

LECTURE

EIGHT

**Fundamentals of
Programming**

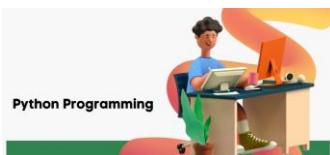


Set

- ✚ set is an unordered collection of items. items where all elements are unique (no duplicated elements) and must be immutable (**cannot** be changed).
- ✚ A set is created by placing all the items (elements) inside **curly braces** {}, separated by comma.
- ✚ It can have any number of items and they may be of immutable **different** types Any (integer, float, tuple, string etc.)
- ✚ We **cannot** access or change an element of a set using indexing or slicing.
- ✚ Unlike with lists, we cannot insert an element at a given index, since sets are unordered containers, meaning elements have not a particular position inside a set.

Example: Create Set, Iterate over the elements of Set

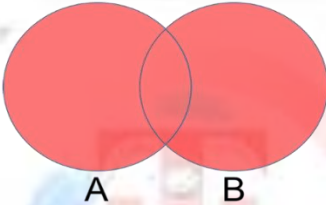
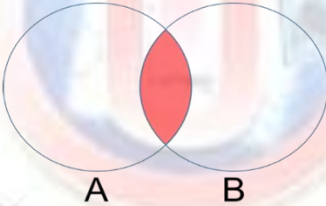
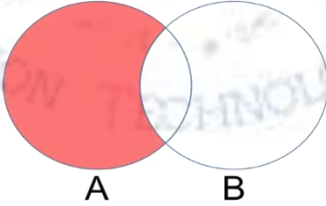
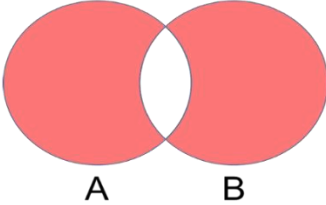
```
m = {}                # Create empty Set
s = {1, 2, 3, 4, 3, 2} # Create the Set
cities = {'Madrid', 'Valencia', 'Munich'}
print(s)              # Print the Set
for i in s:            # Iterate over the elements of Set
    print(i, end=' ')
```

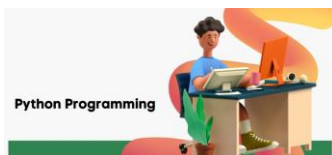


Operations and Functions on Set

Set have their own set of permissible operations:

Operation	Mathematical Notation	Python Syntax	Result Type	Meaning
Union	$A \cup B$	$A \mid B$	set	Elements in A or B or both
Intersection	$A \cap B$	$A \& B$	set	Elements common to both A and B
Set Difference	$A - B$	$A - B$	set	Elements in A but not in B
Symmetric Difference	$A \oplus B$	$A \wedge B$	set	Elements in A or B , but not both

Set Operation	Venn Diagram	Interpretation
Union		$A \cup B$, is the set of all values that are a member of A , or B , or both.
Intersection		$A \cap B$, is the set of all values that are members of both A and B .
Difference		$A \setminus B$, is the set of all values of A that are not members of B
Symmetric Difference		$A \triangle B$, is the set of all values which are in one of the sets, but not both.



python len function: it returns the number of items (length) in an object. use the len() to get the length of the given set.

Example: Operations and Functions on Set

```
A = {4, 1, 2, 3, 4, 5}
```

```
B = {4, 5, 6, 7, 8}
```

```
print(A | B)      # use | operator for Union
```

```
print(A & B)      # use & operator for Intersection
```

```
print(A - B)      # use - operator for Difference
```

```
print(A ^ B)      # use ^ operator for Symmetric Difference
```

```
print(len(A))     # use len function to get the length of the given set.
```

Output

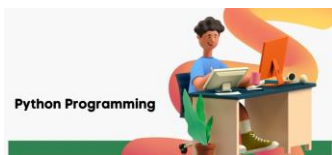
```
{1, 2, 3, 4, 5, 6, 7, 8}
```

```
{4, 5}
```

```
{1, 2, 3}
```

```
{1, 2, 3, 6, 7, 8}
```

```
5
```



Common Python Set Methods

There are numerous methods available with the set object, some of the commonly used methods are:

Method	Description
add()	Adds an element to the set(If the element is already present, it doesn't add any element.)
discard()	Removes an element from the set if it is a member. (Do nothing if the element is not in set)
A.issubset(B)	returns True if all elements of set A are contained in set B .

Example: Common Python Set Methods

```
m = {9, 2, 4, 3, 4, 5}
m.add(6)
print(m)
m.discard(4)
print(m)
k = {3, 2}
print(k.issubset(m))
```

Output

```
{2, 3, 4, 5, 6, 9}
{2, 3, 5, 6, 9}
True
```

