# Python Academy Course - Module 5

## Lesson 5.4 — Dictionaries in Python (Very Detailed)

### 🌟 Learning Goal:

Understand how to use dictionaries to store and manage key-value pairs, perform lookups, updates, and apply dictionary methods.

## 🔢 1. What is a Dictionary?

* A **dictionary** in Python is a collection of **key-value pairs**.
* Each key is **unique**, and used to access its corresponding value.
* Dictionaries are **unordered** (before Python 3.7), **mutable**, and enclosed in **curly braces {}**.

**Example:**

employee = {  
 "name": "Alice",  
 "department": "HR",  
 "salary": 6000  
}

## 🔢 2. Creating Dictionaries

### a) Using curly braces:

person = {"name": "John", "age": 30}

### b) Using the dict() constructor:

person = dict(name="John", age=30)

## 🔢 3. Accessing Dictionary Values

Use the key to access the value:

print(employee["name"]) # Alice  
print(employee.get("salary")) # 6000

### Note:

* get() is safer because it doesn’t throw an error if the key doesn’t exist.

print(employee.get("bonus", 0)) # Default: 0

## 🔢 4. Updating and Adding Values

employee["salary"] = 7000 # Update existing value  
employee["bonus"] = 1000 # Add new key-value pair

## 🔢 5. Removing Items

### a) .pop() — remove by key:

employee.pop("bonus")

### b) .popitem() — remove last item (Python 3.7+):

employee.popitem()

### c) del keyword:

del employee["department"]

### d) .clear() — removes all items:

employee.clear()

## 🔢 6. Dictionary Methods

### a) .keys()

Returns a list of keys.

employee.keys()

### b) .values()

Returns a list of values.

employee.values()

### c) .items()

Returns all key-value pairs as tuples.

for key, value in employee.items():  
 print(f"{key}: {value}")

## 🔢 7. Checking Key Existence

if "name" in employee:  
 print("Name is present")

## 🔢 8. Nested Dictionaries

You can store dictionaries inside other dictionaries:

company = {  
 "emp1": {"name": "Alice", "salary": 6000},  
 "emp2": {"name": "Bob", "salary": 5500}  
}  
  
print(company["emp1"]["name"]) # Alice

## 🛠️ Hands-On Exercise 5.4

1. Create a dictionary for an employee with name, department, and salary.
2. Add a new key: “experience” with a value of 5.
3. Update the salary.
4. Use .get() to retrieve department safely.
5. Print all key-value pairs using a loop.

## 🔍 Mini Quiz 5.4

1. What type of data structure is a dictionary?
2. How do you access the value of a key called “age”?
3. Which method gives you all the keys in a dictionary?
4. How do you safely check if a key exists?
5. Can dictionary keys be duplicated?

## 🔹 Summary of Lesson 5.4

* Dictionaries store data as key-value pairs.
* Keys must be unique; values can be anything.
* Use .get(), .keys(), .values(), .items() for retrieval.
* Dictionaries are mutable and support nesting.
* Widely used for structured, named data.

*End of Lesson 5.4*