Ruby advance topics

Recursive Functions

- "Those that keep calling themselves until they hit an end goal"
- Better performance than loops

```ruby
def iterative_factorial(n)
  (1..n).inject(:*)
end

def recursive_factorial(n)
  # Base case
  return 1 if n <= 1

  # Recursive call
  n * recursive_factorial(n-1)
end
```

Recursive Functions

- Homework
  - Fibonacci Sequence with each number multiplied by 100

Enumerable

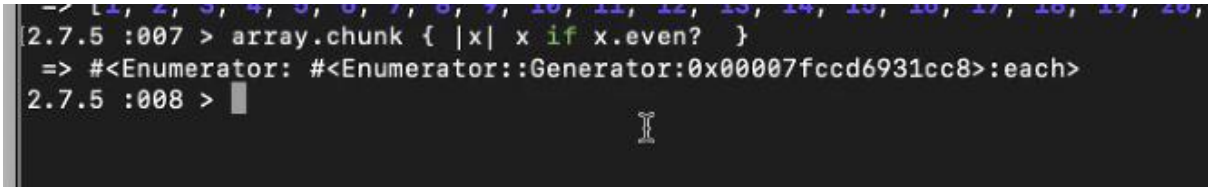
- Module in Ruby that allow to perform operations, from which classes like arrays and hashes inherit
- Useful methods
  - .each
  - .map – Same as array, but returns the array
  - .inject – Applies the block result element to each item in the array
    - https://www.delftstack.com/howto/ruby/use-ruby-inject-method/
  - .any?

Enumerable - .chunk

- Enumerates over the items based on the condition and return an Enumerable. Most oftenly, this Enumerable is used with an each

```
irb(main):006:0> w = [1, 2, 3, 4, 5].chunk { |x| x if x > 2 }
=> #<Enumerator: #<Enumerator::Generator:0x00007fdc43193a30>:each>
irb(main):007:0> w.each { |x| puts x }
3
3
4
4
5
5
=> nil
irb(main):008:0>
```

What does chunk receive as a parameter ? -> a block
Returns an enumerator:



Let's try to access that enumerato
This enumerator does not have special methods

enumerator and enumerable
string of data into smaller lines, for example
each uses more resources, chunk no, because it is part by part?

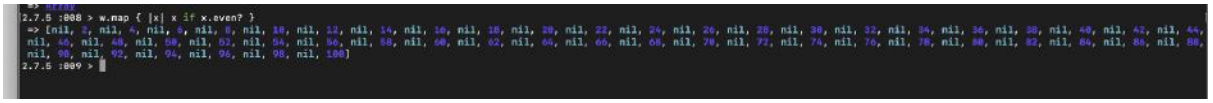
Enumerable - .each

- Iterates and does the process over each item of the block

```
irb(main):006:0> w = [1, 2, 3, 4, 5].chunk { |x| x if x > 2 }
=> #<Enumerator: #<Enumerator::Generator:0x00007fdc43193a30>:each>
irb(main):007:0> w.each { |x| puts x }
3
3
4
4
5
5
=> nil
irb(main):008:0>
```

MAP

returns an array but with modifications



It returns all values.

Map returns an array, chunk an iterator.

Enumerable - .inject

- Applies the result from the block to each item in the array into a single result

```
irb(main):024:0>
irb(main):025:0> w.inject(:*)
=> 120
irb(main):026:0> w.inject(:+)
=> 15
irb(main):027:0> w
=> [1, 2, 3, 4, 5]
irb(main):028:0>
```

- Need to use the accumulator? No problem.

```
inject (initial_value) { |accumulator, array_item| expression }
```

:+ is a shortcut, instead of doing the whole block. He is adding the result of each value to the next one

You can also use the other sintaxis with an accumulator variable.

Enumerable - .any?

- Checks if any of the elements meets the given condition.

```
irb(main):037:0> w.any?(1)
=> true
irb(main):038:0> w.any? { |x| x > 1 }
=> true
irb(main):039:0>
```

Can be use to check if item exists on array

Enumerable - .all?

- All values in the enumerable match the condition or block in specific

```
collection.all?(&:valid?)
```

All the same as any, but the condition will be applied to each one.

```
        2: from /Users/oskarhinojosa/.rvm/rubies/ruby-2.7.5/lib/
        1: from (irb):15
NoMethodError (undefined method `all' for [1, 2, 3]:Array)
Did you mean?  all?
2.7.5 :016 > [1,2,3].all?(:even?)
 => false
2.7.5 :017 > [4,2,6].all?(:even?)
 => false
2.7.5 :018 >
```

Blocks

- Single line of snippets of code
  - Useful information: For betterment they also do multi-line blocks with brackets and use the keyword compact at the end of the block

```ruby
array_of_things.each do |thing|
  thing if thing.condition?
end.compact
```

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

They declare an anonymous piece of code.

.compact not required but it is a good practice.

```ruby
3
4
5   (1..100).to_a.chunk { |x|
6
7   }.compact
```

Remember that ruby is a just in time compilation. .compact is a way to tell the compiler that the block has finished.

Declare your own block

Blocks – Declaring your own blocks

- Options: Use the yield keyword in the method that will be your block
  - Notice how the variable is passed &block

```ruby
1.  def explicit_block(&block)
2.    block.call # same as yield
3.  end
4.
5.  explicit_block { puts "Explicit block
    called" }
```

then you can use yield or call.

Blocks – Declaring your own blocks

- When creating methods, the method block_given? Is available to know if you can use the yield argument

```
1.  def do_something_with_block
2.    return "No block given" unless
    block_given?
3.    yield
4.  end
```

also we have this method, to check if a block was given.

Yield

Blocks – Declaring your own blocks

- You can use parameters with the yield keyword

```
1.  def one_two_three
2.    yield 1
3.    yield 2
4.    yield 3
5.  end
6.
7.  one_two_three { |number| puts number *
    10 }
8.  # 10, 20, 30
```

Con yield si queremos pasar más de un parámetro, usemos un array

Off class notes

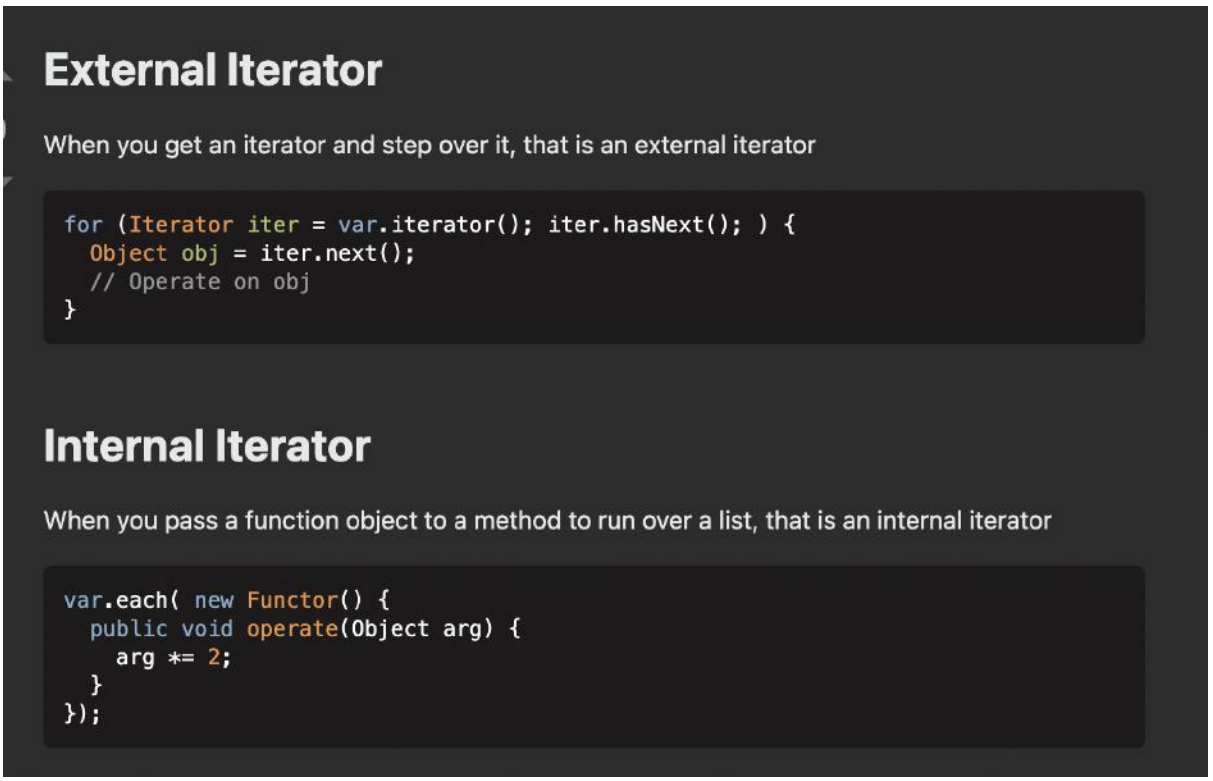
https://scoutapm.com/blog/ruby-enumerator
https://blog.carbonfive.com/enumerator-rubys-versatile-iterator/#:~:text=An%20external%20iterator%20is%20controlled,collection%20classes%2C%20Array%20and%20Hash%20.

Enumeration

Enumeration -> process to transverse over a set of elements

An entity is known to be enumerable when it has a set of elements and knows how to traverse over them.

External vs internal iterator



Enumerable

Is a module
From this module comes out methods of search, traversing, etc, that other classes like array, hash or range uses.

Enumerator

Is a class.

`Enumerator` is an `Enumerable` plus external iteration. In this post, we'll take a look at the basics of `Enumerator`s and some of the powerful functionality that they make possible.

`Enumerator` itself is `Enumerable`, so we can use the full power of `Enumerable`.

It add external iterators

```ruby
enum = Enumerator.new do |yielder|
  yielder << "a"
  yielder << "b"
  yielder << "c"
end

enum.next # "a"
enum.next # "b"
enum.next # "c"
enum.next # StopIteration: iteration reached an end
```

Create enumerator from ienumerable

Creating an Enumerator from an Enumerable

The more common way to create an `Enumerator` is from an `Enumerable` object, specifically an object that defines an `#each` method. `Object#to_enum` (aliased to `Object#enum_for`) is implemented to return a new `Enumerator` that will enumerate by sending `#each` to its receiver.

```ruby
array = [1, 2, 3]
enum = array.to_enum
enum.each {|n| n * 2} # 2 4 6
```

2.rb hosted with ❤ by GitHub view raw

Turning Non-Enumerables into Enumerables

Turning Non-Enumerables into Enumerables

So far, we've looked at how to construct `Enumerator`s from scratch and from `Enumerable`s. However, several non-`Enumerable` classes also return `Enumerator`s. Since `Enumerator` is `Enumerable`, this allows you to effectively turn a non-`Enumerable` class into an `Enumerable` one.

`Integer`, for example, returns an `Enumerator` from `#times`, `#upto`, and `#downto`.

```
enum = 5.times
enum.map { [] }      # [[], [], [], [], []]

enum = 1.upto 10
enum.inject(:+)      # 55

enum = 5.downto 0
enum.map {|n| n * 2} # [10, 8, 6, 4, 2, 0]
```

5.rb hosted with ❤ by GitHub view raw

`String` has several iteration methods that will return an `Enumerator` when not given a block.

```
enum = "hello".each_char
enum.map &:upcase                   # ["H", "E", "L", "L", "O"]

enum = "abc".each_byte
enum.map {|n| n}                    # [97, 98, 99]

enum = "one\ntwo\nthree".each_line
enum.map {|line| line.chomp.reverse} # ["eno", "owt", "eerht"]
```