Ruby (on Rails)

CSE 190M, Spring 2009

Week 4

Constructors

- Writing a new class is simple!
- Example:

```
class Point
end
```

- But we may want to initialize state (constructor)
  - initialize()
  - Example:

```
class Point
  def initialize(x, y)
        @x = x          # the convention for instance variables
        @y = y          # is @parameter_name
  end
end
```

Instantiating New Objects

- We instantiate a new object by calling the new() method on the class we want to instantiate
- Example

  p = Point.new(2,3
- How do we get the @x of p?

  p.@x?

  p.x?

Accessing State

- Instance variables are private by default
- The instance variables for our Point class are

  @x, @y

- To access them, we must write methods that return their value
  - Remember "encapsulation" from CSE 142/143

Accessing State

```
class Point
   def initialize(x, y)
            @x = x
            @y = y
   end

   def get_x
            @x
   end
end

p = Point.new(2, 3)
puts p.get_x        # get value of x by calling a method
```

Accessing State

```
class Point
   def initialize(x, y)
            @x = x
            @y = y
   end

   def x
            @x
   end
end

p = Point.new(2, 3)
puts p.x  # get value of instance variable by calling a method
```

Accessing State

- We do not need to write these methods by hand
- Example:

```
class Point
  attr_reader :x, :y
  def initialize(x, y)
        @x = x
        @y = y
  end
end
```

- What if we want to assign values?

Accessing State

- To assign a value to @x, we can write a method
- Example:

```
def set_x(x)
  @x = x
end
p.set_x(7)
```

- Similarly we can use attr_writer

```
attr_writer :x, :y
```

Accessing State

- If we want to read and write all of our instance variables, we can combine attr_reader and attr_writer to simplify our class, replacing them with attr_accessor

```
class Point
   attr_accessor :x, :y
   def initialize(x, y)
         @x = x
         @y = y
   end
end
```

Objects in erb

- Objects work as expected in erb
- We can include the class directly in the erb file within the code tags <% … %>
- We can also save an external .rb file (Point.rb) and then require the class file in our .erb file (plot_points.erb)

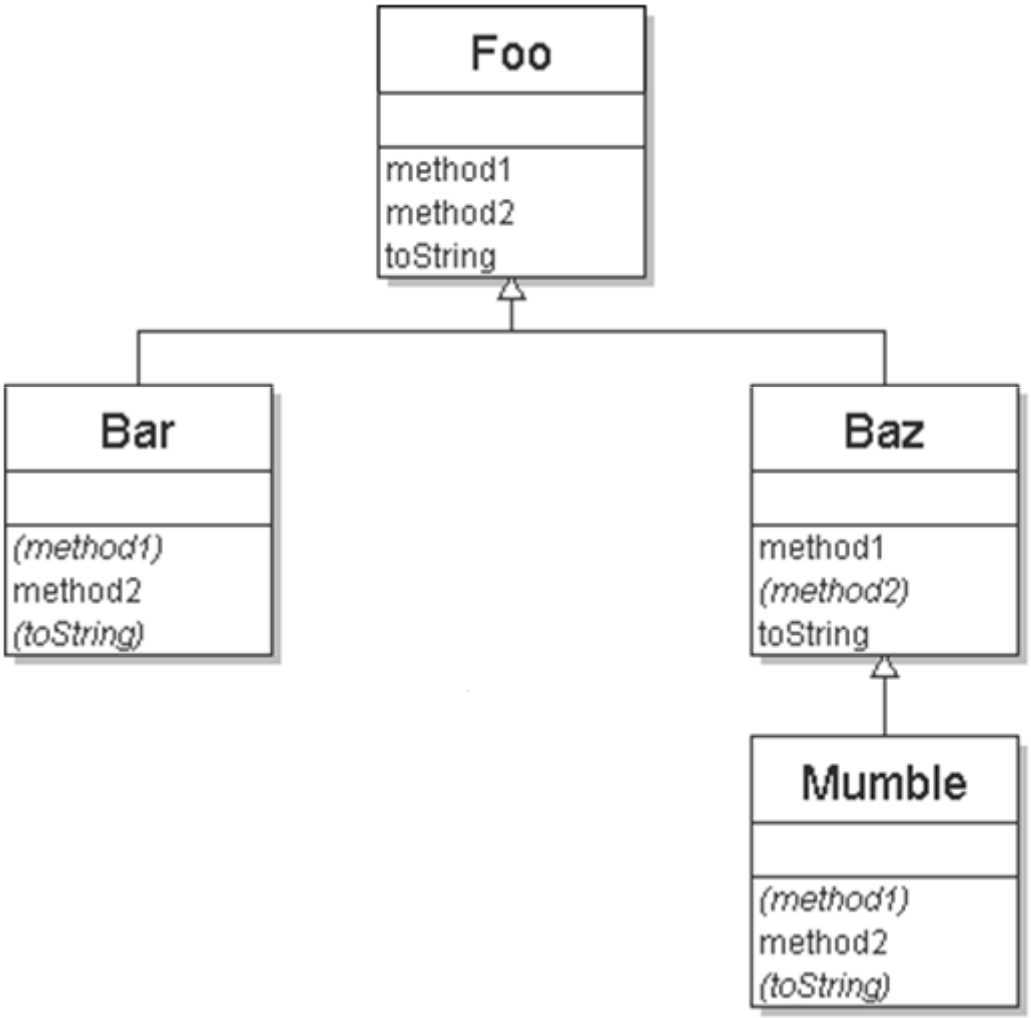
```
require 'Point.rb'
p = Point.new(3,5)
```

- The files should be in the same folder, or specify the path to the class file

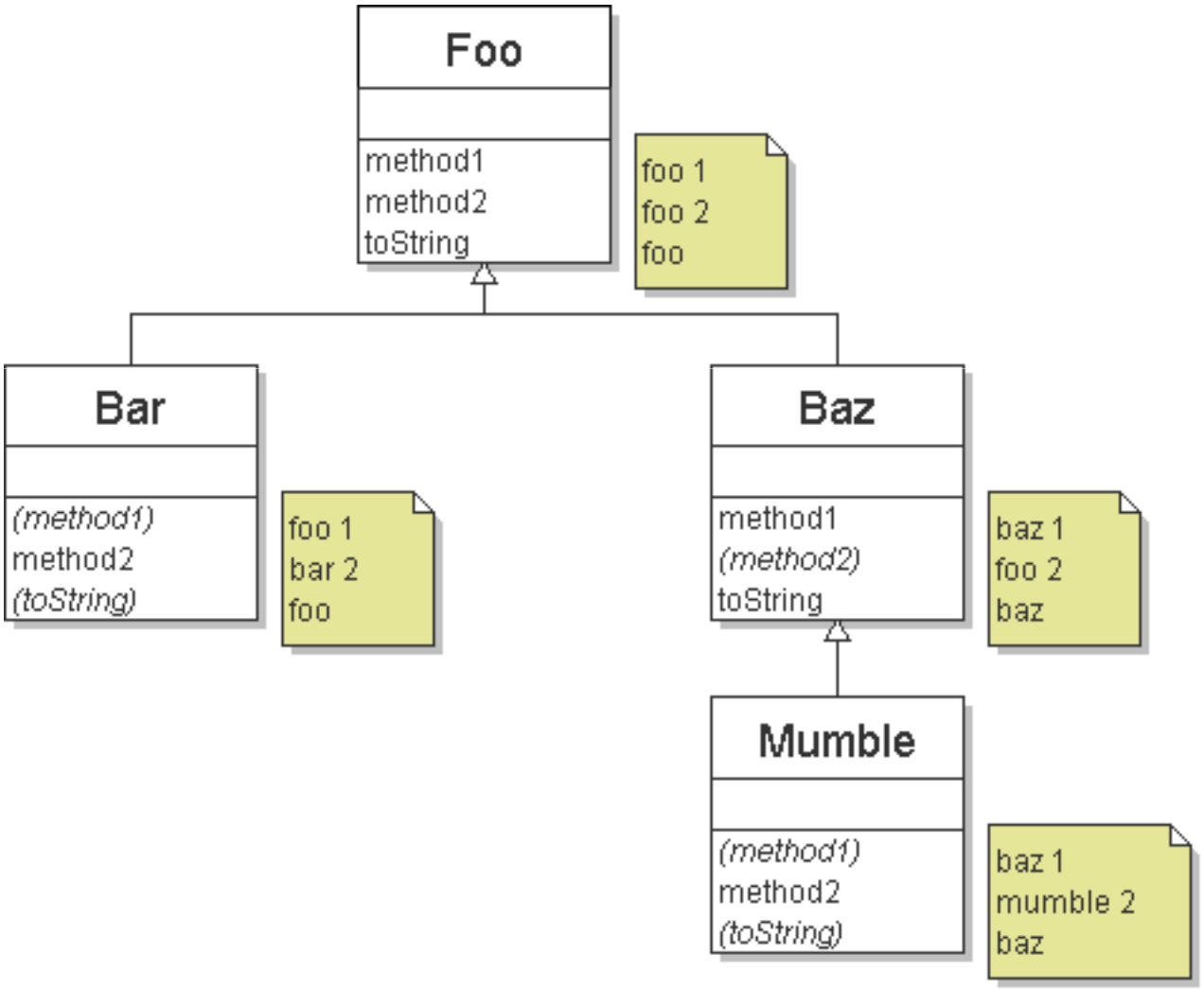
Inheritance

- Ruby supports single inheritance
- This is similar to Java where one class can inherit the state and behavior of exactly one other class
- The parent class is known as the superclass, the child class is known as the subclass

Inheritance



Inheritance



Public and Private Methods

- Methods are public by default
- Private methods are declared the same way as public methods (no keyword at the beginning of method like Java)
- Private methods are designated by an "area" of private methods
- They keyword "private" designates this area
- Any methods after "private" are private methods

Public and Private Methods

- Public – any class can use the methods
- Private – only this particular object can use these methods

- There is a middle ground… methods can be "protected"
- Protected – only objects of this class or its subclasses can use these methods

Modifying Class Behavior

- Ruby allows us to add or modify functionality to ANY class
- This includes built-in classes like Fixnum and String
- Lets allow Strings to add any object to it without having to say to_s

```
"hello" + 3                    # instead of "hello" + 3.to_s
```