DATA SCIENCE COURSE TUTORIAL # 28

3.17.4 Dictionaries

What is a Dictionary?

A dictionary in Python is a collection of key-value pairs. Each key must be unique, and it is used to access its corresponding value. Dictionaries are unordered, changeable (mutable), and indexed by keys.

Example:

```
student = {
    "name": "Ali",
    "age": 22,
    "country": "Pakistan"
}
print(student)
```

Accessing Dictionary Items

You can access values by using their keys.

Example:

```
print(student["name"])        # Ali
print(student.get("age"))     # 22
```

Changing Dictionary Items

You can update values by reassigning them with their keys.

Example:

```
student["age"] = 23
print(student)
```

Adding New Items

You can add a new key-value pair simply by assigning a value to a new key.

Example:

```
student["grade"] = "A"
print(student)
```

Removing Items

Dictionaries provide several methods to remove items.

Example:

```
student.pop("age")           # Removes the key 'age'
student.popitem()            # Removes the last inserted item
student.clear()              # Removes all items
```

Looping through a Dictionary

You can loop through keys, values, or both.

Example:

```
for key in student:
    print(key)               # Prints keys

for value in student.values():
    print(value)             # Prints values

for key, value in student.items():
    print(key, value)        # Prints key-value pairs
```

Dictionary Methods and Functions

Dictionaries come with many useful methods.

Example:

```
info = {"a": 1, "b": 2, "c": 3}

print(info.keys())       # dict_keys(['a', 'b', 'c'])
print(info.values())     # dict_values([1, 2, 3])
print(info.items())      # dict_items([('a', 1), ('b', 2), ('c', 3)])

copy_info = info.copy()  # Creates a copy of dictionary
print(copy_info)
```

Other common functions:

- `len(dictionary)` → Returns the number of items.
- `dict()` → Creates a new dictionary.
- `update()` → Updates one dictionary with another.

Example:

```
info.update({"d": 4})
print(info)   # {'a': 1, 'b': 2, 'c': 3, 'd': 4}
```