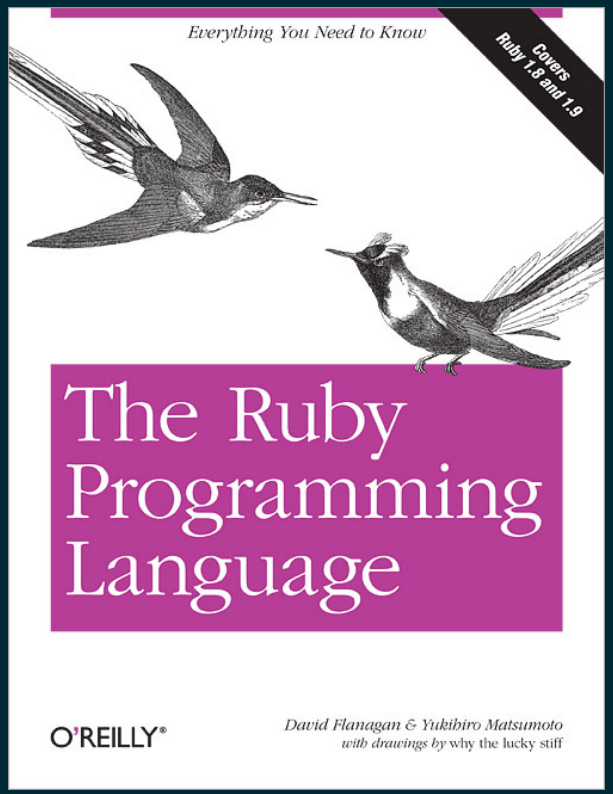
Ruby Intro

CSCI400

Valuable Reference

The Ruby Programming Language, Flanagan and Matsumoto (creator of Ruby)



Getting Started

Option 1: REPL

1. Open `irb` (interactive ruby)
2. Try out a ruby command, e.g.
   - `puts "Who you callin' pinhead?"`

     ```
     Who you callin' pinhead?
     => nil
     ```

   - `puts` returns `nil`

Option 2: Scripting

1. Open a text editor
2. Write ruby commands, e.g.
   - `puts "My god...it's full of stars!"`
3. Save file as `demo1.rb`
4. Open git bash: `ruby demo1.rb`
   - Must be in same directory as `demo1.rb`

Ruby: General Structure

Aside: Expressions vs. Statements

- *Expressions produce a value*
- *Statements* generally *do something*
  - May contain expressions (distinction sometimes blurry)
  - Expression vs. statements in Python

Ruby Program Structure

- Basic unit is *expression*
- Primary expressions
  - `true`, `false`, `nil`, `self`, number/string literals, variable references
- Expression types: arithmetic, boolean

Ruby Program Structure

Code can be organized using:

- Blocks
- Methods
- Classes
- Modules

Program Execution

- Ruby is a *scripting* language
  - No special `main` method
  - Script start at a line 1, execute all lines in order
- A method/class is defined when the definition is read/executed
  - Method calls must come *after* the method's definition

Ruby Expression Structure

- Whitespace: mostly ignored
- Expression separators: newline
- If statement doesn't fit on one line...
  1. Insert newline after operator, period, or comma
  2. or escape the newline *

*Think: How does interpreter recognize tokens/statements?

Ruby: Basic Constructs

Block Structure

```ruby
# Block surround by {}
10.times { puts "hello" }

x = 5
unless x == 10
    # this is the start of an `unless` block
    print x # 'body' of the block
end # this ends an `unless` block
```

Blocks can be nested. Indent for clarity.

Ruby Comments

```
# This is a comment
```

or

```
=begin
This is a longer comment. =begin/=end must be
at the start of a line.
=end
```

Variables/Methods

- Valid variable name identifiers
  - letters, numbers, _
  - Cannot start with number
  - *Global var:* start with $
  - *Instance, class vars:* start with @, @@ resp.)
- Conventions
  - ?: End method name with ? if returns boolean
  - !: End method name with ? if dangerous
- Constants, classes, modules: begin with A-Z

Ruby Data Types: Numbers

Numeric

- `Integer` – allows base 8, 16, 2
  - Fixnum: Fit in 31 bits
  - Bignum: Arbitrary size
- `Float`
  - Includes scientific notation
- `Complex`
- `BigDecimal`
  - Uses decimal rather than binary representation
- `Rational`

A few number-related details

- `div`: integer division
  - `7.div 3`
- `fdiv`: floating point division
  - `7.fiv 3`
- `quo`: rational division
  - In `irb`, try: `(1.quo 3).class`
- `-7/3 = -3` in Ruby, `-2` in Java/C++ (explanation)
- Float limits: See `INFINITY`, `MAX` in this link
- Numbers are immutable (as you'd expect)

Ruby Data Types: Strings

- String literals: *single quote*
  - `'A ruby string'`
  - `'Don\'t call me Shirley.'`
  - Only escape `'` or `\`
  - Newlines are embedded if multi-line
- String literals: *double quote*
  - Normal escape sequences (`\t`, `\n`, etc.)
  - String interpolation

```
w = 5
h = 4
puts "The area is #{w*h}"
```

More on strings (1)

- In Ruby, strings are *mutable*
- +: concatenation (interpolation often preferred)

```
age = 32
puts "I am " + age.to_s
```

- <<: append

```
s = "Hello"
s << " World"
puts s
```

More on strings (2)

- Substring
  - `puts s[0, 5]`
- `*`: repeats string
  - `puts "Alright" * 14`
- `length`: returns length of `s`
  - `puts s.length`

Characters

- Strings of length 1
  - Changed from Ruby 1.8 $\rightarrow$ 1.9

Methods

- No () needed for function calls. Try:
  - `"hello".center 20`
  - `"hello".delete "lo"`
- Note: if using (), *don't put space after function name*
  - `f (3+2)+1 != f (3+2)+1`
- Best practice?
  - Some thoughts

String access

- Cases with examples
  - `[i] # puts s[0], puts s[-1]`
  - `[i, len] # puts s[0, 4]`
  - `[i..j] # puts s[0..3]`

String Access: Quick Exercise

- Try:
  - `s = "Sunday, Monday, Tuesday, Wednesday, "Thursday, Friday"`
  - Extract `"Sunday"`, `"Monday"`, and `"Friday"`
  - Figure out how to turn `s` into `["Sunday", "Monday", ... "Friday"]` (Hint)
- Play with the Ruby basics file
- Nothing to submit, no right answers – just play!

Get Started

Do Ruby intro homework