

Keith R. Bennett's Technical Blog

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Ruby's Forwardable

By keithrbennett on September 13th, 2012

Last night I had the pleasure of attending the Arlington Ruby User Group meeting in Arlington, Virginia. Marius Pop, a new Rubyist, presented on Ruby's Forwardable module. Forwardable allows you to very succinctly specify that you want to define a method that simply calls (that is, delegates to) a method on one of the object's instance variables, and returns its return value, if there is one. Here is an example file that illustrates this:

```
require 'forwardable'
123456789
     class FancyList
       extend Forwardable
       def_delegator :@records, :size
       def initialize
         @records = []
10
\overline{11}
12
     end
     puts "FancyList.new.size = #{FancyList.new.size}'
     puts "FancyList.new.respond_to?(:size) = #{Fancyl
16
17
       Output is:
18
       FancyList.new.size = 0
     # FancyList.new.respond_to?(:size) = true
```

After the meeting I thought of a class I had been working on recently that would benefit from this. It's the <u>LifeTableModel</u> class in my <u>Life Game Viewer</u> application, a Java Swing app written in JRuby. The LifeTableModel is the model that backs the visual table (in Swing, a *JTable*). Often the table model will contain the logic that provides the data to the table, but in my case, it was more like a thin adapter between the table and other model objects that did the real work.

It turned out that almost half the methods were minimal enough to be

replaced with Forwardable calls. The diff is shown here:

```
diff --git a/lib/life_game_viewer/view/life_table_model.
 1
2
     index 0ee2966..6cbcba1 100644
3
    --- a/lib/life_game_viewer/view/life_table_model.rb
    +++ b/lib/life_game_viewer/view/life_table_model.rb
4
    @@ -3,15 +3,26 @@ require 'java'
 5
 6
     java_import javax.swing.table.AbstractTableModel
     java_import javax.swing.JOptionPane
7
8
9
    +require 'forwardable'
10
11
     require_relative 'generations'
12
     # This class is the model used to drive Swing's JTable.
13
14
      # It contains a LifeModel to which it delegates most ca
      class LifeTableModel < AbstractTableModel</pre>
15
16
17
    + extend Forwardable
18
19
        attr accessor :life model
20
        attr_reader :generations
21
    + def delegator :@life model, :row count,
                                                       :getRov
22
23
    + def delegator :@life model, :column count,
                                                       :getCol
    + def_delegator :@life_model, :number_living
24
    + def_delegator :@life_model, :alive?,
25
                                                       :getVal
26
27
    + def_delegator :@generations, :at_first_generation?
     + def_delegator :@generations, :at_last_generation?
28
29
        def initialize(life_model)
30
          super()
31
     @@ -24,34 +35,10 @@ class LifeTableModel < AbstractTable
32
          @generations = Generations.new(life_model)
33
34
        end
35
        def getRowCount
36
37
         life model.row count
    end
38
39
        def getColumnCount
40
        life_model.column_count
41
        end
42
43
        def getValueAt(row, col)
44
          life_model.alive?(row, col)
45
        end
46
```

```
47
        def getColumnName(colnum)
48
49
          nil
        end
50
51
52
        def at_first_generation?
          generations.at_first_generation?
53
54
55
56
        def at_last_generation?
          generations.at last generation?
57
        end
58
59
        def number_living
60
          life_model.number_living
61
        end
62
63
64
        def go_to_next_generation
          if at_last_generation?
65
             JOptionPane.show_message_dialog(nil, "Generation
66
gistfile1.diff hosted with  by GitHub
                                                        view raw
```

The modified class is viewable on Github here.

As you can see, there was a substantial reduction in code, and that is always a good thing as long as the code is clear. More importantly, though, def_delegator is much more expressive than the equivalent standard method definition. It's much more precise because it says this function delegates to another class' method *exactly*, in no way modifying the behavior or return value of that other function. In a standard method definition you'd have to inspect its body to determine that. That might seem trivial when you're considering one method, but when there are several it makes a big difference.

One might ask why not to use inheritance for this, but that would be impossible because:

- a) the class delegates to three different objects, and
- b) the class already inherits from AbstractTableModel, which provides some default Swing table model functionality.

Marius showed another approach that delegates to the other object in the method_missing function. This would also work, but has the following issues:

a) It determines whether or not the delegate object can handle the message by calling its *respond_to* method. If that delegate intended to handle the

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message in its method_missing function, respond_to will return false and the caller will not call it, calling its superclass' method_missing instead.

- b) The delegating object will itself not contain the method. (Maybe the method_missing handling adds a function to the class, but even if it does, that function will not be present when the class is first loaded.) So it too will return a misleading false if respond_to is called on it.
- c) In addition to not communicating its capabilities to objects of other classes, it does not communicate to the human reader what methods are available on the class. One has to look at the class definition of the delegate object, and given Ruby's duck typing, that may be difficult to find. It could even be impossible if users of your code are passing in their own custom objects. This may not be problematic, but it's something to consider. (I talk more about duck typing's occasional challenges at Design by Contract. Ruby Style.)

It was an interesting subject. Thank you Marius!

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One Response to "Ruby's Forwardable"



Marius says:

Thanks for the post Keith!

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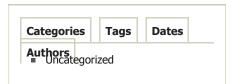
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