PRESENTATION

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AGENDA

- Loops
- String
- List
- Tuple
- Dictionary

INTRODUCTION TO LOOPS

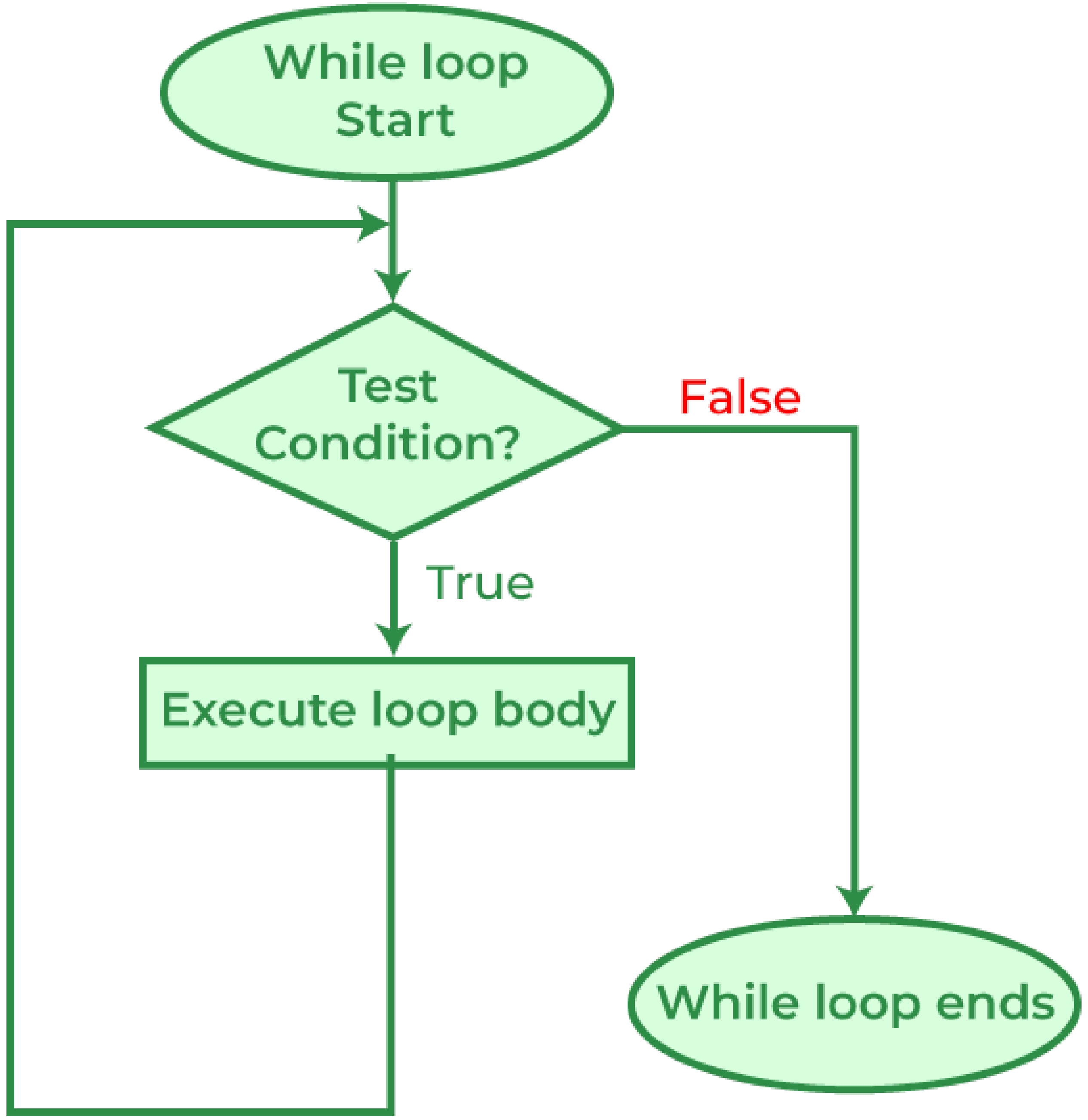
Python has two primitive loop commands:

- while loops
- for loops

WHILE LOOPS

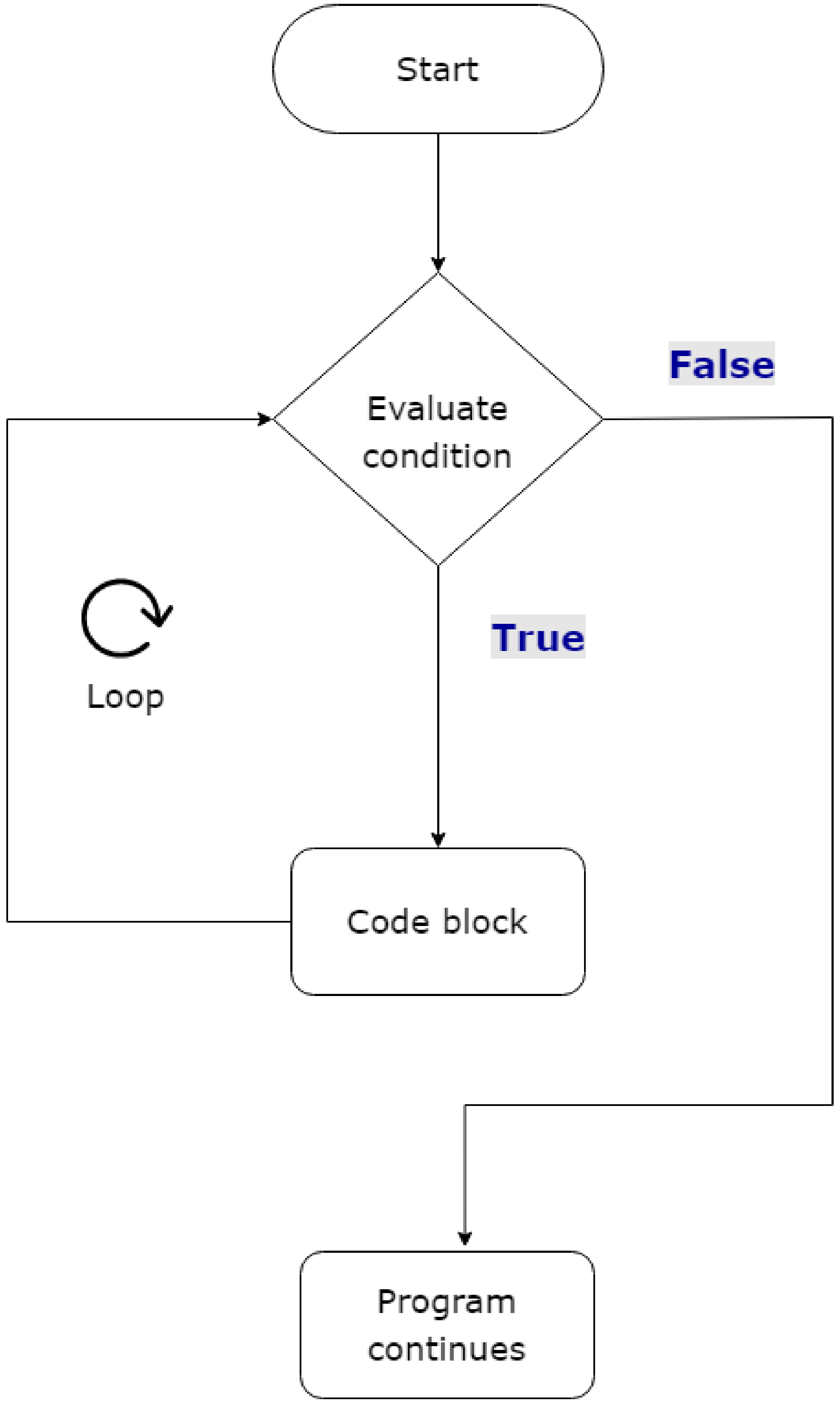
```
while (condition):
    Loop Body
    Updation expression
```

when you forget to write an exit condition for your while loop



FOR LOOPS

```
For (var) in (sequence):
    Loop Body
```



Start

Evaluate condition

False

True

Loop

Code block

Program continues

Python Collections

(LISTS, TUPLES, DICTIONARIES, STRINGS)

UNDERSTANDING MUTABILITY & ORDERING

Mutability: Can a data structure be changed after creation?

- ✅ Mutable → Can be modified
- ❌ Immutable → Cannot be modified

Ordering: Does the data structure maintain the order of elements?

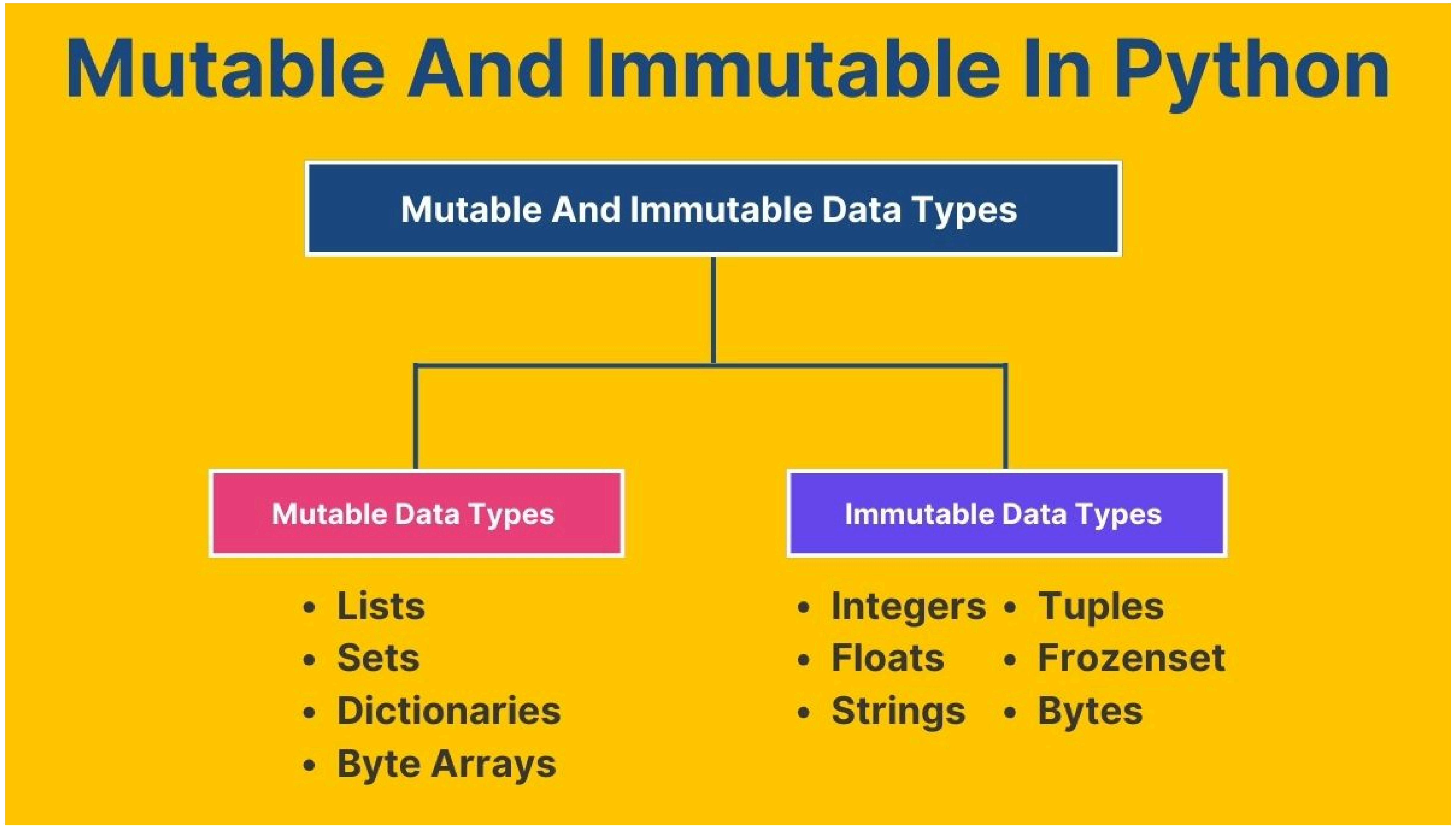
- ✅ Ordered → Elements keep their position
- ❌ Unordered → Elements may appear in any order

CLASSIFICATION OF DATA TYPES

Which Data Type is Mutable & Ordered?

Data Type	Mutable?	Ordered?
List ([])	✅ Yes	✅ Yes
Tuple (())	❌ No	✅ Yes
Dictionary ({})	✅ Yes	✅ Yes (Python 3.7+)
String ("")	❌ No	✅ Yes
Set ({})	✅ Yes	❌ No

CODE DEMONSTRATION OF MUTABILITY & ORDERING



Mutable And Immutable In Python

Mutable And Immutable Data Types

Mutable Data Types

- Lists
- Sets
- Dictionaries
- Byte Arrays

Immutable Data Types

- Integers
- Floats
- Strings
- Tuples
- Frozenset
- Bytes

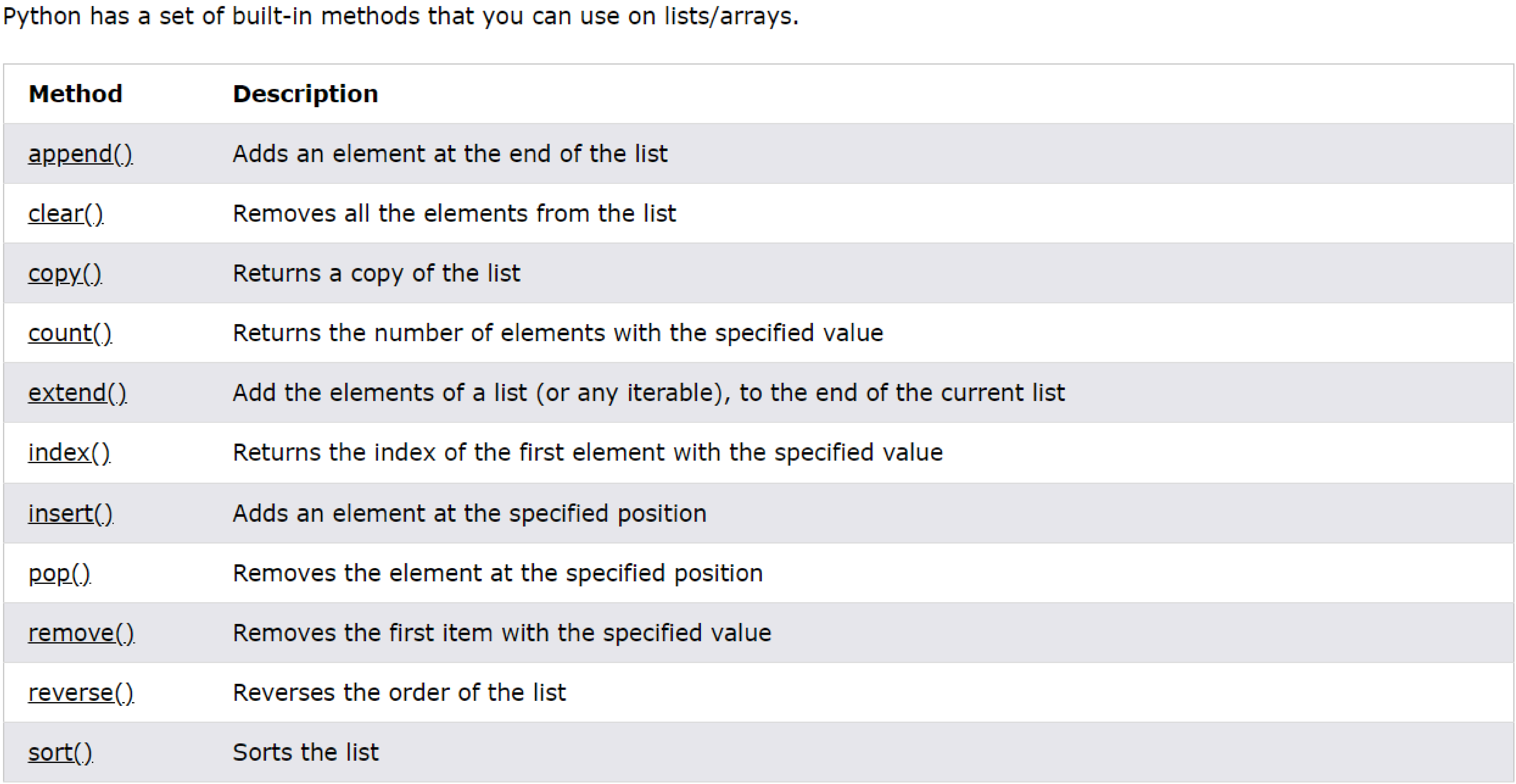
LISTS IN PYTHON

What is a List?

- A list is an ordered, mutable collection of elements.
- It can contain different data types (numbers, strings, booleans, etc.).
- Defined using square brackets [].

```
fruits = ["apple", "banana", "cherry"]
numbers = [1, 2, 3, 4, 5]
```

COMMON LIST METHODS



Python has a set of built-in methods that you can use on lists/arrays.

Method	Description
append()	Adds an element at the end of the list
clear()	Removes all the elements from the list
copy()	Returns a copy of the list
count()	Returns the number of elements with the specified value
extend()	Add the elements of a list (or any iterable), to the end of the current list
index()	Returns the index of the first element with the specified value
insert()	Adds an element at the specified position
pop()	Removes the element at the specified position
remove()	Removes the first item with the specified value
reverse()	Reverses the order of the list
sort()	Sorts the list

PRACTICE QUESTION

📝 Task:

- 1️⃣ Create a list of 3 cities.
- 2️⃣ Add a new city at the end.
- 3️⃣ Insert a city at the 2nd position.
- 4️⃣ Remove a city by name.
- 5️⃣ Print the final list.

TUPLES IN PYTHON

What is a Tuples ?

- A tuple is an ordered, immutable collection of elements.
- Defined using parentheses ( ).
- Once created, elements cannot be changed.

```
# Creating a tuple
fruits = ("apple", "banana", "cherry")
print(fruits)  # Output: ('apple', 'banana', 'cherry')
```

COMMON TUPLE METHODS

Method	Description	Example
count(x)	Counts occurrences of x	fruits.count("apple")
index(x)	Returns index of x	fruits.index("banana")
len(tuple)	Returns length	len(fruits)

TUPLE UNPACKING

Tuple unpacking allows you to assign multiple values from a tuple to variables in a single step.

✅ Basic Tuple Unpacking

```
t = (1, 2, 3)
a, b, c = t  # Unpacking tuple values into variables
print(a, b, c)  # Output: 1 2 3
```

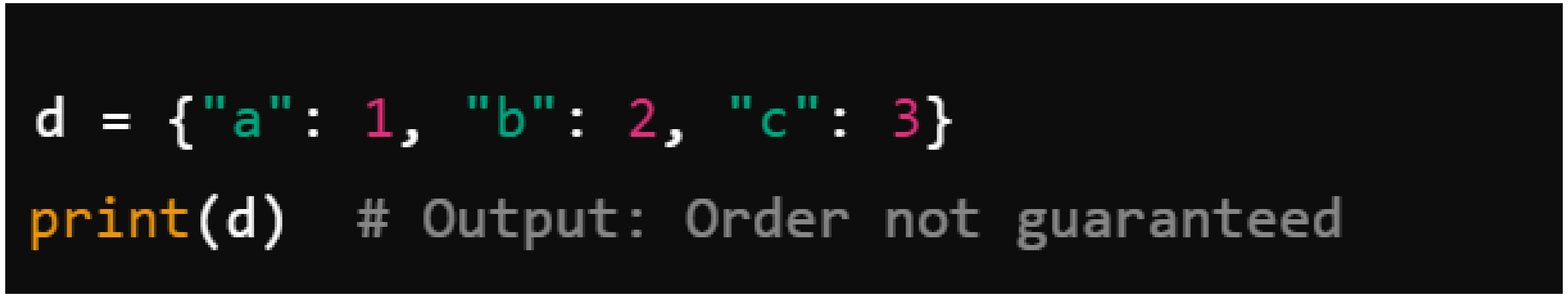
✅ Unpacking with Different Lengths (Using *)

```
t = (1, 2, 3, 4, 5)
a, *b, c = t     # `b` will capture middle values as a list
print(a)  # 1
print(b)  # [2, 3, 4]
print(c)  # 5
```

DICTIONARY INDEXING BEFORE & AFTER PYTHON 3.7

- Before Python 3.7

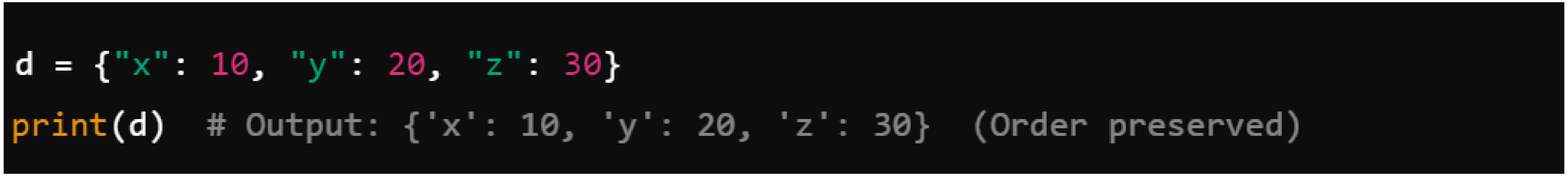
Dictionaries were unordered, meaning key-value pairs could be in any order.



```
d = {"a": 1, "b": 2, "c": 3}
print(d)  # Output: Order not guaranteed
```

- After Python 3.7 (CPython Implementation)

- Dictionaries maintain insertion order, meaning keys appear in the order they were added.



```
d = {"x": 10, "y": 20, "z": 30}
print(d)  # Output: {'x': 10, 'y': 20, 'z': 30}  (Order preserved)
```

PRACTICE QUESTION

📝 Task:

- 1️⃣ Create a tuple of 3 student names.
- 2️⃣ Find the index of a specific student.
- 3️⃣ Count how many times a name appears.
- 4️⃣ Unpack the tuple into variables.

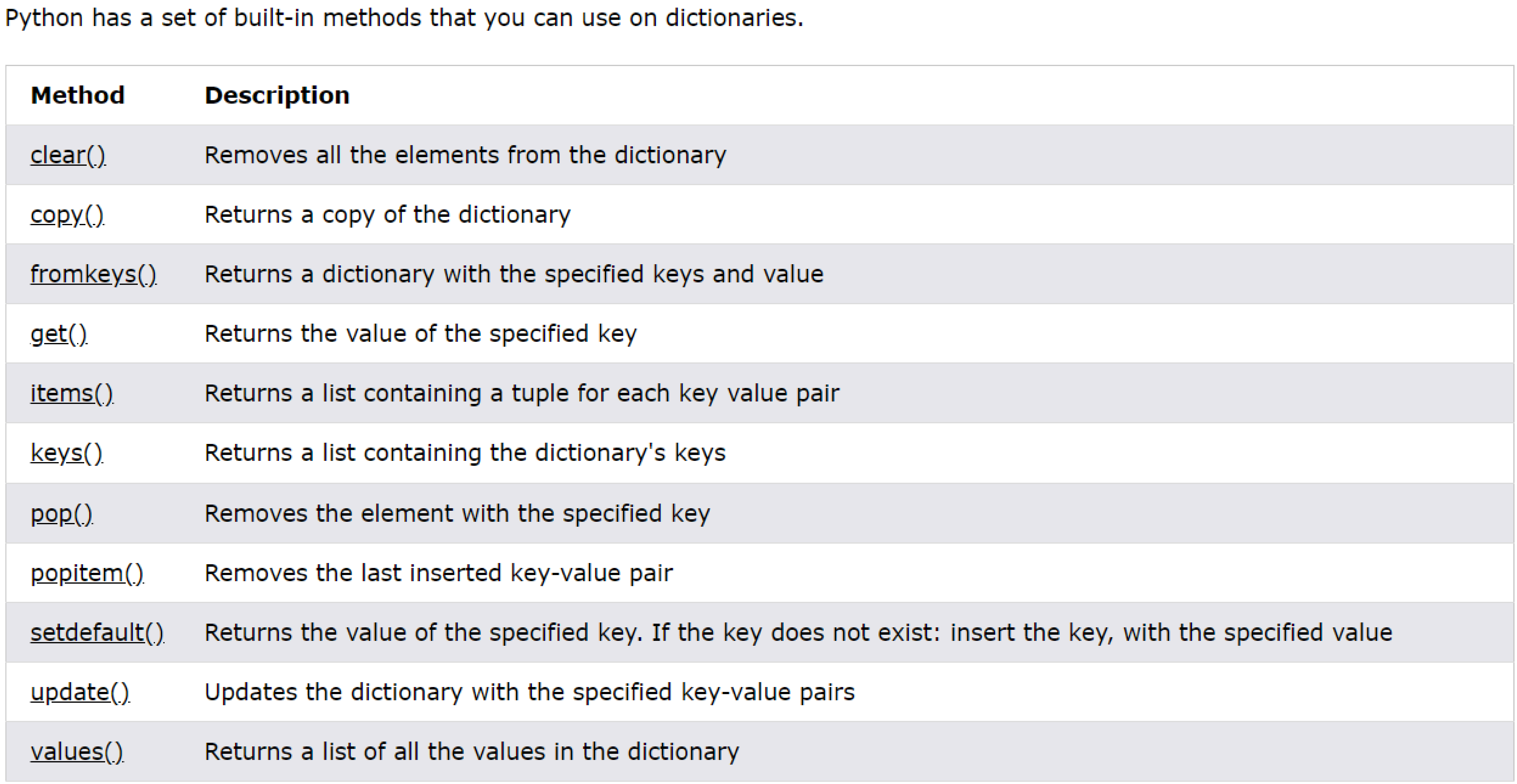
DICTIONARY IN PYTHON

What is a Dictionary ?

- A dictionary (dict) is an unordered, mutable collection of key-value pairs.
- Keys must be unique and immutable (strings, numbers, tuples).
- Values can be any data type.
- Created using {} or the dict() function.

```
# Creating a tuple
student = {"name": "Alice", "age": 20, "marks": [90, 80, 85]}
print(student["name"])  # Output: Alice
```

DICTIONARY METHODS



Python has a set of built-in methods that you can use on dictionaries.

Method	Description
clear()	Removes all the elements from the dictionary
copy()	Returns a copy of the dictionary
fromkeys()	Returns a dictionary with the specified keys and value
get()	Returns the value of the specified key
items()	Returns a list containing a tuple for each key value pair
keys()	Returns a list containing the dictionary's keys
pop()	Removes the element with the specified key
popitem()	Removes the last inserted key-value pair
setdefault()	Returns the value of the specified key. If the key does not exist: insert the key, with the specified value
update()	Updates the dictionary with the specified key-value pairs
values()	Returns a list of all the values in the dictionary

THANK YOU