DATA SCIENCE COURSE TUTORIAL # 26

3.17.2 Tuples

What is a Tuple?

A tuple is like a list, but it is unchangeable (immutable). Once created, its items cannot be modified.

Example:

```
colors = ("red", "green", "blue")
```

Accessing Tuple Items

You can access tuple items using their index.

Example:

```
print(colors[1])   # green
```

Trying to Change Items

If you try to modify a tuple item, Python will give an error because tuples are immutable.

Example:

```
colors[0] = "yellow"   # Error! Tuples can't be changed
```

Tuples are used when you want your data to be safe from accidental changes.

Unpacking Tuples

You can assign values from a tuple directly into variables.

Example:

```
name, age, country = ("Ali", 25, "Pakistan")
```

Now the values will be assigned as:

- **name → "Ali"**
- **age → 25**
- **country → "Pakistan"**

Tuple Methods

Even though tuples are immutable, Python provides some useful built-in methods for working with them.

Example:

```
numbers = (1, 2, 2, 3, 4, 2)

print(numbers.count(2))   # 3 (counts how many times 2 appears)
print(numbers.index(3))   # 3 (returns the index of first occurrence of 3)
```

Common Tuple Functions

Some functions also work with tuples:

```
print(len(numbers))    # 6 (length of tuple)
print(max(numbers))    # 4 (largest item)
print(min(numbers))    # 1 (smallest item)
print(sum(numbers))    # 14 (sum of all items)
```

These methods and functions make it easier to analyze tuple data even though the tuple itself cannot be changed.