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Basic Programming in Ruby

Today's Topics:

- Introduction
  - last class
  - irb history log
- Methods
- Classes (briefly)
- Using 3rd Party Libraries
  - rubygems
  - '`require`' method in ruby
- Using 3rd Party Libraries
  - web scraping with Hpricot
  - BioRuby
- Automating Genboree via Ruby & Genboree API
  - and learning a few more libraries and HTTP programming

Last time I used the interactive Ruby shell 'irb' to do examples.

Today, we'll look at and run examples in Ruby scripts.

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Methods & Classes

Methods

- can define at any time and use thereafter
- methods can have parameters or arguments
  - argument variables are available within the method code
  - arguments can be optional, having a default value
- more complex methods can take *code block arguments*
  - they can execute this code block at an appropriate time
  - they can call the code block and supply arguments to it

Basic Method Definition:

```
def methodName(arg1, arg2, arg3=true)
  # …<do something with arg1, arg2, arg3, store result in resultVariable (say)>…
  return resultVariable
end
```

Ways of calling that one would be:

```
result1 = methodName(value1, value2, value3) # OR
result2 = methodName(otherValA, otherVal2)
```

[example – `useMethod.rb`]

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Using 3rd Party Libraries

Libraries contain useful classes with methods so you don't need to write your own

- Ruby comes with many useful libraries ("standard library")
- But lots of other functionality out there for more specific tasks

Rubygems

- *rubygems* is a tool that downloads, configures, and installs 3rd party libraries for you
- makes library management and access easy
- install this tool from http://www.rubygems.org/
- essential commands (on the command line, not irb):
  - `gem help # ha!`
  - `gem list –-local`
  - `gem install <gemName> # e.g. gem install rest-open-uri`
  - `gem list --remote bio`
- make sure you include `require 'rubygems'` at the top of each ruby program
  - or make use of one of the more convenient approaches in the manual

"`require`" core Ruby method

- use "`require`" to tell Ruby you want to use some library in your code
- Ruby will import the library and make its classes available to you

```
require 'rubygems'
require 'bio'
```

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Classes & Methods

Classes

- Define a class, then call its `new()` method to make instances/object of that class
  - we did this for Array, Hash, etc, last time à anArray = Array.new()
- Classes contain things like:
  - variables local & specific to each object created via `new()`
  - methods (used to ask questions or get the object to do things)
  - properties (a.k.a. attributes)
  - also: class-level variables, class-level methods, constants, etc
- NOTE: object methods defined in a class *automatically* have the `self` variable defined
  - the Ruby compiler makes it available for you automatically
  - `self` is the object the method was called for (same as "`this`" in Java and C++)
  - it's not really needed much anyway, since Ruby will look for variable names in the object automatically if it doesn't find the variable locally in the method
- Classes can inherit from existing parent classes
  - get the methods and variables of the parent
  - but also your more specific methods

[example - `classUse.rb` & `classInheritanceUse.rb`]

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3rd Party Library Examples

- Web scraping with Hpricot
  - example: extract info from online biological database's web pages
    - `getCutSite.rb`

- BioRuby collection of biological-related classes and methods
  - DNA/AA sequence info
    - `biorubySequence.rb`
  - Querying PubMed for papers
    - `biorubyPubMed.rb`

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Automating Genboree via Ruby and the Genboree API

Genboree has a REST-style API (like Google, Amazon, Facebook)

- operates over HTTP, like web browsers do
- your program composes a proper URL for the data resource you want to retrieve, change, or delete
  - URL will contain the Genboree host where the data lives
  - and a path describing the resource
  - any optional parameters the resource recognizes
  - 3 required parameters for effecting authorization
- your program them calls one of the 6 standard HTTP methods
  - `GET` ß retrieve something from server
  - `PUT` ß place/update something on server
  - `DELETE` ß remove something from server

Read more at:
http://www.genboree.org/java-bin/showHelp.jsp?topic=restAPIOverview
and subsections.

[examples: `apiExample1.rb` (modify) & `apiExample2_putLFF.rb`]