



TUPLES IN PYTHON



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- A tuple is an ordered collection of items (elements).
- Tuples are immutable (cannot be changed) once created.
- Tuples are written inside parentheses ().

① INTRODUCTION

- Tuples are used to store multiple values in a single variable.
- Tuples are immutable.

Example:

```
t = (10, 20, 30, 'hello', 3.5, True)
print(t)
# Output: (10, 20, 30, 'hello', 3.5, True)
```

② INDEXING

Indexing starts from 0.

Example:

```
t = (10, 20, 30, 40, 50)
Index: 0 1 2 3 4
-ve Index: -5 -4 -3 -2 -1
t[0] # 10
t[2] # 30
t[-1] # 50 (last element)
t[-2] # 40
```

③ TUPLE OPERATIONS

(A) Concatenation (+)

Example:

```
t1 = (1, 2, 3)
t2 = (4, 5, 6)
t3 = t1 + t2
print(t3)
# (1, 2, 3, 4, 5, 6)
```

(B) Repetition (*)

Example:

```
t = (1, 2, 3)
print(t * 3)
# (1, 2, 3, 1, 2, 3, 1, 2, 3)
```

④ MEMBERSHIP & SLICING

Membership:

```
t = (10, 20, 30, 40)
print(20 in t) # True
print(50 not in t) # True
```

Slicing:

```
t = (10, 20, 30, 40, 50)
print(t[1:4]) # (20, 30, 40)
print(t[-3:]) # (30, 40, 50)
print(t[::2]) # (10, 30, 50)
```

⑤ BUILT-IN FUNCTIONS / METHODS OF TUPLES

No.	Function / Method	Description	Example	Output
1	len(t)	Returns number of items in tuple	len((10, 20, 30))	3
2	tuple(iterable)	Converts iterable (list, string, etc.) to tuple	tuple([1, 2, 3])	(1, 2, 3)
3	count(x)	Returns number of occurrences of x	(1, 2, 2, 3, 2).count(2)	3
4	index(x)	Returns first index of x (raises error if not found)	(1, 2, 3).index(2)	1
5	sorted(t)	Returns a new sorted list from the tuple	sorted((3, 1, 2))	[1, 2, 3]
6	min(t)	Returns minimum value	min((4, 7, 2, 9))	2
7	max(t)	Returns maximum value	max((4, 7, 2, 9))	9
8	sum(t)	Returns sum of all numeric items	sum((1, 2, 3, 4))	10

Remember

- Tuples are immutable.
- Once created, they cannot be changed.

⑥ TUPLE ASSIGNMENT

- Multiple variables can be assigned in one line.
- Number of variables must match number of values.

Example:

```
a, b, c = (10, 20, 30)
print(a, b, c)
# Output: 10 20 30
```

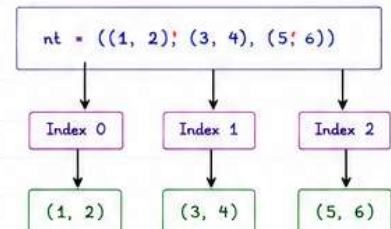
Values are packed into a tuple on right side and unpacked into variables on left side.

⑦ NESTED TUPLE

- A tuple can contain other tuples.
- Access using multiple indexes.

Example:

```
nt = ((1, 2), (3, 4), (5, 6))
print(nt[0]) # (1, 2)
print(nt[1][1]) # 4
print(nt[2][0]) # 5
```



⑧ SUGGESTED PROGRAMS

(A) Min, Max and Mean of Values in a Tuple

Example:

```
t = (10, 20, 30, 40, 50)
mn = min(t)
mx = max(t)
mean = sum(t) / len(t)
print("Min =", mn)
print("Max =", mx)
print("Mean =", mean)
# Output: Min = 10 Max = 50 Mean = 30.0
```



(B) Linear Search in a Tuple of Numbers

Example:

```
t = (12, 23, 34, 45, 56)
key = 34
found = False
for i in range(len(t)):
    if t[i] == key:
        found = True
        print("Found at index", i)
        break
if not found:
    print("Not found in tuple")
# Output: Found at index 2
```



(C) Count Frequency of Elements in a Tuple

Example:

```
t = (4, 2, 4, 5, 2, 4, 3, 2)
freq = {} # empty dictionary
for item in t:
    if item in freq:
        freq[item] += 1
    else:
        freq[item] = 1
print(freq)
# Output: {4: 3, 2: 3, 5: 1, 3: 1}
```



Exam Tip

Practice tuple programs regularly. Focus on indexing, slicing and built-in functions.

Key Points:

- ✓ Tuples are ordered, immutable and can store duplicate values.
- ✓ Use indexing and slicing to access elements.
- ✓ Use built-in functions to perform operations easily.
- ✓ Tuples are faster and safer for fixed data.

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