

Python Programming

Identity Operator

Mostafa S. Ibrahim

Teaching, Training and Coaching since more than a decade!

Artificial Intelligence & Computer Vision Researcher

PhD from Simon Fraser University - Canada

Bachelor / Msc from Cairo University - Egypt

Ex-(Software Engineer / ICPC World Finalist)



is

```
2  # is: return True if two variables are the SAME object (memory)
3
4  str1 = 'mostafa'
5  str2 = str1
6  str3 = str2
7
8  # 0x111 0x111 0x111
9  print(id(str1), id(str2), id(str3))
10
11  print(str1 is str3) ... # True
12
13  class Employee:
14      def __init__(self, name):
15          self.name = name
16
17      # same value: but not mutable
18      obj1 = Employee('Mostafa')
19      obj2 = Employee('Mostafa')
20      obj3 = obj2
21
22      # 0x222 0x333 0x333
23      print(id(obj1), id(obj2), id(obj3))
24      print(obj2 is obj1) ... # False
25      print(obj2 is obj3) ... # True
26      print(obj2 is not obj3) # False
```

Is for checking types

- This is the classical and preferred usage

```
3 x = 1
4 if type(x) is int:
5     print('an int') ... # an int
6
7 y = None
8 print(y is None) ... # True
9 print(x is not None) ... # True
10
11 print(type(2.5) is float) ... # True
12
13 class Employee:
14     def __init__(self, name):
15         self.name = name
16
17 obj1 = Employee('Mostafa')
18 print(type(obj1) is Employee) ... # True
19
```

Mutable objects!

```
3  # CPython 3.7 keeps some small integers in a common namespace
4  x, y = 30, 15 + 15
5  print(x is y) ... # Probably True
6
7  x, y = x * 10000, y * 10000
8  print(x is y) ... # Probably False
9
10 # same for strings: ASCII letters, digits, or underscores
11 x, y = 'hello', 'hello'
12 print(x is y) ... # Probably True
13
14 x, y = x * 1000, y * 1000
15 print(x is y) ... # Probably False
16
17 # ! not in the cached list
18 x, y = 'hello!', 'hello!'
19 print(x is y) ... # Probably False
20
21 z = x
22 print(x is z) ... # Must be True
```

Is vs ==

```
2
3 # is : check if SAME memory/reference
4 # == : check if equal value!
5
6
7 x, y = 123456789, 123456789
8
9 print(x == y) ... # True
10 print(x is y) ... # Probably False
11
12 # but remember small values with is
13 x, y = 10, 10
14 print(x is y) ... # Probably True
15
16 # as implementation dependent
17 # be careful from is operator
18 # use it to check types
19
```

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”