



Day One

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Intro

Meet n' Greet

The Next Three Days

Today

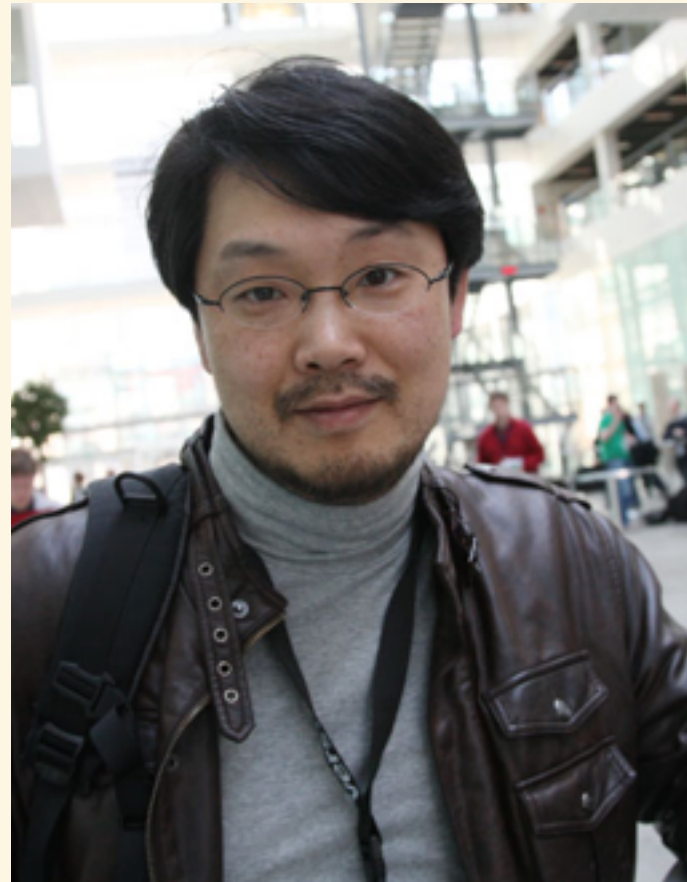
- Basic syntax
- *Lunch*
- I/O and Environment
- OOP
- 3rd Party Code
- *End 17:00*

Setup

Ruby Intro

Background

- Appeared in 1995
- Perl, Smalltalk, Lisp
- Multiple impls
- 1.8.7 vs 1.9.2



Strengths

- String and file manipulation
- Dynamic language features
- Creating DSLs
- Large ecosystem, active community
- Focus on clean code and readability

Weaknesses

- Performance
- Easy to make a mess
- Small local community

Usage Outside Rails

- Scripting & automation
- Tools
- Project “glue”
- Polyglot architectures

Executing Code

```
ruby hello_world.rb  
ruby -e "puts 'hello world'"  
irb
```

Basic Syntax

Variables

```
simple_variable = "I am a string"  
another_variable = 42  
CANNOT_BE_CHANGED = "Constant string"  
initialized_empty_var = nil
```

Objects

```
puts "A String".methods # => ["upcase!", "count", "downcase" ...]
```

```
42.methods # => ["%", "+", "odd?", ... ]
```

```
# Everything is an object.
```

```
# Objects are easy to inspect.
```

Functions

```
def strict_greeting(name)
  return ("Hello, "+name);
end
```

```
def loose_greeting name
  "Hello, "+name
end
```

```
puts(strict_greeting("Mr Smith")); # => "Hello, Mr Smith"
puts loose_greeting "Mr Jones"    # => "Hello, Mr Jones"
```


Conditionals

```
if true
  puts "always prints"
elsif false
  puts "never prints"
else
  puts "never prints"
end
```

```
puts "always prints" if true
puts "never prints" unless true
```

Loops

```
while true  
  puts "endless loop"  
end
```

```
count = 0  
until count == 5  
  puts "climbing"  
  count += 1  
end
```

Exercise 01

exercises/01

Blocks

```
3.times do
  puts "Nice for-loop!"
  puts "Multiline form"
end
```

```
3.times { puts "One-liner form" }
```

```
[1,2,3].each { |n| puts "Param to this block run is #{n}!" }
```

```
[1,2,3].map { |n| n * 2 } # => [2, 4, 6]
```

```
closure_var = "dead people"
3.times { puts "I see #{closure_var}" }
```

Exercise 02

exercises/02

Array and Range

```
an_array = [1, "two", 3] # can have any types
```

```
an_array[0]          # => 1
an_array.first       # => 1
an_array.last        # => "four"
an_array[1..2]       # => ["two", 3]
```

```
(1..5).to_a          # => [1, 2, 3, 4, 5]
(1...5).to_a         # => [1, 2, 3, 4]
```

```
numbers_range = 0..9
numbers_range.class      # Range
numbers_range.max        # => 9
numbers_range.min        # => 0
numbers_range.include? 5  # => true
```

Exercise 03

exercises/03

String

```
holiday = "Christmas"  
puts "Merry #{holiday}"    # => Merry Christmas
```

```
long_greeting = <<HERE_STRING  
This is a long unquoted string  
which includes line breaks, formatting, etc  
We can also interpolate: #{greeting}  
HERE_STRING
```

```
long_greeting.lines.count # => 3
```


Exercise 04

exercises/04

Symbol

```
color_of_sky = :blue
```

```
# evalutes to itself - has no other value  
# think of it as a unique label  
# a "lonely enum value"  
# handy for ids, like flags, hashmap keys etc  
# can be transformed to and from String
```

Hash

```
person = { :name => "Tony Soprano",  
           :job  => "Waste management" }
```

```
person[:name] # => "Tony Soprano"  
person[:job]  # => "Waste management"
```

Value can be anything

Keys can be anything but must respond to .hash

Exercise 05

exercises/05

Exception Handling

```
raise TypeError, "Param shouldn't be a String"  
raise "A runtime exception, the easy way"
```

```
begin  
  raise "kaboom"  
rescue  
  puts "rescuing from exception!"  
end
```

```
begin  
  raise TypeError.new("Inspectable exception")  
rescue TypeError => te  
  puts te.message  
ensure  
  puts "always runs in the end"  
end
```

Exercise 06

exercises/06

Regular Expression

```
literal_regex = /[A-Za-z0-9]/  
explicit_regex = Regexp.new("[A-Za-z0-9]")  
"Alphanumeric123" =~ literal_regex # => true
```

Pragmatic but messy way

```
"This is -James Bond- calling" =~ /-(.*)-/ # => true
```

```
puts $1 # => James Bond
```

\$1 through \$9 are thread-global variables

Each match overwrites these variables

Slightly cleaner and object-oriented

```
re = Regexp.new("-(.*)-")
```

```
match_data = re.match("This is -James Bond- calling")
```

```
puts match_data[0] # James Bond
```

Can have several matches saved at the same time

Exercise 07

`exercises/07`

Lunch!

Environment and I/O

Shelling Out

Three ways of running shell commands

``ls``

`%x[ls]`

`Kernel.system "ls"`

`current_dir = `pwd` # Store result`

`puts `pwd` # Print result directly`

`file_path = "../.bash_profile"`

`file_body = `less #{file_path}` # String interpolation works fine`

Remember: this is Unix-specific code, breaks on Windows!

Exercise 08

exercises/08

File and Dir

```
file = File.new("test1.txt", "w")
file.syswrite "wow" # do stuff to file
file.close
```

#better way, use a block:

```
File.open("test2.txt", "w") do |file_body|
  file_body.puts "Writing this to file"
end # File closed automatically
```

```
Dir["*"] # => ["bin", "Desktop", "Documents", ....]
```

File and Dir are low level Ruby APIs

Use FileUtils API for methods that map directly to cmd line operations

cd(dir, options)

pwd()

mkdir(dir, options)

chmod(mode, list, options)

touch(list, options)

...etc

```
require 'fileutils'
```

```
FileUtils.mv('/tmp/your_file', '/opt/new/location/your_file')
```

Exercise 09

exercises/09

ARG, ENV, Paths

ENV # Hash of system environment variables

ENV # => {"SHELL"=>"/bin/bash", "HOME"=>"/Users/thomas", ...}

ARG # Array of the options send to called ruby program

`ruby myscript.rb "one" 2 "three"` # ARGV becomes ["one", 2, "three"]

__FILE__ # When executed in a script, bound to name of script file

\$: # Paths where Ruby looks for libraries and files that we load

Can add extra folders to load path during startup:

`ruby -I lib:test hello.rb`

Can now run/require all files in ./lib and ./test

Exercise 10

exercises/10

OOP

Overview

- Classes and objects
- Modules
- Metaprogramming

Classes and Objects

Class Definition

```
class Vehicle

  def initialize(name) # Constructor method
    @name = name      # Instance variable has @
                        suffix
  end

  def name # Regular instance method
    @name
  end

end

v = Vehicle.new("Corolla")
puts v.name
```

Attributes

```
class Vehicle
  def speed # Attribute reader
    @speed
  end
  def speed=(new_speed) # Attribute writer
    @speed = new_speed
  end
end
```

```
v = Vehicle.new("Mazda 6")
v.speed = 80
puts v.speed # => 80
```

```
# Shorter alternative form
class Vehicle
  attr :speed
end
```

```
v = Vehicle.new("Ford Fiesta")
v.speed = 90
puts v.speed # => 90
```

Subclassing, Self, Super

```
class Car < Vehicle
  attr :manufacturer

  def initialize(manufacturer, name)
    super(name)
    @manufacturer = manufacturer
  end

  def full_title
    "#{self.manufacturer} #{self.name}"
  end
end

c = Car.new("Porsche", "911")
puts c.full_title #=> "Porsche 911"
```

Class Variables, Class Methods

```
class Vehicle
```

```
  def Vehicle.set_max_speed(speed) # Class method  
    @@max_speed = speed # Class variable has @@ prefix  
  end
```

```
  def max_speed  
    @@max_speed  
  end
```

```
end
```

```
Vehicle.set_max_speed("299,792,458 metres per second")  
c = Car.new("Porsche", "911")  
puts c.max_speed # => 299,792,458 metres per second
```

Access Control

```
class Vehicle

  def method1 # Default public visibility
    # ...
  end

  protected # Subsequent method will be visible to others of same class

  def method2
    # ...
  end

  private # Subsequent method only visible to same class objects

  def method3
    # ...
  end

  public # Subsequent methods will be public again

  # ...
end
```


Exercise II

exercises/II

Modules

Namespacing

```
module Ikea # Declares module
  OWNER = "Ingvar Kamprad" # Module-local constant

  class Factory # Module-local class def

  end
end

# Use :: separator to reach inside module from outside
puts Ikea::OWNER # => Ingvar Kamprad
factory1 = Ikea::Factory.new
factory2 = Factory.new # => NameError: uninitialized constant..

include Ikea # Make available to current context/object
factory3 = Factory.new
# Including the module mixes it into self
```

Mixins

```
@materials = "55 planks"
```

```
build_porch # => NameError: undefined local variable or method  
`build_porch' for main:Object
```

```
module Carpenter  
  def build_porch  
    puts "Built porch using #{@materials}!"  
  end  
end
```

```
include Carpenter # Mixing Carpenter into current object  
build_porch # => "Built porch using 55 planks!"
```

```
# KEY POINT: module code interacts with code in object it's included in!
```

```
# Better example: The Enumerable module  
# "The Enumerable mixin provides collection classes with several  
# traversal and searching methods, and with the ability to sort. The  
# class must provide a method each, which yields successive members of  
# the collection [...]"
```

Exercise 12

exercises/12

Metaprogramming

Open Classes

```
class Project # Create class
  def start
    puts "project starts"
  end
end
```

```
class Project # Reopen and add to the class
  def end
    puts "project ends"
  end
end
```

```
p = Project.new
p.start # => project starts
p.end   # => project ends
```

```
class String # Can also monkeypatch core APIs
  def first_three
    self[0..2]
  end
end
```

```
puts "lorem ipsum".first_three # => "lor"
```

Dynamic Dispatch

```
42 + 2           # => 44  
42.+(2)          # => 44  
42.send(:+, 2)   # => 44
```

*# Can determine at runtime which method to call/
delegate to*

Can also determine if specific function call is safe

```
42.respond_to?(:+) # => true  
42.respond_to?(:magical_operator) # => false
```


method_missing

```
# We can respond to, and decide what happens, when non-existent  
# methods are called  
class Dummy  
  def method_missing(method_name, *args, &block)  
    puts "There's no method called #{method_name} here!"  
  end  
end  
  
d = Dummy.new  
d.mashed_potatoes # => "There's no method called mashed_potatoes here!"
```

Self-Modifying Classes

```
# Pulling it all together:
# Classes are open, methods can be called dynamically
# and missing methods can be detected.
# So one thing we can do is create classes that modify themselves
# at runtime to respond to new scenarios...

class SmartFactory
  def method_missing(method_name, *args, &block)
    if method_name.to_s =~ /new_(.*)/
      expected_type = $1
      eval "#{expected_type}.new"
    else
      "SmartFactory doesn't respond to #{method_name}!"
    end
  end
end

sf = SmartFactory.new
sf.new_String    # => ""
sf.new_Array     # => []
sf.new_Hash      # => {}

# Real example: ActiveRecord responds to arbitrary find_by_X_and_Y()
```

Exercise 13

exercises/13

RubyGems

Using 3rd Party Code

```
# We package, distribute and use Ruby code as 'gems'.  
# A gem can be a standalone tool, a code library or somewhere inbetween.  
  
gem install Vagrant # Installs the Vagrant tool  
rake -h # Used it as normal command line tool  
  
gem install nokogiri # Installs Nokogiri xml library  
# Can now use within your ruby code:  
# require 'nokogiri'  
# doc = Nokogiri::HTML(open('http://www.google.com/search?q=tenderlove'))  
# doc.xpath('//h3/a[@class="l"]').each do |link|
```

Gem (Project) Internals

Create skeleton for a new gem/project:

```
bundle gem my_gem
```

Gem structure:

#.

#|— Gemfile

#|— Rakefile

#|— lib

#| |— my_gem

#| | |— version.rb

#| |— my_gem.rb

#|— my_gem.gemspec

Wrapping Up

You Are Rubyists!

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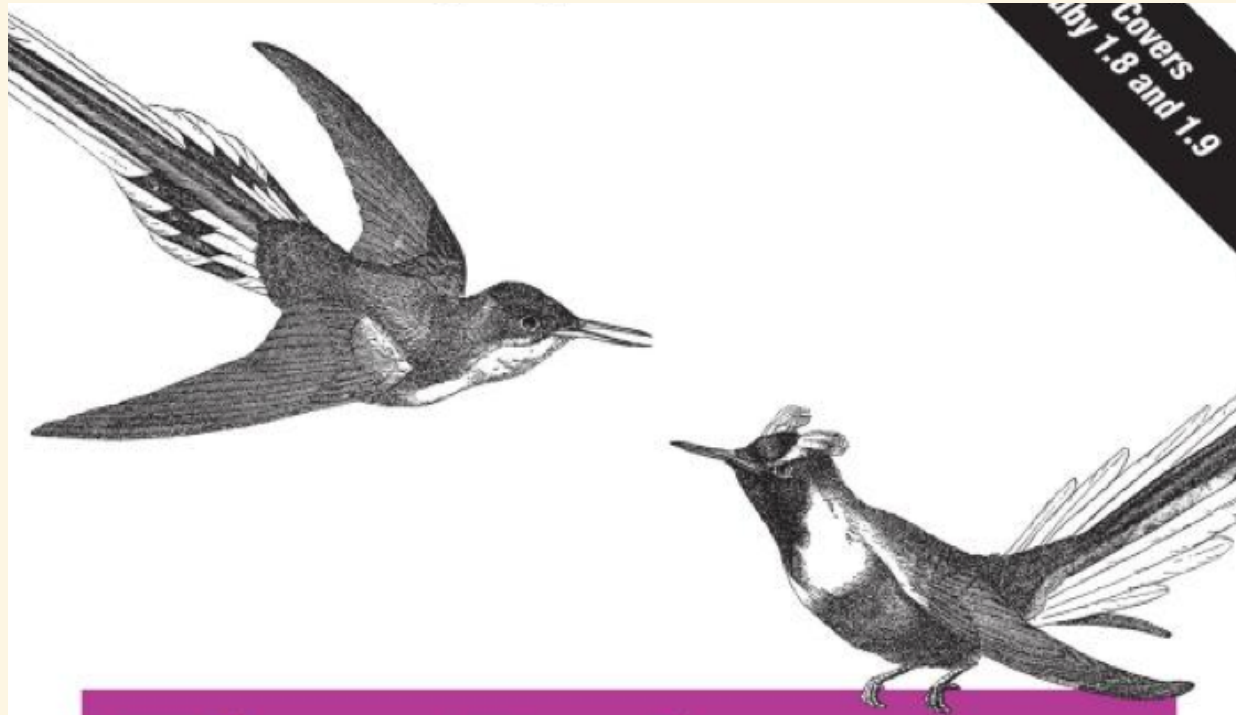
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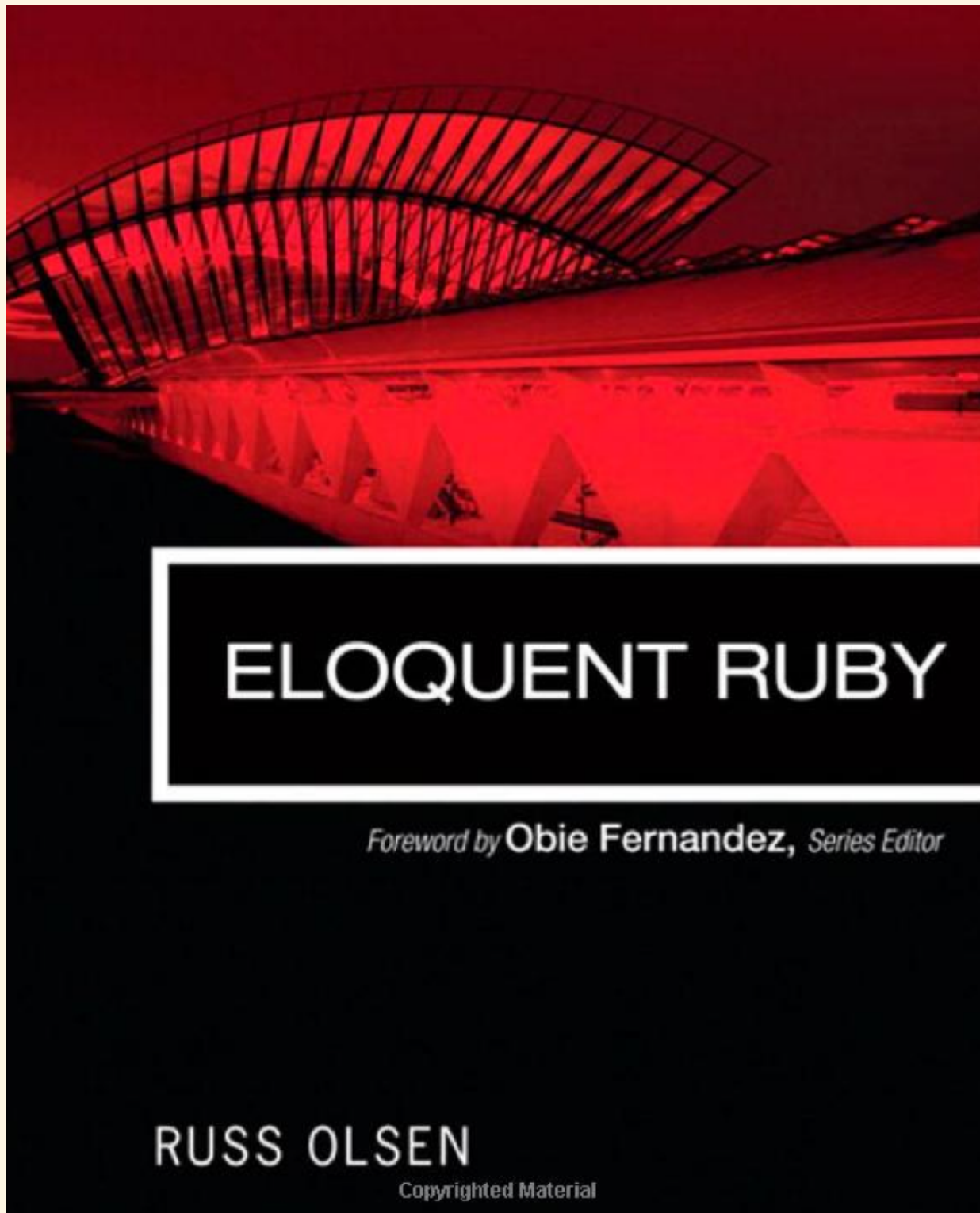
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Foreword by **Obie Fernandez**, *Series Editor*

RUSS OLSEN

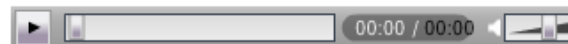
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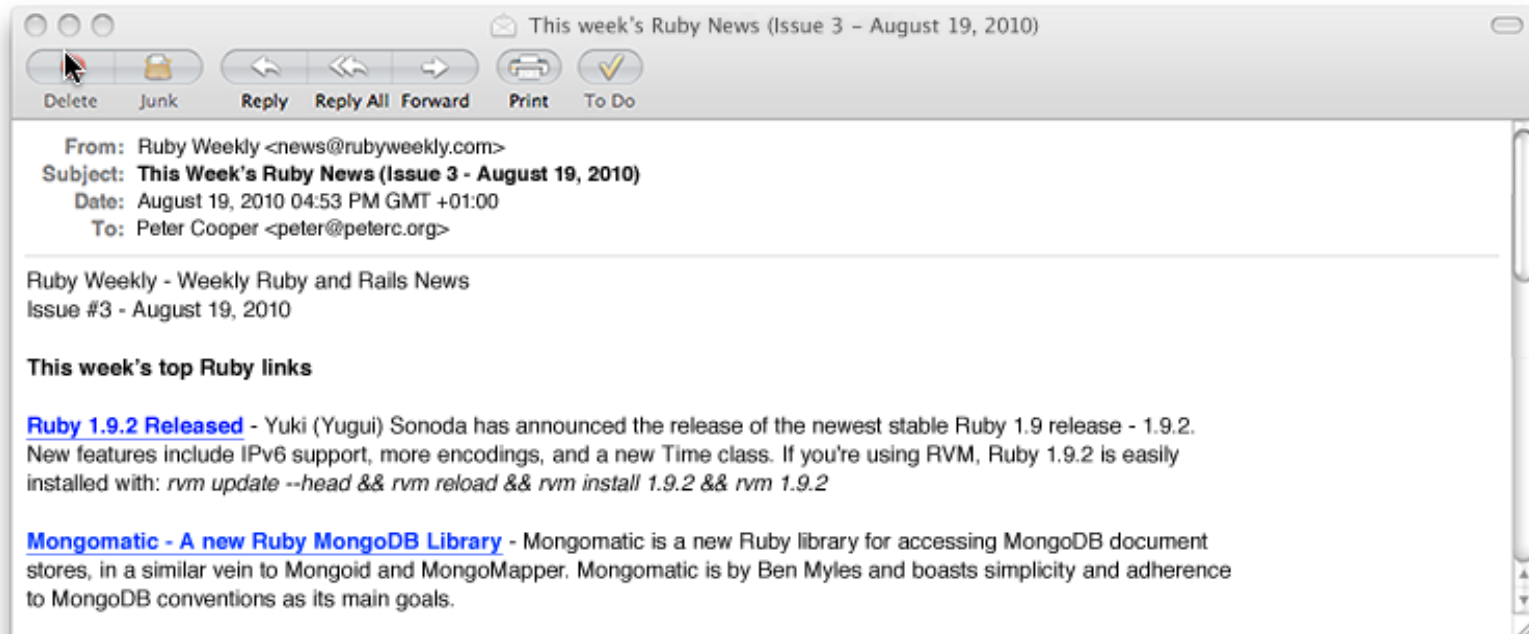
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Questions?

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