

Metaprogramming

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whoami

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what?

the writing of computer programs that write or manipulate other programs (or themselves) as their data, or that do part of the work at compile time that would otherwise be done at runtime.

- Metaprogramming, Wikipedia

what?

writing code that writes code.

- Metaprogramming Ruby, Pragmatic

topics

- ⦿ Ruby Object Model
- ⦿ Real world code examples, from my own poorly written 'projects' (just kidding, not sure they'll run at all)

features covered

- ⦿ class_eval
- ⦿ instance_eval
- ⦿ define_method
- ⦿ send
- ⦿ alias (alias_method)
- ⦿ include
- ⦿ extend
- ⦿ lambda
- ⦿ method_missing
- ⦿ ...

ruby is an OO language

Everything you manipulate is an object,
and the results of those manipulations are
themselves objects.

- Programming Ruby

a class is an object

- with a constant name
- instance (object) of Class
- class Name; end or
- Class.new {}

class family

- ⦿ MyClass.ancestors
- ⦿ super classes and mixed in modules
- ⦿ root is BasicObject (or Object in Ruby 1.8)
- ⦿ Kernel is a module

example #0

- ⦿ MyClass = Class.new {}
- ⦿ obj = MyClass.new
- ⦿ obj.class => MyClass
- ⦿ MyClass.class => Class

example #1

self yield

- ⦿ SomeClass.new { |k| ... }

```
Person.new do |p|
  p.name = 'Bad Guy'
  p.age = 15
  p.gun.reload
end
```

example #2

mixin

- ➊ kick off multiple inheritance
- ➋ make our life much easier - DRY, include other's lib

mixin

```
class DoNothing
  include KillMachine
  extend BigBrother
end
```

```
DoNothing.new.kill
DoNothing.watch_ya
```

minxin

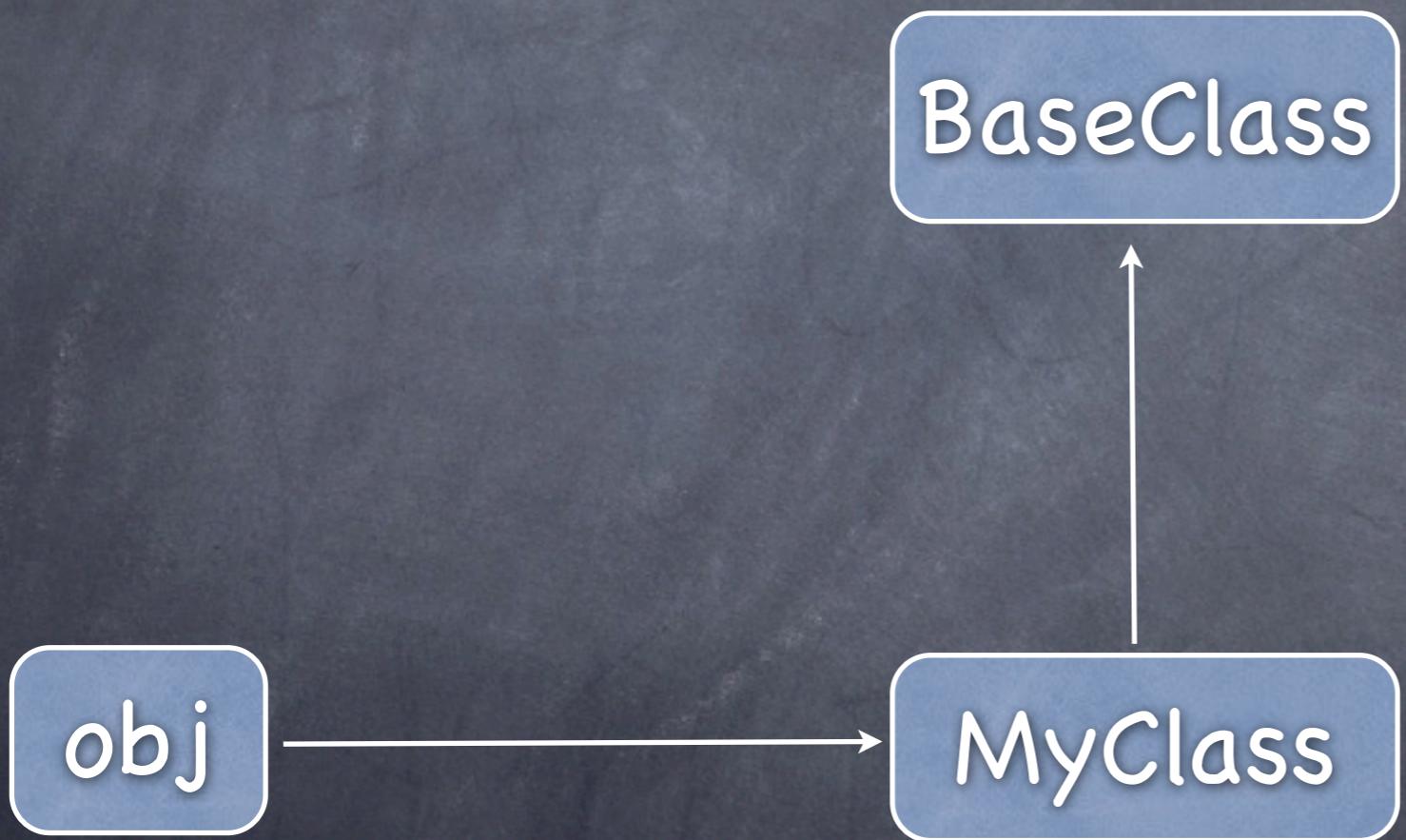
- ⦿ include vs. extend
- ⦿ used widely in Rails plugins

example #3

singleton class

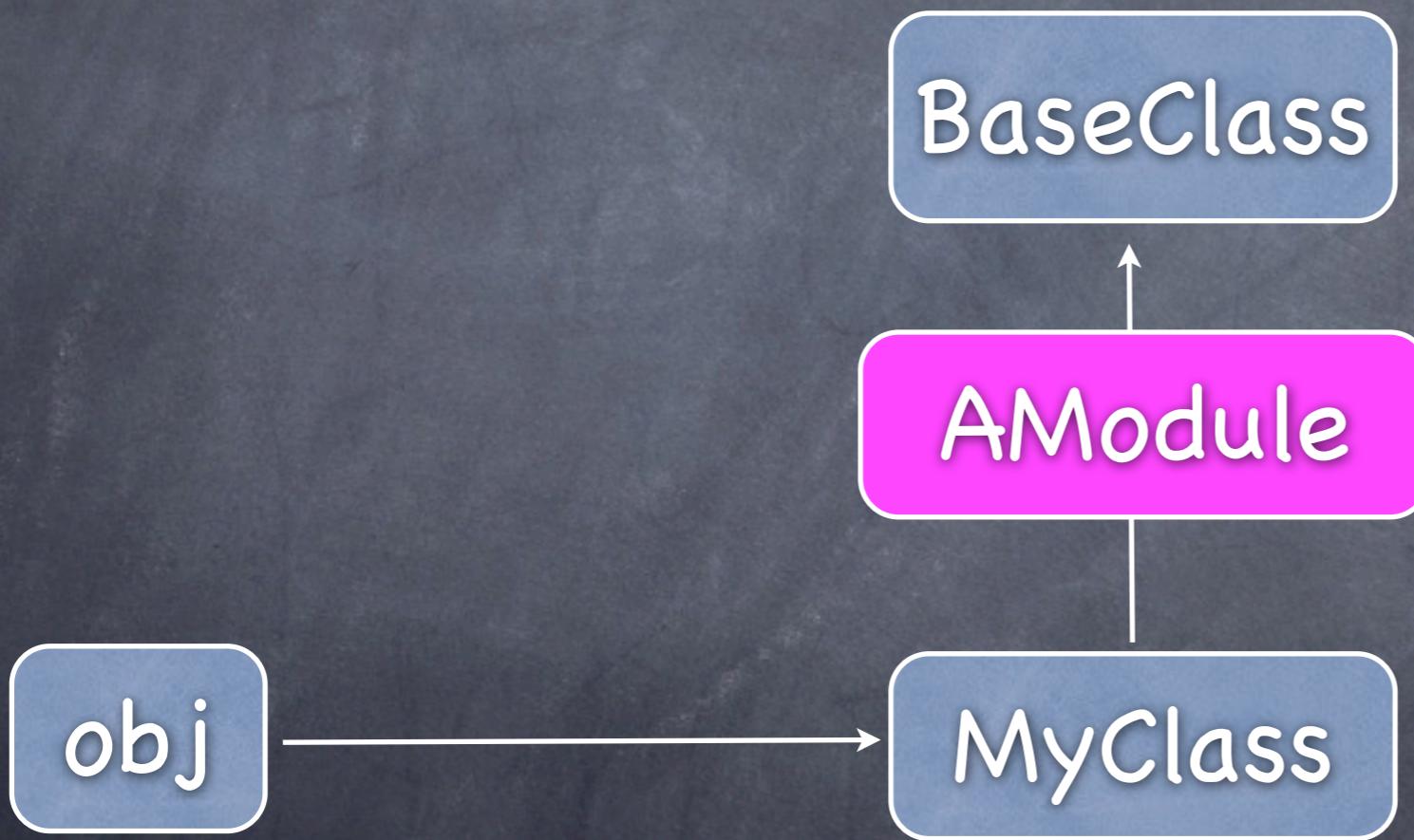
- def MyClass.a_method
- def self.a_method
- class << self; def a_method...
- class << MyClass; def a_method...

methods lookup



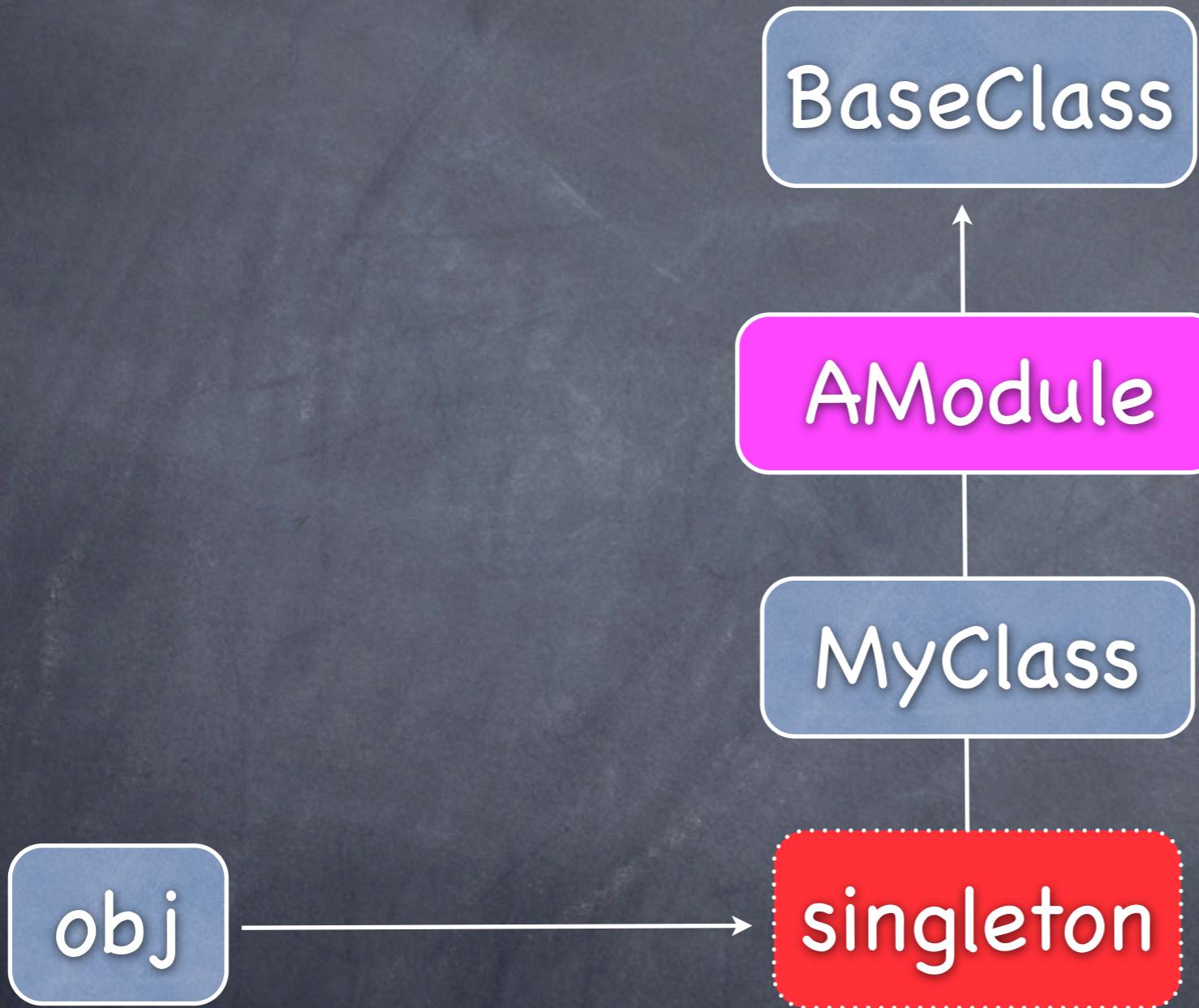
example #4

methods lookup



example #4

methods lookup



example #4

we use all these a lot

rails



code that writes code

from real-world lazy programmer

```
Kind = {  
  :page => '页面',  
  :category => '分类',  
  :product => '产品'  
}
```

```
Kind.each_key do |kind|  
  named_scope kind.to_s.pluralize, :conditions => { :kind => kind.to_s }  
  define_method("##{kind.to_s}?") { self.kind == kind.to_s }  
end
```

more... rails routes

```
map.with_options :controller => "pages" do |pages|
  %w(tos privacy refund how stories support).each do |p|
    pages.send(p, "/#{p}", :action => p)
  end
  pages.contact_us '/contact', :action => 'contact'
end
```

Code Examples

<http://github.com/ashchan/metaprogramming-examples>

Questions?

Thanks!