

# Python



Learn clean and efficient Python  
programs using data structure



# About the Author



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# Icons Used



Questions



Tools



Hands-on Exercise



Coding Standards



Questions?



Reference



Try it Out



Informative  
Slide



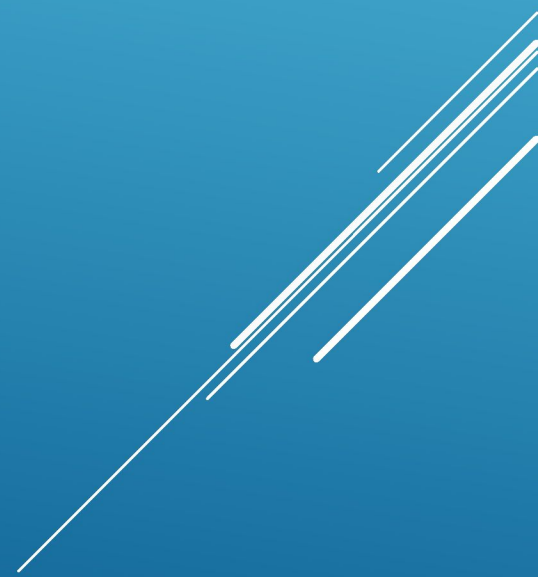
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Welcome Break

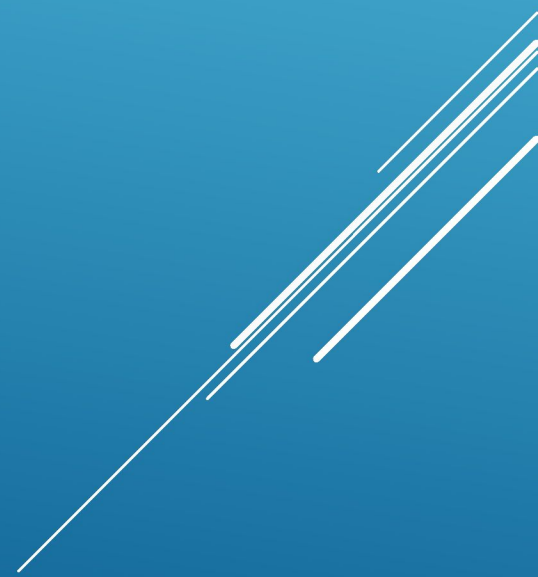
# DATA STRUCTURE IN PYTHON

- ▶ Learn clean and efficient Python programs using the right data structure
- ▶ By: Mohd Salman



- ▶ Lists, Tuples, Sets, Dictionaries, Comprehension
- ▶ By: Mohd Salman

# PYTHON DATA STRUCTURES



- ▶ Understand the purpose and characteristics of Lists, Tuples, Sets, and Dictionaries
- ▶ Identify key differences among these data structures
- ▶ Apply appropriate data structures for different problem scenarios
- ▶ Perform basic operations such as adding, updating, deleting, and accessing elements
- ▶ Use dictionary functions (`get()`, `keys()`, `values()`, `items()`) effectively
- ▶ Write clean and efficient Python programs using the right data structure

# PYTHON DATA STRUCTURES





- ▶ A list is an ordered, mutable collection of items.
- ▶ Allows duplicates and mixed data types.
- ▶ Syntax:
- ▶ `my_list = [10, 20, 30, "Python"]`

## LIST - DESCRIPTION & SYNTAX

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- ▶ Beginner: Create list of numbers, print 2nd and last element.
- ▶ Intermediate: Add, remove, and sort elements.
- ▶ Advanced: New list with elements  $> 50$  using list comprehension.

## LIST - EXERCISES



- ▶ A tuple is ordered and immutable.
- ▶ Once created, values cannot be changed.
- ▶ Syntax:
- ▶ `my_tuple = (1, 2, 3, 4)`

## TUPLE - DESCRIPTION & SYNTAX

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- ▶ Beginner: Print subjects from tuple.
- ▶ Intermediate: Find index of a given value.
- ▶ Advanced: Count frequency of each number in tuple.

## TUPLE - EXERCISES

SETS - WILL NOT PRINT THE REPEATED DATA

- ▶ A set is unordered and contains unique elements.
- ▶ Syntax:
- ▶ `my_set = {1, 2, 3}`

## SET - DESCRIPTION & SYNTAX

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- ▶ Beginner: Create set with duplicates and print it.
- ▶ Intermediate: Find union and intersection of two sets.
- ▶ Advanced: Print elements in set1 not in set2.

## SET - EXERCISES

- ▶ Dictionary stores key-value pairs. Keys are unique.
- ▶ Syntax:
- ▶ `my_dict = {"name": "John", "age": 25}`

## DICTIONARY - DESCRIPTION & SYNTAX

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- ▶ Beginner: Create dictionary and print key-value pairs.
- ▶ Intermediate: Add new key and delete another.
- ▶ Advanced: Find student with highest marks from dictionary.

## DICTIONARY - EXERCISES

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- ▶ Common functions:
- ▶ `.get(key)` - Returns value
- ▶ `.keys()` - All keys
- ▶ `.values()` - All values
- ▶ `.items()` - Key-value pairs

## DICTIONARY FUNCTIONS



- ▶ Beginner: Print all keys.
- ▶ Intermediate: Safely access missing key using `get()`.
- ▶ Advanced: Print employees with salary > 50,000 using comprehension.

## DICTIONARY FUNCTION EXERCISES

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Feature	List	Tuple	Set	Dictionary
Syntax	[ ]	( )	{ }	{key: value}
Ordered	Yes	Yes	NO	Yes (since Python 3.7)
Mutable	Yes	NO	Yes	Yes
Indexed	Yes	Yes	NO	Yes (by key)
Duplicates	Yes	Yes	NO	NO (keys unique)
Use Case	General- purpose ordered data	Fixed data that shouldn't change	Unique items collection  intersection, union etc	Key-value mapping

# COMPARISON

- ▶ Data structures are organized ways to store, manage, and access data efficiently in a program

THANK YOU!

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