List and tuple

**What is a List?**

A list is a collection of items (like numbers, words, or even other lists) that:

* Can be changed after it is created.
* Items in the list are ordered, meaning they have a specific sequence.
* You can add, remove, or modify the items in a list.

Key Features of a List:

1. Mutable (Changeable):

You can modify a list after creating it by:

Adding new items.

Removing existing items.

Changing values at specific positions.

1. Ordered: The items in a list maintain their order. If you add or remove items, the order adjusts but remains consistent.
2. Duplicates Allowed: A list can have duplicate items.

Example of a List:

# Creating a list

fruits = ["apple", "banana", "cherry"]

# Modifying the list

fruits[1] = "orange" # Replace "banana" with "orange"

fruits.append("grape") # Add "grape" to the end

fruits.remove("apple") # Remove "apple" from the list

print(fruits) # Output: ['orange', 'cherry', 'grape']

What is a Tuple?

A tuple is similar to a list, but:

It cannot be changed after it is created.

It is used for data that should remain constant.

1. Immutable (Unchangeable):

Once created, the items in a tuple cannot be modified. You cannot:

Add or remove items.

Change the values of items.

1.ordered:

Like a list, tuples also maintain the order of items.

2.Duplicates Allowed:

A tuple can also have duplicate items.

Example of a Tuple:

# Creating a tuple

fruits = ("apple", "banana", "cherry")

# Trying to modify a tuple will cause an error

# fruits[1] = "orange" # This will raise an error

print(fruits) # Output: ('apple', 'banana', 'cherry')

Key Differences Between List and Tuple

| Feature | List | Tuple |
| --- | --- | --- |
| Mutability | Mutable (can be changed) | Immutable (cannot be changed) |
| Syntax | Square brackets [] | Parentheses () |
| Performance | Slower than tuple (uses more memory) | Faster than list (uses less memory) |
| Use Cases | Use when you need to modify data. | Use for fixed data that shouldn’t change. |
| Example | ["a", "b", "c"] | ("a", "b", "c") |

Use a list when:

The data may need to change (e.g., adding or removing items).

Example: A shopping list or a list of tasks.

Use a tuple when:

The data must remain constant.

Example: Storing coordinates, fixed settings, or days of the week.

*# creating*x = list()  
print(x) *# o/p []*x = []  
print(x) *# o/p []  
  
# length*x = ["apple", "banana", "cherry"]  
print(x)  
print(len(x))  
  
*# type*x = [5, 2.5, True, "apple", "apple"]  
print(type(x))  
  
*# indexing*x = [5, 2.5, True, "apple"]  
print(x[-1])  
  
*# slice*x = [5, 2.5, True, "apple"]  
y = x[1:3]  
print(y) *# o/p [2.5,True]  
  
# append*x = [5, 2.5, True, "apple"]  
x.append(7)  
print(x) *# o/p [5,2.5,True,"apple",7]  
  
# insert*x = [5, 2.5, True, "apple"]  
x.insert(1, "banana")  
print(x) *# o/p [5,banana,2.5,True,"apple"]  
  
# EXTEND*x = [5, 2.5, True, "apple"]  
y = [2, 3, "banana"]  
x.extend(y)  
print(x) *# o/p [5,2.5,True,"apple",2,3,"banana"]  
  
# remove (removes specified item)*thislist = ["apple", "banana", "cherry"]  
thislist.remove("banana")  
print(thislist) *# o/p ["apple","cherry"]  
  
# pop (removes item at particular index)*x = [5, 2.5, True, "apple"]  
x.pop(1)  
print(x) *# o/p [5,True,"apple"]  
  
# sort*x = [5, 2]  
x.sort()  
print(x) *# o/p [2,5]*x = ["apple", "mango", "banana"]  
x.sort(reverse=True)  
print(x) *# o/p ["mango","banana","apple"]  
  
# reverse*x = [5, 2.5, True, "apple"]  
x.reverse()  
print(x) *# o/p ["apple",True,2.5,5]  
  
# split*x = " ammu is a student"  
y = x.split()  
print(y)  
  
*# join*x = ["Durga", "mam", "is", "our", "trainer"]  
y = " ".join(x)  
print(y)  
  
*# count*x=[5, 6, 6, 7, 7, 8, 9]  
y=x.count(2)  
print(y) *# o/p 0  
  
# index*x=[5, 6, 6, 7, 7, 8, 9]  
print(x.index(6)) *# o/p 1  
  
# tuple creating*x=()  
print(x) *# o/p ()*x=tuple()  
print(x) *# o/p ()*print(type(x)) *# o/p <class "tuple">  
  
# length*x=(1,2,2.5,True,"hi")  
print(len(x)) *# o/p 5  
  
# changing values by converting to list*x = ("apple", "banana", "cherry", "apple")  
y = list(x)  
y[1] = "kiwi"  
x = tuple(y)  
print(x) *# o/p ("apple", "kiwi", "cherry", "apple")  
  
# add tuple to a tuple*x = ("apple","banana","cherry")  
y=(True,"hi")  
x+=y  
print(x) *# o/p ("apple","banana","cherry",True,"hi")  
  
# count*x = ("apple", "banana", "cherry", "apple")  
y=x.count("apple")  
print(y) *# o/p 2  
  
# index*x = ("apple", "banana", "cherry", "apple")  
print(x.index("apple")) *# o/p 0*list = [1, 2, 3, 4]  
list.remove(2)  
del list[1]  
popped = list.pop(0)  
print(list)