ENSF 592: Programming Fundamentals for Data Engineers

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Lecture 8: Classes

October 2, 2019

Agenda

1. Key ideas in Ch 15 and 16

2. More on Classes

3. Assignment04

4. Preparation for next lecture

Notes: Key ideas Classes and Objects

- Objects are mutable
- Instance variabels can be created on the fly (?!)
- use copy.copy() or copy.deepcopy() to create copies of objects
- isinstance(p, Point) and hasattr(p, 'x')
- Documentation see for example http://greenteapress.com/thinkpython2/code/Circle.py
- When you do help(Point) documentation is printed.

Notes: Key ideas Classes and Functions

- pure functions vs modifiers
- functional programming: use pure functions whenever reasonable
- protoype and patch vs designed development
- higher level insight (designed dev): time_to_int -> calculation -> int_to_time
- Check invariants (or proper input) raise ValueError or use assert

More on classes

```
class Animal:
    """ Represents an animal
        Attributes:
            kind (Class): string
            name: string
    """
    # Class attribute
    kind = 'Animal'

    def __init__(self, name):
        """ Constructor """
        self.name =  name

    def make_noise(self, noise):
        """A method: Makes animal noise"""
        print(noise)
```

More on classes

```
class Dog(Animal):
    """ Represents a Dog extends Animal
        Attributes:
            kind (Class): string
            name: string
            age: int
    """
    kind = 'Dog'
    def __init__(self, name, age):
        super().__init__(name) # calling parent class constructor
        self.age = age
    # Overriding method
    def make_noise(self, noise):
        """Makes animal noise"""
        print(noise.upper())
    # Extending class with new method
    def eat(self):
        """Not implemented yet"""
        pass
```

Importing and executing modules

With code above in `Animal.py` you can do:

```
>>>import Animal
>>>help(Animal.Dog)
```

Or

```
>>>from Animal import Dog
>>>help(Dog)
```

Or (my preference)

```
>>>import Animal as al
>>>help(al.Dog)
```

Assignment04: Classes

See `Assignment04.pdf`

Preparation For Next Lab/Lecture

Read/follow Ch 17 and Ch 18 in Think Python 2e