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Dictionaries – Part II

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C14: Problem Solving with Programming

Quick Recap:

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- Dictionaries in Python
- Creating a Dictionary
- Accessing Dictionary
- Updating Dictionary
- keys() , values() , items()

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Iterating a Dictionary

Iterating Through Dictionaries

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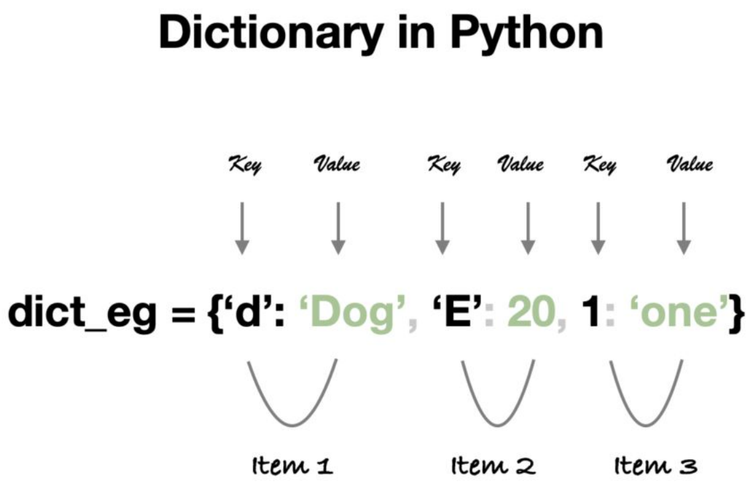
"Dictionaries often contain data that we want to process or analyze."

"Looping through dictionaries allows us to access data stored inside and use it in various ways."



Looping Through Key-Value Pairs

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```python
for fruit, price in fruit_prices.items():
    print(f"{fruit} costs ${price}")
# Output:
# apple costs $0.99
# banana costs $0.49
# orange costs $0.79
```

Using **my_dict.items()** returns each **key-value pair** in the form of a tuple, which we can then unpack into key and value in the loop. This gives us access to both elements.

Looping Through Values Only

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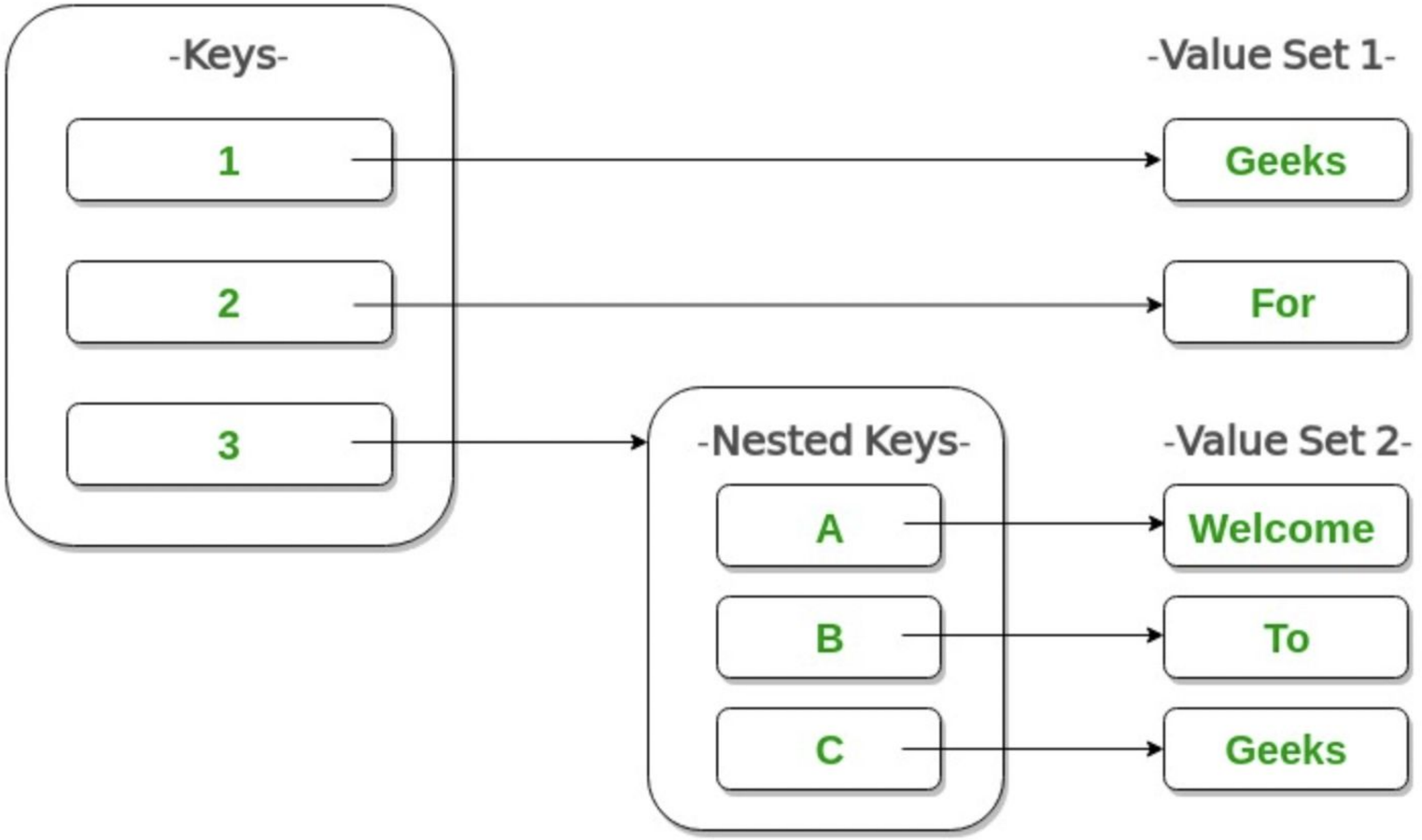
```python
for price in fruit_prices.values():
    print(price)
# Output:
# 0.99
# 0.49
# 0.79
```

Using **my_dict.values()** retrieves only the values from the dictionary, leaving the keys out.

Nested Dictionaries

A **nested dictionary** is a dictionary that contains other dictionaries as values



Syntax of a Nested Dictionary

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The syntax for creating a nested dictionary is similar to a regular dictionary, but the values within it are also dictionaries.

```
# Basic syntax of a nested dictionary
nested_dict = {
    "key1": {"sub_key1": "value1", "sub_key2": "value2"},
    "key2": {"sub_key1": "value3", "sub_key2": "value4"}
}
```

- **Outer Dictionary**: Contains main keys ("**key1**" and "**key2**" in the example above).
- **Inner Dictionaries**: Each key in the outer dictionary maps to another dictionary, containing its **own key-value pairs**.

Creating the Nested Dictionary

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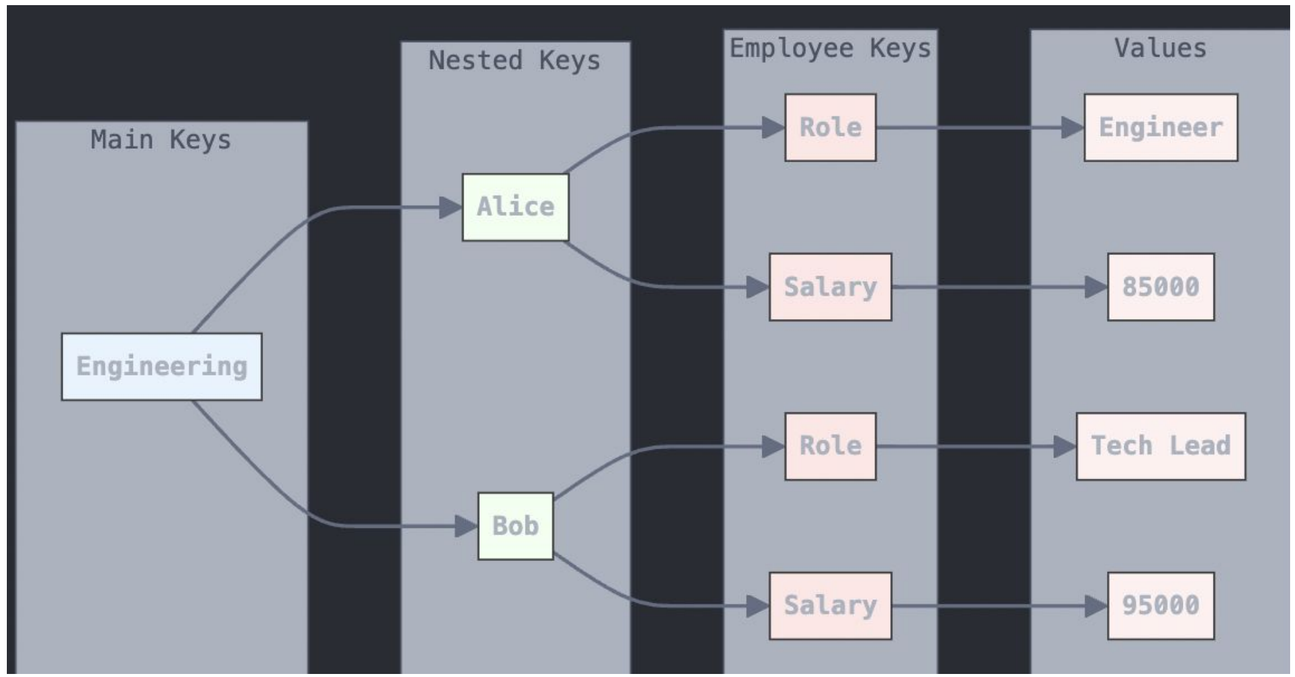
```
company_data = {
    "Engineering": {
        "Alice": {"Role": "Engineer", "Salary": 85000},
        "Bob": {"Role": "Tech Lead", "Salary": 95000}
    },
    "Marketing": {
        "Charlie": {"Role": "Analyst", "Salary": 65000},
        "Daisy": {"Role": "Manager", "Salary": 78000}
    }
}
```

Visualizing the elements in Nested



- The **outer dictionary** has department names as keys, like "**Engineering**" and "**Marketing**".
- Each department **key maps to another dictionary**, which contains employees as **keys** (e.g., "Alice", "Bob").
- The **keys "Role" and "Salary"** describe the employee's job position and compensation, respectively, while the **values** are the actual data (like "Engineer" and 85000)

Accessing Elements in Nested

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To access elements in a nested dictionary, specify each key level to drill down to the specific value you need.

python

```python
role_bob = company_data["Engineering"]["Bob"]["Role"]
print(role_bob)  # Output: Tech Lead
```

python

```python
salary_daisy = company_data["Marketing"]["Daisy"]["Salary"]
print(salary_daisy)  # Output: 78000
```

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Dictionary Comprehension

Dictionary Comprehension

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Dictionary comprehension is a concise way to create dictionaries by applying an expression to an iterable. It is similar to list comprehensions but produces dictionaries instead of lists.

```python
{key_expression: value_expression for item in iterable if condition}
```

Where:

- **key_expression**: The key you want in the dictionary.
- **value_expression**: The value associated with that key.
- **iterable**: An iterable (like a list or range) over which the comprehension is executed.
- **condition (optional)**: A condition that filters which items to include in the dictionary.

Creating a Dictionary Comprehension

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```python
numbers = [1, 2, 3, 4, 5]
squares = {num: num ** 2 for num in numbers}
print(squares)
```

The comprehension loops through each number in the numbers list, computes the square, and stores it in a dictionary with the number as the key.

```python
{1: 1, 2: 4, 3: 9, 4: 16, 5: 25}
```

Thank You!