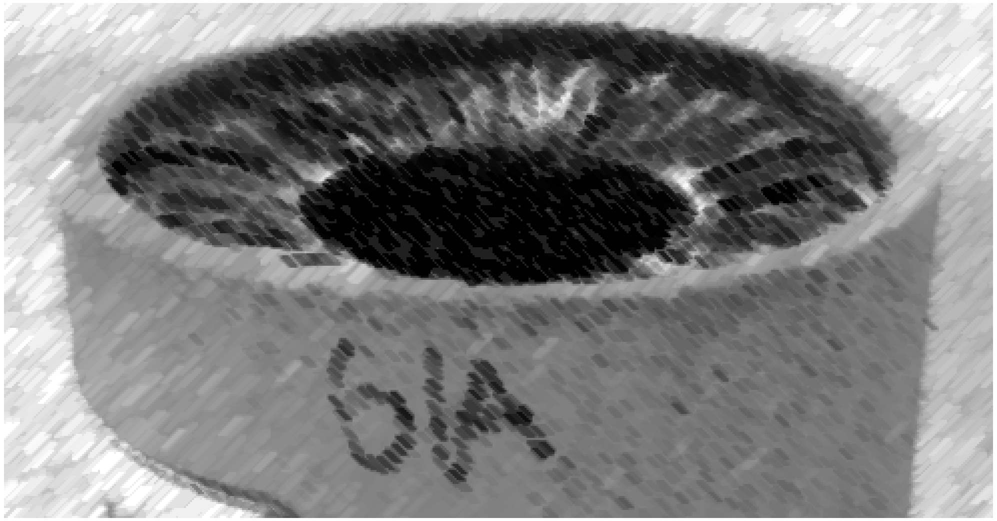

CS61A Lecture 21

Amir Kamil

UC Berkeley

March 11, 2013

Announcements

- HW7 due on Wednesday
- Ants project out

Looking Up Names

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Not all languages work this way

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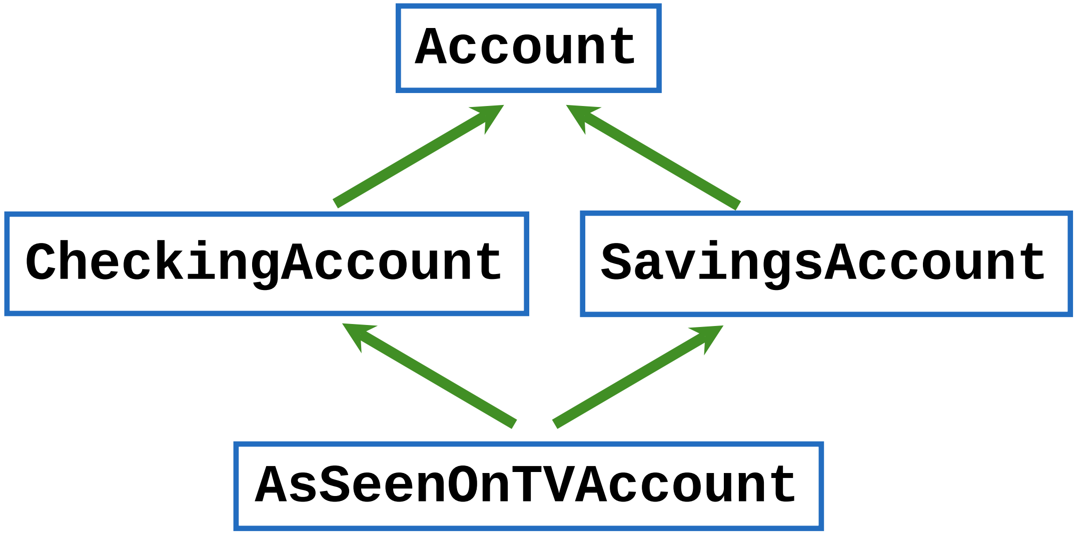

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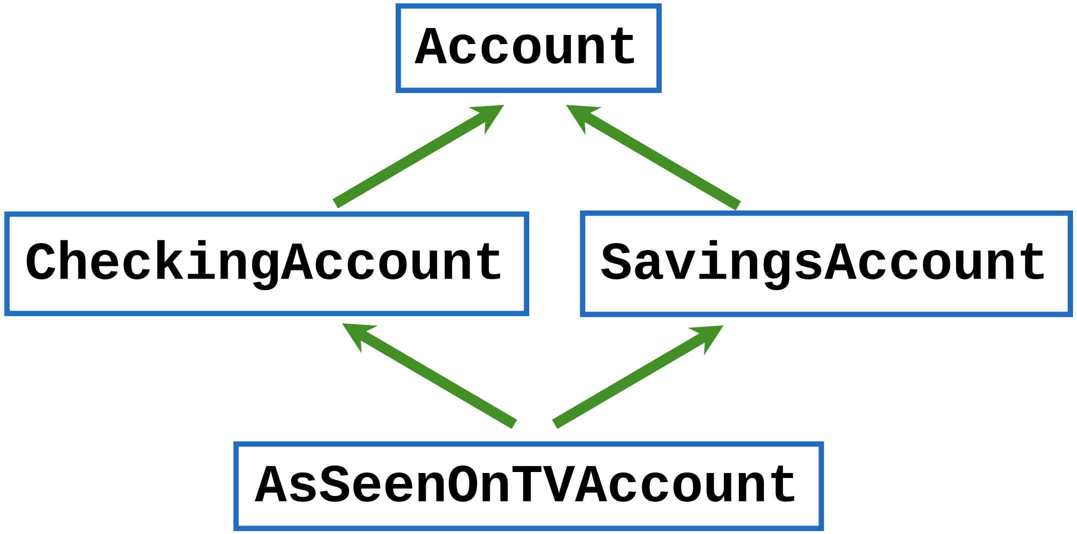

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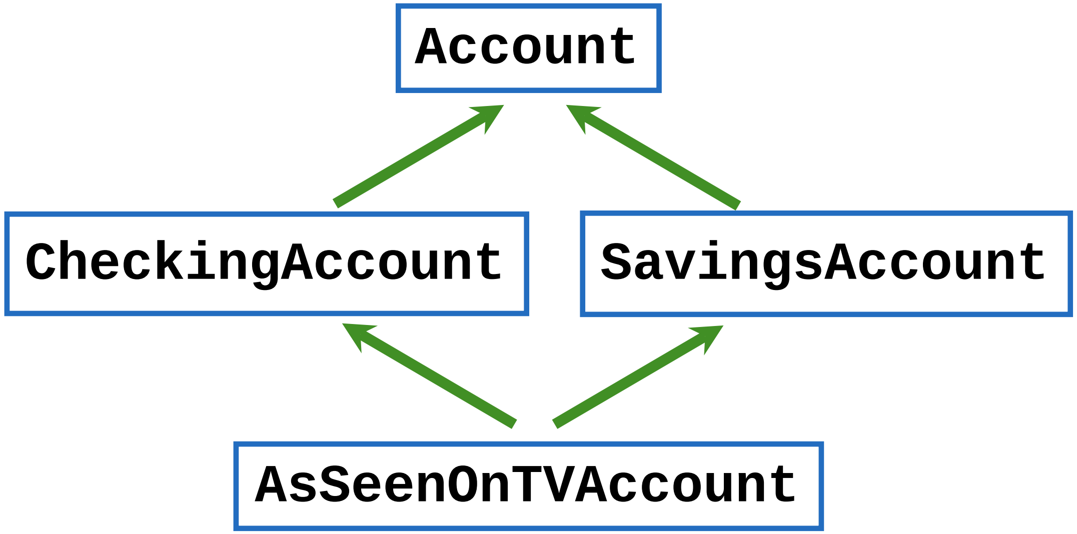

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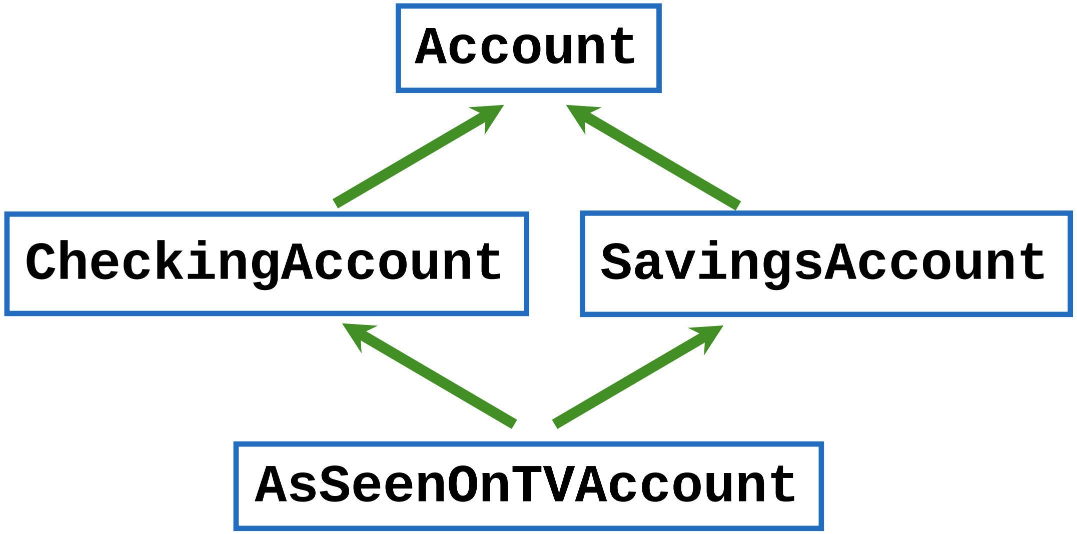

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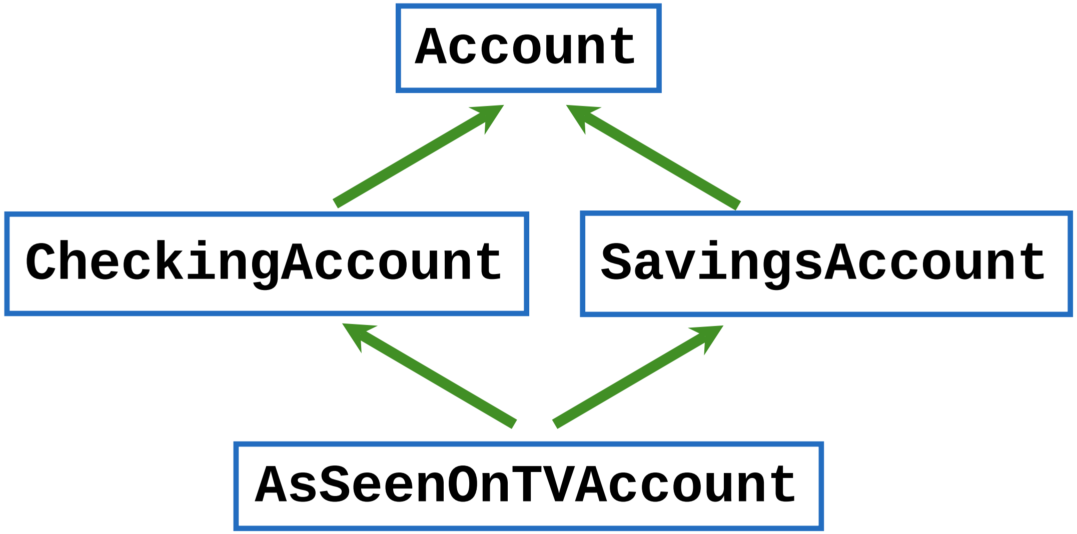

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Message passing enables us to accomplish all of the above, as we will see today and next time

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- The “str” is legible to **humans**.
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When the “str” and “repr” **strings are the same**, that’s evidence that a programming language is legible by humans!

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The result of calling **`str`** on the value of an expression is what Python prints using the **`print`** function.

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Classes that implement **`__repr__`** and **`__str__`** methods *that return Python- and human-readable* strings thereby **implement an interface** for producing Python string representations.

Classes that implement **`__len__`** and **`__getitem__`** are sequences.

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Examples:

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`+, +=`	`__add__, __iadd__`
`[], []=`	`__getitem__, __setitem__`

`.`	`__getattr__, __getattribute__,`
	`__setattr__`

`a[i]` is equivalent to **`type(a).__getitem__(a, i)`**

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class Rational(object):
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class Rational(object):
    def __init__(self, numer, denom):
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        self.numerator = numer // g
```

Example: Rational Numbers

```
class Rational(object):
    def __init__(self, numer, denom):
        g = gcd(numer, denom)
        self.numerator = numer // g
        self.denominator = denom // g
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        return 'Rational({0}, {1})'.format(self.numerator,
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    def __add__(self, num):
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        return 'Rational({0}, {1})'.format(self.numerator,
                                           self.denominator)
    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
```

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    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                  self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
        numer1 = self.numerator * num.denominator
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class Rational(object):
    def __init__(self, numer, denom):
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        return 'Rational({0}, {1})'.format(self.numerator,
                                           self.denominator)
    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                  self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
        numer1 = self.numerator * num.denominator
        numer2 = self.denominator * num.numerator
```

Example: Rational Numbers

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class Rational(object):
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        return 'Rational({0}, {1})'.format(self.numerator,
                                           self.denominator)
    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                  self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
        numer1 = self.numerator * num.denominator
        numer2 = self.denominator * num.numerator
        return Rational(numer1 + numer2, denom)
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        g = gcd(numer, denom)
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        self.denominator = denom // g
    def __repr__(self):
        return 'Rational({0}, {1})'.format(self.numerator,
                                           self.denominator)
    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
        numer1 = self.numerator * num.denominator
        numer2 = self.denominator * num.numerator
        return Rational(numer1 + numer2, denom)
    def __eq__(self, num):
```

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class Rational(object):
    def __init__(self, numer, denom):
        g = gcd(numer, denom)
        self.numerator = numer // g
        self.denominator = denom // g
    def __repr__(self):
        return 'Rational({0}, {1})'.format(self.numerator,
                                           self.denominator)
    def __str__(self):
        return '{0}/{1}'.format(self.numerator,
                                  self.denominator)
    def __add__(self, num):
        denom = self.denominator * num.denominator
        numer1 = self.numerator * num.denominator
        numer2 = self.denominator * num.numerator
        return Rational(numer1 + numer2, denom)
    def __eq__(self, num):
        return (self.numerator == num.numerator and
                  self.denominator == num.denominator)
```

Property Methods

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>>> f = Rational(3, 5)
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>>> f = Rational(3, 5)
>>> f.float_value
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>>> f.numerator = 4
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```
>>> f = Rational(3, 5)
>>> f.float_value
0.6
>>> f.numerator = 4
>>> f.float_value
0.8
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```
>>> f = Rational(3, 5)
>>> f.float_value
0.6
>>> f.numerator = 4
>>> f.float_value
0.8
>>> f.denominator -= 3
```

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```
>>> f = Rational(3, 5)
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>>> f.numerator = 4
>>> f.float_value
0.8
>>> f.denominator -= 3
>>> f.float_value
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2.0
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0.6
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The **`@property`** decorator on a method designates that it will be called whenever it is *looked up* on an instance.

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```

```
@property
def float_value(self):
    return (self.numerator //
            self.denominator)
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The `@property` decorator on a method designates that it will be called whenever it is *looked up* on an instance.

Property Methods

Often, we want the value of instance attributes to be linked.

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>>> f = Rational(3, 5)
>>> f.float_value
0.6
>>> f.numerator = 4
>>> f.float_value
0.8
>>> f.denominator -= 3
>>> f.float_value
2.0
```

```
@property
def float_value(self):
    return (self.numerator //
            self.denominator)
```

The `@property` decorator on a method designates that it will be called whenever it is *looked up* on an instance.

It allows zero-argument methods to be called without an explicit call expression.