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Control Flow

`or` Operator

The Python `or` operator combines two Boolean expressions and evaluates to `True` if at least one of the expressions returns `True`. Otherwise, if both expressions are `False`, then the entire expression evaluates to `False`.

```
True or True      # Evaluates to True
True or False     # Evaluates to True
False or False    # Evaluates to False
1 < 2 or 3 < 1    # Evaluates to True
3 < 1 or 1 > 6    # Evaluates to False
1 == 1 or 1 < 2   # Evaluates to True
```

`elif` Statement

The Python `elif` statement allows for continued checks to be performed after an initial `if` statement. An `elif` statement differs from the `else` statement because another expression is provided to be checked, just as with the initial `if` statement.
If the expression is `True`, the indented code following the `elif` is executed. If the expression evaluates to `False`, the code can continue to an optional `else` statement. Multiple `elif` statements can be used following an initial `if` to perform a series of checks. Once an `elif` expression evaluates to `True`, no further `elif` statements are executed.

```
# elif Statement

pet_type = "fish"

if pet_type == "dog":
  print("You have a dog.")
elif pet_type == "cat":
  print("You have a cat.")
elif pet_type == "fish":
  # this is performed
  print("You have a fish")
else:
  print("Not sure!")
```

Handling Exceptions in Python

A `try` and `except` block can be used to handle error in code block. Code which may raise an error can be written in the `try` block. During execution, if that code block raises an error, the rest of the `try` block will cease executing and the `except` code block will execute.

```
def check_leap_year(year):
  is_leap_year = False
  if year % 4 == 0:
    is_leap_year = True

try:
  check_leap_year(2018)
  print(is_leap_year)
  # The variable is_leap_year is declared
inside the function
except:
  print('Your code raised an error!')
```

Equal Operator ==

The equal operator, `==`, is used to compare two values, variables or expressions to determine if they are the same.
If the values being compared are the same, the operator returns `True`, otherwise it returns `False`.
The operator takes the data type into account when making the comparison, so a string value of `"2"` is *not* considered the same as a numeric value of `2`.

```
# Equal operator

if 'Yes' == 'Yes':
  # evaluates to True
  print('They are equal')

if (2 > 1) == (5 < 10):
  # evaluates to True
  print('Both expressions give the same
result')

c = '2'
d = 2

if c == d:
  print('They are equal')
else:
  print('They are not equal')
```

Not Equals Operator !=

The Python not equals operator, `!=`, is used to compare two values, variables or expressions to determine if they are NOT the same. If they are NOT the same, the operator returns `True`. If they are the same, then it returns `False`.
The operator takes the data type into account when making the comparison so a value of `10` would NOT be equal to the string value `"10"` and the operator would return `True`. If expressions are used, then they are evaluated to a value of `True` or `False` before the comparison is made by the operator.

```
# Not Equals Operator

if "Yes" != "No":
  # evaluates to True
  print("They are NOT equal")

val1 = 10
val2 = 20

if val1 != val2:
  print("They are NOT equal")

if (10 > 1) != (10 > 1000):
  # True != False
  print("They are NOT equal")
```

Comparison Operators

In Python, *relational operators* compare two values or expressions. The most common ones are:

- `<` less than
- `>` greater than
- `<=` less than or equal to
- `>=` greater than or equal too

If the relation is sound, then the entire expression will evaluate to `True`. If not, the expression evaluates to `False`.

```
a = 2
b = 3
a < b  # evaluates to True
a > b  # evaluates to False
a >= b # evaluates to False
a <= b # evaluates to True
a <= a # evaluates to True
```

`if` Statement

The Python `if` statement is used to determine the execution of code based on the evaluation of a Boolean expression.

- If the `if` statement expression evaluates to `True`, then the indented code following the statement is executed.
- If the expression evaluates to `False` then the indented code following the `if` statement is skipped and the program executes the next line of code which is indented at the same level as the `if` statement.

```
# if Statement

test_value = 100

if test_value > 1:
  # Expression evaluates to True
  print("This code is executed!")

if test_value > 1000:
  # Expression evaluates to False
  print("This code is NOT executed!")

print("Program continues at this point.")
```

`else` Statement

The Python `else` statement provides alternate code to execute if the expression in an `if` statement evaluates to `False`.

The indented code for the `if` statement is executed if the expression evaluates to `True`. The indented code immediately following the `else` is executed only if the expression evaluates to `False`. To mark the end of the `else` block, the code must be unindented to the same level as the starting `if` line.

```
# else Statement

test_value = 50

if test_value < 1:
  print("Value is < 1")
else:
  print("Value is >= 1")

test_string = "VALID"

if test_string == "NOT_VALID":
  print("String equals NOT_VALID")
else:
  print("String equals something else!")
```

`and` Operator

The Python `and` operator performs a Boolean comparison between two Boolean values, variables, or expressions. If both sides of the operator evaluate to `True` then the `and` operator returns `True`. If either side (or both sides) evaluates to `False`, then the `and` operator returns `False`. A non-Boolean value (or variable that stores a value) will always evaluate to `True` when used with the `and` operator.

```
True and True     # Evaluates to True
True and False    # Evaluates to False
False and False   # Evaluates to False
1 == 1 and 1 < 2  # Evaluates to True
1 < 2 and 3 < 1   # Evaluates to False
"Yes" and 100     # Evaluates to True
```

Boolean Values

Booleans are a data type in Python, much like integers, floats, and strings. However, booleans only have two values:

- `True`
- `False`

Specifically, these two values are of the `bool` type. Since booleans are a data type, creating a variable that holds a boolean value is the same as with other data types.

```
is_true = True
is_false = False

print(type(is_true))
# will output: <class 'bool'>
```

`not` Operator

The Python Boolean `not` operator is used in a Boolean expression in order to evaluate the expression to its inverse value. If the original expression was `True`, including the `not` operator would make the expression `False`, and vice versa.

```
not True     # Evaluates to False
not False    # Evaluates to True
1 > 2        # Evaluates to False
not 1 > 2    # Evaluates to True
1 == 1       # Evaluates to True
not 1 == 1   # Evaluates to False
```