Python
Alternative Statements
More on Conditions

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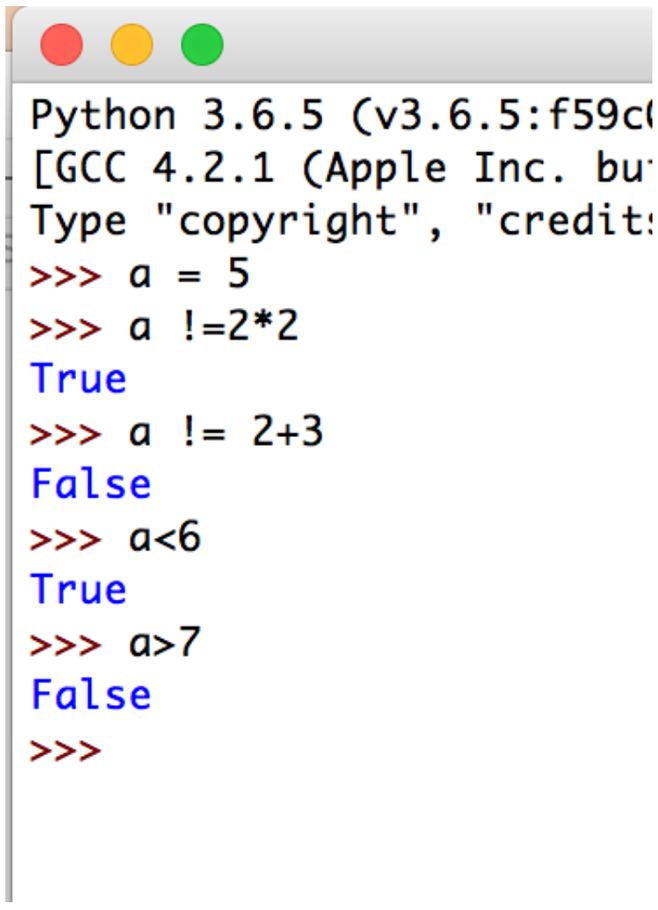
Conditions

- A condition is an expression that evaluates to True or False
- This type is called Boolean

Boolean Expressions

- The simplest Boolean expressions are `True` and `False`
- The next simplest class are numerical comparators
  - < smaller
  - > greater
  - == equals (Two! equal symbols)
  - != not equals
  - <= smaller or equal
  - >= larger or equal



Boolean Expressions

- We can combine Boolean expressions using the logical operands
  - and
  - or
  - not
- If necessary, we can add parentheses in order to specify precedence

Boolean Expression Examples

- A program that decides whether user input is divisible by 2, but not by 3.

example.py - /Users/thomasschwarz/Documents/My website/Classes/Module4/ex...

```
x = int(input("Please enter a number: "))
if x%2==0 and not x%3==0:
    print("The number is divisible by two, but not by three")
else:
    print("The number is not divisible by two or it is divisible by three.")
```

Python 3.6.5 Shell

```
Python 3.6.5 (v3.6.5:f59c0932b4, Mar 28 2018, 03:03:55)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: /Users/thomasschwarz/Documents/My website/Classes/Module4/example.py
Please enter a number: 5
The number is not divisible by two or it is divisible by three.
>>>
 RESTART: /Users/thomasschwarz/Documents/My website/Classes/Module4/example.py
Please enter a number: 6
The number is not divisible by two or it is divisible by three.
>>>
 RESTART: /Users/thomasschwarz/Documents/My website/Classes/Module4/example.py
Please enter a number: 4
The number is divisible by two, but not by three
>>>
```

Boolean Expression Example

- A program that checks whether the letter “a”, “A”, “e” or “E” is part of user input.
- Python allows the keyword “in” to check for the presence of letters in strings.

example2.py - /Users/thomasschwarz/Documents/My website/Classes/Module4/example2.py (3.6.5)

```
user_input = input("Please enter a string: ")
if 'a' in user_input or 'A' in user_input or "e" in user_input or "E" in user_input:
    print("present")
else:
    print("not present")
```

Python 3.6.5 Shell

```
Python 3.6.5 (v3.6.5:f59c0932b4, Mar 28 2018, 03:03:55)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: /Users/thomasschwarz/Documents/My website/Classes/Module4/example2.py
Please enter a string: retiuyert
present
>>>
 RESTART: /Users/thomasschwarz/Documents/My website/Classes/Module4/example2.py
Please enter a string: rtiuyirtuy
not present
>>>
```

Short-Circuit Operators

- The value of an “or”- or “and” expression is evaluated from the left to the right
    - If the first operand of an “or” is True, then the second operand is not evaluated and True is returned.
        - This is because the value of the expression is already known
- Similarly, if the first operand of an “and” expression is False, then the second operand is not evaluated and the value of the expression is False.

Conversion of other expressions

- Any object can be tested for a truth value.
- The truth value of a non-zero number is True, otherwise False.
  - Example:

```
>>> if 5%2:
        print("5 is odd")
```

```
5 is odd
```

  - Since 5%2 evaluates to 1, it's truth value is True and the conditional statement (`print(...)`) is executed
- This behavior extends to other type of objects such as strings
  - The empty string "" has truth value 0, every other string has truth value 1.