Building Ruby in Ruby

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- Boolean Values

- Natural Numbers

Smalltalk

nil
self
true
super
false
thisContext

```
true ifTrue: [ 'Hello, world!' printNl ]
```

```
true.if_true { 'Hello, world!'.print }
```

```ruby
class True
  def if_true &block
    yield block
    self
  end

  def if_false &block
    self
  end
end
```

```ruby
class False
  def if_true &block
    self
  end

  def if_false &block
    yield block
    self
  end
end
```

Alonzo Church

the λ-calculus
church numerals

```
Number.new
```

```
one = Number.new
two = Number.new(Number.new)
```

```ruby
class Number
  attr_reader :prev

  def initialize(prev = Zero.new)
    @prev = prev
  end

  def call(value, &action)
    next_value = action.call(value)
    prev.call(next_value, &action)
  end
end
```

```ruby
class Zero < Number
  def call(value, &action)
    value
  end
end
```

```
two = Number.new(Number.new)
one = Number.new

assert_equal 1, one.to_i
assert equal 2, two.to_i
```

```
class Number

  # …

  def to_i
    call 0 do |value|
      value + 1
    end
  end

  # …

end
```

```
two = Number.new(Number.new)

three = two.inc

assert_equal 3, three.to_i
```

```ruby
class Number

  # …

  def inc
    Number.new(self)
  end

  # …

end
```

```
two = Number.new(Number.new)
one = Number.new

three = one + two

assert_equal 3, three.to_i
```

```
class Number

  # …

  def +(other)
    self.call other do |other|
      other.inc
    end
  end

  # …

end
```

```
two = Number.new(Number.new)
five = Number.new(Number.new(Number.new(Number.new(Num

ten = five * two

assert_equal 10, ten.to_i
```

```ruby
class Number

  # …

  def *(other)
    call Zero.new do |value|
      value + other
    end
  end

  # …

end
```

```ruby
3.times do
  puts 'this is repeated'
end
```

```ruby
class Number

  # …

  def times(&block)
    self.call nil do |_value|
      block.call
    end
  end

  # …

end
```

```
a_thousand.times { thank_you! }
```

Links

http://wiki.c2.com/?SmalltalkTutorial
http://codon.com/programming-with-nothing
https://en.wikipedia.org/wiki/Alonzo_Church