	SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGG.	**LABORATORY MANUAL**
	PRACTICAL EXPERIMENT INSTRUCTION SHEET	
	EXPERIMENT TITLE : Write a program to demonstrate working with dictionaries in python.	

EXPERIMENT NO. : **SSGMCE/WI/IT/01/3IT09/01**		ISSUE NO. : 00	ISSUE DATE : 30.07.2023
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1.0) AIM: Write a program to demonstrate working with dictionaries in python.

2.0) SCOPE: The scope of this Python program is to demonstrate various operations with dictionaries, a fundamental data structure in Python. This program showcases how to create dictionaries, access elements, modify values, add new key-value pairs, remove entries, and perform other common dictionary-related tasks.

3.0) FACILITIES/ APPARATUS:

1. Python development environment (e.g., IDLE)
2. Input mechanism (keyboard)
3. Computer with Python installed

4.0) THEORY:

Dictionaries in Python:

Dictionaries are unordered collections of key-value pairs in Python. Each key is unique and maps to a specific value. Dictionaries are defined using curly braces {} and use colons : to separate keys and values.

Example:

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```python
# Creating a dictionary
student = {
    "name": "Alice",
    "age": 20,
    "major": "Computer Science",
    "courses": ["Python", "Data Structures", "Algorithms"]
}

# Accessing dictionary elements
print("Student's name:", student["name"])
print("Student's age:", student["age"])

# Modifying a value
student["age"] = 21
print("Updated age:", student["age"])

# Adding a new key-value pair
student["gpa"] = 3.9
print("Student's GPA:", student["gpa"])

# Dictionary keys and values
print("Keys:", student.keys())
print("Values:", student.values())

# Checking if a key exists
if "gender" in student:
    print("Student's gender:", student["gender"])
else:
    print("Gender information not available")

# Looping through keys and values
print("Student's details:")
for key, value in student.items():
    print(key + ":", value)
```

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Output:

```
Student's name: Alice
Student's age: 20
Updated age: 21
Student's GPA: 3.9
Keys: dict_keys(['name', 'age', 'major', 'courses', 'gpa'])
Values: dict_values(['Alice', 21, 'Computer Science', ['Python', 'Data Struc
Gender information not available
Student's details:
name: Alice
age: 21
major: Computer Science
courses: ['Python', 'Data Structures', 'Algorithms']
gpa: 3.9
```

Explanation:

In the example above:

1. We create a dictionary named student containing various key-value pairs. Each key (e.g., "name," "age") maps to a corresponding value (e.g., "Alice," 20).

2. We access dictionary elements using square brackets, such as student["name"], to retrieve the value associated with a specific key.

3. We modify the value associated with the "age" key, updating it to 21.

4. A new key-value pair "gpa" is added to the dictionary using student["gpa"] = 3.9.

5. We can obtain the keys and values of the dictionary using the keys() and values() methods.

6. We check if the key "gender" exists in the dictionary using the in operator and provide an appropriate message.

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7. A for loop is used to iterate through the keys and values of the dictionary, allowing us to print each key-value pair.

8. Dictionaries are versatile data structures in Python, commonly used for storing and manipulating data in real-world applications where information can be organized using keys and values.

Dictionaries in Python:

- Dictionaries are unordered collections of key-value pairs.
- Each key in a dictionary is unique and maps to a specific value.
- Dictionaries are defined using curly braces {} and use colons : to separate keys and values.

Program Description:

1. Creating a Dictionary: We start by creating a dictionary named student that represents student information. It contains key-value pairs such as "name," "age," "major," and "courses."

2. Accessing Dictionary Elements: We demonstrate how to access dictionary elements using square brackets, e.g., student["name"], which retrieves the value associated with a specific key.

3. Modifying Values: We modify the value associated with the "age" key, updating it from 20 to 21.

4. Adding a New Key-Value Pair: We add a new key-value pair, "gpa," to the dictionary using student["gpa"] = 3.9.

5. Dictionary Keys and Values: We use the keys() and values() methods to obtain the keys and values of the dictionary.

6. Checking Key Existence: We check if the key "gender" exists in the dictionary using the in operator and provide a suitable message.

7. Looping Through Keys and Values: We demonstrate a for loop to iterate through the keys and values of the dictionary, allowing us to print each key-value pair.

8. Removing a Key-Value Pair: We use the del statement to remove a key-value pair from the dictionary. In this case, we remove the "courses" key.

9. Length of the Dictionary: We determine the number of key-value pairs in the dictionary using the len() function.

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Example:

For example, when we access student["name"], we retrieve the value "Alice" associated with the "name"

key. This exemplifies the concept of key-value pairs in dictionaries.

Program Execution Line by Line:

- Line 4: We create a dictionary named student.

- Line 7-10: We access dictionary elements and print them.

- Line 13: We modify the value associated with the "age" key.

- Line 16: We add a new key-value pair "gpa" to the dictionary.

- Line 19-20: We obtain dictionary keys and values.

- Line 23-27: We check key existence, loop through keys and values, and print them.

- Line 30: We remove the "courses" key-value pair.

- Line 33: We calculate the length of the dictionary.

Program

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```python
# Creating a dictionary
student = {
    "name": "Alice",
    "age": 20,
    "major": "Computer Science",
    "courses": ["Python", "Data Structures", "Algorithms"]
}

# Accessing dictionary elements
print("Student's name:", student["name"])
print("Student's age:", student["age"])

# Modifying a value
student["age"] = 21
print("Updated age:", student["age"])

# Adding a new key-value pair
student["gpa"] = 3.9
print("Student's GPA:", student["gpa"])
```

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```python
# Dictionary keys and values
print("Keys:", student.keys())
print("Values:", student.values())

# Checking if a key exists
if "gender" in student:
    print("Student's gender:", student["gender"])
else:
    print("Gender information not available")

# Looping through keys and values
print("Student's details:")
for key, value in student.items():
    print(key + ":", value)

# Removing a key-value pair
del student["courses"]
print("Courses removed:", student)

# Length of the dictionary
print("Number of key-value pairs:", len(student))
```

Output

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```
Student's name: Alice
Student's age: 20
Updated age: 21
Student's GPA: 3.9
Keys: dict_keys(['name', 'age', 'major', 'courses', 'gpa'])
Values: dict_values(['Alice', 21, 'Computer Science', ['Python', 'Data Struc
Gender information not available
Student's details:
name: Alice
age: 21
major: Computer Science
courses: ['Python', 'Data Structures', 'Algorithms']
gpa: 3.9
Courses removed: {'name': 'Alice', 'age': 21, 'major': 'Computer Science', '
Number of key-value pairs: 4
```

In this program, we create a dictionary named student and perform various operations:

1. Accessing dictionary elements.
2. Modifying a value.
3. Adding a new key-value pair.
4. Obtaining keys and values.
5. Checking if a key exists.
6. Looping through keys and values.
7. Removing a key-value pair.
8. Determining the length of the dictionary.

This program demonstrates how to work with dictionaries in Python, showing their flexibility in storing and manipulating data.

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4.2) Program Execution:

1. We create the fruits tuple with three elements.

2. The program accesses and prints the first, second, and third elements of the tuple.

3. It calculates and displays the number of fruits in the tuple.

4. A for loop iterates through the tuple's elements, printing each fruit.

5. The program checks if "apple" is present in the tuple and displays a message accordingly.

6. Finally, tuple unpacking is demonstrated by assigning elements to variables a, b, and c.

5.0) Conclusion:

This program serves as an essential introduction to working with dictionaries in Python. It demonstrates fundamental operations such as creation, access, modification, addition, removal, and traversal of key-value pairs within dictionaries. Students can gain a solid understanding of dictionaries, a crucial data structure in Python, and apply these skills in various programming tasks.

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