ni hoti tho basically random kahi bhi add hoga
s.remove(2) # 2 element ko nikalega

- **DICTIONARY:**

Stores data in key: value format
Key must be unique
Values can be duplicate
Fast lookup

Syntax:

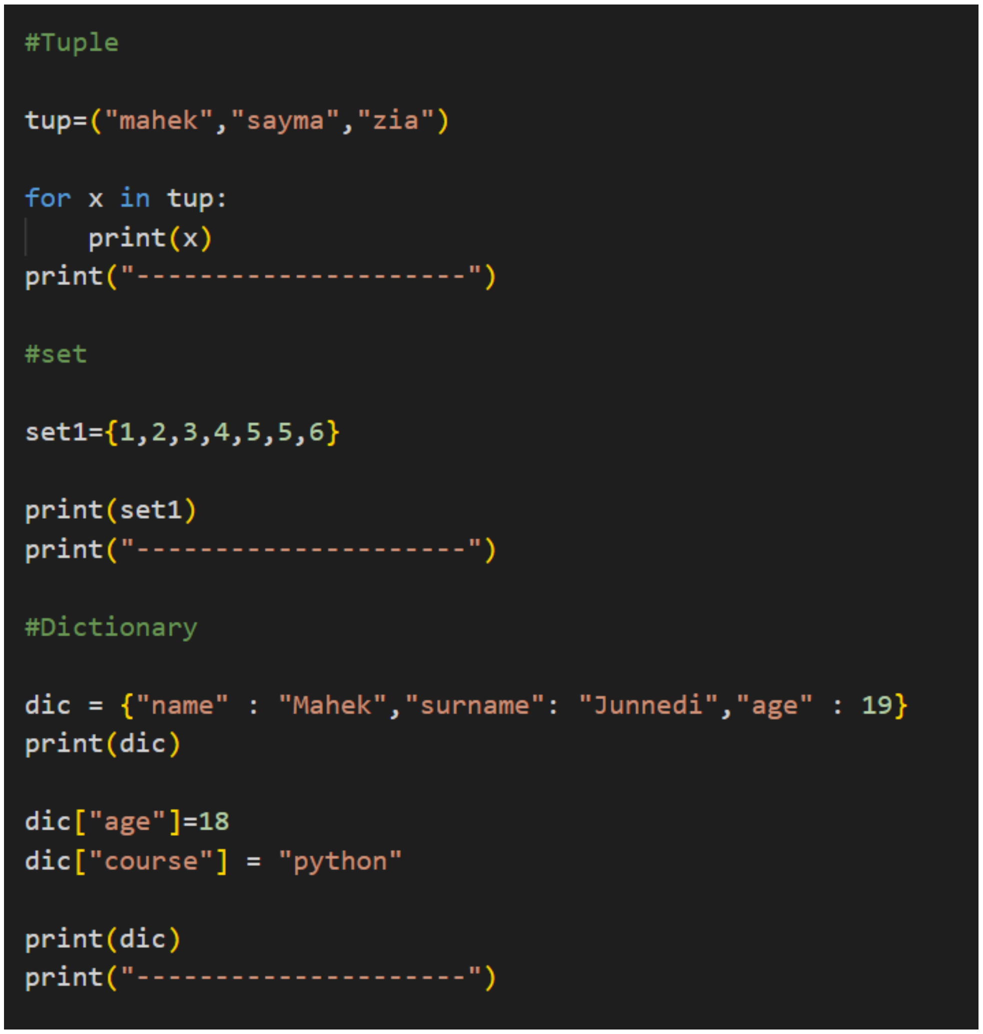
Dict_name = {key1: value1, key2: value2}

Example:

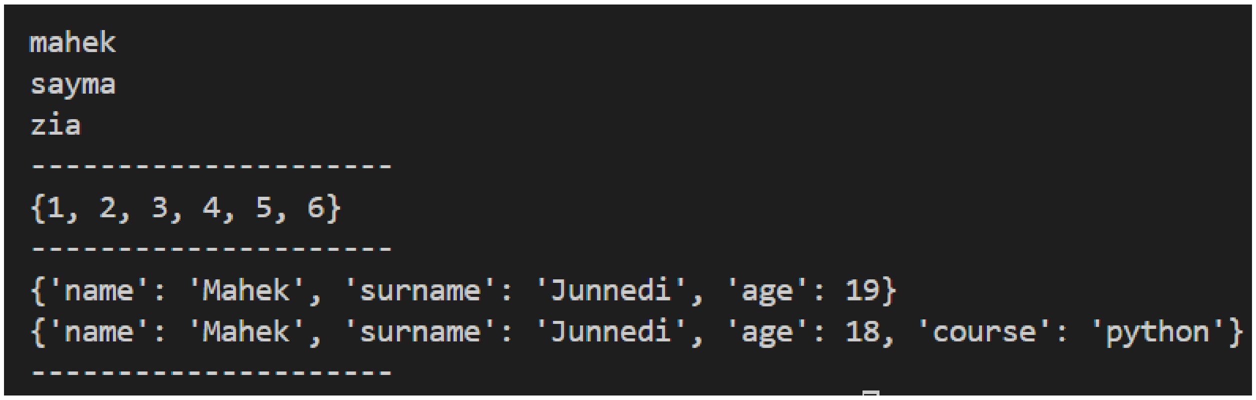
Student = { “name”: “mahek”, “surname”: “Junnedi”}

Common Operations:

Student[“name”] = “Zia” #update
Student[“age”] = 18 #add
Del Student[“name”]



```python
#Tuple

tup=("mahek","sayma","zia")

for x in tup:
    print(x)
print("---------------------")

#set

set1={1,2,3,4,5,5,6}

print(set1)
print("---------------------")

#Dictionary

dic = {"name" : "Mahek","surname": "Junnedi","age" : 19}
print(dic)

dic["age"]=18
dic["course"] = "python"

print(dic)
print("---------------------")
```



```
mahek
sayma
zia
---------------------
{1, 2, 3, 4, 5, 6}
---------------------
{'name': 'Mahek', 'surname': 'Junnedi', 'age': 19}
{'name': 'Mahek', 'surname': 'Junnedi', 'age': 18, 'course': 'python'}
---------------------
```