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## Mutable Data Structure - Dictionaries

- 1) Dictionaries are <sup>1</sup>mutable objects
- 2) dict object

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Raw NBConvert

## Mutable Data Structure - Dictionaries

- 1) Dictionaries are mutable objects
- 2) dict object
- 3) No indexing



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The screenshot shows a Jupyter Notebook interface. At the top, there's a toolbar with File, Edit, View, Insert, Cell, Kernel, Widgets, Help, Trusted, and Python 3 buttons. Below the toolbar is a menu bar with File, Edit, View, Insert, Cell, Kernel, Widgets, Help, Trusted, and Python 3. A navigation bar at the bottom includes icons for back, forward, search, and file operations. The main content area contains a section titled "Mutable Data Structure - Dictionaries" with the following text:

```
1) Dictionaries are mutable objects
2) dict object
3) No indexing
```



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### Mutable Data Structure - Dictionaries

- 1) Dictionaries are mutable objects
- 2) dict object
- 3) No indexing



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goudam  
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## Mutable Data Structure - Dictionaries

- 1) Dictionaries are mutable objects
- 2) dict object
- 3) No indexing
- 4) Keys and values

In [1]: `# Create an empty dictionary  
employees = {}  
print(employees)`

{}

In [ ]:

Pawan Kumar  
its good for its impactus



BITS Pilani  
Bharat Lalit Gauravayya  
World Class Engineering Program

9:10 AM 4/12/2020

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## Mutable Data Structure - Dictionaries

- 1) Dictionaries are mutable objects
- 2) dict object
- 3) No indexing
- 4) Keys and values

```
In [1]: # Create an empty dictionary
employees = {}
print(employees)

()
```

```
In [ ]: # Creating a dictionary with initial values
employees|
```



GALI SHIVA SHANKAR

Voice is clear and we are able to see him/her.

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2) dict object  
3) No indexing  
4) Keys and values

In [1]: # Create an empty dictionary  
employees = {}  
print(employees)  
()

In [2]: # Creating a dictionary with initial values  
employees = {'1111': "James", '2222': "Lucy"}  
print(employees)

In [ ]:

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1) Dictionaries are mutable objects  
2) dict object  
3) No indexing  
4) Keys and values

```
In [1]: # Create an empty dictionary
employees = {}
print(employees)

{}

In [2]: # Creating a dictionary with initial values
employees = {'1111' : "James", '2222' : "Lucy"}
print(employees)

{'1111': 'James', '2222': 'Lucy'}
```

In [ ]:

RABIL GUPTA

BITS Pilani  
Mumbai Campus

10:11 AM 4/13/2020

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Raw NBConvert

1) Dictionaries are mutable objects  
2) dict object  
3) No indexing  
4) Keys and values  
5) Key and its value are separated by a colon  
6) key-value pairs are separated by a comma

In [1]: # Create an empty dictionary  
employees = {}  
print(employees)  
{}

In [2]: # Creating a dictionary with initial values  
employees = {'1111': "James", '2222': "Lucy"}  
print(employees)  
{'1111': 'James', '2222': 'Lucy'}

In [ ]:

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Mumbai Campus

9:11 AM 4/3/2020

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In [3]: # Add a value  
employees['3333'] = "Robert"  
print(employees)  
  
('1111': 'James', '2222': 'Lucy', '3333': 'Robert')

In [4]: # Modifying an existing value  
employees['1111'] = "Kelly"  
print(employees)  
  
('1111': 'Kelly', '2222': 'Lucy', '3333': 'Robert')

In [5]: print(employees['2222'])  
Lucy

In [ ]:

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In [7]: `# Accessing dictionary elements using get() method  
print(employees.get('1111'))`

Kelly

In [8]: `print(employees.get('4444'))`

None

In [ ]: `#Loop through a dictionary`

Mail Assessment Demo

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In [8]:

```
print(employees.get('AAA'))
```

Name:

```
#Loop through a dictionary
for <key> in <dict object>:
    statements
    statements
```

In [9]:

```
for key in employees:
    print(key)
```

111  
222  
333

In [10]:

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#Loop through a dictionary  
for <key> in <dict object>:  
 statements  
 statements

In [12]: for key in employees:  
 print(key)

1111  
2222  
3333

In [ ]: for key in employees:  
 print(key, " : ", employees[key])

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1111  
2222  
3333

In [13]: `for key in employees:  
 print(key, " : ", employees[key])`

1111 : Kelly  
2222 : Lucy  
3333 : Robert

In [14]: `employees.keys()`

Out[14]: dict\_keys(['1111', '2222', '3333'])

In [ ]: |

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\*\*\*\*

2222

3333

```
In [13]: for key in employees:  
    print(key, " : ", employees[key])
```

1111 : Kelly

2222 : Lucy

3333 : Robert

```
In [14]: employees.keys()
```

```
Out[14]: dict_keys(['1111', '2222', '3333'])
```

```
In [ ]:
```

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In [13]: `for key in employees:  
 print(key, " : ", employees[key])`

1111 : Kelly  
2222 : Lucy  
3333 : Robert

In [14]: `employees.keys()`

Out[14]: `dict_keys(['1111', '2222', '3333'])`

In [15]: `for key in employees.keys():  
 print(key)`

1111  
2222  
3333

In [ ]:

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In [19]: `for key in employees.keys():  
 print(key)`

1111  
2222  
3333

In [16]: `#looping through dictionary values  
employees.values()`

In [17]: `dict_values(['Amy', 'Lucy', 'Robert'])`

In [18]: `for value in employees.values():  
 print(value)`

Amy  
Lucy  
Robert

In [19]: `employees.values`

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[ ] + ↗ ↘ ⌂ ⌂ ⌂ ⌂ ⌂ ⌂ ⌂ ⌂ ⌂ Run Code

3333

In [16]: *#Looping through dictionary values*  
employees.values()

Out[16]: dict\_values(['Kelly', 'Lucy', 'Robert'])

In [19]: for value in employees.values():  
 print(value)

Kelly  
Lucy  
Robert

In [ ]: employees.items()

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employees.values()

Out[16]: dict\_values(['Kelly', 'Lucy', 'Robert'])

In [19]: for value in employees.values():  
 print(value)

Kelly  
Lucy  
Robert

In [21]: employees.items()

Out[21]: dict\_items([('1111', 'Kelly'), ('2222', 'Lucy'), ('3333', 'Robert')])

In [ ]:

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Kelly  
Lucy  
Robert

In [21]: employees.items()

Out[21]: dict\_items([('1111', 'Kelly'), ('2222', 'Lucy'), ('3333', 'Robert')])

In [24]: for item in employees.items():  
 print(item)

('1111', 'Kelly')  
('2222', 'Lucy')  
('3333', 'Robert')

In [ ]: for item in employees.items():  
 print()



VINEET KUMAR  
for (x, y) in employees.items():  
 print(x, y)  
 input()

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In [24]: `for item in employees.items():  
 print(item)  
  
('1111', 'Kelly')  
('2222', 'Lucy')  
('3333', 'Robert')`

In [25]: `for item in employees.items():  
 print(item[0], ' : ', item[1])  
  
1111 : Kelly  
2222 : Lucy  
3333 : Robert`

In [ ]: `# Number of elements in the dictionary`



Smita Dhankar Kumar Mehta  
Can a computer think again?  
@smitamehta

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In [25]: `for item in employees.items():  
 print(item[0], ': ', item[1])`

1111 : Kelly  
2222 : Lucy  
3333 : Robert

In [26]: `t1 = (3, 4)  
# 0 1  
  
print(t1[0])`

3

In [ ]: |

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In [24]: `for item in employees.items():  
 print(item)  
  
('1111', 'Kelly')  
('2222', 'Lucy')  
('3333', 'Robert')`

In [25]: `for item in employees.items():  
 print(item[0], ': ', item[1])  
  
1111 : Kelly  
2222 : Lucy  
3333 : Robert`

In [26]: # Number of items in employees  
len(employees)

Out[27]: 3

In [ ]:

MUTHARASAN R · mutharasan.r@bits-pilani.ac.in · GitHub · LinkedIn

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1111 : Kelly  
2222 : Lucy  
3333 : Robert

In [27]: # Number of items in a dictionary  
len(employees)

Out[27]: 3

In [28]: #remove an element  
del employees['3333']  
  
print(employees)

{'1111': 'Kelly', '2222': 'Lucy'}

In [ ]:



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Cell toolbar icons: New, Open, Save, Print, Run, Stop, Clear, Code, Cell Type, Cell Style.

Cell content:  
In [27]: `# Number of items in a dictionary  
len(employees)`  
Out[27]: 3

In [28]: `#remove an element  
del employees['3333']  
  
print(employees)`  
Out[28]: `{'1111': 'Kelly', '2222': 'Lucy'}`

In [ ]:



CHANDRESH PRATAP SINGH  
How can it has duplicate inputs?

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Out[27]: 3

In [28]: 

```
#remove an element
del employees['3333']

print(employees)

{'1111': 'Kelly', '2222': 'Lucy'}
```

In [29]: 

```
key = '4444'

if key in employees:
    del employees[key]
```

In [ ]:



SHUBHAM RAMESH COOKALE  
CSE MC SEMESTER-II  
Student

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In [28]: `#remove an element  
del employees['3333']  
  
print(employees)  
  
{'1111': 'Kelly', '2222': 'Lucy'}`

In [29]: `key = '4444'  
  
if key in employees:  
 del employees[key]`

In [31]: `print ('1111' in employees) 1`  
|  
True

In [ ]:

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In [32]:

```
def employees[key]
```

```
In [32]: print ('1111' in employees)
print('4444' not in employees)
```

True  
True

In [ ]:

```
# Number of corona cases
coronaData = {
    'Telangana' : 100,
    'Maharashtra' : 400,
    'Kerala' : 300,
    'Karnataka' : 200
}
```



CHANDRESH PRATAP SINGH  
It can have other set or other data structures.  
Imported

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```
In [32]: print ('1111' in employees)
          print('4444' not in employees)
```

```
True
True
```

```
In [33]: # Number of corona cases
coronaData = [
    'Telangana' : 100,
    'Maharashtra' : 400,
    'Kerala' : 300,
    'Karnataka' : 200
]
```

```
In [ ]: coronaData = [
    'Telangana' : 100,
    'Maharashtra' : 400,
    'Kerala' : 300,
    'Karnataka' : 200
]
```



SHAILENDRA PRASHAR

cannot update the values with next
print(data)
because

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In [32]:

```
print ('1111' in employees)
print('4444' not in employees)
```

True  
True

In [33]:

```
# Number of corona cases
coronaData = [
    'Telangana' : 100,
    'Maharashtra' : 400,
    'Kerala' : 300,
    'Karnataka' : 200
}
```

In [ ]:

```
coronaData = [
    'Telangana' : 100,
    'Maharashtra' : 400,
    'Kerala' : 300,
    'Karnataka' : 200
}
```

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Run Code

```
'Kerala' : 300,  
'Karnataka' : 200  
}  
  
In [34]: # Number of cases and deaths  
coronaData = {  
    'Telangana' : [100, 2],  
    'Maharashtra' : [400, 10],  
    'Kerala' : [300,15],  
    'Karnataka' : [200, 5]  
}  
  
In [35]: print(coronaData['Maharashtra'])  
[400, 10]  
  
In [ ]:
```

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In [39]: student1 = [  
 '101' : ['James', 28, 'CSIS'],  
 '201' : ['Kalpana', 30, 'ECE']  
]

In [40]: student2 = [  
 '401' : ['Priyanka', 35, 'Management'],  
 '501' : ['Kishore', 25, 'CIVIL']  
]

In [41]: student1.update(students2)  
  
student1

---

NameError: name 'students2' is not defined

Traceback (most recent call last)  
<ipython-input-41-4098d012553c> in <module>  
----> 1 student1.update(students2)  
 2  
 3 student1

File -> New -> Python

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In [40]: student2 = {  
 '401' : ['Priyanka', 35, 'Management'],  
 '501' : ['Kishore', 25, 'CIVIL']  
}

In [42]: student1.update(student2)  
  
student1

Out[42]: {'101': ['James', 20, 'CSIS'],  
 '201': ['Kalpana', 30, 'ECE'],  
 '401': ['Priyanka', 35, 'Management'],  
 '501': ['Kishore', 25, 'CIVIL']}

In [ ]: person = {  
 'Name' : 'Zebra',  
 'Height' : 12 \* 5 + 10  
}

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Python 3



student1

```
Out[42]: {'101': ['James', 20, 'CSIS'],
           '201': ['Kalpana', 30, 'ECE'],
           '401': ['Priyanka', 35, 'Management'],
           '501': ['Kishore', 25, 'CIVIL']}
```

```
In [43]: person = {
    'Name' : 'Zebra',
    'Height' : 12 * 5 + 10
}

print("Height of the person : ", person['Height'])
```

```
Height of the person :  70
```

```
In [ ]: grades = {
    |
}
```

HATIMUDUR RUPAK RAJENDRA  
USHAPlease do not ask questions now, it is  
disturbing all of us including the  
professor.  
Thanks.



Logout

## jupyter Untitled Last Checkpoint: 10 minutes ago (unsaved changes)

A horizontal toolbar with various icons for file operations like New, Open, Save, Print, Run, Kernel, etc.

```
Name : 'Zebra',
Height : 12 * 5 + 10
}
```

```
print("Height of the person : ", person['Height'])
```

```
Height of the person : 70
```

```
In [44]: grades = {
    'Smitha' : [85, 92, 94, 88],
    'Bhaskar' : [86, 95, 78, 85]
}
```

```
print(grades['Smitha'])
```

```
[85, 92, 94, 88]
```

```
In [ ]: #Average grade for Smitha
```

VUPPALA SHARAN

It's same as update method but it updates the values of key with the object present in update function instead.

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Run Cell Code

```
'Name' : 'Zebra',
'Height' : 12 * 5 + 10
}

print("Height of the person : ", person['Height'])

Height of the person : 70
```

In [44]:

```
grades = {
    'Smitha' : [85, 92, 94, 88],
    'Bhaskar' : [86, 95, 78, 85]
}

print(grades['Smitha'])

[85, 92, 94, 88]
```

In [ ]:

```
#Average grade for Smitha

x = sum(grades['Smitha'])
y = len(grades['Smitha'])

|
```

VUPPALA SMARAN  
A = ('1','abc','2','def','3','ghi')  
B = ('1','2','3')  
B.update(A)  
print(B)  
B.pop()

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```
'Smitha' : [85, 92, 94, 88],  
'Bhaskar' : [86, 95, 78, 85]  
}  
  
print(grades['Smitha'])  
[85, 92, 94, 88]
```

In [45]: #Average grade for Smitha  
  
x = sum(grades['Smitha'])  
y = len(grades['Smitha'])  
  
print("Avg grade for Smitha: ", x/y)  
Avg grade for Smitha: 89.75

In [ ]:

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In [45]: #Average grade for Smitha  
x = sum(grades['Smitha'])  
y = len(grades['Smitha'])  
  
print("Avg grade for Smitha: ", x/y)

Avg grade for Smitha: 89.75

### Nested Dictionaries

In [ ]: employeeData = {  
}  
I

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In [45]: #Average grade for Smitha

```
x = sum(grades['Smitha'])
y = len(grades['Smitha'])

print("Avg grade for Smitha: ", x/y)
```

Avg grade for Smitha: 89.75

### Nested Dictionaries

In [ ]: employeeData = {

```
'Name' : {'First' : 'Sanjay', 'Name' : 'Shukla'} ,
'JobTitle' : ['Developer', 'Manager'],
'City' : 'Pune'
'Salary' |
}
```

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In [48]: print(employeeData)

```
{'Name': {'First': 'Sanjay', 'Name': 'Shukla'}, 'JobTitle': ['Developer', 'Manager'], 'City': 'Pune', 'Salary': 100000.0}
```

In [49]: employeeData['Name']

Out[49]: {'First': 'Sanjay', 'Name': 'Shukla'}

In [50]: employeeData.get('Name')

Out[50]: {'First': 'Sanjay', 'Name': 'Shukla'}

In [ ]:

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In [54]: employeeData.get('Name')

Out[54]: {'First': 'Sanjay', 'Last': 'Shukla'}

In [55]: employeeData['Name']['Last']

Out[55]: 'Shukla'

In [56]: employeeData['Name'].get('Last')

Out[56]: 'Shukla'

In [57]: employeeData['JobTitle']

Out[57]: ['Developer', 'Manager']

In [ ]:

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In [55]: employeeData['Name']['Last']  
Out[55]: 'Shukla'

In [56]: employeeData['Name'].get('Last')  
Out[56]: 'Shukla'

In [57]: employeeData['JobTitle']  
Out[57]: ['Developer', 'Manager']

In [58]: employeeData['JobTitle'].append("Systems Analyst")

In [ ]: employee

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In [57]: employeeData['JobTitle']

Out[57]: ['Developer', 'Manager']

In [58]: employeeData['JobTitle'].append("Systems Analyst")

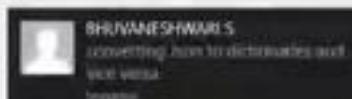
In [59]: employeeData['JobTitle']

Out[59]: ['Developer', 'Manager', 'Systems Analyst']

In [60]: a = {100 : None}  
print(a)

{100: None}

In [ ]:



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File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [57]: employeeData['JobTitle']

Out[57]: ['Developer', 'Manager']

In [58]: employeeData['JobTitle'].append("Systems Analyst")

In [59]: employeeData['JobTitle']

Out[59]: ['Developer', 'Manager', 'Systems Analyst']

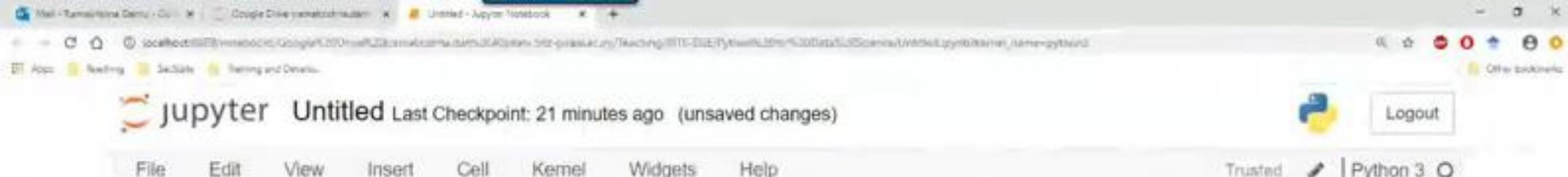
In [60]: a = {100 : None}  
print(a)

{100: None}

In [ ]: student = {  
|  
| }  
|



SAKRAN S  
When we append, why is it opt.  
replacing the file  
Important



```
In [44]: grades = {
    'Smitha' : [85, 92, 94, 88],
    'Bhaskar' : [86, 95, 78, 85]
}

print(grades['Smitha'])

[85, 92, 94, 88]
```

```
In [45]: #Average grade for Smitha

x = sum(grades['Smitha'])
y = len(grades['Smitha'])

print("Avg grade for Smitha: ", x/y)

Avg grade for Smitha: 89.75
```

## Nested Dictionaries

```
In [51]: employeeData = {
    'Name' : {'First' : 'Sanjay', 'Last' : 'Shukla'} ,
    'JobTitle' : ['Developer', 'Manager'],
```



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Code

```
Bhaskar : [80, 95, 78, 85]
}

print(grades['Smitha'])

[85, 92, 94, 88]
```

In [45]: #Average grade for Smitha

```
x = sum(grades['Smitha'])
y = len(grades['Smitha'])

print("Avg grade for Smitha: ", x/y)

Avg grade for Smitha: 89.75
```

## Nested Dictionaries

In [51]: employeeData = {

```
'Name' : {'First' : 'Sanjay', 'Last' : 'Shukla'} ,
'JobTitle' : ['Developer', 'Manager'],
'City' : 'Pune',
'Salary' : 100000.00
}
```

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In [58]: `employeeData['JobTitle'].append("Systems Analyst")`

In [59]: `employeeData['JobTitle']`

Out[59]: `['Developer', 'Manager', 'Systems Analyst']`

In [60]: `a = {100 : None}`  
`print(a)`  
`{100: None}`

In [ ]: `grades = {`  
 `'Smitha' : [85, 92, 94, 88],`  
 `'Bhaskar' : [86, 95, 78, 85]`  
}]



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Out[57]: ['Developer', 'Manager']

In [58]: employeeData['JobTitle'].append("Systems Analyst")

In [59]: employeeData['JobTitle']

Out[59]: ['Developer', 'Manager', 'Systems Analyst']

In [60]: a = {100 : None}  
print(a)

{100: None}

In [ ]: studentGrades = {  
 ('Smitha', 'Kolluri') : [85, 92, 94, 88],  
 ('Bhaskar', 'Tiwari') : [86, 95, 78, 85]  
}

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In [55]: employeeData['Name'].get('Last')

Out[55]: 'Shukla'

In [56]: employeeData['Name'].get('Last')

Out[56]: 'Shukla'

In [57]: employeeData['JobTitle']

Out[57]: ['Developer', 'Manager']

In [58]: employeeData['JobTitle'].append("Systems Analyst")

In [59]: employeeData['JobTitle']

Out[59]: ['Developer', 'Manager', 'Systems Analyst']

In [60]: a = {100 : None}  
print(a)

{100: None}

In [61]: studentGrades = {

SOWMINA S tuples are mutable and keys should be immutable

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In [58]: employeeData['JobTitle'].append("Systems Analyst")

In [59]: employeeData['JobTitle']

Out[59]: ['Developer', 'Manager', 'Systems Analyst']

In [60]: a={100 : None}  
print(a)

{100: None}

In [ ]: studentGrades = {  
 ('Smitha', 'Kolluri') : [85, 92, 94, 89],  
 ('Bhaskar', 'Tiwari') : [86, 95, 78, 85]  
}

PRAVEEN KUMAR R  
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In [59]: `employeeData['JobTitle']`

Out[59]: `['Developer', 'Manager', 'Systems Analyst']`

In [60]: `a = {100 : None}`  
`print(a)`  
`{100: None}`

In [ ]: `studentGrades = {`  
 `('Smitha', 'Kolluri') : [85, 92, 94, 88],`  
 `('Bhaskar', 'Tiwari') : [86, 95, 78, 85]`  
}

In [ ]: |

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avg grade for switcher --> 69.69

## Nested Dictionaries

```
In [51]: employeeData = {  
    'Name': {'First': 'Sanjay', 'Last': 'Shukla'},  
    'JobTitle': ['Developer', 'Manager'],  
    'City': 'Pune',  
    'Salary': 100000  
}
```

```
In [52]: print(employeeData)  
{'Name': {'First': 'Sanjay', 'Last': 'Shukla'}, 'JobTitle': ['Developer', 'Manager'], 'City': 'Pune',  
'Salary': 100000}
```

```
In [53]: employeeData['Name']
```

```
Out[53]: {'First': 'Sanjay', 'Last': 'Shukla'}
```

```
In [54]: employeeData.get('Name')
```

```
In [54]: {'First': 'Sanjay', 'Last': 'Shukla'}
```

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In [ ]: studentGrades = {  
 ('Smitha', 'Kolluri') : [85, 92, 94, 88],  
 ('Bhaskar', 'Tiwari') : [86, 95, 78, 85]  
}

In [61]: for key in employeeData:  
 print(key)

Name  
JobTitle  
City  
Salary

In [ ]: |





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In [ ]: studentGrades = {  
 ('Smitha', 'Kolluri') : [85, 92, 94, 88],  
 ('Bhaskar', 'Tiwari') : [86, 95, 78, 85]  
}

In [61]: for key in employeeData:  
 print(key)

Name  
JobTitle  
City  
Salary

In [ ]: t1 = (1, 1.5, "Java", [4,8,2], True)  
t1

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In [ ]: studentGrades = {  
 ('Smitha', 'Kolluri') : [85, 92, 94, 88],  
 ('Bhaskar', 'Tiwari') : [86, 95, 78, 85]  
}

In [61]: for key in employeeData:  
 print(key)

Name  
JobTitle  
City  
Salary

In [ ]: t1 = (1, 1.5, "Java", [4,8,2], True)  
t1

In [ ]: a = [1,2,3]



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Name  
JobTitle  
City  
Salary

In [ ]: t1 = (1, 1.5, "Java", [4,8,2], True)  
t1

In [62]: a = [1,2,3]  
print(a)  
  
a[1] = 'Python'  
print(a)

[1, 2, 3]  
[1, 'Python', 3]

In [ ]:



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In [62]:

```
a = [1,2,3]
print(a)

a[1] = 'Python'
print(a)
```

[1, 2, 3]  
[1, 'Python', 3]

In [63]:

```
t1 = (1,2,3)
print(t1)

t1[1] = 'Python'
print(t1)
```

(1, 2, 3)

---

TypeError Traceback (most recent call last)  
<ipython-input-63-9fe58f549a82> in <module>  
 2 print(t1)  
 3  
----> 4 t1[1] = 'Python'

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You have not yet received high  
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TypeError: 'tuple' object does not support item assignment

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In [ ]: `t1 = (1, 1.5, "Java", [4,8,2], True)`  
`t1`

In [62]: `a = [1,2,3]`  
`print(a)`  
  
`a[1] = 'Python'`  
`print(a)`  
  
`[1, 2, 3]`  
`[1, 'Python', 3]`

In [63]: `t1 = (1,2,3)`  
`print(t1)`  
  
`t1[1] = 'Python'`  
`print(t1)`  
  
`(1, 2, 3)`

-----  
**TypeError** Traceback (most recent call last)  
<ipython-input-63-9fe58f549a82> in <module>  
 2 print(t1)  
 3



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In [63]:

```
t1 = (1,2,3)
print(t1)

t1[1] = 'Python'
print(t1)

(1, 2, 3)

-----
TypeError Traceback (most recent call last)
<ipython-input-63-9fe58f549a82> in <module>
      2 print(t1)
      3
----> 4 t1[1] = 'Python'
      5 print(t1)

TypeError: 'tuple' object does not support item assignment
```

In [ ]:

```
t1 = (1, 1.5, "Java", [4,8,2], True)
print(t1)

t1[3][1] = 'Python'
```

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In [1]: `x = "Programming is fun!!!"`  
`print(x)`  
Programming is fun!!!

In [2]: `x = 4.5`  
`type(x)`

Out[2]: `float`

### Functions from other modules

In [ ]: |

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In [2]: `x = 4.5  
type(x)`

Out[2]: float

## Functions from other modules

In [3]: `import math  
  
x = 5  
  
print("Cube of x = ", math.pow(x,3))`

Cube of x = 125.0

In [ ]: |

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Functions from other modules

In [3]: `import math  
x = 5  
print("Cube of x = ", math.pow(x,3))`

Cube of x = 125.0

In [4]: `from math import sqrt  
print("Square root of x = ", sqrt(x))`

Square root of x = 2.23606797749979

In [ ]:



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x = 5  
print("Cube of x = ", math.pow(x,3))  
Cube of x = 125.0

In [4]: from math import sqrt  
print("Square root of x = ", sqrt(x))  
Square root of x = 2.23606797749979

## User-defined functions

In [ ]:

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Square root of x = 2.23606797749979

## User-defined functions

```
In [5]: # Function without any input or output (nothing out of the function)
def displayMessage():
    message = "COVID-19: Please stay home unless it's extremely important"

    print("=" * len(message))
    print(message)
    print("=" * len(message))
```

```
In [ ]:
```

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Run C Code

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In [8]: # Function computes average of a list of numbers  
# Function accepts a list

```
def computeAvg(numList):
    count = len(numList)
    total = sum(numList)

    average = total/count

    print("Average = %.2f" %average)
```

In [ ]: #Call function

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In [8]: # Function computes average of a list of numbers  
# Function accepts a list

```
def computeAvg(numList):  
  
    count = len(numList)  
    total = sum(numList)  
  
    average = total/count  
  
    print("Average = %.2f" %average)
```

In [9]: #Call function using anonymous List  
computeAvg([2,3,4])

Average = 3.00

In [ ]:

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Code Run Cell C Cell

In [8]: *# Function computes average of a list of numbers  
# Function accepts a list*

```
def computeAvg(numList):
    count = len(numList)
    total = sum(numList)

    average = total/count

    print("Average = %.2f" %average)
```

In [9]: *#Call function using anonymous List*  
computeAvg([2,3,4])

Average = 3.00

In [10]: computeAvg([1.2, 2.5, 4.3])

Average = 2.67

In [11]: x = [1,2,3]
computeAvg(x)



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In [9]: #Call function using anonymous List  
computeAvg([2,3,4])  
  
Average = 3.00

In [10]: computeAvg([1.2, 2.5, 4.3])  
  
Average = 2.67

In [11]: x = [1,2,3]  
computeAvg(x)  
  
Average = 2.00

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Average = 2.00

### Functions that accept and return values

```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

In [ ]:

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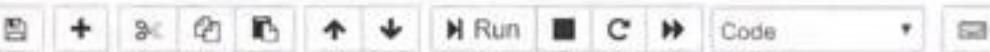


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```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

```
In [1]: x = int(input("Enter a number: "))
print(x)
```

```
In [ ]:
```

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### Functions that accept and return values

```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

```
In [*]: x = int(input("Enter a number: "))

print("Factorial of x = ", computeFactorial(x))
```

Enter a number: 

In [ ]:

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## Functions that accept and return values

```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

```
In [15]: x = int(input("Enter a number: "))

print("Factorial of x = ", computeFactorial(x))

Enter a number: 5
Factorial of x = 120
```

In [ ]:

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### Functions that accept and return values

```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

```
In [15]: x = int(input("Enter a number: "))

print("Factorial of x = ", computeFactorial(x))

Enter a number: 5
Factorial of x =  120
```

```
In [ ]:
```

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Instructor

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## Functions that accept and return values

```
In [12]: def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

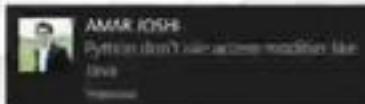
    else:
        num *= computeFactorial(num-1)
    |
    return num
```

```
In [15]: x = int(input("Enter a number: "))

print("Factorial of x = ", computeFactorial(x))
```

```
Enter a number: 5
Factorial of x = 120
```

```
In [ ]:
```



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In [12]:

```
def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

In [15]:

```
#get user input
x = int(input("Enter a number: "))

#call factorial function
fact = computeFactorial(x)

|
print("Factorial of x = ", computeFactorial(x))
```

Enter a number: 5  
Factorial of x = 120

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Functions that accept and return values

In [12]:

```
def computeFactorial(num):
    if (num == 0 or num == 1):
        num = 1

    else:
        num *= computeFactorial(num-1)

    return num
```

In [15]:

```
#get user input
x = int(input("Enter a number: "))

#call factorial function
# Values passed to a function are called arguments
|
fact = computeFactorial(x) # x is called an argument

#display output
print("Factorial of x = ", fact)
```

Enter a number: 5  
Factorial of x = 120

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fact = computeFactorial(x) # x is called an argument  
#display output  
print("Factorial of x = ", fact)  
Enter a number: 5  
Factorial of x = 120

In [ ]: # Function to return multiple values  
def findMinMax (numList):  
  
 max = numList[0]  
 min = numList[0]  
  
 for num in numList:  
  
 if num > max:  
 max = num  
  
 if num < min:  
 min = num  
  
 return max, min



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```
max = numList[0]
min = numList[0]

for num in numList:
    if num > max:
        max = num # Replace maximum

    for num in numList:
        if num < min:
            min = num # Replace minimum

return min, max
```

In [17]: *#Call findMinMax function*

```
x, y = findMinMax([2,8,5])
print("Min and Max are: ", x, y)
```

Min and Max are: 2 8

**Variable scope**

PRASHANT LAKHANPAL

What does 'return' do? If we do not put the statement 'return min, max' then will there be an error? imports.

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max = numList[0]  
min = numList[0]

for num in numList:  
 if num > max:  
 max = num # Replace maximum

for num in numList:  
 if num < min:  
 min = num # Replace minimum

return min, max

In [17]: #Call findMinMax function  
  
x, y = findMinMax([2,8,5])  
  
print("Min and Max are: ", x, y)

Min and Max are: 2 8

### Variable scope

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In [17]: #Call findMinMax function  
x, y = findMinMax([2,8,5])  
print("Min and Max are: ", x, y)  
Min and Max are: 2 8

Variable scope

In [ ]: num = 5.6  
  
def displayNumber(val):  
 print("Local number in function: ", val)  
 print("Global number in function: ", num)  
  
displayNumber(2.5)

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In [17]: `#CALL findMinMax function`

`x, y = findMinMax([2,8,5])`

`print("Min and Max are: ", x, y)`

Min and Max are: 2 8

## Variable scope

In [ ]: `num = 5.6`

`#Namespace`

`def displayNumber(val):`

`print("Local number in function: ", val)`

`print("Global number in function: ", num)`

`displayNumber(2.5)`

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Variable scope

```
In [18]: num = 5.6

#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    print("Global number in function: ", num)
    I

displayNumber(2.5)

Local number in function:  2.5
Global number in function:  5.6
```

In [ ]:

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## Variable scope

In [19]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    print("Global number in function: ", num)

    num = 8.5

displayNumber(2.5)
```

Local number in function: 2.5

-----

UnboundLocalError

Traceback (most recent call last)

```
<ipython-input-19-ae8041794f35> in <module>
      10     num = 8.5
      11
----> 12 displayNumber(2.5)
```

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In [20]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    print("Global number in function: ", num)

    global num

    num = 8.5

displayNumber(2.5)
```

File "&lt;ipython-input-20-f2030f267501&gt;", line 13

SyntaxError: name 'num' is used prior to global declaration

In [ ]:

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In [20]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    global num

    print("Global number in function: ", num)
    num = 8.5

displayNumber(2.5)
```

File "<ipython-input-20-f2030f267501>", line 13

SyntaxError: name 'num' is used prior to global declaration

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In [21]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    global num

    print("Global number in function: ", num)

num = 8.5
displayNumber(2.5)
```

Local number in function: 2.5  
Global number in function: 5.6

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In [21]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    global num

    print("Global number in function: ", num)

    num = 8.5
    print

displayNumber(2.5)

Local number in function: 2.5
Global number in function: 5.6
```

In [ ]:

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In [23]: num = 5.6

```
#Namespace

def displayNumber(val):
    print("Local number in function: ", val)

    global num

    print("Global number in function: ", num)

    num = 8.5
    print("Global number in function: ", num)

displayNumber(2.5)

print("Global number outside the function: ", num)
```

Local number in function: 2.5  
Global number in function: 5.6  
Global number in function: 8.5  
Global number outside the function: 8.5

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global num  
print("Global number in function: ", num)  
  
num = 8.5  
print("Global number in function: ", num)  
  
displayNumber(2.5)  
  
print("Global number outside the function: ", num)

Local number in function: 2.5  
Global number in function: 5.6  
Global number in function: 8.5  
Global number outside the function: 8.5

In [ ]:

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In [24]: `def calculateInterest(principal, rate, period): #Parameters  
 interest = principal * rate * period  
 print("Interest Amount = %.2f" %interest)`

In [25]: `#Calling the function using positional arguments  
calculateInterest(10000, 0.01, 10) # Arguments args`  
Interest Amount = 1000.00

In [26]: `# Calling the function using keyword arguments  
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs`  
Interest Amount = 1000.00

In [ ]: `# Calling the function using a combination of keywords and positional arguments`

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```
In [24]: def calculateInterest(principal, rate, period): #Parameters  
    interest = principal * rate * period  
    print("Interest Amount = %.2f" %interest)
```

```
In [25]: #Calling the function using positional arguments  
calculateInterest(10000, 0.01, 10) # Arguments args  
  
Interest Amount = 1000.00
```

```
In [26]: # Calling the function using key-word arguments  
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs  
  
Interest Amount = 1000.00
```

```
In [27]: # Calling the function using a combination of keywords and positional arguments  
calculateInterest(10000, period=10, rate=0.01)  
  
Interest Amount = 1000.00
```

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keyword arguments

In [24]: `def calculateInterest(principal, rate, period): #Parameters`  
 `interest = principal * rate * period`  
 `print("Interest Amount = %.2f" %interest)`

In [25]: `#Calling the function using positional arguments`  
`calculateInterest(10000, 0.01, 10) # Arguments args`  
Interest Amount = 1000.00

In [26]: `# Calling the function using key-word arguments`  
`calculateInterest(rate=0.01, period=10, principal=10000) # kwargs`  
Interest Amount = 1000.00

In [27]: `# Calling the function using a combination of keywords and positional arguments`  
`calculateInterest(10000, period=10, rate=0.01)`  
Interest Amount = 1000.00

In [ ]:

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In [24]:

```
def calculateInterest(principal, rate, period): #Parameters  
    interest = principal * rate * period  
    print("Interest Amount = %.2f" %interest)
```

In [25]:

```
#Calling the function using positional arguments  
calculateInterest(10000, 0.01, 10) # Arguments args  
  
Interest Amount = 1000.00
```

In [26]:

```
# Calling the function using key-word arguments  
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs  
  
Interest Amount = 1000.00
```

In [27]:

```
# Calling the function using a combination of keywords and positional arguments  
calculateInterest(10000, period=10, rate=0.01)  
  
Interest Amount = 1000.00
```

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## Keyword Arguments

```
In [24]: def calculateInterest(principal, rate, period): #Parameters
    interest = principal * rate * period
    print("Interest Amount = %.2f" %interest)
```

```
In [28]: calculateInterest(10000, rate=0.01, 10)
          File "<ipython-input-28-b906bcd12587>", line 1
            calculateInterest(10000, rate=0.01, 10)
          ^
SyntaxError: positional argument follows keyword argument
```

```
In [25]: #Calling the function using positional arguments
calculateInterest(10000, 0.01, 10) # Arguments args
Interest Amount = 1000.00
```

```
In [26]: # Calling the function using key-word arguments
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs
```

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Python 3



```
In [25]: #Calling the function using positional arguments  
calculateInterest(10000, 0.01, 10) # Arguments args
```

Interest Amount = 1000.00

```
In [26]: # Calling the function using key-word arguments  
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs
```

Interest Amount = 1000.00

```
In [27]: # Calling the function using a combination of keywords and positional arguments  
calculateInterest(10000, period=10, rate=0.01)
```

Interest Amount = 1000.00

```
In [ ]:
```

.



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reverse is also allowed?  
Important

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In [25]: *#Calling the function using positional arguments*  
calculateInterest(10000, 0.01, 10) # Arguments args  
  
Interest Amount = 1000.00

In [26]: *# Calling the function using key-word arguments*  
calculateInterest(rate=0.01, period=10, principal=10000) # kwargs  
  
Interest Amount = 1000.00

In [27]: *# Calling the function using a combination of keywords and positional arguments*  
calculateInterest(10000, period=10, rate=0.01)  
  
Interest Amount = 1000.00

In [ ]: **def calculateInterest(principal, rate, period): #Parameters**  
  
interest = principal \* rate \* period  
  
print("Interest Amount = %.2f" %interest)

 MANDAL BIMALENDU BAIKYANATH  
or but the keywords may not be known  
to someone who has not defined the  
functions.  
Inspect

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Interest Amount = 1000.00

In [27]: # Calling the function using a combination of keywords and positional arguments  
calculateInterest(10000, period=10, rate=0.01)

Interest Amount = 1000.00

In [29]: # Giving default values to the parameters  
def calculateInterest(principal=10000, rate=0.01, period=10): #Parameters  
  
 interest = principal \* rate \* period  
  
 print("Interest Amount = %.2f" %interest)

In [ ]:

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Code

```
In [27]: # Calling the function using a combination of keywords and positional arguments  
calculateInterest(10000, period=10, rate=0.01)
```

Interest Amount = 1000.00

```
In [29]: # Giving default values to the parameters  
def calculateInterest(principal=10000, rate=0.01, period=10): #Parameters  
  
    interest = principal * rate * period  
  
    print("Interest Amount = %.2f" %interest)
```

```
In [30]: calculateInterest()
```

Interest Amount = 1000.00

```
In [ ]:
```



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In [32]: calculateInterest(principal=5000, period=20)

Interest Amount = 1000.00

In [ ]: def displayList(numList):  
 print(numList)  
 numList[1] = "Python"  
 print(numList)  
 x = [1,2,3]  
 display

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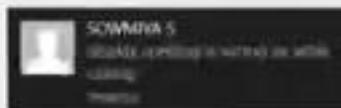
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In [32]: `calculateInterest(principal=5000, period=20)`

Interest Amount = 1000.00

In [ ]: `def displayList(numList):`  
    `print(numList)`  
    `numList[1] = "Python"`  
    `print(numList)`  
    `x = [1,2,3]`  
    `dipslayList(x)`  
    `print(x)`



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In [32]: calculateInterest(principal=5000, period=20)

Interest Amount = 1000.00

In [33]: def displayList(numList):  
 print(numList)  
 numList[1] = "Python"  
 print(numList)  
x = [1,2,3]  
displayList(x)  
print(x)

[1, 2, 3]  
[1, 'Python', 3]  
[1, 'Python', 3]

In [ ]:

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In [32]: calculateInterest(principal=5000, period=20)

Interest Amount = 1000.00

In [33]: def displayList(numList):  
 print(numList)  
  
 numList[1] = "Python"  
  
 print(numList)  
  
x = [1,2,3]  
displayList(x)  
  
print(x)

[1, 2, 3]  
[1, 'Python', 3]  
[1, 'Python', 3]

In [ ]:

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```
y = list(x)

print(id(y))

displayList(x)

print(y)
```

```
2125926474248
2125925655112
[1, 2, 3]
[1, 'Python', 3]
[1, 2, 3]
```

In [ ]: # Passing variable arguments

```
def addNumbers(numbers):
    total = 0
    for num in numbers:
        total += num
    return total
```

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displayList(x)  
print(y)

```
2125926474248  
2125925655112  
[1, 2, 3]  
[1, 'Python', 3]  
[1, 2, 3]
```

In [38]: # Passing variable arguments

```
def addNumbers(*numbers):  
  
    total = 0  
  
    for num in numbers:  
        total += num  
  
    return total
```

In [39]: addNumbers(1,2)

Out[39]: 3

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[1, 2, 3]

In [38]: 

```
# Passing variable arguments
```

```
def addNumbers(*numbers):
```

```
    total = 0
```

```
    for num in numbers:
```

```
        total += num
```

```
    return total
```

In [39]: 

```
addNumbers(1,2)
```

Out[39]: 3

In [40]: 

```
addNumbers(1,2,3)
```

Out[40]: 6

In [41]: 

```
addNumbers(1,2,3,4)
```

Out[41]: 10

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[1, 2, 3]

In [42]: # Passing variable arguments

```
def addNumbers(numbers):
    total = 0
    for num in numbers:
        total += num
    return total
```

In [43]: | addNumbers(1,2)

-----

Traceback (most recent call last)  
<ipython-input-43-988ccf33d5f2> in <module>  
----> 1 addNumbers(1,2)

TypeError: addNumbers() takes 1 positional argument but 2 were given

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[1, 2, 3]

In [42]: # Passing variable arguments

```
def addNumbers(numbers):
    total = 0
    for num in numbers:
        total += num
    return total
```

In [44]: t1 = (1,2)
addNumbers(t1)

Out[44]: 3

In [40]: addNumbers(1,2,3)

Out[40]: 6

In [41]: addNumbers(1,2,3,4)

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In [42]: *# Passing variable arguments*

```
def addNumbers(numbers):
    total = 0
    for num in numbers:
        total += num
    return total
```

In [44]: t1 = (1,2)  
addNumbers(t1)

Out[44]: 3

In [45]: t2 = (1,2,3)  
addNumbers(t2)

Out[45]: 6

In [41]: addNumbers(1,2,3,4)

AJAY NAIK what is the logic of function made  
functiondef addNumbers(a,b,c,d):  
total = a+b+c+d  
return total



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In [42]: # Passing variable arguments

```
def addNumbers(numbers):
    total = 0
    for num in numbers:
        total += num
    return total
```

In [44]: t1 = (1,2)  
addNumbers(t1)

Out[44]: 3

In [45]: t2 = (1,2,3)  
addNumbers(t2)

Out[45]: 6

In [41]: addNumbers(1,2,3,4)

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Python 3

```
def addNumbers(*numbers):
    print(type(numbers))
    total = 0
    for num in numbers:
        total = total + num
    return total
```

In [60]: t1 = (1,2)  
addNumbers(t1)

<class 'tuple'>

-----

TypeError Traceback (most recent call last)  
<ipython-input-60-6230ddbed680> in <module>

68> in addNumbers(\*numbers)

The screenshot shows a Jupyter Notebook interface. At the top, there's a menu bar with File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu is a Python logo icon and a Logout button. Below the menu is a toolbar with various icons for file operations like New, Open, Save, and Run. The main workspace contains a code cell with the following Python code:

```
def addNumbers(*numbers):
    print(type(numbers))
    total = 0
    for num in numbers:
        total = total + num
    return total
```

Below the code cell is an input cell with the following content:

In [60]: t1 = (1,2)  
addNumbers(t1)

The output of the code cell is:

<class 'tuple'>

After the output, a dashed line separates the code from the error message. The error message is:

-----  
TypeError Traceback (most recent call last)  
<ipython-input-60-6230ddbed680> in <module>

68> in addNumbers(\*numbers)

At the bottom of the screen, there's a taskbar with several icons, and the system tray shows the date and time as 12:09 PM 4/12/2020.

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[1, 2, 3]

In [58]: # Passing variable arguments

```
def addNumbers(*numbers):
    print(type(numbers))
    total = 0
    for num in numbers:
        total = total + num
    return total
```

In [60]: t1 = (1,2)  
addNumbers(t1)

```
<class 'tuple'>
```

---

TypeError Traceback (most recent call last)  
<ipython-input-60-6230ddbed680> in <module>  
 1 t1 = (1,2)
----> 2 addNumbers(t1)

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for num in numbers:  
 total = total + num  
  
return total

In [60]: t1 = (1,2)  
addNumbers(t1)  
  
<class 'tuple'>  
  
-----  
TypeError Traceback (most recent call last)  
<ipython-input-60-6230ddbed680> in <module>  
 1 t1 = (1,2)  
----> 2 addNumbers(t1)  
  
<ipython-input-58-10f89a9b4d68> in addNumbers(\*numbers)  
 8  
 9 for num in numbers:  
----> 10 total = total + num  
 11  
 12 return total  
  
TypeError: unsupported operand type(s) for +: 'int' and 'tuple'

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jagannath.boni@bits-pilani.ac.in  
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In [61]: # Passing variable arguments

```
def addNumbers(*numbers):
    print(type(numbers))
    total = 0
    for num in numbers:
        total = total + num
    return total
```

In [62]: t1 = (1,2)  
addNumbers(t1)

```
<class 'tuple'>
```

Out[62]: 3

In [49]: #t2 = (1,2,3)  
addNumbers(1,2,3)

```
Out[49]: 6
```



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total = 0

for num in numbers:

total = total + num

return total

In [64]: t1 = (1,2)  
addNumbers(t1)

<class 'tuple'>

-----  
**TypeError** Traceback (most recent call last)  
c:\python\input\64-5238ddbad699.py in <module>  
 1 t1 = (1,2)  
----> 2 addNumbers(t1)  
 3  
c:\python\input\65-1e79415a699.py in <module>(\*numbers)  
 5  
 6 for num in numbers:  
----> 7 total = total + num  
 8  
 9 return total

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In [49]: #t2 = (1,2,3)  
addNumbers(1,2,3)

Out[49]: 6

In [41]: addNumbers(1,2,3,4)

Out[41]: 10

### Lambda Function (anonymous)

In [ ]:



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displayList(x)  
print(y)

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2125925655112  
[1, 2, 3]  
[1, 'Python', 3]  
[1, 2, 3]

In [63]: # Passing variable arguments

```
def addNumbers(*numbers):
    print(type(numbers))
    total = 0
    for num in numbers:
        total = total + num
    return total
```

In [64]: t1 = (1,2)
addNumbers(t1)

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12 return total

TypeError: unsupported operand type(s) for +: 'int' and 'tuple'

In [49]: tt2 = (1,2,3)  
addNumbers(1,2,3)

Out[49]: 6

In [51]: addNumbers(1,2,3)

Out[51]: 6

In [64]: 10

## Lambda Function (anonymous)

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In [49]: #t2 = (1,2,3)  
addNumbers(1,2,3)

Out[49]: 6

In [41]: addNumbers(1,2,3,4)

Out[41]: 10

**Lambda Function (anonymous)** 

In [ ]:

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addNumbers(1,2,3)

Out[49]: 6

In [41]: addNumbers(1,2,3,4)

Out[41]: 10

### Lambda Function (anonymous)

In [65]: `def xSquare(x):  
 return x * x`

In [ ]:

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In [41]: addNumbers(1,2,3,4)

Out[41]: 10

### Lambda Function (anonymous)

In [65]: `def xSquare(x):  
 return x * x`

In [66]: `xSquare(5)`

Out[66]: 25

In [ ]:



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In [41]: addNumbers(1,2,3,4)

Out[41]: 10

## Lambda Function (anonymous)

In [65]: `def xSquare(x):  
 return x * x`

In [66]: xSquare(5)

Out[66]: 25

In [ ]:

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Code

## Lambda Function (anonymous)

```
In [65]: def xSquare(x):
    return x * x
```

```
In [66]: xSquare(5)
```

```
Out[66]: 25
```

```
In [67]: valueA = lambda x: x*x
```

```
In [ ]:
```

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Out[66]: 25

In [67]: valueA = lambda x: x\*x

In [68]: print(valueA(5))

25

In [69]: valueB = lambda a, b : a \* b  
print(valueB(2,5))

10

In [ ]:

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Out[66]: 25

In [67]: `valueA = lambda x: x*x`

In [68]: `print(valueA(5))`

25

In [69]: `valueB = lambda a, b : a * b`  
`print(valueB(2,5))`

10

In [ ]:

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In [67]: `valueA = lambda x: x*x`

In [68]: `print(valueA(5))`

25

In [69]: `valueB = lambda a, b : a * b`  
`print(valueB(2,5))`

10

In [ ]: `def funA(y):`  
 `return lambda x: x * y`

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In [70]: `def funA(y):  
 return lambda x: x * y`

In [71]: `a = funA(5)`

In [72]: `a`

Out[72]: <function \_\_main\_\_.funA.<locals>.<lambda>(x)>

In [73]: `a(10)`

Out[73]: 50

In [ ]:



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In [70]: `def funA(y):  
 return lambda x: x * y`

In [71]: `a = funA(5)`

In [72]: `a`

Out[72]: <function \_\_main\_\_.funA.<locals>.<lambda>(x)>

In [73]: `a(10)`

Out[73]: 50

In [ ]: # Applying a Lambda function to a List

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In [72]: a

Out[72]: <function \_\_main\_\_.funA.<locals>.<lambda>(x)>

In [73]: a(10)

Out[73]: 50

In [ ]: # Applying a Lambda function to a List  
# input [2,7,3,5,9]  
# output [4,14,3,5,18]

```
def applyToList (listA, lambFun):  
    return [lambFun(x) for x in list A]
```

In [ ]: listB = [2,7,3,5,9]  
applyToList(listB, lambda x : x\*2)