Representation

Announcements

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Strings are important: they represent language and programs
In Python, all objects produce two string representations:
•The str is legible to humans
•The repr is legible to the Python interpreter
The str and repr strings are often the same, but not always

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repr(object) -> string
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Return the canonical string representation of the object.
For most object types, eval(repr(object)) == object.
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```
>>> repr(min)
'<built-in function min>'
```

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'Fraction(1, 2)'
>>> str(half)
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```
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6

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(Demo)

F-Strings

String Interpolation in Python

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8

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8

Using string concatenation:

```
>>> from math import pi
>>> 'pi starts with ' + str(pi) + '...'
'pi starts with 3.141592653589793...'
```

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Using string interpolation:

```
>>> f'pi starts with {pi}...'
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pi starts with 3.141592653589793...

Using string interpolation:

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>>> f'pi starts with {pi}...'
'pi starts with 3.141592653589793...'
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```
>>> print(f'pi starts with {pi}...')
pi starts with 3.141592653589793...
```

String interpolation involves evaluating a string literal that contains expressions.

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pi starts with 3.141592653589793...
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Using string interpolation:

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>>> f'pi starts with {pi}...'
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The result of evaluating an f-string literal contains the str string of the value of each sub-expression.

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Using string interpolation:

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(Demo)

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>>> half.__repr__()
'Fraction(1, 2)'

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Polymorphic function: A function that applies to many (poly) different forms (morph) of data

str and repr are both polymorphic; they apply to any object

repr invokes a zero-argument method <u>repr</u> on its argument
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Polymorphic function: A function that applies to many (poly) different forms (morph) of data

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repr invokes a zero-argument method <u>repr</u> on its argument
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```
>>> half.__repr__()
'Fraction(1, 2)'
```

str invokes a zero-argument method __str__ on its argument

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>>> half.__str__()
'1/2'
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The behavior of repr is slightly more complicated than invoking __repr__ on its argument:
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def repr(x):
 return x.__repr__(x) def repr(x):
 return x.__repr_() def repr(x):
 return type(x).__repr__(x) def repr(x): return type(x).__repr__() def repr(x):
 return super(x).__repr__()

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def repr(x):
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The behavior of **repr** is slightly more complicated than invoking <u>repr</u> on its argument:

• An instance attribute called ___repr__ is ignored! Only class attributes are found

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```
def repr(x):
    return x._repr_(x)
def repr(x):
    return x._repr_()
def repr(x):
    return type(x)._repr_(x)
def repr(x):
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def repr(x):
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The behavior of **str** is also complicated:

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def repr(x):
    return x.__repr__(x)

    def repr(x):
    return x.__repr__()

    def repr(x):
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The behavior of **repr** is slightly more complicated than invoking <u>_____repr__</u> on its argument:

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(Demo)

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Example:

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Classes that implement <u>repr</u> and <u>str</u> methods that return Python-interpretable and human-readable strings implement an interface for producing string representations

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(Demo)
Special Method Names

Certain names are special because they have built-in behavior

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__init___ Method invoked automatically when an object is constructed __repr___ Method invoked to display an object as a Python expression

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__init___ Method invoked automatically when an object is constructed
__repr___ Method invoked to display an object as a Python expression
__add___

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init	Method invoked automatically when an object is constructed
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add	Method invoked to add one object to another

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init	Method invoked automatically when an object is constructed
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14

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init	Method	invoked	aut	comatica	lly	when ar	n ob	oject is	constr	ructed
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>>> zero, one, two = 0, 1, 2
>>> one + two
3
```

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Same behavior using methods

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>>> zero, one, two = 0, 1, 2
>>> one.__add__(two)
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>>> Ratio(1, 3) + Ratio(1, 6)
Ratio(1, 2)
```

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```

```
>>> Ratio(1, 3).__add__(Ratio(1, 6))
Ratio(1, 2)
```

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>>> Ratio(1, 3) + Ratio(1, 6)
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http://getpython3.com/diveintopython3/special-method-names.html

http://docs.python.org/py3k/reference/datamodel.html#special-method-names

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(Demo)

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Ratio(4, 3)
```

```
>>> from math import pi
>>> Ratio(1, 3) + pi
3.4749259869231266
```

A polymorphic function might take two or more arguments of different types **Type Dispatching:** Inspect the type of an argument in order to select behavior **Type Coercion:** Convert one value to match the type of another

```
>>> Ratio(1, 3) + 1
Ratio(4, 3)
>>> 1 + Ratio(1, 3)
Ratio(4, 3)
>>> from math import pi
>>> Ratio(1, 3) + pi
3.4749259869231266
```

(Demo)