HTML5 and CSS3 for Mobile Applications

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Introducing Ruby and Rails

Objectives for today

- Explore some core Ruby syntax
  - You should take time to experiment a little with what you learn
- Introduce Classes in Ruby

Source for today’s material

- The “Pickaxe book”:
  - Programming Ruby 1.9 - The Pragmatic Programmer’s Guide
  - Dave Thomas
  - Pragmatic Bookshelf

Opinionated Software?

- Convention over configuration
- Elegance is not optional
- Do Not Repeat Yourself
- Developer motivation and productivity are primary factors in project success

Let’s take a look at Ruby

Key Features of Ruby

- Easy syntax
- Fully OO
- Highly dynamic
- Strong Web frameworks
    - Ruby on Rails

Let’s Try it!

- Open an Interactive Ruby shell

    > irb

    > quit *or* exit *will end the session*

“Hello World” in Java

```
class HelloWorld {

        public static void main(String[] args) {

            System.out.println(“Hello World!”)

        }

    }
```

and in Ruby:

```
puts “Hello World!”
```

Even Better

Enter: 3.times {puts “Hello World!”}

Ruby’s Objects

- Enter: 4 (return)

- Enter: 4.567.round

- Find out the class of something you have entered...

Ruby is Dynamically Typed

- Enter: n=1
- Enter: n.class
- Enter: n=”fishpaste”
- Enter: n.class
- How about: n+4; n.size; n.methods

Regular Expressions

- Regular expressions are written between slashes
- Enter: regex = /better/
- Find out what class it is.
- Enter: “Mine is bigger” =~ regex
- Enter: “Mine is better” =~ regex

Containers

- Enter: stack = [1, 2, 3]
- Enter: stack.push “cat”
- Enter: stack.pop
- Enter: stack

Arrays and Hashes

```
a = [1, ‘cat’, 3.14]    # array with 3 elements

puts “The first element is #{a[0]}”

# set the third element

a[2] = nil

puts “The array is now #{a.inspect}”
```

Note that *nil* is an object – it just represents nothing

Short cut to arrays with words

```
a = [ ‘ant’, ‘bee’, ‘cat’, ‘dog’, ‘fox’]
```

Try a[0], a[1] in the irb

Alternative is

```
a = %w{ ant bee cat dog fox }
```

Try the above again.

Hashes

- Basically a list of key, value pairs separated by “=>”
- Each Key in a particular Hash must be unique

```
inst_section = {
  ‘cello’ => ‘string’,
  ‘clarinet’ => ‘woodwind’,
  ‘drum’ => ‘percussion’,
  ‘oboe’ => ‘woodwind’,
  ‘trumpet’ => ‘brass’,
  ‘violin’ => ‘string’
}
```

- Try accessing with `p inst_section[‘KEY’]`
  - (what happens if you use a key that is not yet defined?)

Control Structures

```
if count > 10
   puts “Try Again”
elseif tries == 3
   puts “You loose”
else
   puts “Enter a number”
end
```

```
while weight < 100 and num_pallets <= 30
   pallet = next_pallet()
   weight += pallet.weight
   num_pallets += 1
end
```

Statements as conditions

`gets` returns `nil` when the end of file is reached, and

`nil` is treated as “false” in conditions, so

```
while line = gets
  puts line.downcase
end
```

will terminate cleanly when the end of file is reached.

Statement modifiers

- Useful if the body of an if or while statement is just a single expression

```
if radiation > 1000
   puts “I suggest you leave now!”
end
```

- Can be rewritten as

```
puts “I suggest you leave now!” if radiation > 1000
```

- Also

```
square = 2
square = square*square while square < 1000
```

Regular Expressions

- To match a string containing either Perl or Python use:

```
/Perl|Python/ or
/P(erl|ython)/
```

- Repetition – one a, followed by one or more b’s and finish with one c:

```
/ab+c/
```

- For zero or more b’s use “*”:

```
/ab*c/
```

- Character classes

`\s` – matches any white space character
\w – matches characters that may appear in words [A-Z,a-z,0-9]
\d – matches any digit
. – matches (almost) any character

Using Regular Expressions

```
if line =~ /Perl|Python/
  puts “Scripting language mentioned: #{line}”
end
```

- Changing history:

```
line.sub(/Perl/, ‘Ruby’)     # Replace first ‘Perl’ with ‘Ruby’
line.gsub(/Python/, ‘Ruby’) # Replace every ‘Python’ with
                             # ‘Ruby’

line.gsub(/Perl|Python/, ‘Ruby’) # Total dominance
```

Blocks and iterators

- Two kinds of delimiter for code blocks

```
{ puts “Hello” }
```

- Or

```
do
   club.enroll(person)
   person.socialize
 end
```

Yield

- What can you do with a block?

- You can associate it with a call to a method

```
greet { puts “Hi” }
```

  - The method (‘greet’ in the above case) can then invoke the block using the Ruby `yield` statement

  - Try it out...

Blocks and yield

- Inter this into a Ruby file:

```
def call_block
  puts "Start of Block"
  yield
  yield
  puts "End of method"
end

call_block { puts "In the block" }
```

Passing arguments into a block

```
def who_says_what
  yield("Dave", "hello")
  yield("Simon", "goodbye")
end

who_says_what {|person, phrase| puts "#{person} says
                                               #{phrase}"}
```

Using blocks to implement iterators

- You will see this used widely in Ruby and in Rails
- Iterators return successive elements from some kind of collection. E.g.:

```
animals = %w( ant bee cat dog fox )
animals.each {|animal| puts animal}
```

- You might remember this example from the last lecture:

```
3.times {puts “Hello World!”}
```

Writing

- Ruby supports formatted writing in much the same way as C, Java and PERL
- Use `printf` as illustrated below:

```
printf(“Number: %5.2f, \nString: %s\n”, 1.23, “hello”)
```

Classes, Objects and Variables

- We will use a simple example to base this discussion around
  - Following the “Pickaxe Book”
- We want to monitor stock in a bookshop:
  - Scan books to record: Date; ISBN No.; Price
  - Enter each record into a file
  - Analyse the data to find out how many copies of each book we have, and what is the total value of the stock

Class BookInStock

- Open a Ruby Project
- Call it BookShop, or something similar
- Once the project has been created, right-click Source Files and create a new Ruby Class. Call it BookInStock.
- A file will be generated with the following skeleton:

```
class BookInStock
  def initialize

  end
end
```

Adding State

- We need to add in instance variables so that objects of class BookInStock actually contain the information we need:

```
class BookInStock
    def initialize(isbn, price)
         @isbn=isbn
         @price=Float(price)
    end
end
```

Adding State

- We need to add in instance vari of class BookInStock actually contain the information

local variables

```
class BookInStock
    def initialize(isbn, price)
        @isbn=isbn
        @price=Float(price)
    end
end
```

Adding State

- We need to add in instance vari of class BookInStock actually contain the information

local variables

```
class BookInStock
    def initialize(isbn, price)
        @isbn=isbn
        @price=Float(price)
    end
end
```

instance variables

Print out some objects

```
class BookInStock
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end
end
b1 = BookInStock.new("isbn1", 3)
p b1
b2 = BookInStock.new("isbn2", 3.14)
p b2
b1 = BookInStock.new("isbn3", “5.67”)
p b3
```

Creating a string representation

```ruby
class BookInStock
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end
  def to_s
    "ISBN: #{@isbn}, price: #{@price}"
  end
end

b1 = BookInStock.new("isbn1", 3)
puts b1
b2 = BookInStock.new("isbn2", 3.14)
puts b2
b3 = BookInStock.new("isbn1", "5.67")
puts b3
```

Accessing instance variables

```
class BookInStock
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end
  def isbn
    @isbn
  end

  # ...
end
```

attr_reader

```
class BookInStock
  attr_reader :isbn, :price
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end

  # ...
end
```

attr_reader

```
class BookInStock
  attr_reader :isbn, :price
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end

  # ...
end
```

These symbols represent names for the accessor methods and their corresponding instance variables

Writable attributes

```
class BookInStock
  attr_reader :isbn
  attr_accessor :price
  def initialize(isbn, price)
    @isbn=isbn
    @price=Float(price)
  end

  # ...
end
```

Access Control

- Public methods
  - can be called by anyone (default)
- Protected methods
  - keep it in the family - only accessible by objects of the defining class and its subclasses
- Private methods
  - the receiver is *always* the current object

Specifying Access Control

```
class AccessClass
  def method1   # default is public
    # ...
  end









end
```

Specifying Access Control

```
class AccessClass
  def method1   # default is public
    # ...
  end
  protected
  def method2   # subsequent methods will be ‘protected’
    # ...
  end




end
```

Specifying Access Control

```
class AccessClass
  def method1   # default is public
     # ...
  end
  protected
  def method2   # subsequent methods will be ‘protected’
    # ...
  end
  private
  def method3   # subsequent methods will be ‘private’
    # ...
  end
end
```

Variables

- Remember, a Variable is a *reference* to an object

```
person1 = "Tim"
person2 = person1

person1[0] = 'J'

puts "person1 is #{person1}"
puts "person2 is #{person2}"
```

Contrast with

- Duplicating an object

```
person1 = "Tim"
person2 = person1.dup

person1[0] = 'J'

puts "person1 is #{person1}"
puts "person2 is #{person2}"
```

Inheritance

“the child is father of the man”

The child class inherits its parent’s methods

```
class Parent
  def sayHello
    puts "Hello from #{self}"
  end
end

class Child < Parent
end
```

Finding parents

```
class Person
  def initialize(name)
    @name = name
  end
end

puts "The superclass of Person is #{Person.superclass}"
```

Object

- Object is an ancestor of every Ruby class
- the method `to_s` is defined in Object
- Hence, every Ruby object has access to a `to_s` method
- But you will normally need to override it

Writing objects to strings

```
class Person
  def initialize(name)
    @name = name
  end
end

p = Person.new(“Brian”)
puts p
```

produces:

```
#<Person:0x18b1bc>
```

Overriding `to_s`

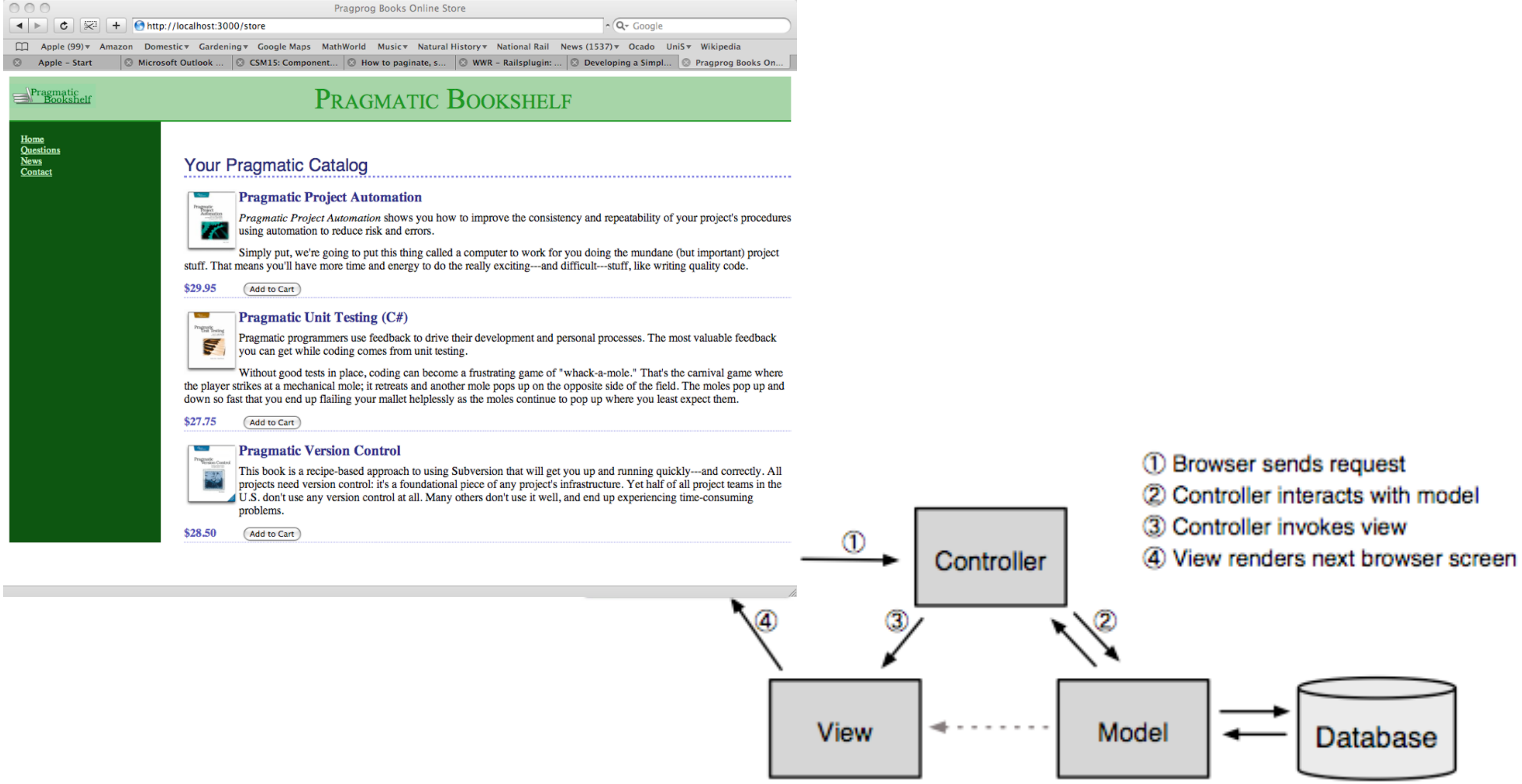
```
class Person
  def initialize(name)
    @name = name
  end
  def to_s
   "Person named #{@name}"
  end
end

p = Person.new(“Brian”)
puts p
produces:
Person named Brian
```

That’s very nice, but

- Ruby was released by its designer *Yukihiro Matsumoto* in 1995
- Why is it only relatively recently, that it has been generating so much interest?
- Let’s explore Rails a little bit ...

The Rails Framework


Pragprog Books Online Store
http://localhost:3000/store
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① Browser sends request
② Controller interacts with model
③ Controller invokes view
④ View renders next browser screen

Recap and Next

- We have delved a little deeper into Ruby basics
- Next time we will
    - explore classes in a little more detail
    - start to explore Rails