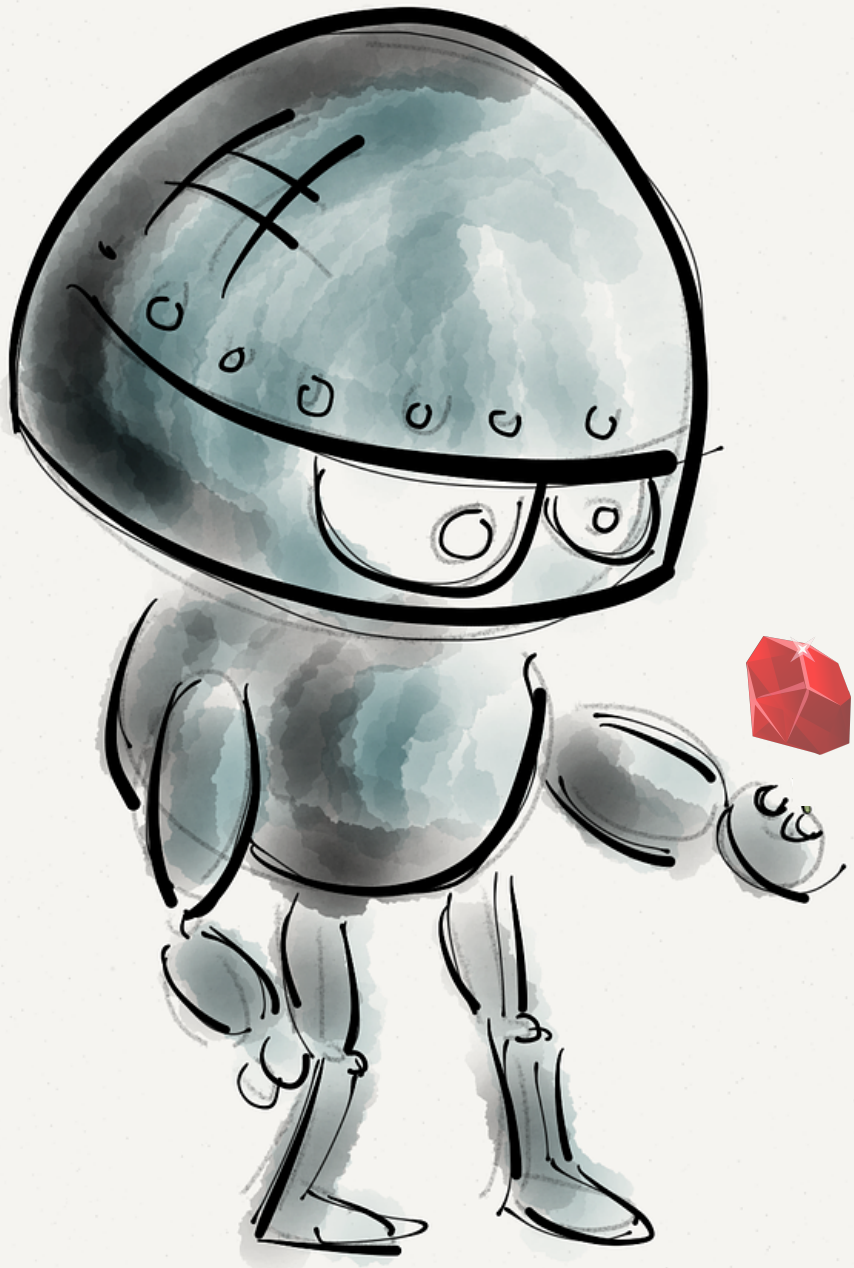

RUBY *for* Testing Automation

By Eduardo Gomes Heinen

Introduction

In this ebook we will talk about Ruby to be used in testing automation. You will learn some important concepts about Ruby and how to start applying in your projects.

How to get it better

To improve the speed of your learning, I recommend you redo all examples. That way you will understand better how it works. I created a repository to train people on Github. You can also try to develop the exercise there. The link to repository is here.

You will see a pattern of blocks in the ebook, following what which block means:

```
Terminal or Prompt Command (cmd)
```

```
irb - Interactive Ruby Console
Just enter irb on your Terminal on Linux or Mac
Open the interactive ruby exe on Windows

The signal => means return or result of some
execution
```

Command sintaxes

Explanation of something

Tips

Author: Eduardo Gomes Heinen -2017

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If you enjoy this book, please share it in your social media and invite me on LinkedIn. You may also send me an email, I will read it as soon as possible, promise.

LinkedIn: https://linkedin.com/in/eduardogheinen
Github: https://github.com/eheinen/
Email: eduardogheinen@gmail.com

Summary

OOP Fundamentals

Object-Oriented Programming

Before to start developing, let's talk about OOP concepts a little bit.

- Object-Oriented Programming is a methodology or paradigm to design a program using classes and objects.

Objects

Any entity that has state and behaviour is known as an object. Object means a real word entity. It can be physical and logical.

Example: TV, radio, mouse, keyboard, etc.

Class

Collection of objects is called class. It is a **logical** entity.

A class is simply a representation of a type of object. It is the blueprint, or plan, or template, that describes the details of an object.

A class is the blueprint from which the individual objects are created.

Class is composed of three things: A **name**, **attributes**, and **operations**.

Example: Fruit, vehicle, colour, animal, etc.

Object-Oriented Programming

Attributes

Attributes may be defined as characteristics of a class.
For example:

Class: **Animal**

Which characteristics an animal has?

- Type (Kind of the animal)
- Eye colour
- Hair colour
- Size
- Weight
- Behaviour
- Etc.

Object-Oriented Programming

Operations | Methods | Functions

For now, pretend those 3 names are the same thing for us. (There are a little difference between them).

An operator is composed by some instructions passed to a block to do something.

Normally, it describes an action of something. For example:

In the same **Animal** class, let think about which actions an animal may has.

- Eat
- Run
- Poop :)
- Search food
- Etc.

In each action above, we have to describe which **instructions** are necessary be executed to achieve its purpose. For example:

Operation: Poop :)

- The animal needs to search food;
- The animal needs to kill/catch the food;
- The animal needs to eat the food;
- The animal needs to wait the food be digested;
- The animal search a place to poop;
- The animal poop.

Object-Oriented Programming

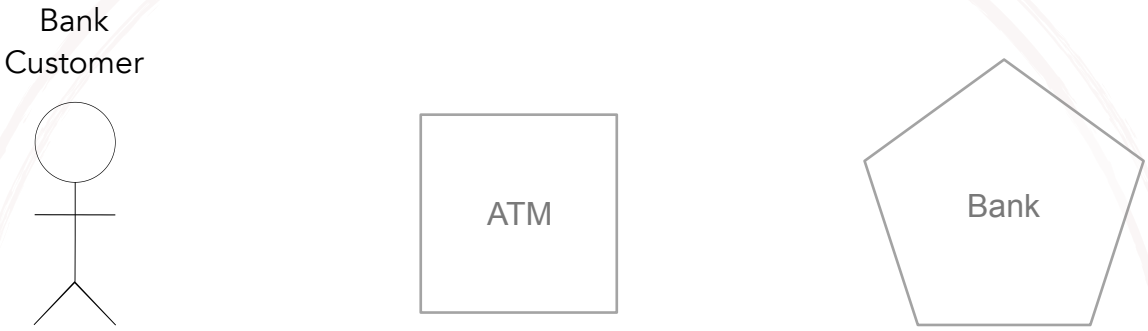
Operations | Methods | Functions

In the last example we defined some steps to be followed until an animal is able to poop. That was a simple physical representation. We could create an logical representation of our animal using a class with attributes and operations to define the actions.

Object-Oriented Programming

Exercise:

Now, you will think about which class, attributes and operations the following images could have:



I challenge you think about restrictions also.
For example:

- A bank costumer must be authenticated to do anything in the ATM.
- ???

Ruby Fundamentals

Ruby is a language programming designed and developed in the mid of 1990s by Yukihiro Matsumoto in Japan. And the language is dynamic, reflective, and object-oriented.

Installing Ruby

To install Ruby on Windows you need to download a version of Ruby and install through Ruby Installer. The link where you will find the ruby versions: http://rubyinstaller.org/downloads/

After you installed Ruby, you need to download and install Ruby DevKit. It is found in the same link above.

Once you have installed Ruby and Ruby DevKit, you must to include your Ruby path to a environment variable.

I recommend you use this tutorial.

To install Ruby on Ubuntu or Mac OS I strongly recommend use RVM to manage the Ruby versions in your computer. You need just install using this link: https://rvm.io/rvm/install

After you installed RVM just open your terminal and type it:

```
rvm install 2.2.3
```

You are able to change the Ruby version.

Once you have Ruby installed in your machine, navigate to your project directory and execute the following command:

```
gem install bundler
```

Configuring Ruby Project

We installed Bundler because we will use it to install our gems through a easier way.

If you don't want to install gems with bundler, just include the following command in your terminal:

```
gem install 'name of your gem'
```

I don't recommend to install gems without bundler, because if you are sharing your project with other people in your team and a certain gem must has an exactly version to work with your project, then someone may install a different version of yours.

Furthermore, we just install all gems once using the command:

```
bundle install
```

Bundler will search for the file Gemfile in the same directory you are at the moment you typed it. For instance, If you are inside 'workspace' directory and execute "bundle install", then you must have a Gemfile inside 'workspace' directory.

Bundler is similar to Maven on Java and Gemfile is similar to pom.xml

Ruby Fundamentals

Basic Commands

In Ruby we have a lot of resources to use in our day by day and know them is really important to develop faster and better.

You can access the Ruby website to get more information about: https://www.ruby-lang.org/en/documentation/quickstart/ and http://tryruby.org/

To start to play with Ruby, just open your terminal and execute:

```
irb
```

The command above will open the terminal to interact with Ruby. Now you can start to play! Let's try!

```
n1 = "Hello World!"
n1
=> Hello World!
```

In the terminal, attribute the text "Hello World!" to a variable and then just type the variable name and enter.

Congratulations for your first lines of code!

Ruby Fundamentals

Comments

Comments are used to document something and it won't be executed. I recommend you comment all your methods because that is a good practice. Sometimes we just develop a lot of methods and when we have to maintain, or even use it, we don't remember what it does.

If you want to comment something in Ruby, you just need to include the "**#**" symbol before the wordier phrase.

```
# That is a simple comment inline.
```

There is another comment used to comment a block. Let's see:

```
=begin

    Everything you include here will be commented.
    This comment is really useful when you need to comment more detailed.

=end
```

Ruby Fundamentals

Variables I

Variables are labels used to store a value. In other languages is mandatory to define which kind of variable is and when you pass a value to this variable, must be the same type.

In Ruby we don't define the kind of our variables, Ruby identifies it implicitly.

Variables have scopes (life time), that we will see in the second part of variables.

```
a = 10
=> 10

b = 10.5
=> 10.5

c = "Hello World!"
=> "Hello World!"
```

Operators - Arithmetic

Operators are important because depending on which project you are developing you will use it. Follow some examples you are able to try it also:

```
a = 10
b = 2

addition       = a + b
subtraction    = a - b
multiplication = a * b
division       = a / b
modulus        = a % b
exponation     = a ** b
```

```
# Result:

addition       = 12
subtraction    = 8
multiplication = 20
division       = 5
modulus        = 0
exponation     = 100
```

Ruby Fundamentals

Operators - Comparison

Some comparison operators are mandatory to know by heart! For sure you will use it in your project.

```
a = 10
b = 2

equality                = a == b
difference              = a != b
left_greater            = a > b
left_greater_or_equal   = a >= b
left_lesser             = a < b
left_lesser_or_equal    = a <= b
combined                = a <=> b
type_and_value_equality = a.eql? b
same_object             = a.equal? b
```

```
# Result:

equality                = false
difference              = true
left_greater            = true
left_greater_or_equal   = true
left_lesser             = false
left_lesser_or_equal    = false
combined                = 1
type_and_value_equality = false
same_object             = false
```

Operators - Comparison <=>

Notice in the three last comparison operators are different a little bit. Let me explain them:

The operator "**<=>**" is a combined operator used to get a value depends on the comparison. If the first operand is lesser than second operand, then it will return the value **-1**. If the first operand is equal the second operand, then it will return the value **0**. And if the first operand is greater than the second operand, then it will return the value **1**.

```
a = 9 <=> 10
b = 10 <=> 10
c = 10  <=> 9
```

```
-1
0
1
```

Ruby Fundamentals

Operators - Comparison ===

The operator "**===**" is used to compare an equality inside a "when" statement. For instance, if you have a range of values to iterate and you want to include a certain number to test the equality with one number in iteration, then you may include the operator "===" to works for you.

```
a = (0...100) === 150

min_value = 12
max_value = 31
b =(min_value..max_value) === 30
```

```
a = false
b = true
```

In the variable "**a**" it was false because it didn't find the number 150 inside the loop between 0 and 100. And in the variable "**b**" it was true because the number 30 is between the min and max value that we have passed.

Ruby Fundamentals

Operators - Comparison eql? and equal?

The operator "**eql?**" is used to compare if the type and value of our operands are the same.

```
a = 10.eql? 10
b = 10.eql? 11
c = 10.eql? 10.0
```

```
a = true
b = false
c = false
```

Observer the variable "**a**" is true because it has the same value and same type (Fixnum). But in the variables "**b**" and "**c**" are false because in "**b**" the value is different and "**c**" the value is relatively the same except for the variable type (Float).

```
a = 10.class
b = 10.0.class
```

```
a = Fixnum
b = Float
```

If you want to know which type is your variable/ object just include **.class**

Array

When you create a variable of an Array in instance, you are able to store more than one value in this variable, differently of normal variables that stores just one value per time.

Arrays are used in practically all language programmings and it's super useful.

In Ruby you may add any type of value inside an array and you can create an Array object using Array.new or just []. Let's see.

```
array = []

array = Array.new
```

Adding items/values

If you want to add a value to an array, just use "**<<**" signal:

```
array << 1
=> [1]
array << 1.5
=> [1, 1.5]
array << "Hello"
=> [1, 1.5, "Hello"]
array << true
=> [1, 1.5, "Hello", true]
array << Array.new
=> [1, 1.5, "Hello", true, []]
```

https://ruby-doc.org/core-2.2.0/Array.html

Array

Accessing items/values

If you want to access a value in an array, just use "**[index]**"where index is the position (Starting by **0**) or even using the method "**at**":

```
array = [1, 2, 3, 4, 5]

array[0] # Accessing the first item
=> 1

array[1] # Accessing the second item
=> 2

array.at(0)# Accessing the first item
=> 1

array.at(1) # Accessing the second item
=> 2
```

You can also use ".fist" or ".last" to get the first and last item consecutively. Example:

```
array = [1, 2, 3, 4, 5]

array.first # Accessing the first item
=> 1

array.last # Accessing the last item
=> 5
```

Array

Deleting items/values

If you want to delete a value in an array, just use "**delete**" passing the value you want to remove or even use "**delete_at**" passing the index position:

```
array = [1, 2, 3, 4, 5]

# Deleting the item with value equals to 1
array.delete(1)
=> [2, 3, 4, 5]

# Deleting the item with index equals to 1
array.delete_at(1)
=> [1, 3, 4, 5]
```

Array

Min and Max

Min and max are methods used to get the minimum and maximum value consecutively.

```
array = [1, 2, 3, 4, 5, 5, 6, 7, 3]
array.min
=> 1

array.max
=> 7
```

Reverse

Reverse is a method used to reverse the order of your array.

```
array = [1, 2, 3, 4, 5, 5, 6, 7, 3]
array.reverse
=> [3, 7, 6, 5, 5, 4, 3, 2, 1]
```

Shuffle

Shuffle is a method used to reorganise randomically your array.

```
array = [1, 2, 3, 4, 5, 5, 6, 7, 3]
array.shuffle
=> [5, 7, 2, 6, 5, 1, 3, 4, 3]
```

Array

Uniq

If you want reject duplicate values in your array, then you should use uniq method.

```
array = [1, 1, 2, 2, 3]
array.uniq
=> [1, 2, 3]
```

Length

Length is a method used to get how many items there are in your array.

```
array = [1, 2, 3, 4, 5, 5, 6, 7, 3]
array.length
=> 9
```

Select

Select is powerful method used to filter values according to your specification. In the following example, I select just values lesser than 5:

```
array = [1, 2, 3, 4, 5, 5, 6, 7, 3]
array.select { |value| value < 5 }
=> [1, 2, 3, 4, 3]
```

Ruby Fundamentals

Array

There are a lot of methods inside Array class you can use. Take a look:

```
                                array.each                      array.instance_eval             array.pop                       array.size
array.__id__                    array.each_cons                 array.instance_exec             array.private_methods           array.slice
array.__send__                  array.each_entry                array.instance_of?              array.product                   array.slice!
array.all?                      array.each_index                array.instance_variable_defined? array.protected_methods        array.slice_after
array.any?                      array.each_slice                array.instance_variable_get     array.public_method             array.slice_before
array.assoc                     array.each_with_index           array.instance_variable_set     array.public_methods            array.slice_when
array.at                        array.each_with_object          array.instance_variables        array.public_send               array.sort
array.bsearch                   array.empty?                    array.is_a?                     array.push                      array.sort!
array.bsearch_index             array.entries                   array.itself                    array.rassoc                    array.sort_by
array.chunk                     array.enum_for                  array.join                      array.reduce                    array.sort_by!
array.chunk_while               array.eql?                      array.keep_if                   array.reject                    array.taint
array.class                     array.equal?                    array.kind_of?                  array.reject!                   array.tainted?
array.clear                     array.extend                    array.last                      array.remove_instance_variable  array.take
array.clone                     array.fetch                     array.lazy                      array.repeated_combination      array.take_while
array.collect                   array.fill                      array.length                    array.repeated_permutation      array.tap
array.collect!                  array.find                      array.map                       array.replace                   array.to_a
array.collect_concat            array.find_all                  array.map!                      array.respond_to?               array.to_ary
array.combination               array.find_index                array.max                       array.reverse                   array.to_enum
array.compact                   array.first                     array.max_by                    array.reverse!                  array.to_h
array.compact!                  array.flat_map                  array.member?                   array.reverse_each              array.to_s
array.concat                    array.flatten                   array.method                    array.rindex                    array.transpose
array.count                     array.flatten!                  array.methods                   array.rotate                    array.trust
array.cycle                     array.freeze                    array.min                       array.rotate!                   array.uniq
array.define_singleton_method   array.frozen?                  array.min_by                    array.sample                    array.uniq!
array.delete                    array.grep                      array.minmax                    array.select                    array.unshift
array.delete_at                 array.grep_v                    array.minmax_by                 array.select!                   array.untaint
array.delete_if                 array.group_by                  array.nil?                      array.send                      array.untrust
array.detect                    array.hash                      array.none?                     array.shift                     array.untrusted?
array.dig                       array.include?                  array.object_id                 array.shuffle                   array.values_at
array.display                   array.index                     array.one?                      array.shuffle!                  array.zip
array.drop                      array.inject                    array.pack                      array.singleton_class
array.drop_while                array.insert                    array.partition                 array.singleton_method
array.dup                       array.inspect                   array.permutation               array.singleton_methods
```


If you want to check which methods a Class has, just type the name of the class and **".methods"**.
Example: Array.methods

Ruby Fundamentals

Hash

Hash is a really useful resource in Ruby, because we work with key and value. We can create an instance of Hash just using Hash.new or even {}.

```
hash = {}
=> {}

hash = Hash.new
=> {}
```

Adding items:

To add items to a hash is pretty simple, just indicate the key and the value of this key. You are able to use symbols to define a key.

```
hash = {}
hash['my_key'] = "my value"

hash = { 'a' => 1, 'b' => 2, 'c' => 3 }

hash[:name] = "Eduardo Heinen"
```

A good example of where Hash is used is JSON parses

https://ruby-doc.org/core-2.2.0/Hash.html

Hash

Accessing items:

To access items in a hash, just use "[key]" where key is the name of your key.

```
hash = { 'a' => 1, 'b' => 2, 'c' => 3 }
hash['a']
=> 1

hash = { :a=> 1, :b=> 2, :c=> 3 }
hash[:b]
=> 2
```

Deleting items:

To delete items in a hash, just use "**delete(key)**" and replace key for your key.

```
hash = { 'a' => 1, 'b' => 2, 'c' => 3 }
hash.delete('a')
=> { 'b' => 2, 'c' => 3 }

hash = { :a=> 1, :b=> 2, :c=> 3 }
hash.delete(:b)
=> { :a=> 1, :c=> 3}
```

Hash

Count:

Count is a method used to count how many items a hash has.

```
hash = { 'a' => 1, 'b' => 2, 'c' => 3 }
hash.count
=> 3
```

Keys:

Keys is a method used to list all keys inside the hash (returned as Array).

```
hash = { 'a' => 1, 'b' => 2, 'c' => 3 }
hash.keys
=> ["a", "b", "c"]
```

Values:

Values is a method used to list all values inside the hash (returned as Array).

```
hash = { 'a' => 1, 'b' => 2, 'c' => 3 }
hash.values
=> [1, 2, 3]
```

Hash

Select:

Select is a method used to filter values in a hash. In the following example I filter first by value and after that by key.

```
person1 = { first_name: "Eduardo", last_name:
"Heinen", hobbie: "Develop" }

person1.select { |key, value| value == "Eduardo" }
=> {:first_name=>"Eduardo"}

person1.select { |key, value| key == :hobbie }
=> {:hobbie=>"Develop"}
```

Merge:

Merge is a method used to merge values in a hash. If the key is the same but the value is different between those hashes, then the first hash will be replaced by the value of the second hash.

```
numbers1 = { a: 1, b: 10, c: 3 }
numbers2 = { a: 1, b: 15, c: 3 }
numbers1.merge(numbers2)
=> { :a=>1, :b=>15, :c=>3 }
```

Hash

There are a lot of methods inside Hash class you can use. Take a look:

```
hash.__id__                  hash.dig                     hash.first                   hash.keep_if                 hash.protected_methods       hash.sort_by
hash.__send__                hash.display                 hash.flat_map                hash.key                     hash.public_method           hash.store
hash.all?                    hash.drop                    hash.flatten                 hash.key?                    hash.public_methods          hash.taint
hash.any?                    hash.drop_while              hash.freeze                  hash.keys                    hash.public_send             hash.tainted?
hash.assoc                   hash.dup                     hash.frozen?                 hash.kind_of?                hash.rassoc                  hash.take
hash.chunk                   hash.each                    hash.grep                    hash.lazy                    hash.reduce                  hash.take_while
hash.chunk_while             hash.each_cons               hash.grep_v                  hash.length                  hash.rehash                  hash.tap
hash.class                   hash.each_entry              hash.group_by                hash.map                     hash.reject                  hash.to_a
hash.clear                   hash.each_key                hash.has_key?                hash.max                     hash.reject!                 hash.to_enum
hash.clone                   hash.each_pair               hash.has_value?              hash.max_by                  hash.remove_instance_variable hash.to_h
hash.collect                 hash.each_slice              hash.hash                    hash.member?                 hash.replace                 hash.to_hash
hash.collect_concat          hash.each_value              hash.include?                hash.merge                   hash.respond_to?             hash.to_proc
hash.compare_by_identity     hash.each_with_index         hash.index                   hash.merge!                  hash.reverse_each            hash.to_s
hash.compare_by_identity?    hash.each_with_object        hash.inject                  hash.method                  hash.select                  hash.trust
hash.count                   hash.empty?                  hash.inspect                 hash.methods                 hash.select!                 hash.untaint
hash.cycle                   hash.entries                 hash.instance_eval           hash.min                     hash.send                    hash.untrust
hash.default                 hash.enum_for                hash.instance_exec           hash.min_by                  hash.shift                   hash.untrusted?
hash.default=                hash.eql?                    hash.instance_of?            hash.minmax                  hash.singleton_class         hash.update
hash.default_proc            hash.equal?                  hash.instance_variable_defined? hash.minmax_by            hash.singleton_method        hash.value?
hash.default_proc=           hash.extend                  hash.instance_variable_get   hash.nil?                    hash.singleton_methods       hash.values
hash.define_singleton_method hash.fetch                   hash.instance_variable_set   hash.none?                  hash.size                    hash.values_at
hash.delete                  hash.fetch_values            hash.instance_variables      hash.object_id               hash.slice_after             hash.zip
hash.delete_if               hash.find                    hash.invert                  hash.one?                    hash.slice_before
hash.detect                  hash.find_all                hash.is_a?                   hash.partition               hash.slice_when
                             hash.find_index              hash.itself                  hash.private_methods         hash.sort
```

Ruby Fundamentals

Loops - While

```
while condition [do]
  code
end
```

```
count = 0
while count < 5
  count += 1
  puts count
end
```

Once you executed the above statement then you should see this:

```
1
2
3
4
5
```

Ruby Fundamentals

Loops - For

```
for variable [, variable ...] in expression [do]
  code
end
```

```
for i in 0..5
  puts i
end
```

Once you executed the above statement then you should see this:

```
0
1
2
3
4
5
```

Notice in the code has ".." between 0 and 10. We also could put "...". The difference between both ".." and "..." is:

"0..10" is equal to **"0 >= 10"** and **"0...10"** is equal to **"0 > 10"**

If we had put "..." then we had seen printed 0 until 9 just. The loop would executed while **"i"** was lesser than **"10"**.

Ruby Fundamentals

Loops - Each

```
(expression).each do |variable[, variable...]|
  code
end
```

```
(0..5).each do |variable|
  puts variable
end
```

Once you executed the above statement then you should see this:

```
0
1
2
3
4
5
```

The loop each is really useful daily, principally when used with arrays like:

```
fruits = ["Banana", "Strawberry", "Lemon", "Orange"]
fruits.each do |fruit|
  puts fruit
end
```

Loops - Each and Each with index

In our example of each with fruit array, after I executed in my terminal I got the following result:

```
Banana - 0
Strawberry - 1
Lemon - 2
Orange - 3
```

Case you also need to get the index, then there is another command to execute:

```
(expression).each_with_index do |variable, index|
  code
end
```

```
fruits = ["Banana", "Strawberry", "Lemon", "Orange"]
fruits.each_with_index do |fruit, index|
  puts fruit + " - " + index.to_s
end
```

Remember, the second variable is the index, take a look at the statement executed:

```
Banana - 0
Strawberry - 1
Lemon - 2
Orange - 3
```

Ruby Fundamentals

Loops - Times

```
number.times do |variable|
  code
end
```

```
5.times do |i|
  puts i
end
```

Once you executed the above statement then you should see this:

```
0
1
2
3
4
5
```

There is another way to execute times like:

```
10.times { puts "hello!" }
```

The statement above will print 10 times the word "hello!"

Ruby Fundamentals

Loops - Until

```
until conditional [do]
   code
end
```

```
count = 0
until count > 5
  count += 1
  puts count
end
```

Once you executed the above statement then you should see this:

```
1
2
3
4
5
6
```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Ruby Fundamentals

Condition IF

```
if conditional [then]
  code...
[elsif conditional [then]
  code...]...
[else
  code...]
end
```

```
fruit = "strawberry"
if fruit == "strawberry"
  puts "Strawberry!"
elsif fruit == "banana"
  puts "Banana!"
else
  puts "Other fruit!"
end
```

Once you executed the above statement then you should see this:

```
=> Strawberry!
```

Ruby Fundamentals

Condition UNLESS

```
unless conditional [then]
   code
[else
   code ]
end
```

```
price = 950
unless price >= 1000
  puts "Hey, the price is lesser than $1000"
else
  puts "Hey, the price is bigger than $1000"
end
```

Once you executed the above statement then you should see this:

```
Hey, the price is lesser than $1000
```

Conditions Inline

You may also work with conditions inline. When we are developing an IF or UNLESS block we are obligated to include the keyword **end** to finish our block. But when we work inline it is not necessary.

```
code if condition

code unless condition
```

```
count = 100
count += 50 if count >= 100
count
```

```
=> 150
```

```
count = 100
count -= 50 unless count < 100
count
```

```
=> 50
```

Ruby Fundamentals

Methods

If you want to create a method, just use the following syntax:

```
def method_name(params)
  code
end

or

def method_name params
  code
end
```

Notice these methods above, the unique difference is ")(". You are able to define which one you want to use. It doesn't matter to Ruby.

```
def format_fruits fruit
  "I love eating " + fruit
end

format_fruits "strawberry"
```

When executed the method above, it will return a phrase with the fruit's name that you passed. Like:

```
=> I love eating strawberry
```

Methods

Notice that all methods in Ruby returns something! Even if you just include a puts, it will return **nil**. You may also include **return** to return something. Like:

```
def format_fruits fruit
  return "I love eating " + fruit
end

format_fruits "strawberry"
```

There is no difference with or without **return** in the method, the return will be the same.

```
=> I love eating strawberry
```

Methods

If your method has an argument and it doesn't need to be required, you may initialize this argument and when you call your method you choose if you want or not include arguments. Let's see:

```
def format_fruits(fruit = "strawberry")
  return "I love eating " + fruit
end

format_fruits
```

```
=> I love eating strawberry
```

Observe I just called the method format_fruits without pass any arguments. When the method was executed I could see the value "strawberry" I included as default value.

Methods

You also may define an argument able to receive various value, like an array. Let's see:

```
def format_fruits(*fruits)
  fruits.each do |fruit|
      puts fruit
  end
end

format_fruits("strawberry", "banana", "orange")
```

```
strawberry
banana
orange
```

Actually, Ruby transforms the argument fruits in an Array type.

Ruby Fundamentals

Variables II

In Ruby there are 4 kinds of variable scope in Ruby:

Local Variables: Local variables are defined inside methods and can't be access outside of the method. Local variables begin with a "lowercase letter" or "_".
Example: count = 0 or _count = 0

Instance Variables: Instance variables are available across methods for any particular instance or object. Instance variables are preceded by the at sign "@" followed by the variable name.
Example: @array = Array.new

Class Variables: Class variables are available across different objects. A class variable belongs to the class and is a characteristic of a class. They are preceded by the sign "@@" and are followed by the variable name.
Example: @@color

Global Variables: Class variables are not available across classes. If you want to have a single variable, which is available across classes, you need to define a global variable. The global variables are always preceded by the dollar sign "$".
Example: $status

Class

```
class ClassName
  ...
end
```

When you create a class, it's important to respect patterns. The name of the class uses Pascal case, first letter of each word is uppercase.

To instantiate a class (create objects of a class) you need just write the class name proceeded of ".new".

```
class Fruit
end

fruit = Fruit.new
```

If you execute the code above you will see something like this:

```
=> #<Fruit:0x007f9d3d0d5278>
```

Now you are able to interact with the methods inside the class.

Class

```
class Fruit
  def format_fruits(fruit)
      fruit.capitalize
  end
end

fruit = Fruit.new
fruit.format_fruits("sTrAWBerry")
```

Observe I create an object of Fruit class and called the method format_fruits passing a value not formatted. After I executed it you are able to see the following statement:

```
=> Strawberry
```

If you would like to know which class an object belongs, just type ".class" after the variable. Like:

Class

```
fruit.class

=> Fruit < Object
```

Sometimes we need to interact with a class specifically, and to it works, we need to be sure which class our variable is. To be sure about it we just can use: "instance_of?"

```
fruit.instance_of? Fruit

=> true
```

```
fruit.instance_of? Object

=> false
```

Class

Notice our variable fruit is not an instance of Object, but it is an Object because the Object class is the superclass (All classes are children of Object). Now if you try ".is_a? Object" or ".kind_of? Object", the result will be "true". Let's see:

```
fruit.is_a? Object

=> true
```

```
fruit.kind_of? Object

=> true
```

Class

In all variable you are able to check if it is nil or empty, like:

```
fruit = nil
fruit.nil?

=> true
```

```
name = ""
name.empty?

=> true
```

Class

In Ruby classes we are able to create a constructor to initialize things before to interact with something else inside the class, like:

```
class Fruit
  def initialize(fruit, flavor)
      @fruit = fruit
      @flavor = flavor
  end

  def save
      DataBase.new.save(@fruit, @flavor)
      puts "Fruit successfully saved"
  end
end
```

```
Fruit.new("Banana", "Sweet").save
```

```
Fruit successfully saved
```

Notice I didn't need to create a variable to store my object class to interact with elements inside the class. I just create the object and called the method "save" inline.

Handle Exceptions

Treatment of exception is really important when you are developing, because sometimes the user or something else makes something unexpected like a division by zero! So, when an exception occurs the program stops! You need to foresee situations that can explode an exception in your system.

```
begin
  code
rescue Exception One
  code
rescue Exception Two
  code
else
  code
ensure
  code
end
```

We have to define a block if we want to get the exception followed by **rescue** keyword. If you know the kind of exception that could happen you may inform after rescue, like:

Ruby Fundamentals

Handle Exceptions

```
def divide(number1, number2)
  number1 / number2
end

divide 10, 0
```

```
# Exception thrown:
ZeroDivisionError: divided by 0
```

```
def divide(number1, number2)
  begin
      number1 / number2
  rescue ZeroDivisionError
      puts "Ops! You cannot divide by zero"
  end
end

divide 10, 0
```

```
Ops! You cannot divide by zero
```

Handle Exceptions

If you don't know which kind of exception could be thrown in your method, just put rescue and treat it in a generic format. Like:

```
def divide(number1, number2)
  begin
      number1 / number2
  rescue
      puts "Ops! Something went wrong!"
  end
end

divide 10, 0
```

```
Ops! Something went wrong!
```

If you need something be always executed after do something, you may use **ensure**. It will execute your code inside your method and if something goes wrong then ensure will do something. The ensure is widely used to close connections with database. Even the method doesn't throw any exception you need to close the database connection, or else, it will be open.

Handle Exceptions

If you don't know which kind of exception could be thrown in your method, just put rescue and treat it in a generic format. Like:

```
def save
  begin
      # Code to open database connection
      # Code to save and commit
  rescue
      puts "Ops! Something went wrong!"
  ensure
      # Code to close database connection
      puts "Database was closed!"
  end
end
```

The ensure above will **always** be executed! It doesn't matter if everything goes right or not. The database connection will be closed.

Handle Exceptions

You may also want to throw an exception, and you can do it using raise. Especially if you are working with testing automation.

```
def divide(number1, number2)
  raise "You cannot divide by zero" if number2.zero?
  number1 / number2
end

divide 10, 0
```

```
=> RuntimeError: You cannot divide by zero
```

If you are executing a test and an exception is thrown, then your test will fail. That is a kind of the Asserts' principle.

References

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