Classes and Objects

Shirley B. Chu

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De La Salle University
College of Computer Studies

Procedural vs Object-Oriented Paradigm

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organized around data and logic	organized around objects and data

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- e.g. `String` and `Scanner` objects

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- A class defines the *attributes* and *behavior* of an object.

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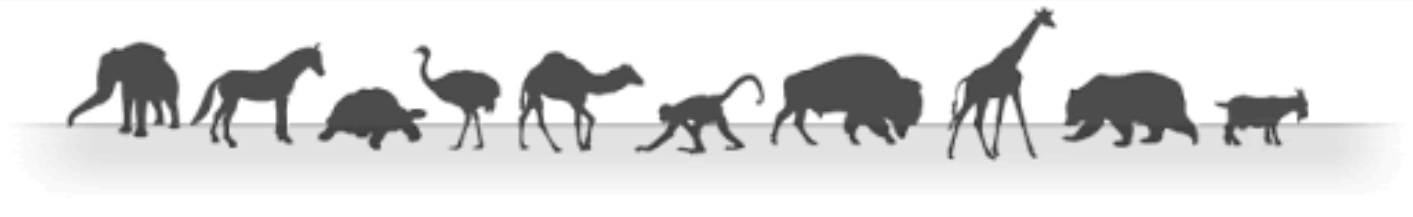
     - a.k.a actions, behavior
     - actions or behavior that the object is capable of

Try this



Create a class for your favorite animal.

Identify at least two properties and at least one method.

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By looking at the UML class diagram, a person should have an idea on what different classes are available and how they are structured to work with one another.

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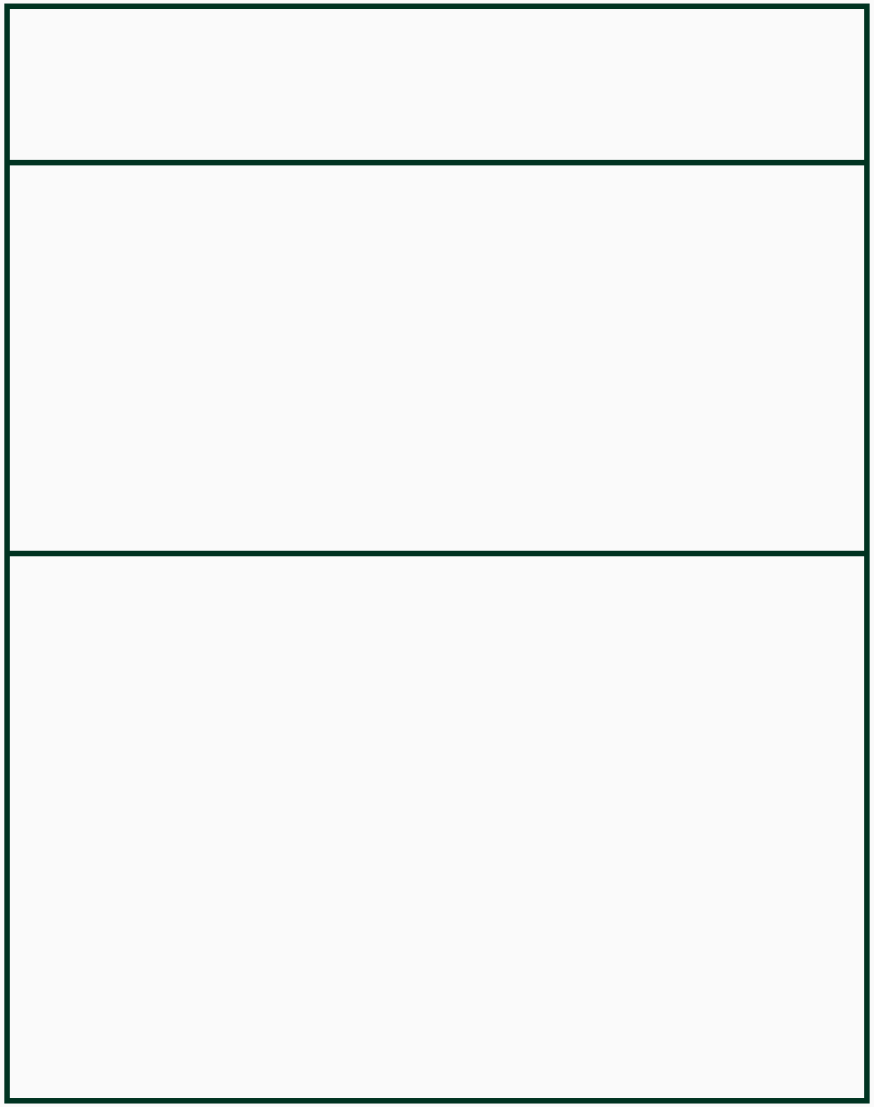

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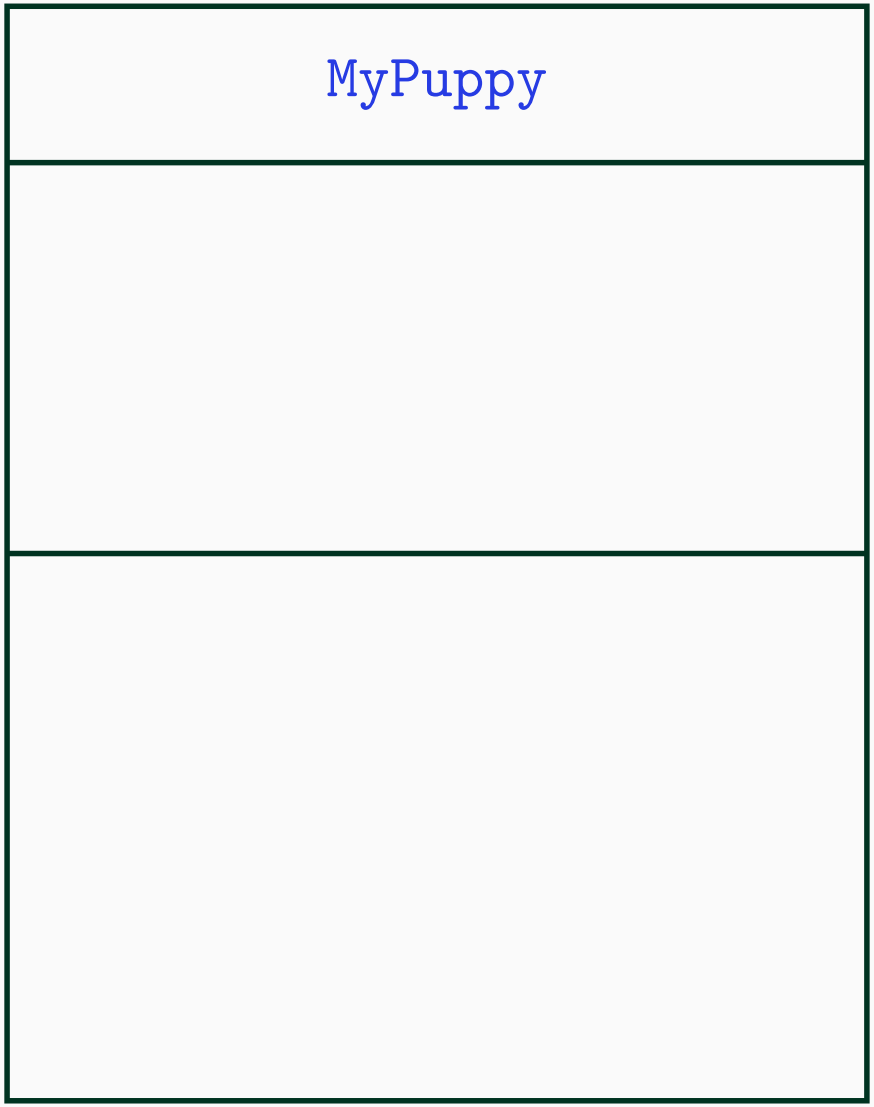

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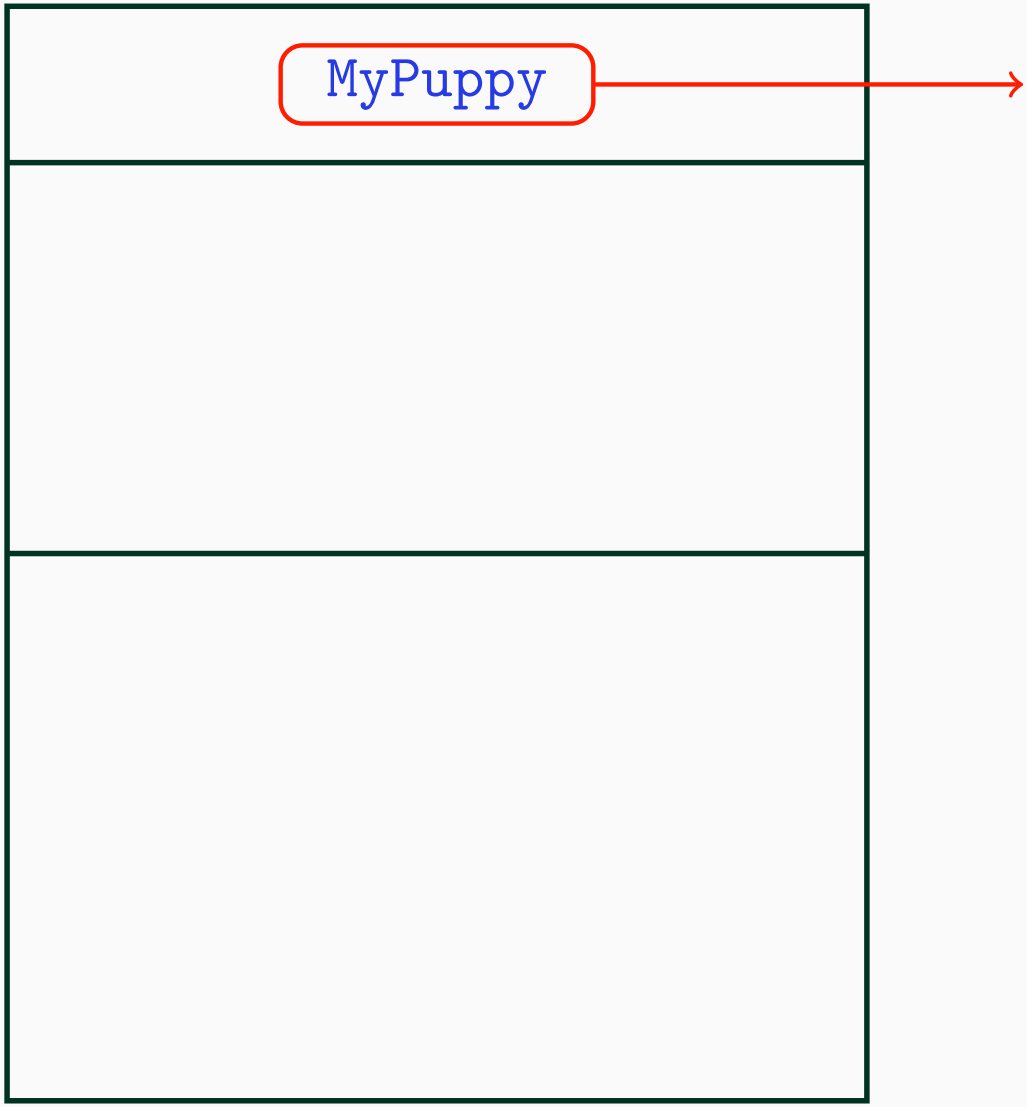

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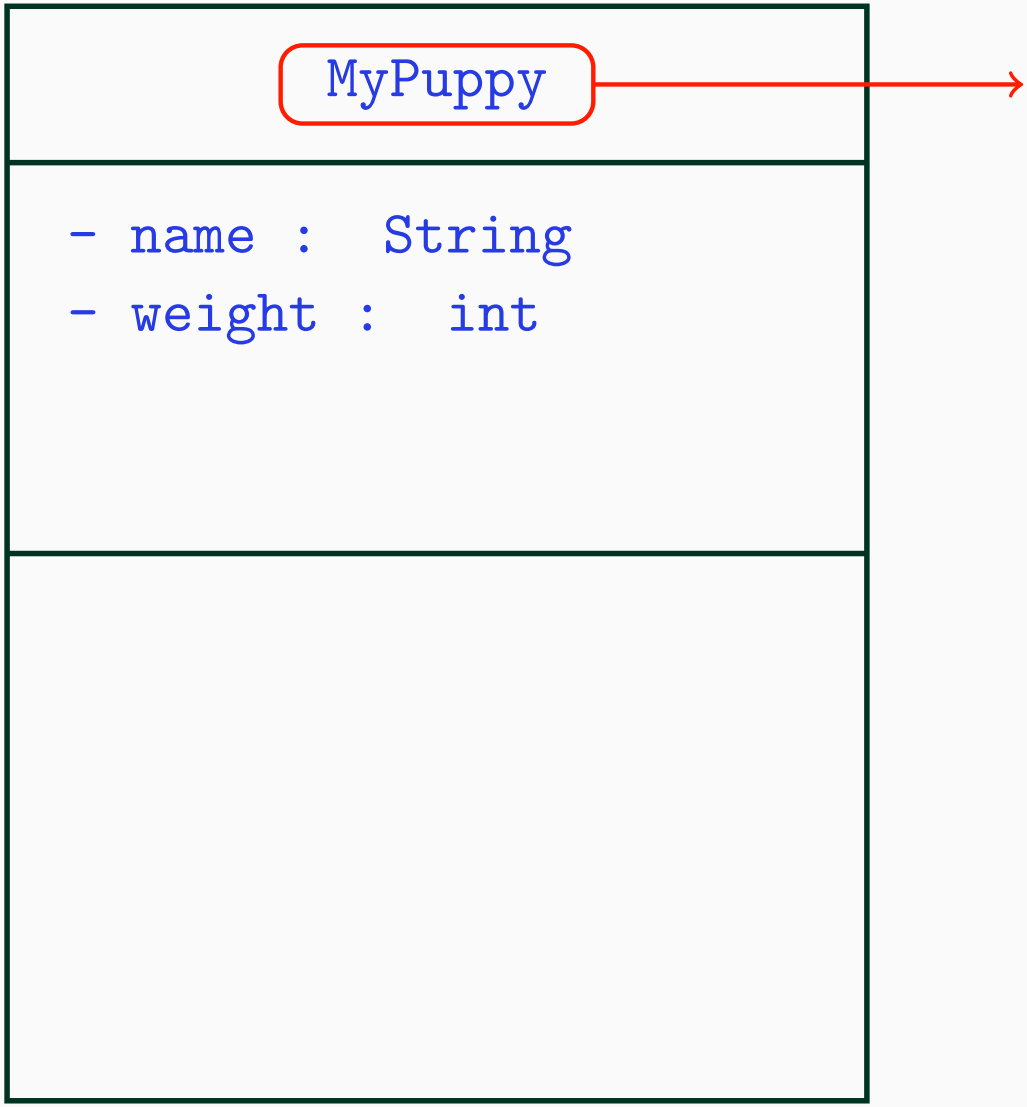

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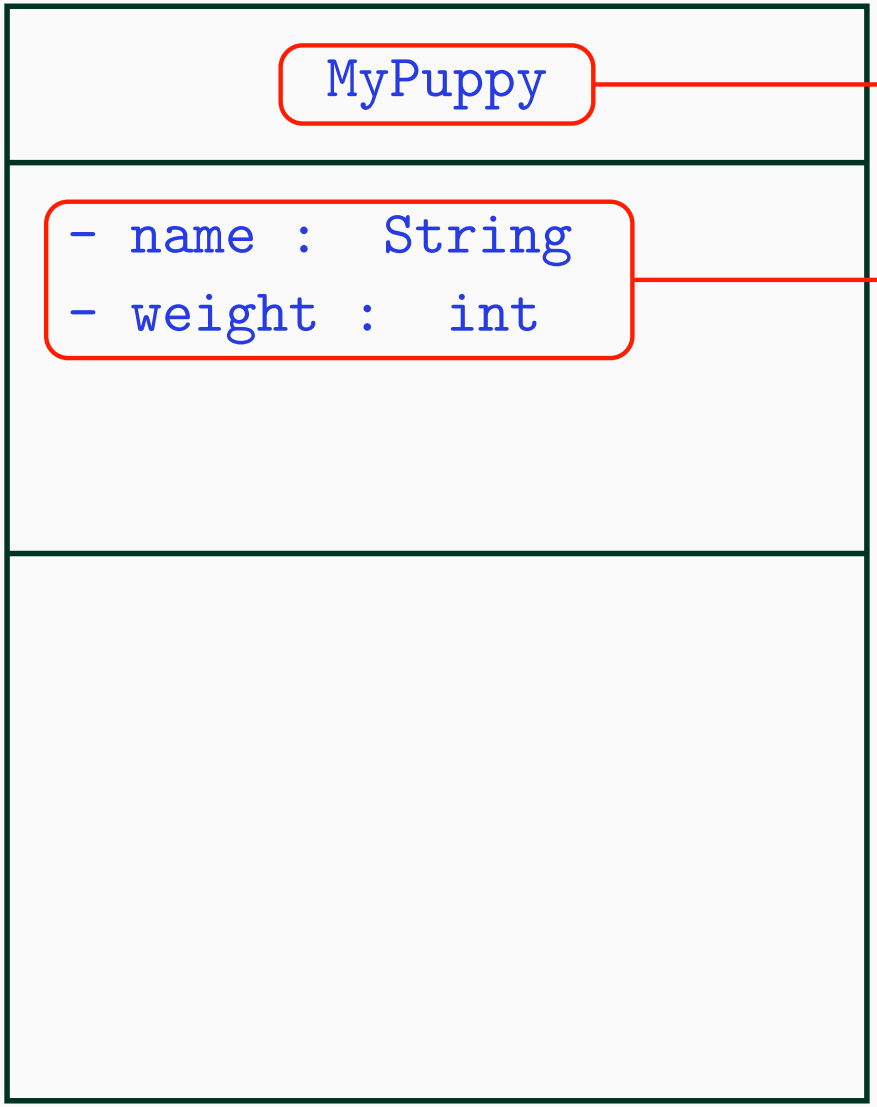

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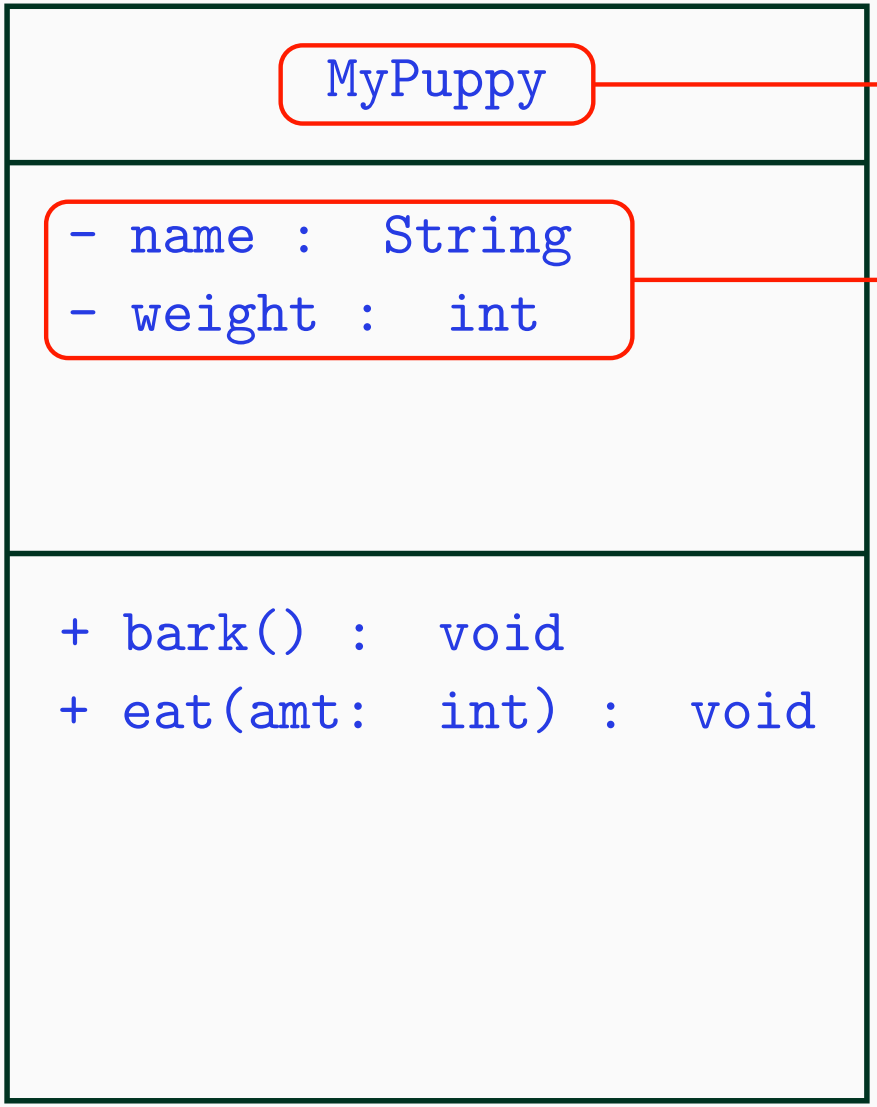

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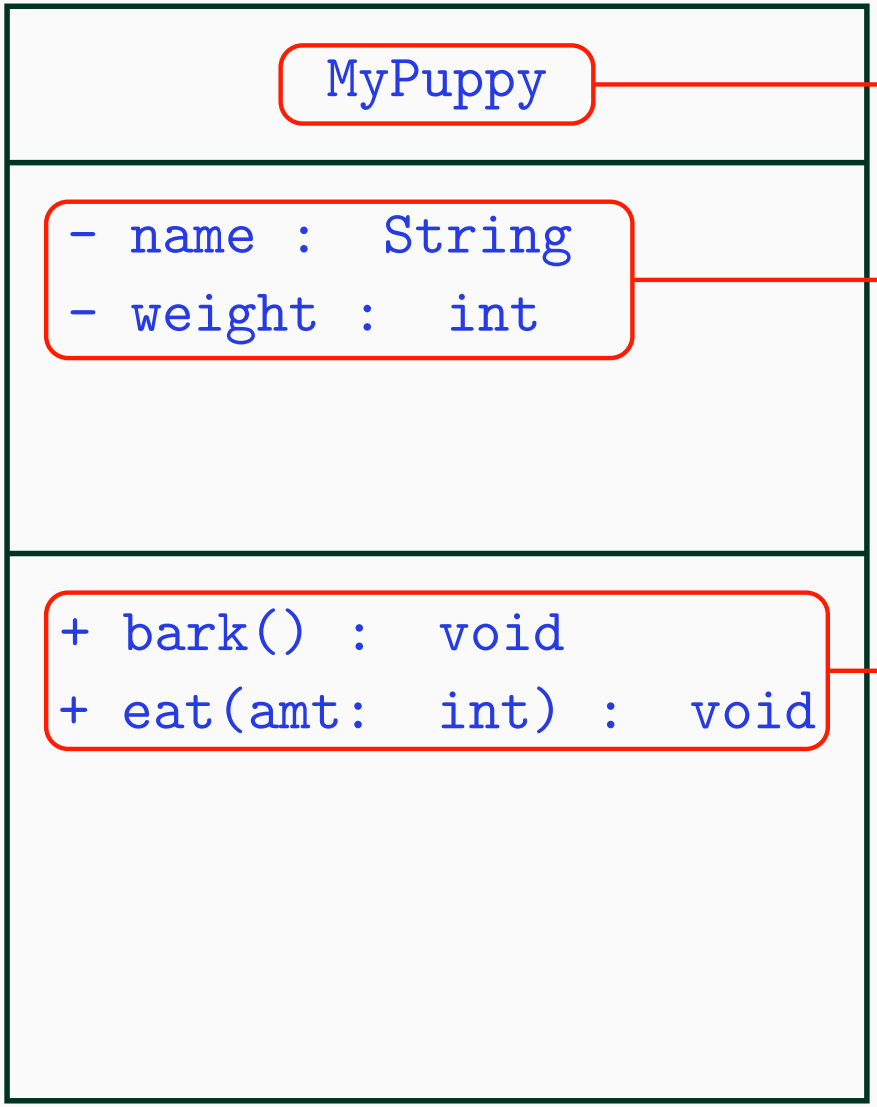

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Attributes: indicate access modifier, attribute name, type

Behavior: indicate access modifier, method name, parameter list, return type

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  - `protected` (#) : the member can be accessed within its own package, by a subclass of its class.

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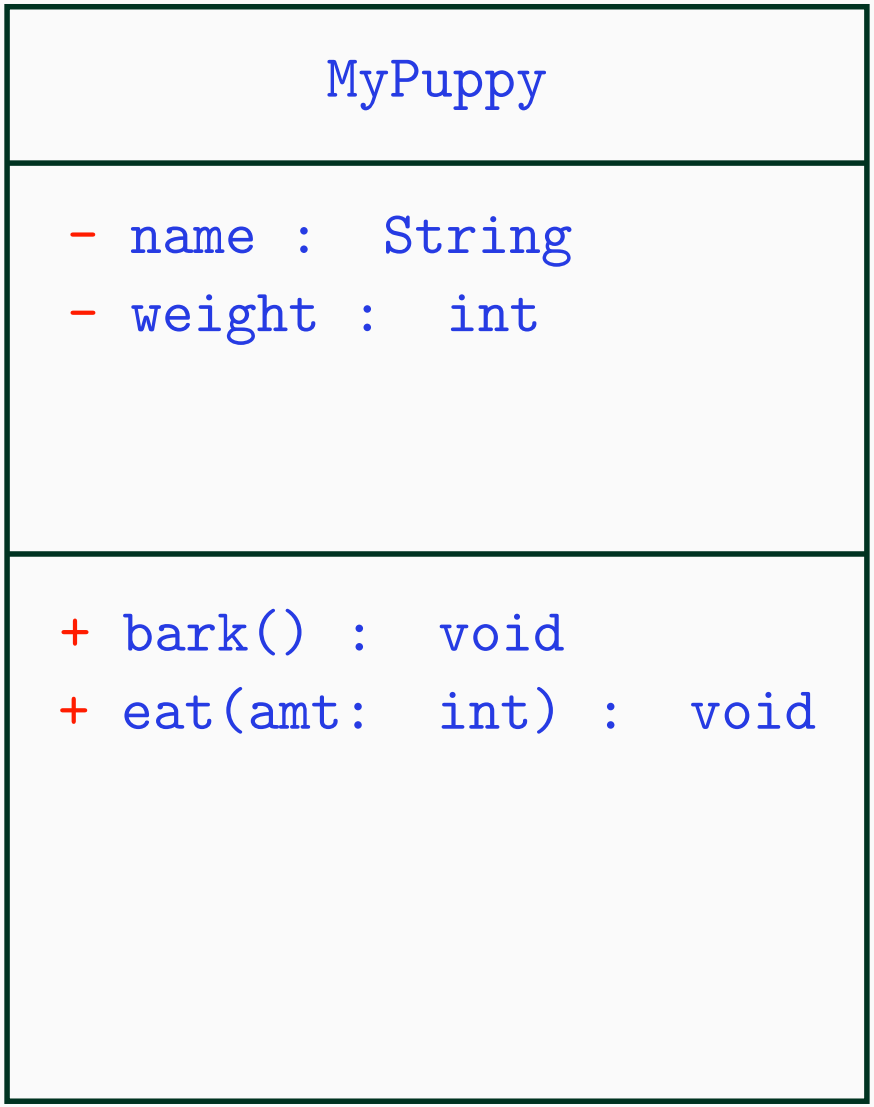

Getters and Setters

- Methods that are used for retrieving (getting) and changing (setting) the values of private attributes.

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- Allows you to restrict which properties could be accessed / changed, and how these are done.

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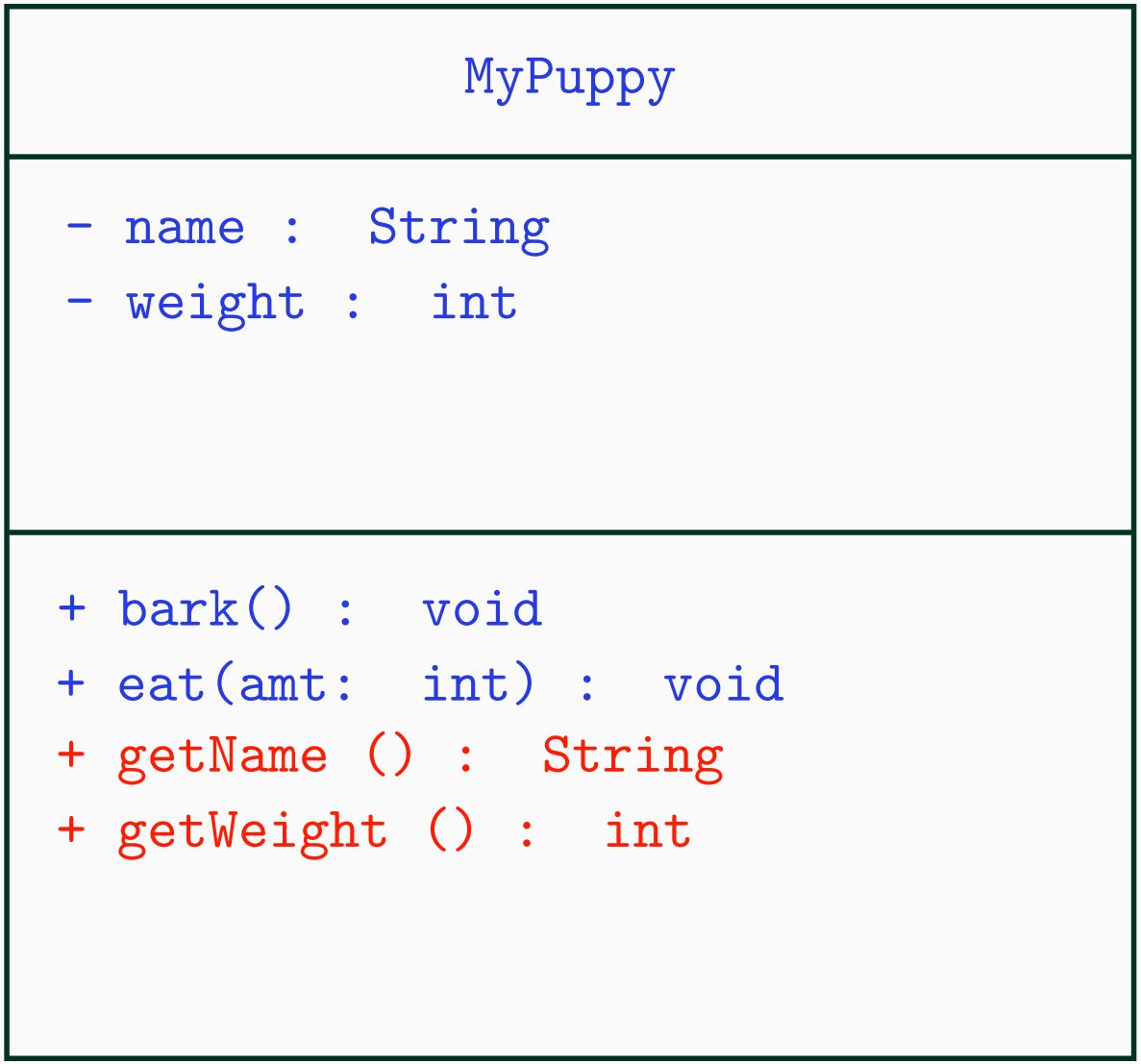

Class Diagram

MyPuppy
- name : String - weight : int
+ bark() : void + eat(amt: int) : void + getName () : String + getWeight () : int + setName (name: String) : void + setWeight (wt: int): void

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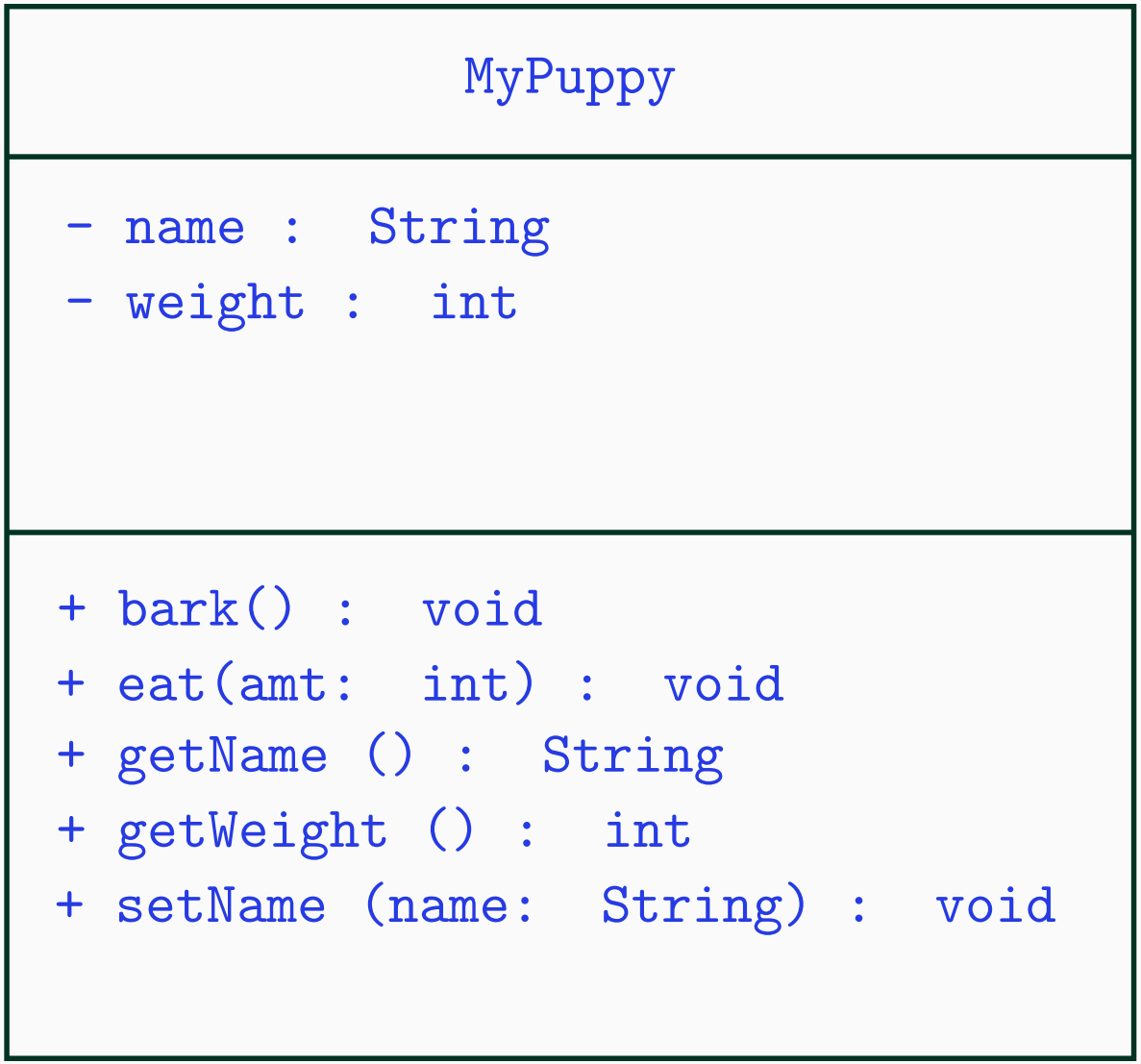

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- Typically used to initialize the values of an object once it is instantiated.
- A special method with the same name as the class name, and has no return type.
- Declared `public`, most of the time. .

Constructors

MyPuppy
- name : String - weight : int
+ MyPuppy(n : String, w: int) + bark() : void + eat(amt: int) : void + getName () : String + getWeight () : int + setName (name: String) : void

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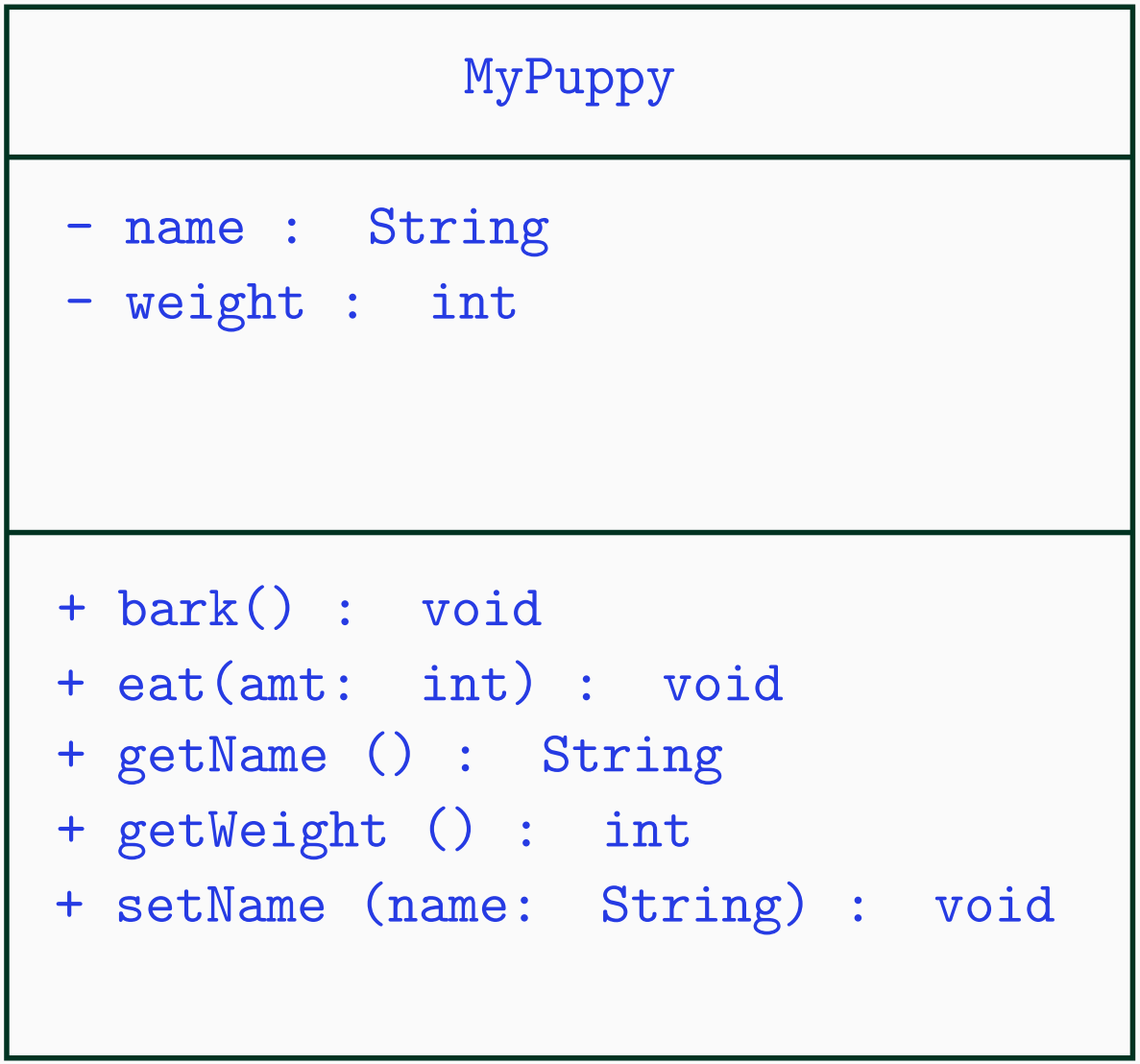
- Constructors have no explicit return type.
- Constructors can only be invoked by the `new` operator.
- Every class defines its own constructor/s.

Default Constructor



Default constructor is a constructor with no parameter.

It initializes the member variables to their default values.

This is automatically generated by the compiler if no constructors have been defined.

Constructor Overloading

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- differentiated by their *parameter lists*, in terms of number, order and type

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- name : String - weight : int
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Design the Date class

A date is composed of integers representing month, day, and year. When a `Date` object is created, its default date is set to July 1, 2020. However, a `Date` object can also be created given a specified date, or given month and day.

When updating the date value of the object, the new date value must be a valid date.

Do include a method to display the date.

OO Concepts

encapsulation refers to the bundling of data with the methods that operate on these data into a single unit.

information hiding refers to hiding the internal representation or state of an object

abstraction refers to hiding certain details (representation, implementation details) and showing only essential information to the user.

☺ **Thank you!** ☺