Introduction to Computer Programming

Comparison and Identity Operators

Operators

In programming, **operators** are symbols/characters that represent a process or computation.

The values that an operator acts on are called **operands**.

Comparison Operators

Comparison operators (==, !=, <, > ....) compare values (operands) and return a *Boolean* value: `True` or `False`

==	Equality
! =	Inequality
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

Examples

Test if `2` is equal to `2.0`

In [2]:
```
2 == 2.0
```

Out[2]: `True`

Test if `1.5` is less than `20`

In [3]:
```
1.5 < 20
```

Out[3]: `True`

Test if `1.0` is greater than or equal to `1`

In [4]:
```
1.0 >= 1
```

Out[4]:
```
True
```

Test if two strings have equal value

In [7]:
```
a = 'Python'

b = 'Python'

a == b
```

Out[7]:
```
True
```

Test if two variables are the same object type

In [9]:
```
a = 'Python'
b = 'snake'

type(a) == type(b)
```

Out[9]:
```
True
```

Identity Operators

If two variables are *equal* this does not imply that they are *identical*.

The `is` operator outputs `True` if the operands are identical
The `is not` operator outputs `True` if the operands are *not* identical

In [12]:
```
# a and b have equal value
# a and b have different variable type

a = 1.0
b = 1

print(a == b)
print(a is b)
print(a is not b)
```

```
True
False
True
```

Operators (in order of precedence)

1. Parentheses
2. Arithmetic operators (top to bottom)
   - `**` Exponent
   - `/`, `*`, `//`, `\%` Division, multiplication, floor division, modulo (evaluated left to right in code)
   - `+`, `-` Addition, subtraction (evaluated left to right in code)

3. Comparison operators: `<`, `<=`, `>`, `>=`, `!=`, `==` (evaluated left to right in code)
4. Assignment operators `=`, `/=`, `*=`, `//=`, `\%=`, `+=`, `-=` ....
5. Identity operators `is`, `is not`
6. Logical `not`
7. Logical `and`
8. Logical `or`

Need to see some more examples?

https://www.w3schools.com/python/python_operators.asp (https://www.w3schools.com/python/python_operators.asp)
https://www.geeksforgeeks.org/python-operators/ (https://www.geeksforgeeks.org/python-operators/)
https://www.programiz.com/python-programming/operators (https://www.programiz.com/python-programming/operators)
https://pynative.com/python-operators/ (https://pynative.com/python-operators/)

Want to take a quiz?

https://realpython.com/quizzes/python-operators-expressions/ (https://realpython.com/quizzes/python-operators-expressions/)
https://pynative.com/python-operators-and-expression-quiz/ (https://pynative.com/python-operators-and-expression-quiz/)

Want some more advanced information on this topic?

https://realpython.com/python-operators-expressions/ (https://realpython.com/python-operators-expressions/)