

A **dictionary** is a built-in data structure that stores data as **key-value pairs**.

### Key Characteristics

- **Ordered** (Python 3.7+): Items maintain insertion order.
- **Mutable**: You can add, update, or delete items.
- **Indexed by keys**: Not by position like lists.
- **Keys must be unique and immutable**: Strings, numbers, or tuples.
- **Values can be any data type**: Even lists or other dictionaries.

```
student = {  
    "name": "Sasikala",  
    "age": 21,  
    "grade": "A"  
}
```

### Common Operations

Operation	Example	Result
Access value	<code>student["name"]</code>	"Sasikala"
Add item	<code>student["status"] = "active"</code>	Adds new key-value pair
Update value	<code>student["grade"] = "A+"</code>	Changes grade to "A+"
Delete item	<code>del student["age"]</code>	Removes "age" key
Get keys	<code>student.keys()</code>	<code>dict_keys([...])</code>
Get values	<code>student.values()</code>	<code>dict_values([...])</code>
Get items	<code>student.items()</code>	<code>dict_items([...])</code>

```
d = {  
    "name": "Sasikala",  
    "role": "Professor",  
    "subject": "Python",  
    "year": 2025}
```

1.

for key in d:

```
    print(key)
```

2. for value in d.values():

```
print(value)
```

3. for key, value in d.items():

```
print(f'{key}: {value}')
```

4. d1 = {'a': 1, 'b': 2}

d2 = {'b': 3, 'c': 4}

merged = d1 | d2

# Output: {'a': 1, 'b': 3, 'c': 4}

5. squares = {x: x\*\*2 for x in range(5)}

# Output: {0: 0, 1: 1, 2: 4, 3: 9, 4: 16}

6. grades = {'Aarav': 85, 'Diya': 92, 'Kabir': 78}

passed = {k: v for k, v in grades.items() if v >= 80}

7. student = {

```
    'name': 'Aarav',
```

```
    'marks': {'math': 90, 'science': 85}
```

```
} print(student['marks']['science']) # Output: 85
```

8. d = {'name': 'Sasikala', 'role': 'Professor', 'year': 2025}

value\_at\_index\_1 = list(d.values())[1]

print(value\_at\_index\_1)

1. Create last 3 days temperature average and store atleast 5 readings / day using dictionary
2. Find best ratings and lowest price of amazon products. Get product id, rating and price

2, 22, 24, 36, 44,