Python: Sets

## Definition

A set is an unordered collection of unique elements in Python. It is mutable but does not allow duplicate elements.

## Characteristics of Sets

- Unordered: No specific order of elements.  
- Mutable: You can add or remove elements.  
- Unique Elements: Duplicate elements are automatically removed.  
- Elements must be immutable (numbers, strings, tuples).

## Properties of Sets

- Defined using curly braces {} or the set() constructor.  
- Cannot contain mutable elements like lists or dictionaries.  
- Useful for mathematical set operations like union, intersection, difference.

## Set Operations & Methods

## Creation

# Creating sets  
my\_set = {1, 2, 3}  
empty\_set = set() # Empty set  
mixed\_set = {1, "apple", (2, 3)}

## Adding Elements

my\_set = {1, 2}  
my\_set.add(3)  
print(my\_set) # Output: {1, 2, 3}

## Removing Elements

my\_set = {1, 2, 3}  
my\_set.remove(2) # Raises KeyError if not present  
my\_set.discard(3) # Does not raise error if not present  
print(my\_set) # Output: {1}

## Set Operations

set1 = {1, 2, 3}  
set2 = {3, 4, 5}  
  
# Union  
print(set1 | set2) # Output: {1, 2, 3, 4, 5}  
  
# Intersection  
print(set1 & set2) # Output: {3}  
  
# Difference  
print(set1 - set2) # Output: {1, 2}  
  
# Symmetric Difference  
print(set1 ^ set2) # Output: {1, 2, 4, 5}

## Membership Test

my\_set = {1, 2, 3}  
print(2 in my\_set) # Output: True  
print(5 in my\_set) # Output: False

## Set Length

my\_set = {1, 2, 3}  
print(len(my\_set)) # Output: 3