SNS COLLEGE OF ENGINEERING

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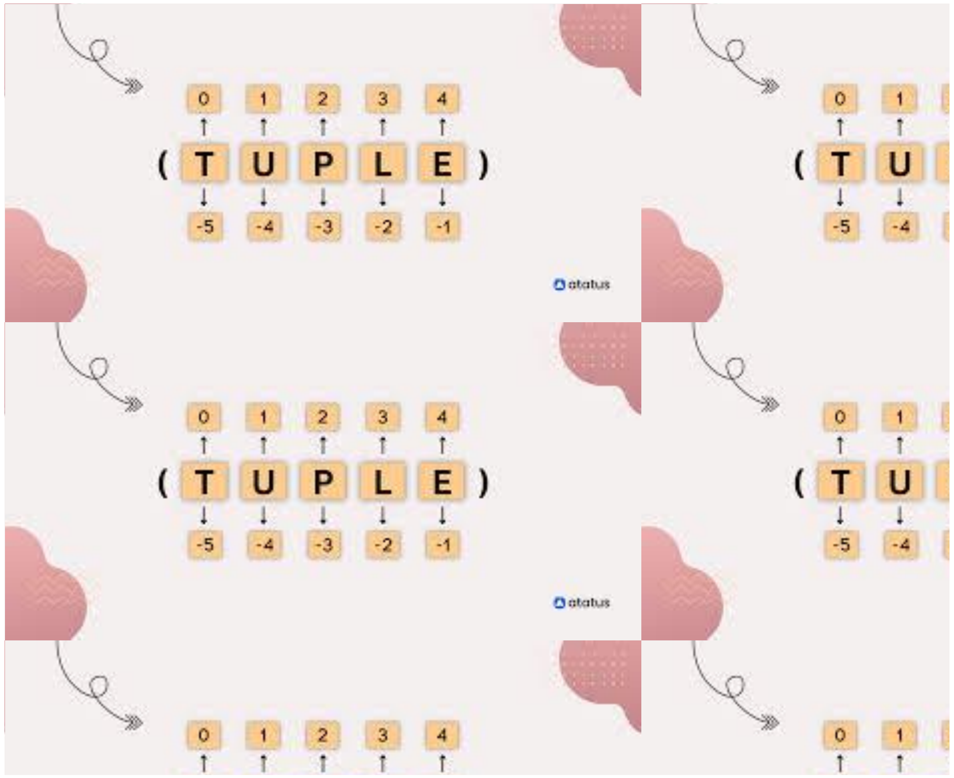
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE NAME: 23ITB202-PYTHON PROGRAMMING

II YEAR/ III SEM

Unit : LISTS, TUPLES, DICTIONARIES

Topic : TUPLES


0 1 2 3 4
(T U P L E)
-5 -4 -3 -2 -1
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List vs Tuples
[1,2] (1,2)
List vs
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[1,2] (1,2)
List vs
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List vs
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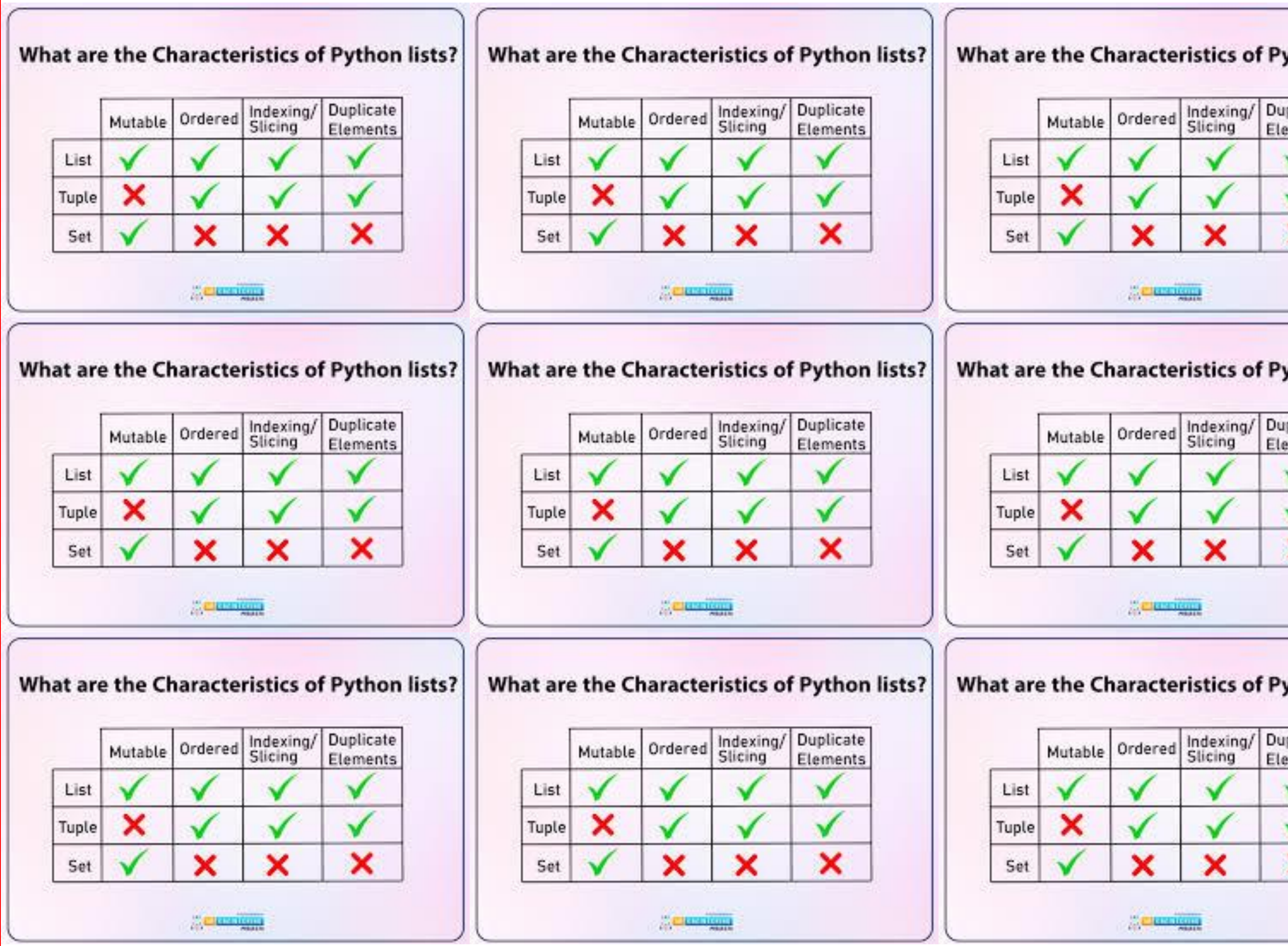
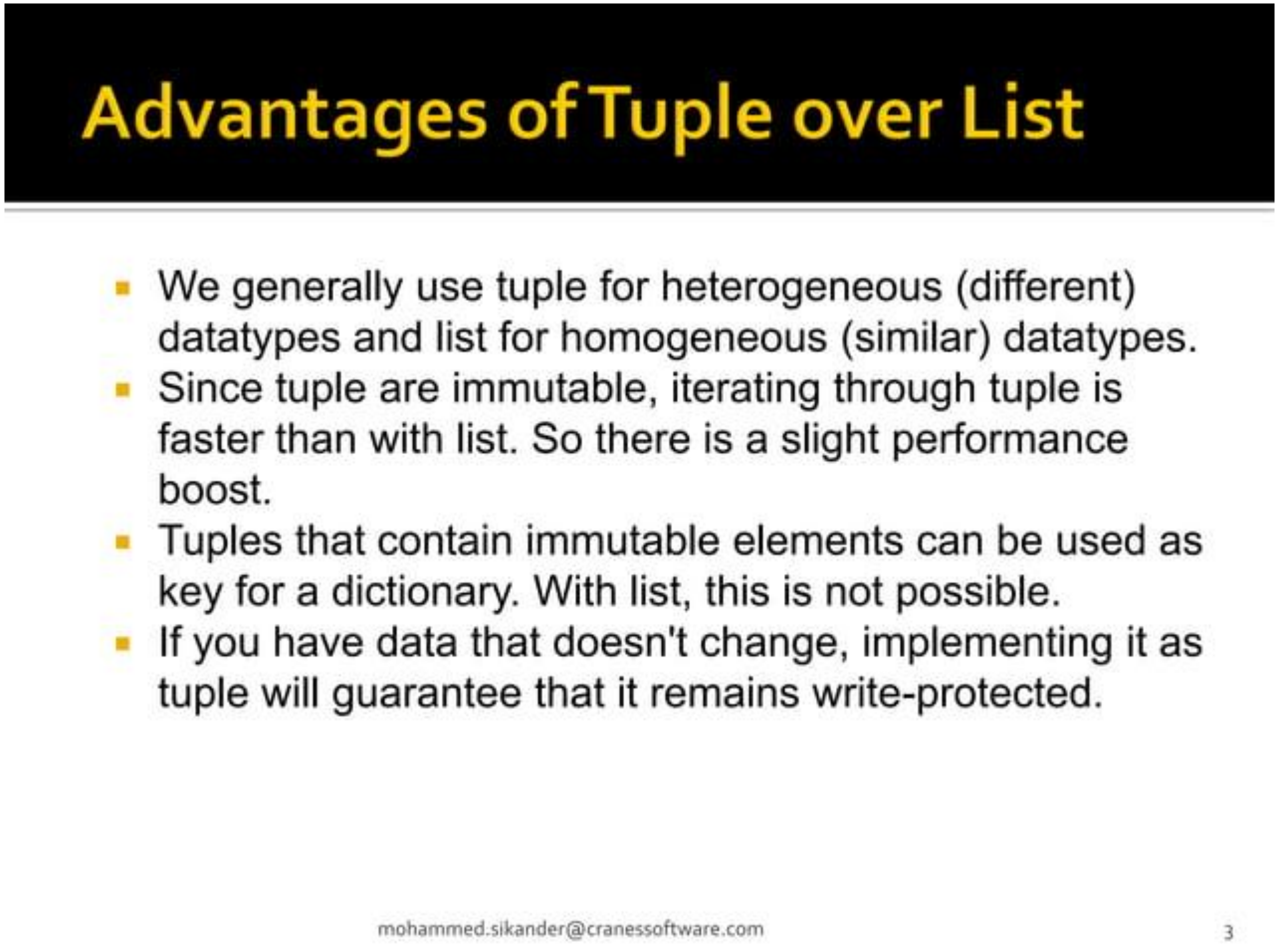


What are the Characteristics of Python lists?

	Mutable	Ordered	Indexing/ Slicing	Duplicate Elements
List	✓	✓	✓	✓
Tuple	✗	✓	✓	✓
Set	✓	✗	✗	✗

Python Tuples

- **Tuples** are very similar to lists, except that they are immutable (they cannot be changed).
- They are created using **parentheses**, rather than square brackets.



Advantages of Tuple over List

- We generally use tuple for heterogeneous (different) datatypes and list for homogeneous (similar) datatypes.
- Since tuple are immutable, iterating through tuple is faster than with list. So there is a slight performance boost.
- Tuples that contain immutable elements can be used as key for a dictionary. With list, this is not possible.
- If you have data that doesn't change, implementing it as tuple will guarantee that it remains write-protected.

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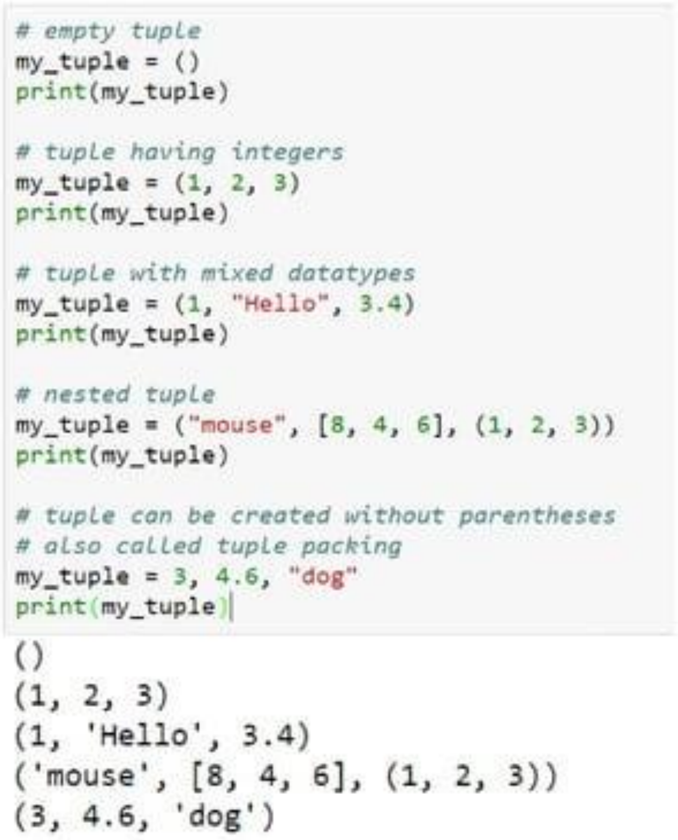
Creating a Tuple

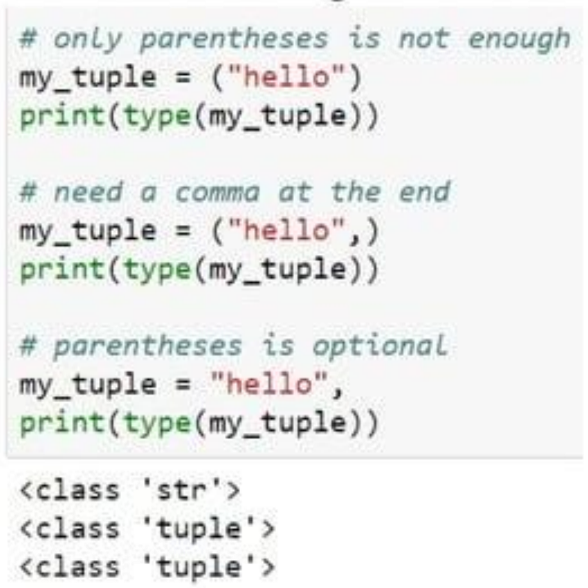
- A tuple is created by placing all the items (elements) inside a parentheses (), separated by comma.
- The parentheses are optional but is a good practice to write it.
- A tuple can have any number of items and they may be of different types (integer, float, list, string etc.).



```
# empty tuple
my_tuple = ()
print(my_tuple)

# tuple having integers
my_tuple = (1, 2, 3)
print(my_tuple)

# tuple with mixed datatypes
my_tuple = (1, "Hello", 3.4)
print(my_tuple)

# nested tuple
my_tuple = ("mouse", [8, 4, 6], (1, 2, 3))
print(my_tuple)

# tuple can be created without parentheses
# also called tuple packing
my_tuple = 3, 4.6, "dog"
print(my_tuple)
```

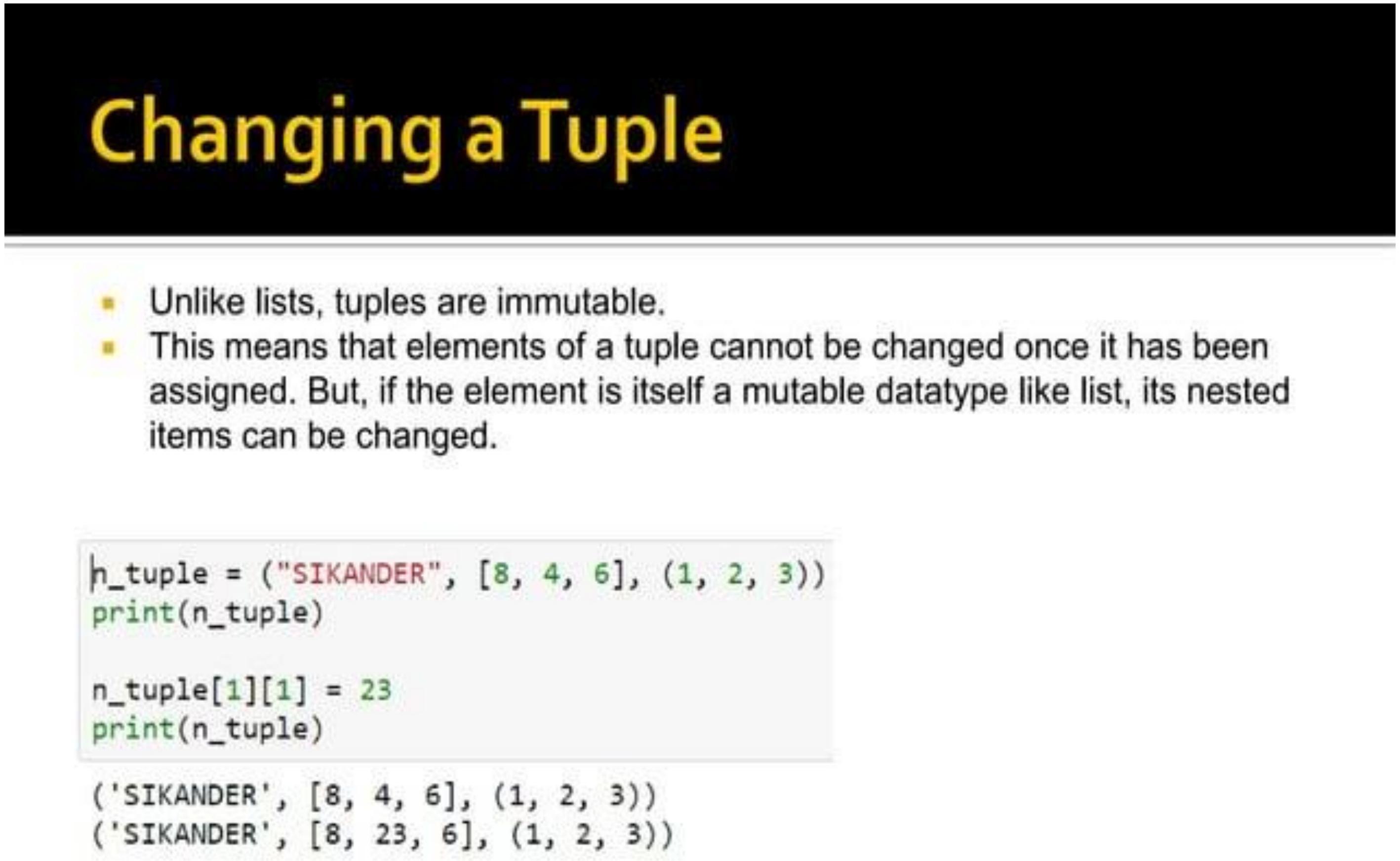
```
()
(1, 2, 3)
(1, 'Hello', 3.4)
('mouse', [8, 4, 6], (1, 2, 3))
(3, 4.6, 'dog')
```

- Creating a tuple with one element is a bit tricky.
- Having one element within parentheses is not enough. We will need a trailing comma to indicate that it is in fact a tuple.



```python
# only parentheses is not enough
my_tuple = ("hello")
print(type(my_tuple))

# need a comma at the end
my_tuple = ("hello",)
print(type(my_tuple))

# parentheses is optional
my_tuple = "hello",
print(type(my_tuple))
```

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



Changing a Tuple

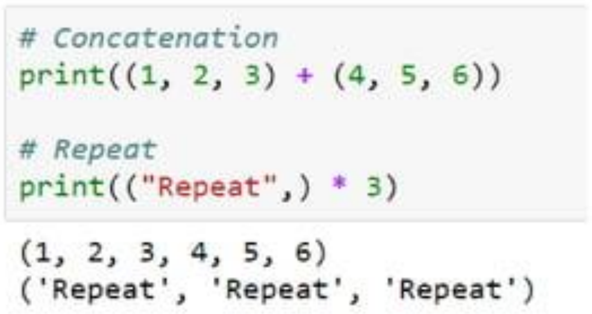
- Unlike lists, tuples are immutable.
- This means that elements of a tuple cannot be changed once it has been assigned. But, if the element is itself a mutable datatype like list, its nested items can be changed.

```
n_tuple = ("SIKANDER", [8, 4, 6], (1, 2, 3))
print(n_tuple)

n_tuple[1][1] = 23
print(n_tuple)
```

```
('SIKANDER', [8, 4, 6], (1, 2, 3))
('SIKANDER', [8, 23, 6], (1, 2, 3))
```

Similar to List,

- We can use + operator to combine two tuples. This is also called **concatenation**.
- We can also **repeat** the elements in a tuple for a given number of times using the * operator.
- Both + and * operations result into a new tuple.

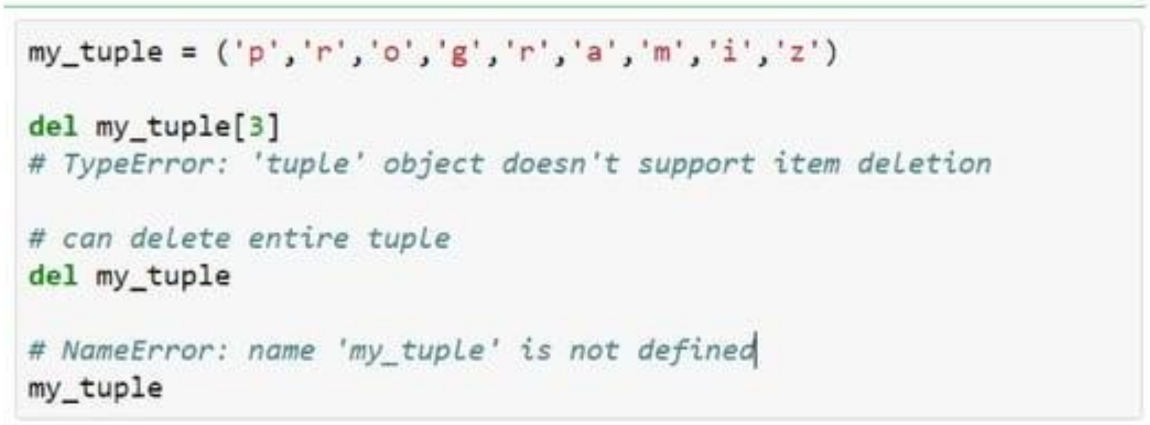


```
# Concatenation
print((1, 2, 3) + (4, 5, 6))

# Repeat
print(("Repeat",) * 3)
```

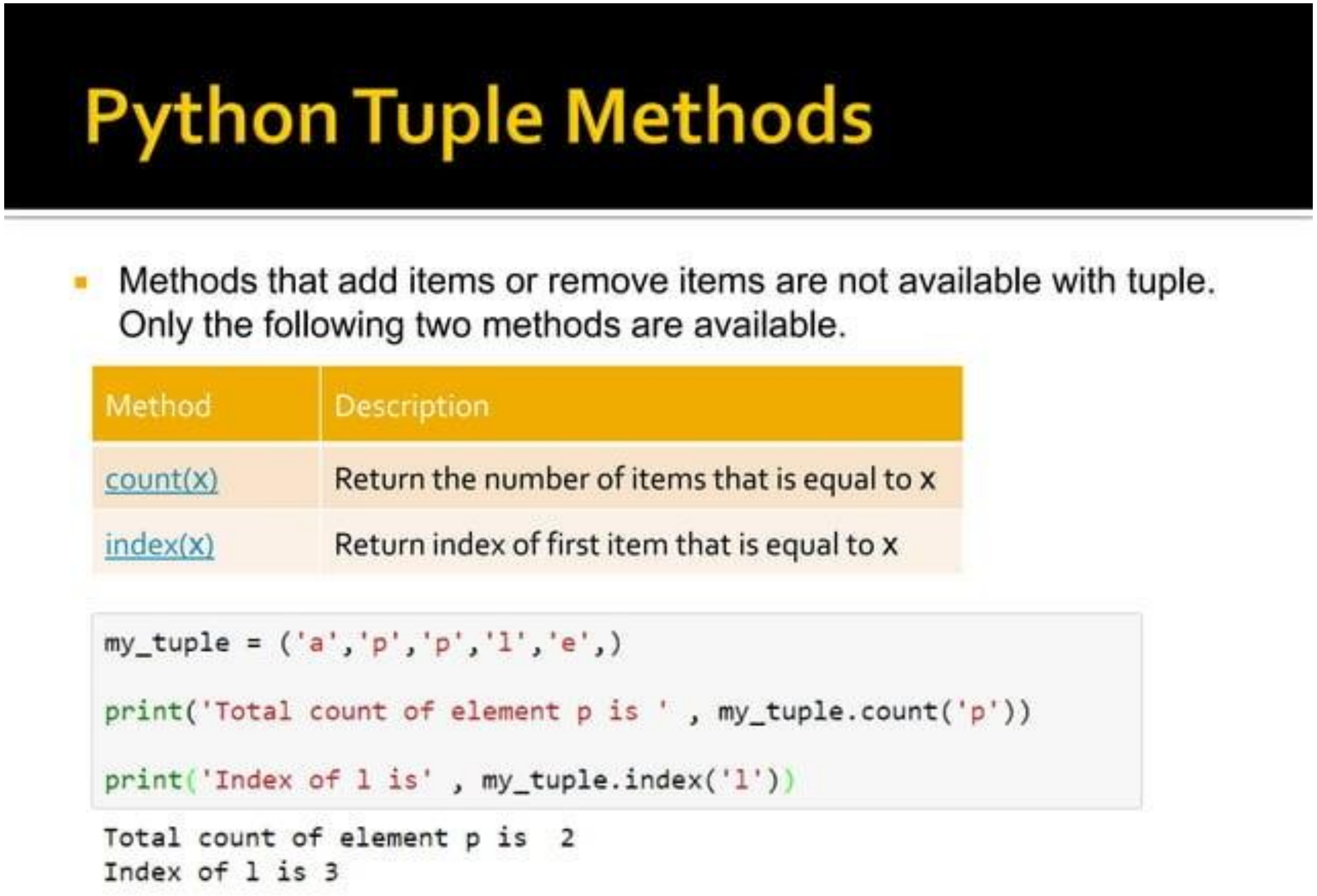
```
(1, 2, 3, 4, 5, 6)
('Repeat', 'Repeat', 'Repeat')
```

Deleting a Tuple

- We cannot change the elements in a tuple. That also means we cannot delete or remove items from a tuple.
- But deleting a tuple entirely is possible using the keyword del.



```
my_tuple = ('p','r','o','g','r','a','m','i','z')

del my_tuple[3]
# TypeError: 'tuple' object doesn't support item deletion

# can delete entire tuple
del my_tuple

# NameError: name 'my_tuple' is not defined
my_tuple
```



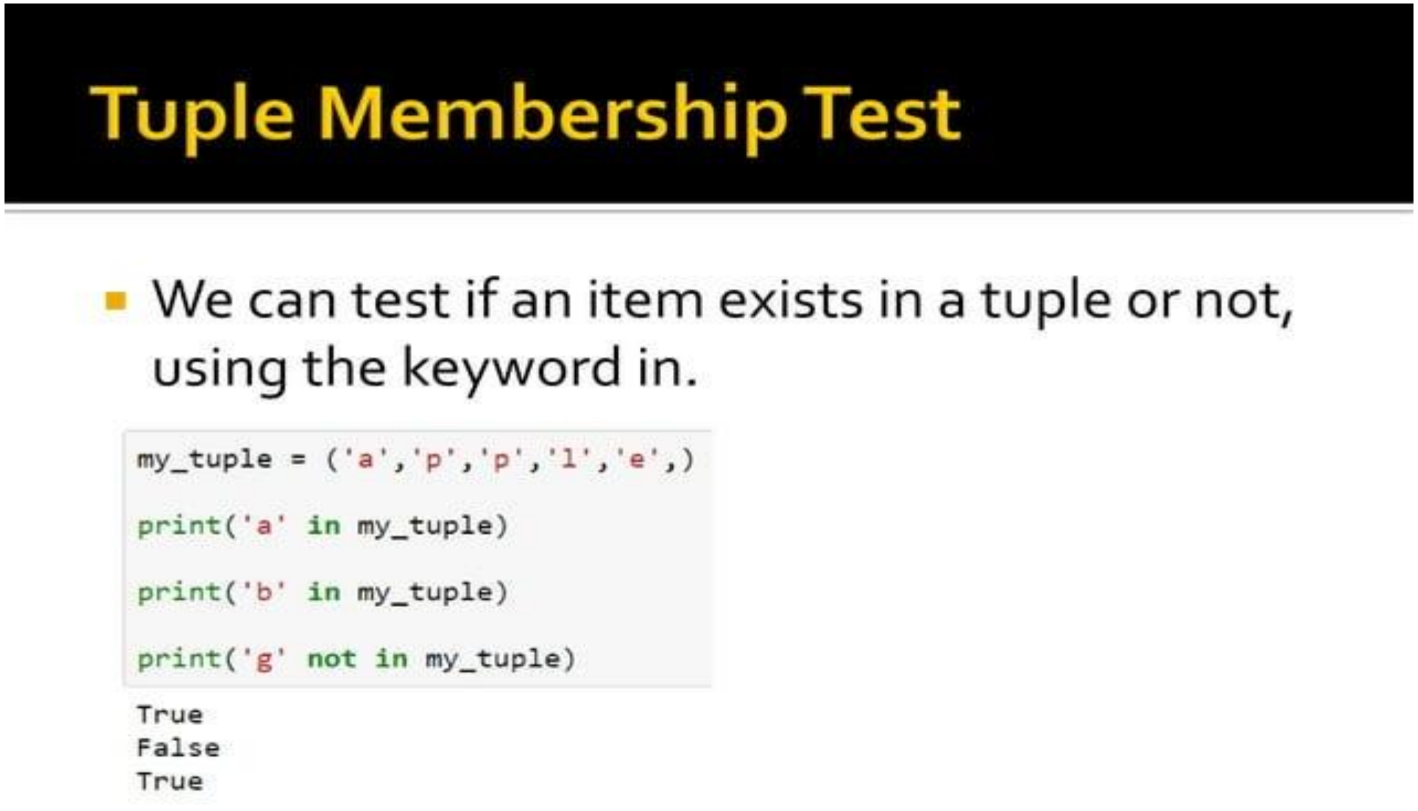
Python Tuple Methods

- Methods that add items or remove items are not available with tuple. Only the following two methods are available.

Method	Description
count(x)	Return the number of items that is equal to x
index(x)	Return index of first item that is equal to x

```
my_tuple = ('a','p','p','l','e',)

print('Total count of element p is ' , my_tuple.count('p'))

print('Index of l is' , my_tuple.index('l'))
```

```
Total count of element p is  2
Index of l is 3
```

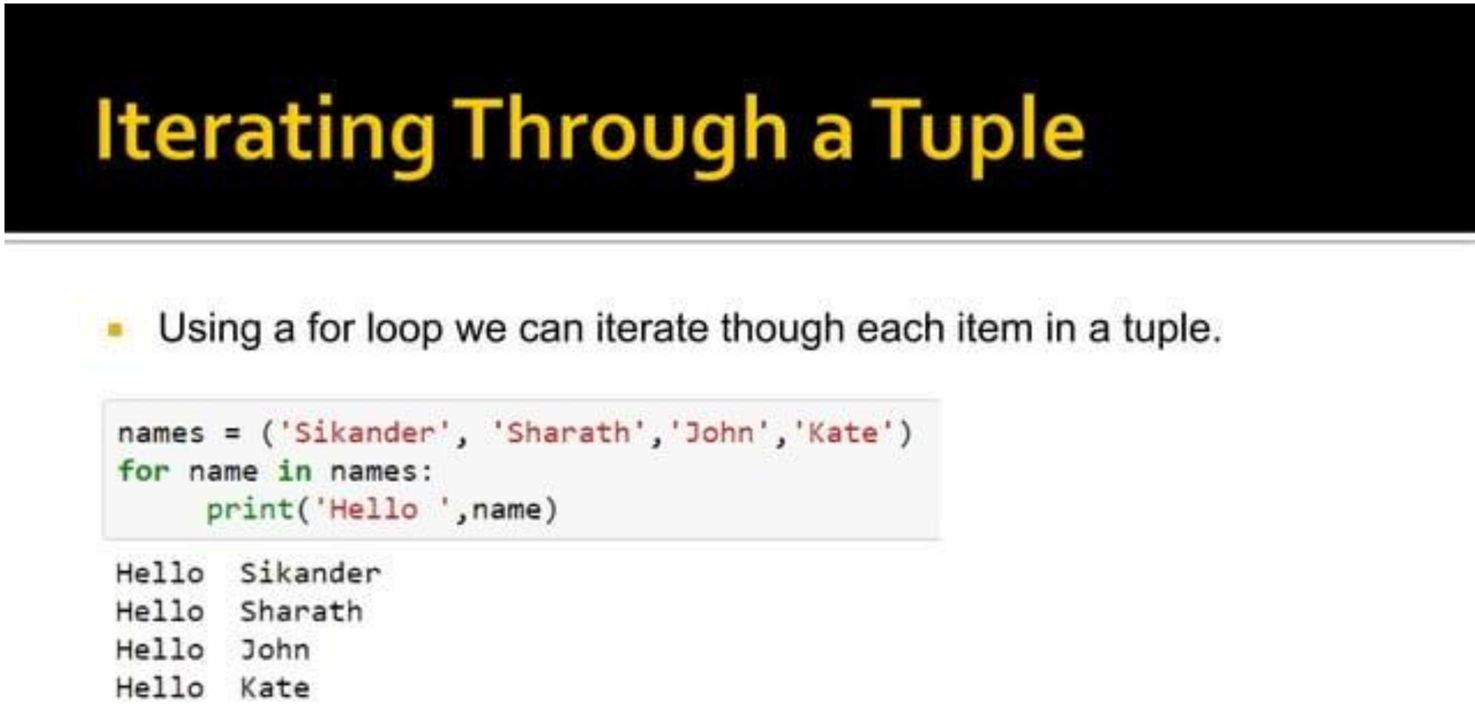


Tuple Membership Test

- We can test if an item exists in a tuple or not, using the keyword in.

```
my_tuple = ('a','p','p','l','e',)

print('a' in my_tuple)

print('b' in my_tuple)

print('g' not in my_tuple)
```

```
True
False
True
```

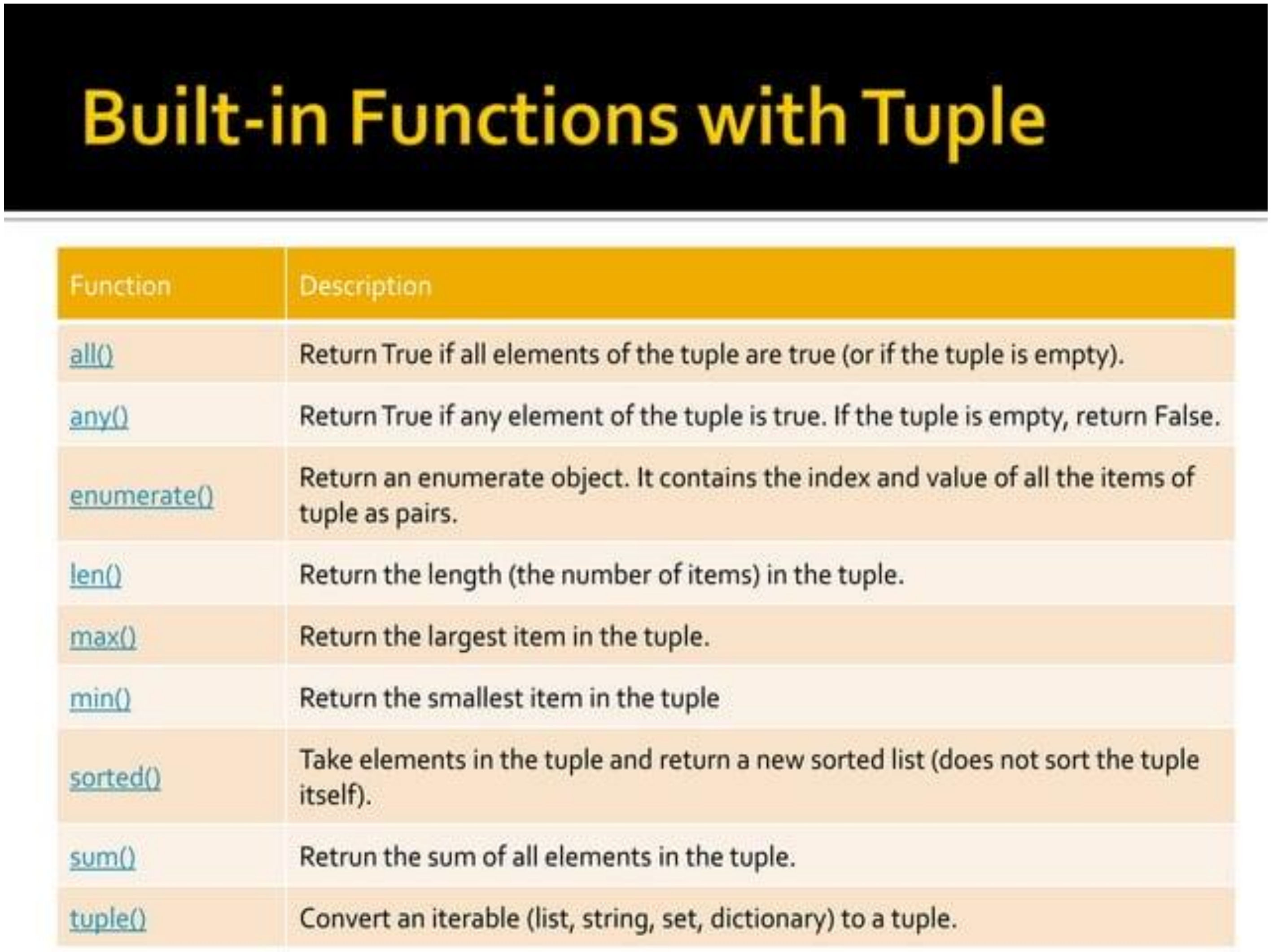


Iterating Through a Tuple

- Using a for loop we can iterate though each item in a tuple.

```
names = ('Sikander', 'Sharath','John','Kate')
for name in names:
     print('Hello ',name)
```

```
Hello  Sikander
Hello  Sharath
Hello  John
Hello  Kate
```



Built-in Functions with Tuple

Function	Description
all()	Return True if all elements of the tuple are true (or if the tuple is empty).
any()	Return True if any element of the tuple is true. If the tuple is empty, return False.
enumerate()	Return an enumerate object. It contains the index and value of all the items of tuple as pairs.
len()	Return the length (the number of items) in the tuple.
max()	Return the largest item in the tuple.
min()	Return the smallest item in the tuple
sorted()	Take elements in the tuple and return a new sorted list (does not sort the tuple itself).
sum()	Retrun the sum of all elements in the tuple.
tuple()	Convert an iterable (list, string, set, dictionary) to a tuple.