

Lists, Tuples, and Dictionaries in Python

Lists

A list in Python is an ordered collection of items that can be changed [mutable]. Lists can contain elements of different data types, including other lists. They are defined by enclosing the elements in square brackets `[]`.

Creating a List

```
my_list = [1, 2, 3, 'apple', 'banana']
```

Accessing Elements

You can access elements in a list using their index, starting from 0.

```
print(my_list[0]) # Output: 1
```

Modifying a List

Lists can be modified by adding, removing, or changing elements.

```
my_list.append('orange') # Adding an element
my_list[1] = 'grape'     # Changing an element
```

Common List Methods

- **append()**: Adds an element to the end of the list.
- **remove()**: Removes the first occurrence of a specified value.
- **pop()**: Removes and returns an element at a given index.

Tuples

A tuple is similar to a list but is immutable, meaning that once a tuple is created, its elements cannot be changed. Tuples are defined by enclosing the elements in parentheses `()`.

Creating a Tuple

```
my_tuple = (1, 2, 3, 'apple', 'banana')
```

Accessing Elements

Like lists, you can access elements in a tuple using their index.

```
print(my_tuple[0]) # Output: 1
```

Common Tuple Methods

- **count()**: Returns the number of times a specified value appears in the tuple.
- **index()**: Returns the index of the first occurrence of a specified value.

Dictionaries

A dictionary is an unordered collection of key-value pairs. Each key must be unique, and values can be of any data type. Dictionaries are defined using curly braces {}.

Creating a Dictionary

```
my_dict = {'name': 'Alice', 'age': 25, 'city': 'New York'}
```

Accessing Values

You can access values in a dictionary using their corresponding keys.

```
print(my_dict['name']) # Output: Alice
```

Modifying a Dictionary

Dictionaries can be modified by adding or changing key-value pairs.

```
my_dict['age'] = 26 # Changing a value  
my_dict['country'] = 'USA' # Adding a new key-value pair
```

Common Dictionary Methods

- **keys()**: Returns a view object displaying a list of all the keys in the dictionary.
- **values()**: Returns a view object displaying a list of all the values in the dictionary.
- **items()**: Returns a view object displaying a list of key-value tuple pairs.

Conclusion

Lists, tuples, and dictionaries are essential data structures in Python that serve different purposes. Lists are mutable and ordered, tuples are immutable and ordered, and dictionaries are mutable and unordered collections of key-value pairs. Understanding these data structures will significantly improve your programming skills and enable you to handle data more effectively in Python.