3.2. Tuple

Fig. 3.2.1 Photo by Jonas Svidras on Unsplash

> **✏️ Note**
>
> Outline
>
> 1. Introduction
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> 2. Examples
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> **✏️ Note**
>
> Roadmap
>
> 1. This topic: Tuple
>
>> myMaze, myBoard, myBlock
>>
>> | Container | | | | |
>> |---|---|---|---|---|
>> | tuple Statement | list Statement | set Statement | dict Statement | del Statement* |
>
> 2. Course: Python 1
>
> 3. Subject: Programming
>
> 4. Field
>
>> a. Software Engineering (SE)
>>
>> b. Computer Science and Information Engineering (CSIE)
>>
>> c. Electrical/Electronics Engineering (EE)

3.2.1. Introduction

1. tuple會在( ) 裡面放置資料，這些資料有順序但是不能更改。

2. tuple 內的資料是從0 開始編號，在字串的章節中，菲絲恩也使用[ ] 來取出特定index 值的字元，在序對也可以使用同樣的方法。

3. 此外，Python 中有順序的資料型態（如list、str 等）的index 值也都可以這樣使用。

4. 換言之，如果t 不是空的，那第一個元素必定為t[0]。

5. 如果要找到tuple 裡面的最後一筆資料，可以使用負數索引。

6. 也就是說，如果t 不是空的，則最後一個元素必定是t[-1]。

7. tuple 只有兩個方法，因為當tuple 被建立起來，就不能被任何方式修改，所以只有index 跟 count 兩種方法。

8. 以下舉例說明：

3.2.2. Examples

3.2.2.1. Ex1: len()

1. Source

Listing 3.2.2.1.1 /src/Tuple/p0701TupleLen.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   print(tuple1)
7   print(len(tuple1))
8
9   tuple2 = ('a', 'b', 'c', 'd', 'e', 'f')
10  print(tuple2)
11  print(len(tuple2))
12
```

2. Output

```
(1, 2, 3, 4)
4
('a', 'b', 'c', 'd', 'e', 'f')
6
```

3.2.2.2. Ex2: max()

1. Source

Listing 3.2.2.2.1 /src/Tuple/p0701TupleMax.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   print(tuple1)
7   print(max(tuple1))
8
9   tuple2 = ('a', 'b', 'c', 'd', 'e', 'f')
10  print(tuple2)
11  print(max(tuple2))
```

2. Output

```
(1, 2, 3, 4)
4
('a', 'b', 'c', 'd', 'e', 'f')
f
```

3.2.2.3. Ex3: min()

1. Source

Listing 3.2.2.3.1 /src/Tuple/p0701TupleMin.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   print(tuple1)
7   print(min(tuple1))
8
9   tuple2 = ('a', 'b', 'c', 'd', 'e', 'f')
10  print(tuple2)
11  print(min(tuple2))
```

2. Output

```
(1, 2, 3, 4)
1
('a', 'b', 'c', 'd', 'e', 'f')
a
```

3.2.2.4. Ex4: tuple()

1. Source

Listing 3.2.2.4.1 /src/Tuple/p0701TupleFromList.py

```
1    '''
2    Created on 20210721
3    @author: cph
4    '''
5    list1 = [1, 2, 3, 4]
6    print(list1)
7    print(tuple(list1))
```

2. Output

```
[1, 2, 3, 4]
(1, 2, 3, 4)
```

3.2.2.5. Ex5: Concatenation

1. Source

Listing 3.2.2.5.1 /src/Tuple/p0701TupleConcat.py

```
1     '''
2     Created on 20210721
3     @author: cph
4     '''
5     tuple1 = (1, 2, 3, 4)
6     print(tuple1)
7
8     tuple2 = ('a', 'b', 'c', 'd', 'e', 'f')
9     print(tuple2)
10
11    tuple3 = tuple1 + tuple2
12    print(tuple3)
13
```

2. Output

```
(1, 2, 3, 4)
('a', 'b', 'c', 'd', 'e', 'f')
(1, 2, 3, 4, 'a', 'b', 'c', 'd', 'e', 'f')
```

3.2.2.6. Ex6: Iteration

1. Source

Listing 3.2.2.6.1 /src/Tuple/p0701TupleIteration.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   for i in tuple1:
7       print(i)
```

2. Output

```
1
2
3
4
```

3.2.2.7. Ex7: Index

1. Source

Listing 3.2.2.7.1 /src/Tuple/p0701TupleIndex.py

```
1    '''
2    Created on 20210721
3    @author: cph
4    '''
5    tuple1 = (1, 2, 3, 4)
6    print(tuple1)
7    print(tuple1[0])
8    print(tuple1[3])
9    print(tuple1[-2])
10   print(tuple1[1: 3])
11   print(tuple1[-3: -1])
12   print(tuple1[-2: -4: -1])
```

2. Output

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

3.2.2.8. Ex8: In

1. Source

Listing 3.2.2.8.1 /src/Tuple/p0701TupleIn.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   print(tuple1)
7   print(3 in tuple1)
8   print(5 in tuple1)
9   print(tuple1[-2: -4: -1])
10  print(3 in tuple1[-2: -4: -1])
11  print(3 in tuple1[1: 3])
```

2. Output

```
(1, 2, 3, 4)
True
False
(3, 2)
True
True
```

3.2.2.9. Ex9: Repetition

1. Source

Listing 3.2.2.9.1 /src/Tuple/p0701TupleRepetition.py

```
1   '''
2   Created on 20210721
3   @author: cph
4   '''
5   tuple1 = (1, 2, 3, 4)
6   print(tuple1)
7   print(tuple1 * 3)
```

2. Output

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

3.2.2.10. Ex10: More

1. Source

> **Listing 3.2.2.10.1 /src/Tuple/p0701Tuple.py**
>
> ```
> 1   '''
> 2   Created on 20150901
> 3   @author: cph
> 4   '''
> 5   # 設定t 的值
> 6   t = ("a", "b", "mary", "john", "a", "mary", "a", "b")
> 7   print(t.index("a", 1, 5))    # 在t 的index 1 到5 範圍中尋找'a' 第一次
> 8   出現的index 值。
> 9   print(t.count("mary"))       # 計算在'mary' 在t 當中出現過幾次
> 10  print(t[2: ].count("b"))     # 計算在'b' 在t 當中出現過幾次
>     print(t.count("b", 0, 5))    # Error: tuple 的count 沒有辦法接收三個
>     值
> ```

2. Output

> ```
> 4
> 2
> 1
> Traceback (most recent call last):
>     File "C:\examples\Ch7\ex07_01.py", line 6, in <module>
>       print(t.count('b',0,5))      #tuple 的count 沒有辦法接收三個值
> TypeError: count() takes exactly one argument (3 given)
> ```

3. 一樣都是count()，str.count() 跟tuple.count() 能接受的參數就不太相同。

4. str.count() 可以指定index 範圍，在範圍內計數。

5. 但從上面的程式可知，tuple.count() 則只能接收單一值來做統計，沒辦法指定範圍。

> **✏️ Note**
>
> 1. Start: 20170719
>
> 2. System Environment:

Listing 3.2.2.10.2 requirements.txt

```
 1   sphinx==7.1.2                           # Sphinx
 2   graphviz>=0.20.1                        # Graphviz
 3   sphinxbootstrap4theme>=0.6.0            # Theme: Bootstrap
 4   sphinx-material>=0.0.35                 # Theme: Material
 5   sphinxcontrib-plantuml>=0.25            # PlantUML
 6   sphinxcontrib.bibtex>=2.5.0             # Bibliography
 7   sphinx-autorun>=1.1.1                   # ExecCode: pycon
 8   sphinx-execute-code-python3>=0.3        # ExecCode
 9   btd.sphinx.inheritance-diagram>=2.3.1   # Diagram
10   sphinx-copybutton>=0.5.1                # Copy button
11   sphinx_code_tabs>=0.5.3                 # Tabs
12   sphinx-immaterial>=0.11.3               # Tabs
13
14   #----------------------------------------------------
15   #-- Library Upgrade Error by Library Itself
16   #   >> It needs to fix by library owner
17   #   >> After fixed, we need to try it later
18   #----------------------------------------------------
19   pydantic==1.10.10                       # 2.0: sphinx compiler
20   error, 20230701
21
22   #----------------------------------------------------
23   #-- Minor Extension
24   #----------------------------------------------------
25   sphinxcontrib.httpdomain>=1.8.1         # HTTP API
26
27   #sphinxcontrib-blockdiag>=3.0.0          # Diagram: block
28   #sphinxcontrib-actdiag>=3.0.0            # Diagram: activity
29   #sphinxcontrib-nwdiag>=2.0.0             # Diagram: network
30   #sphinxcontrib-seqdiag>=3.0.0            # Diagram: sequence
31
32   #----------------------------------------------------
33   #-- Still Wait For Upgrading Version
34   #----------------------------------------------------
35
36   #----------------------------------------------------
37   #-- Still Under Testing
38   #----------------------------------------------------
39   #numpy>=1.24.2                           # Figure: numpy
40
41   #----------------------------------------------------
42   #-- NOT Workable
43   #----------------------------------------------------
44   #sphinxcontrib.jsdemo==0.1.4    # ExecCode: Need replace
45   add_js_file()
46   #jupyter-sphinx==0.4.0          # ExecCode: Need gcc compiler
```

```
47  #sphinxcontrib.slide==1.0.0      # Slide: Slideshare
48  #hieroglyph==2.1.0               # Slide: make slides
49  #matplotlib>=3.7.1               # Plot: Need Python >= v3.8
50  #manim==0.17.2                   # Diagram: scipy, numpy need
    gcc
    #sphinx_diagrams==0.4.0          # Diagram: Need GKE access
    #sphinx-tabs>=3.4.1                    # Tabs: Conflict w/
    sphinx-material
```