BST 234: Lab - 3

Divy Kangeyan

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Classes in Python

- Classes define objects and their associated methods
- class object is defined as `class <name>:`

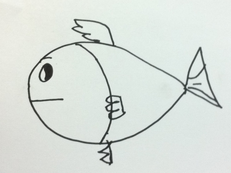
Class Objects

- Class objects support two operations
  1. Attribute references
  2. Instantiation
- We need to create an instance of the class and then we may reference its various attributes

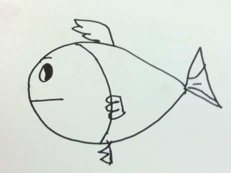
Class Objects

- Class

Class Objects

- Class 

Class Objects

- Class 
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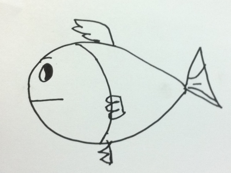
- Class 
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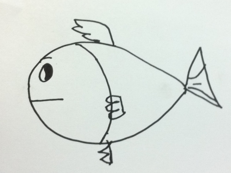
- Class 
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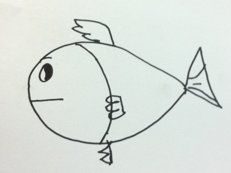
- Class 
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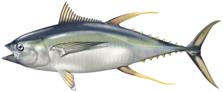
  2. Instantiation: 

Class Instantiation

- We need to create an instance of the class and then we may reference its various attributes

Class Instantiation

```
class MaxHeap(object):
        #construct - empty array
        def __init__(self, data = []):
                self.data = data
```

Calling the class

```
x = MaxHeap()
data = x.data
```

Attribute Reference

- Given an instance, we may reference attributes (assign, retrieve, delete)
- Two types of attributes:
  1. Data attributes
  2. Methods

Attribute reference

```
class MaxHeap(object):
        #construct - empty array
        def __init__(self, data = []):
                self.data=data

        def isEmpty(self):
                return(len(self.data) == 0)
```

Class Vs. Instance variables

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- Two types of variables exist
    1. Class variable(e.g. has gills, has scales)
    2. Instance variable(e.g. color of a muscle tissue ranges from pink to dark red, streamlined body)
- Class variables are shared by all instances of the class
- Instance variable are unique to each call

Class Vs. Instance variables

```
class Fish:
  self.gills = True
  self.scales = True
  def __init__(self, muscle_color, body_type):
    self.muscle_color = muscle_color
    self.body_type = body_type
```

Summary

- Classes provide a structure for a process with associated methods and objects
- Attribute references and instantiation are operations supported by a class object
- Data attributes and methods are two types of attributes
- There are two types of variables: class variable (shared by all instance of a class) and instance variable (unique to each instantiation)