Lab 7: Dictionaries in Python

Objectives:

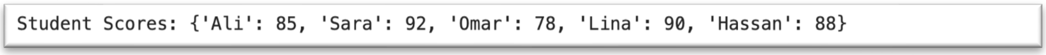
- Create and manipulate dictionaries using key-value pairs.
- Apply dictionary methods and access techniques.
- Use dictionary comprehensions and membership tests.
- Practice iteration and deletion operations.

Part 1: Creating and Accessing Dictionaries

1. Create a dictionary named **`student_scores`** with the following key-value pairs:

```
student_scores = {
    "Ali": 85,
    "Sara": 92,
    "Omar": 78,
    "Lina": 90,
    "Hassan": 88
}
```

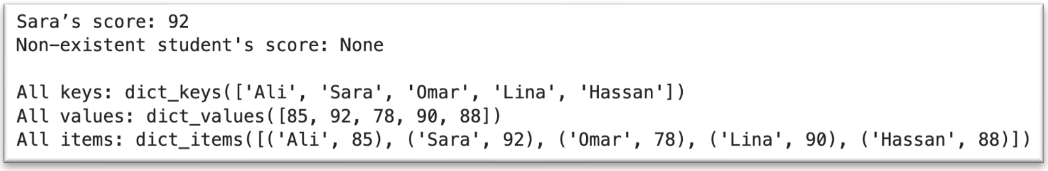
1. **`print`** the entire dictionary.



```
Student Scores: {'Ali': 85, 'Sara': 92, 'Omar': 78, 'Lina': 90, 'Hassan': 88}
```

2. Access and print:

   - **Sara's score** using square brackets.
   - A **non-existent student's score** using **`.get()`** method.
   - All **keys** using **`.keys()`**
   - All **values** using **`.values()`**
   - All **items** using **`.items()`**



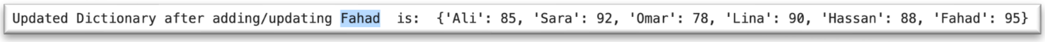
```
Sara’s score: 92
Non-existent student's score: None

All keys: dict_keys(['Ali', 'Sara', 'Omar', 'Lina', 'Hassan'])
All values: dict_values([85, 92, 78, 90, 88])
All items: dict_items([('Ali', 85), ('Sara', 92), ('Omar', 78), ('Lina', 90), ('Hassan', 88)])
```

Part 2: Dictionary Operations

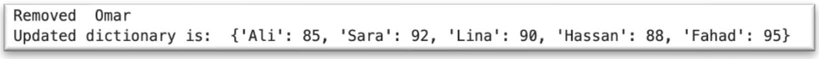
Write the following **functions** that:

- `add_or_update_score(d, name, score)` – Adds a new student or updates the score if the student already exists.



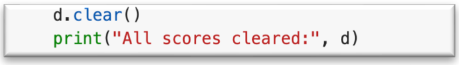
```
Updated Dictionary after adding/updating Fahad  is:  {'Ali': 85, 'Sara': 92, 'Omar': 78, 'Lina': 90, 'Hassan': 88, 'Fahad': 95}
```

- `remove_student(d, name)` – Removes a student using **`.pop()`** and prints the updated dictionary.

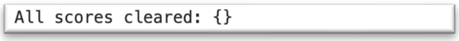


```
Removed  Omar
Updated dictionary is:  {'Ali': 85, 'Sara': 92, 'Lina': 90, 'Hassan': 88, 'Fahad': 95}
```

- `clear_scores(d)` – Clears all entries using **`.clear()`**

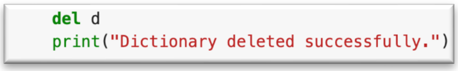


```
    d.clear()
    print("All scores cleared:", d)
```

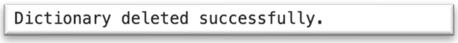


```
All scores cleared: {}
```

- `delete_dictionary(d)` – Deletes the dictionary using **`del`**.



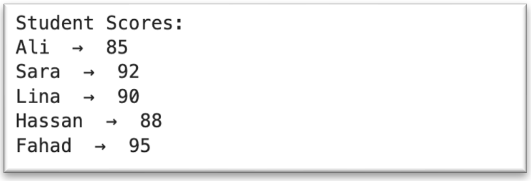
```
    del d
    print("Dictionary deleted successfully.")
```



```
Dictionary deleted successfully.
```

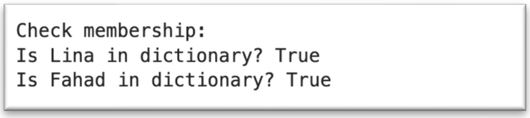
Part 3: Iteration and Membership

- **Iterate** through **`student_scores`** and print each student and their score.



```
Student Scores:
Ali  →  85
Sara  →  92
Lina  →  90
Hassan  →  88
Fahad  →  95
```

- Check **`if "Lina"`** is **`in`** the **dictionary**.
- Check **`if "Fahad"`** is **`in`** the **dictionary**.



```
Check membership:
Is Lina in dictionary? True
Is Fahad in dictionary? True
```

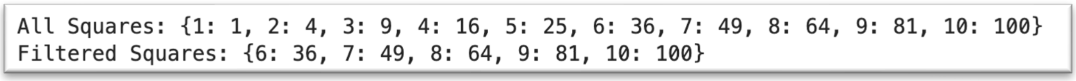
Part 4: Dictionary Comprehension

- Create a dictionary named **`squares`** that maps numbers **from 1 to 10** to their **squares** using **dictionary comprehension:**

  ```
  squares = {x: x**2 for x in range(1, 11)}
  ```

- Modify the comprehension to include **only numbers whose square is greater than 30:**

```
filtered_squares = {x: x**2 for x in range(1, 11) if x**2 > 30}
```

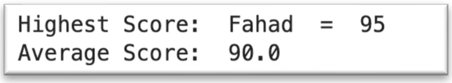


```
All Squares: {1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100}
Filtered Squares: {6: 36, 7: 49, 8: 64, 9: 81, 10: 100}
```

Part 5: Advanced Tasks

Write the following **functions**:

- **`highest_score(d)`** – Returns the name of the student with the highest score.
- **`average_score(d)`** – Returns the average score of all students.



```
Highest Score:  Fahad  =  95
Average Score:  90.0
```