DATA SCIENCE COURSE TUTORIAL # 25

3.17 Data Structures in Python

Data structures are used to store and organize data in Python. They help us manage multiple values under a single variable.

Python provides the following main data structures:

- **Lists**
- **Tuples**
- **Dictionaries**
- **Sets**

3.17.1 Lists

What is a List?

A list is a collection of ordered, changeable items. It can store different types of values like numbers, strings, etc.

Example:

```python
fruits = ["apple", "banana", "mango"]
```

Accessing List Items

You can access list items using their index.

Example:

```python
print(fruits[0])    # apple
print(fruits[-1])   # mango (last item)
```

Changing Items

Lists are mutable, which means you can change their values.

Example:

```python
fruits[1] = "orange"
```

List Methods

Python provides several useful methods to work with lists.

Example:

```python
fruits.append("grape")      # Add at end
fruits.insert(1, "kiwi")    # Add at position 1
fruits.remove("apple")      # Remove item
fruits.pop()                # Remove last item

print(len(fruits))          # Length of list
```

List Comprehension

List comprehension provides a short way to create a new list using a loop in one line.

Example:

```python
squares = [x*x for x in range(5)]
print(squares)   # [0, 1, 4, 9, 16]
```

You can also add conditions in list comprehension.

Example:

```python
even = [x for x in range(10) if x % 2 == 0]
print(even)   # [0, 2, 4, 6, 8]
```