University: Mohamed Khider University of Biskra
Faculty: Faculty of Exact Sciences
Department: Department of SM
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Prepared by: Dr OUAAR Fatima

Module: Scientific Programming
Level: 2nd Year LMD
Specialty: Physics
Session: Practical Work N°2
Subject: Dictionaries

SESSION 2
Dictionaries – Creation, Access and Modification

LEARNING GOALS

- Understand the idea of a key–value pair.
- Create and access a dictionary.
- Add, modify and delete information.
- Recognize a simple scientific use of dictionaries.

SHORT THEORY

A **dictionary** stores information as `key:value` pairs. The key identifies the information. A dictionary is useful when data have names rather than only positions.

1. Creating and accessing a dictionary

LET'S TRY

```
student = {"name":"Sara", "physics":16, "math":14}

print(student["name"])
print(student["physics"])
```

The keys are `"name"`, `"physics"` and `"math"`.

2. Add and modify

GUIDED PRACTICE

```
student["english"] = 15
student["physics"] = 17
print(student)
```

Use `d[key] = value` to add a new key or modify an existing value.

3. Delete and inspect

LET'S TRY

```
del student["english"]

print(student.keys())
print(student.values())
print(student.items())
```

PHYSICS CONNECTION

A small dictionary can represent named experimental information:

```
measurement = {"temperature": 25.4, "unit":"C", "trial":1}
```

The purpose is simply to organize related values with meaningful names.

Guided examples

LET'S TRY

Example – physical quantities

```
data = {"mass":2.0, "velocity":3.0}

print(data["mass"])
print(data["velocity"])

data["velocity"] = 4.0
print(data)
```

GUIDED PRACTICE

Example – a laboratory record

```
lab = {"sample":"A", "length":12.5, "mass":4.2}

lab["length"] = 12.7
lab["temperature"] = 22.0

print(lab)
```

SHORT THEORY

Essential operations

- Access: `d[key]`
- Add/modify: `d[key] = value`
- Delete: `del d[key]`
- Inspect: `d.keys()`, `d.values()`, `d.items()`

TRY IT YOURSELF – NO SOLUTION

1. Create a dictionary containing a student's name, physics mark and mathematics mark.
2. Add an English mark.
3. Modify the physics mark.
4. Delete the English mark.
5. Create a dictionary for a measurement containing value, unit and trial number.

QUICK TIP

Do not memorize everything at once. First remember the central idea:

$$\boxed{\text{key} \longrightarrow \text{value}}$$