Intro to Ruby Programming

GDI Rochester Chapter

https://github.com/chorn/intro_to_ruby

Welcome

Girl Develop It is here to provide affordable and accessible programs to learn software through mentorship and hands-on instruction.

Thank You

- GDI Rochester
- GDI Cincinnati – Ryan Dlugosz
- GDI Seattle

The Golden Rules

» We are here for you!

» Every question is important.

» Help each other.

» Have fun!

@chorn

» Chris Horn

» chorn@chorn.com

What to expect

» See Ruby

» Write Ruby

» Meet people who are learning with you

» Get an overview of Ruby

Ruby

» Ruby is a powerful language that reads like English

» "I hope to see Ruby help every programmer in the world to be productive, and to enjoy programming, and to be happy. That is the primary purpose of Ruby language." – Yukihiro "Matz" Matsumoto

https://en.wikipedia.org/wiki/Ruby(*programming*language))
https://en.wikipedia.org/wiki/Yukihiro_Matsumoto

You will get stuck

1. You are not the first to get stuck.
2. You are not the first to see that error message.
3. Google it.

You!

- Who are you?
- What is your programming experience?
- What is your favorite hobby that has nothing to do with technology?

Take notes

- Make a copy of these slides
  - https://github.com/chorn/intro_to_ruby
  - Take notes on paper
  - Take notes in an editor

Repl.it

https://repl.it/languages/ruby

```
ruby 2.3.1p112 (2016-04-26 revision 54768) [x86_64-linux]
>
```

A REPL is a Read, Evaluate, and Print Loop.

What does this code do?

Type this into the right side and hit return:

```
1 + 1
```

What does this mean?

```
> 1 + 1
=> 2
>
```

What does > mean?

What does => mean?

You wrote a Program!

» Programs are the steps that computers follow to meet a goal.

What does this code do?

```
1 +* 1
```

Errors - SyntaxError

```
1 +* 1
(repl):1: syntax error, unexpected *
1 +* 1
  ^
```

All languages have Syntax

» Different for each language

So how do we fix:

```
1 +* 1
```

Math

What do these do?

```
1 + 1

2 * 2

3 - 3

4 / 2

2 / 4

1 / 0

2 ** 3 # Exponents

3 % 2 # Modulo or Remainder
```

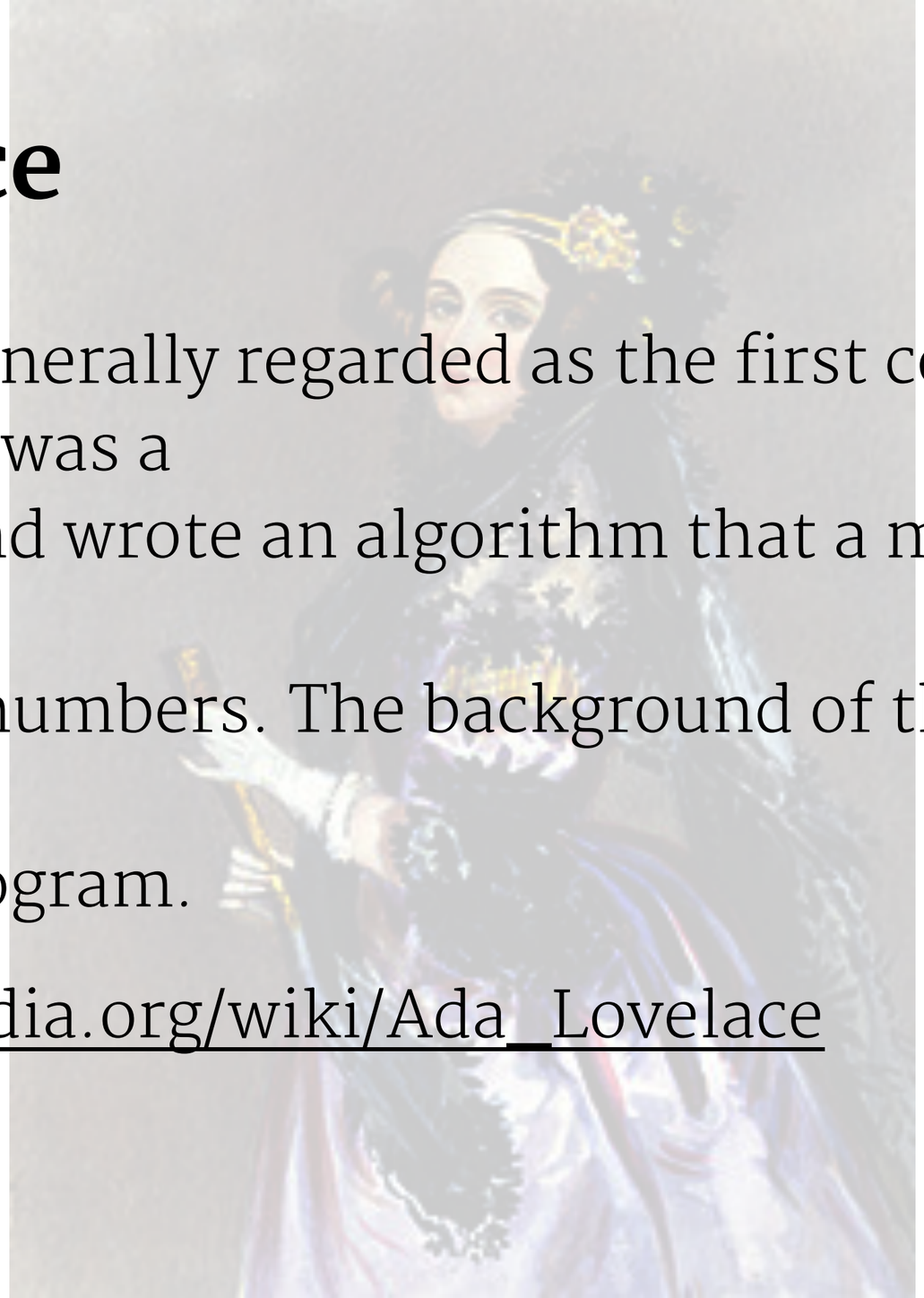
What does this code do?

```
2 +++ 2
```

All language have Semantics

» Similar across languages

Ada Lovelace



Ada Lovelace is generally regarded as the first computer programmer. She was a
mathematician and wrote an algorithm that a machine could use to generate a
specific series of numbers. The background of this slide are her notes--the
first computer program.

https://en.wikipedia.org/wiki/Ada_Lovelace

What does this code do?

```
puts "Welcome to Ruby!"
```

» What is `puts`?

» What is `""`

Strings

```
"Ruby".upcase
"Ruby".downcase
"ruby".capitalize
"Ruby".reverse
"Ruby".length
"Ruby".swapcase
"Ruby".empty?
"".empty?
```

What are Strings?

Ideas

We translate ideas into code

Objects

Objects are our ideas, as code, put into practice.

Messages

Sending and receiving messages is the fundamental concept of Object Orient Programming.

`1 + 1`

» 1 is an Object

» + is a message (or in Ruby, a method)

» 1 is an argument to + (and also an Object)

What does this do?

```
1 + 1
```

```
1 + (1)
```

```
1 .+ (1)
```

```
1.+(1)
```

Kernel

```
>> puts isn't really just puts

>> Kernel.puts

>> Kernel.rand
```

What does this do?

```
1 + 2 + 3
```

What does this do?

```
"Ruby".upcase.reverse
```

Explore

Object Oriented Programming

» Match the semantics of our code to the idea

» I keep saying `Object`

» We code in a `Class`

Our first `Class`

» Let's make a brick!

» Type this into the *left* pane of and hit *Run*

```
class Brick
end
```

new

» Update the *left* pane to look like this and hit *Run* this:

```
class Brick
end


Brick.new
```

What does `=> #<Brick:0x007f5275a13708>` mean?

`Brick`

» What questions do I want to ask a `Brick`?

» What properties do all `Bricks` have?

» What properties do some `Bricks` have?

def

Methods are the names of our messages.

```
class Brick
  def color
    "gold"
  end
end
```

```
Brick.new.color
```

Add 2 more methods to `Brick`

- One with a `String`
- Another with an `Integer`

What did you make?

» What worked?

» What didn't work?

```
class Brick
  def color
    "gold"
  end
  def length
    8
  end
  def width
    4
  end
  def height
    2
  end
  def location
    "On the table."
  end
end

Brick.new.color
Brick.new.length
Brick.new.width
Brick.new.height
Brick.new.location
```

Booleans

```
>> true

>> false

>> !
```

```
true

false

!true

!false
```

Add 2 more methods to `Brick`

- Method names that end in a `?`
- Return `true` or `false`

What did you make?

» What worked?

» What didn't work?

```
class Brick
  def color
    "gold"
  end
  def length
    8
  end
  def width
    4
  end
  def height
    2
  end
  def location
    "On the table."
  end
  def heavy?
    true
  end
  def edible?
    false
  end
end

Brick.new.color
Brick.new.length
Brick.new.width
Brick.new.height
Brick.new.location
Brick.new.heavy?
Brick.new.edible?
```

End of Day 1

» What have we learned?

» What's missing?

Homework

» What is an algorithm?

Day 2

» Welcome back!

Review

- Syntax & Semantics
- Object Oriented Programming
  - Match the semantics of our code to the idea
- Integers
- Strings
- Booleans
- Classes

Back to Bricks

» Update the *left* pane to look like this and hit *Run* this:

```
class Brick
  def color
    "gold"
  end
end


my_brick = Brick.new
puts my_brick.color
```

Variables

```
my_favorite_number = 5
```

» Can change

» Has a name

» Has a value

» Has a `Class`

Literals

```
my_favorite_number = 5
the_worst_day = "Tuesday"
```

Re-assignment

What does this do?

```
my_favorite_number = 5
my_favorite_number = 7
my_favorite_number += 1
my_favorite_number *= 2
```

Variables and Literals

```
my_favorite_number = 5
your_favorite_number = my_favorite_number
your_favorite_number = my_favorite_number + 1
your_favorite_number = my_favorite_number * 1
```

Expressions

» Code is a mashup of natural language (English), math, and logic

» Programming is powerful because it allows you to combine lots and lots and lots of expressions

Exploring Strings

```
greeting = "Hello"
language = "Ruby"
```

What does this code do?

```
greeting + language
greeting * language
greeting * 2
language + 2
greeting.upcase.reverse
language.downcase * greeting.length
```

What about `Brick`?

» So far we've been using `Brick.new.some_method_name`

A new kind of Brick

» Type this into the *left* pane

```
class Brick
end


my_brick = Brick.new
```

Initialize

```
class Brick
  def initialize
  end
end

my_brick = Brick.new
```

@color

```
class Brick
  def initialize
    @color = "gold"
  end
end

my_brick = Brick.new
```

» `@` creates an instance variable

» `@color` exists and is accessible throughout my `Class`

Instance Variables

What does this code do?

```
class Brick
  def initialize
    @color = "gold"
  end
end

my_brick = Brick.new
puts my_brick.@color
```

Instance Variables

Instance variables are not messages

```
class Brick
  def initialize
    @color = "gold"
  end
  def color
    @color
  end
end

my_brick = Brick.new
puts my_brick.color
```

Not Instance Variables

What if I forget the @?

```
class Brick
  def initialize
    my_color = "gold"
  end

  def color
    my_color
  end
end

my_brick = Brick.new
puts my_brick.color
```

Do names matter?

```
class Brick
  def initialize
    @qwerty = "gold"
  end
  def color
    @qwerty
  end
end

my_brick = Brick.new
puts my_brick.color
```

» What happens?

» Is this a good idea?

Arguments

```
my_string = String.new("Hello Ruby")
my_empty_string = String.new()
```

Brick.new("gold")

```
class Brick
  def initialize(color)
    @color = color
  end
  def color
    @color
  end
end

my_brick = Brick.new("gold")
puts my_brick.color
```

Messages

Let's rewrite our use of `Brick` as plain English.

- So far we have
  - I would like to make a gold colored brick.
  - What is the color of my brick?
- Let's add
  - Who owns my brick?
  - What is my brick made of?

Change `initialize`, add `owner`

```
class Brick
  def initialize(color, owner)
    @color = color
    @owner = owner
  end
  def color
    @color
  end
  def owner
    @owner
  end
end

my_brick = Brick.new("gold", "Me!")
puts my_brick.color
puts my_brick.owner
```

initialize(color, owner)

» Is it:

```
my_brick = Brick.new("gold", "Me!")
```

» Or:

```
my_brick = Brick.new("Me!", "gold")
```

Named Parameters

```
class Brick
  def initialize(color:, owner:)
    @color = color
    @owner = owner
  end
  def color
    @color
  end
  def owner
    @owner
  end
end

my_brick = Brick.new(color: "gold", owner: "Me!")
puts my_brick.color
puts my_brick.owner
```

attr_reader

```
class Brick
  attr_reader :color
  attr_reader :owner

  def initialize(color:, owner:)
    @color = color
    @owner = owner
  end
end

my_brick = Brick.new(color: "gold", owner: "Me!")
puts my_brick.color
puts my_brick.owner
```

Changing attributes

What does this do?

```
my_brick = Brick.new(color: "gold", owner: "Me!")
puts my_brick.color
puts my_brick.owner

my_brick.owner = "You?"
puts my_brick.owner
```

attr_writer

```
class Brick
  attr_reader :color
  attr_reader :owner
  attr_writer :owner

  def initialize(color:, owner:)
    @color = color
    @owner = owner
  end
end

my_brick = Brick.new(color: "gold", owner: "Me!")
puts my_brick.color
puts my_brick.owner

my_brick.owner = "You?"
puts my_brick.owner
```

Default Attributes 1

```
class Brick
  attr_reader :color
  attr_writer :color
  attr_reader :owner
  attr_writer :owner

  def initialize(color: "gold", owner: "Me!")
    @color = color
    @owner = owner
  end
end

my_brick = Brick.new(color: "red")
puts my_brick.color
puts my_brick.owner

my_brick.owner = "You?"
puts my_brick.owner
```

Exploration

» Make more bricks

» Change the parameter order around

» Write expressions to compare parts of your bricks

Volume

- How do we determine the volume of a `Brick`?
  - Length * Width * Height

Volume

```
class Brick
  def initialize(l: 5, w: 2, h: 1)
    @l = l
    @w = w
    @h = h
  end

  def volume
    @l * @w * @h
  end
end

my_brick = Brick.new
puts my_brick.volume
```

Naming

Pick the best variable name

```
my_favorite_number = 5
fav_num = 5
fav = 5
number = 5
n = 5
mfn = 5
temp = 5
```

Naming

Names should be

» Meaningful

» Easy to read

» Concise

» Specific

» Speling

Good Names

```
occupation = "Software Developer"
occupation_name = "Software Developer"
job_title = "Software Developer"
```

Writing code

- Code is read more often than it is written
- The next programmer to read your code should
  - Understand what you are trying to do
  - Even if it doesn't work
  - Especially if you are the next programmer

Expressing your intent

» Huge names are awesome

» If it takes a whole sentence to clearly explain what a variable is for, use it

» `adjustment_to_be_made_at_time_of_purchase` is perfect

Leveling up

What is the problem we're solving?

- We work for the Brick Store
- They sell Bricks
- We are building a new website for them so that:
  - Customers can buy Bricks
  - We can manage the inventory of Bricks

Default Attributes 2

```
class Brick
  attr_reader :color, :owner
  attr_writer :color, :owner

  def initialize(color: "gold", owner: "Me!")
    @color = color
    @owner = owner
  end
end

my_brick = Brick.new(color: "red")
puts my_brick.color
puts my_brick.owner

my_brick.owner = "You?"
puts my_brick.owner
```

attr_accessor

```
class Brick
  attr_accessor :color, :owner

  def initialize(color: "gold", owner: "Me!")
    @color = color
    @owner = owner
  end
end

my_brick = Brick.new(color: "red")
puts my_brick.color
puts my_brick.owner

my_brick.owner = "You?"
puts my_brick.owner
```

`attr_accessor :color`

What does it really do?

```
def color
  @color
end

def color=(new_color)
  @color = new_color
end
```

`def color`

» When our brick receives the message:

What is your color?

» We answer with:

This is my color.

`def color`

This should be the only place we return `@color`

`def color=`

» When our brick receives the message:

I want to change your color to be purple.

» We answer with:

I have changed my to purple.

`def color=`

This should be the only place we change `@color`

```ruby
class Brick
  def initialize(color: "gold")
    @color = color
  end
  def color
    @color
  end
  def color=(new_color)
    @color = new_color
  end
end

my_brick = Brick.new
puts my_brick.color
my_brick.color = "blue"
puts my_brick.color
```

The use of color, color, color in `initialize` is tricky.

Clearly named parameters

```
class Brick
  def initialize(initializing_brick_color)
    @color = initializing_brick_color
  end
  def color
    @color
  end
  def color=(new_color)
    @color = new_color
  end
end

my_brick = Brick.new("gold")
puts my_brick.color
my_brick.color = "blue"
puts my_brick.color
```

`self` with clearly named parameters

```
class Brick
  def initialize(initializing_brick_color)
    self.color = initializing_brick_color
  end
  def color
    @color
  end
  def color=(new_color)
    @color = new_color
  end
end

my_brick = Brick.new("gold")
puts my_brick.color
my_brick.color = "blue"
puts my_brick.color
```

`self` with named parameters

```
class Brick
  def initialize(color: "gold")
    self.color = color
  end
  def color
    @color
  end
  def color=(new_color)
    @color = new_color
  end
end

my_brick = Brick.new(color: "gold")
puts my_brick.color
my_brick.color = "blue"
puts my_brick.color
```

Debugging a `Brick`

```
class Brick
  def initialize(initializing_brick_color)
    puts "Initialize BEGIN with initializing_brick_color '#{initializing_brick_color}'"
    self.color = initializing_brick_color
    puts "Initialize END   with initializing_brick_color '#{initializing_brick_color}'"
  end
  def color
    puts "Reader BEGIN/END 'color' with @color #{@color}"
    @color
  end
  def color=(new_color)
    puts "Writer BEGIN 'color=' with @color '#{@color}' and new_color '#{new_color}'"
    @color = new_color
    puts "Writer END   'color=' with @color '#{@color}' and new_color '#{new_color}'"
  end
end

puts "----Program Start----"

puts "1. Make a gold brick."
my_brick = Brick.new("gold")

puts
puts "2. Print the color of my brick."
puts my_brick.color

puts
puts "3. Change the color of my brick to be blue"
my_brick.color = "blue"

puts
puts "4. Print the color of my brick."
puts my_brick.color

puts
puts "----Program Stop----"
```

Our new Boss

- As employees of the Brick Store, we have a new boss.
  - His name is Jack
  - Jack considers himself to be a master of bricks.
  - Jack prefers the blue bricks and will not share.
  - Jack wants our website enforce these rules.

Constants

The Brick Master

```
class Brick
  attr_accessor :color, :owner

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.color = color
    self.owner = owner
  end
end

my_brick = Brick.new(owner: "Our Local Store")
puts my_brick.owner
my_brick.owner = "Customer"
puts my_brick.owner
```

What does this do?

```
class Brick
  attr_accessor :color, :owner

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.color = color
    self.owner = owner

    BRICK_MASTER = owner
  end
end

my_brick = Brick.new(owner: "Someone")
puts my_brick.owner
my_brick.owner = "You?"
puts my_brick.owner
```

What does this do?

```
class Brick
  attr_accessor :color, :owner

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.color = color
    self.owner = owner
  end
end

my_brick = Brick.new(owner: "Someone")
puts my_brick
```

to_s

```
class Brick
  attr_accessor :color, :owner

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.color = color
    self.owner = owner
  end

  def to_s
    "I am a Brick"
  end
end

my_brick = Brick.new(owner: "Someone")
puts my_brick
```

to_s

```
def to_s
end
```

```
>> @color

>> "#{@color}"

>> "Color: #{@color}"

>> "Owner: #{@owner} Color: #{@color}"

>> "Owner: #{@owner}\nColor: #{@color}"

>> "Owner: #{@owner}\tColor: #{@color}"
```

to_s

```
class Brick
  attr_accessor :color, :owner

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.color = color
    self.owner = owner
  end

  def to_s
    "Owner: #{self.owner}\tColor: #{self.color}"
  end
end

my_brick = Brick.new(owner: "Someone")
puts my_brick
```

The Brick Master's Rules

```
def owned_by_the_brick_master?
  # ???
end
```

Logic

```
true
false
!true
!false
true && true
true && false
true || false
false || true
false && false
false || false
```

Logic

Expressions!

```
1 == 1
1 == 2
1 != "Hello"
"Ruby" == "Ruby?"
1 < 2
1 > 2
1 <= 1
1 <= 2
2 >= 1
2 >= 2
```

Logic

Order of Operations

```
(1) == (2)
(1 + 1) == 2
(1 + 1) == (2 + 0)
(1 + 1) == (2 + 100)
(1 + 1) <= (2 + 100)
```

nil

» Defined vs. Undefined

» Does this thing exist?

» Does it have a value?

```
puts nil
nil && true
nil || true
false || nil
nil && nil
```

Truthy

» Truthy

`true` is truthy
Any expression with a defined value is truthy

» Falsey

`false` is falsey
`nil` is falsey

Truthy!

» These are all Truthy

```
"hello"
```

```
String
```

```
1
```

```
Time.new
```

Truthy!!

0 is truthy

Which ones are truthy?

```
true
1
3.14 == 3.14
3.14 * 100 == 3.14 * 10**2
0
0 || false
0 && 0
false && 0
!nil
(!false || nil) && 0
```

Part of a Brick Master Rule

```
def owned_by_the_brick_master?
  @owner == BRICK_MASTER
end
```

What do we put in `color=`?

```
class Brick
  attr_accessor :owner
  attr_reader :color

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.owner = owner
    self.color = color
  end
  def color=(new_color)
    # What goes here?
  end
  def owned_by_the_brick_master?
    self.owner == BRICK_MASTER
  end
  def to_s
    "Owner: #{self.owner}\tColor: #{self.color}"
  end
end

my_brick = Brick.new(owner: "Someone")
puts my_brick
puts my_brick.owned_by_the_brick_master?
```

End of Day 2

Homework

- Ruby Core Library
  - http://ruby-doc.org/core-2.4.0/
- What can Strings do?
  - http://ruby-doc.org/core-2.4.0/String.html

Day 3

» Welcome back!

Review

- Variables – Literals, Constants, Instance Variables
- Classes
  - `attr_reader`, `attr_writer`, `attr_accessor`, `to_s`
  - Initializers, Default Values
- Names
- Named Parameters
- Expressions – Logic, `nil`, Truthy, Falsey

Just Bricks

```
class Brick
  attr_accessor :owner
  attr_reader :color

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.owner = owner
    self.color = color
  end
  def color=(new_color)
    @color = new_color
  end
  def owned_by_the_brick_master?
    self.owner == BRICK_MASTER
  end
  def to_s
    "Owner: #{self.owner}\nColor: #{self.color}"
  end
end

someones_brick = Brick.new(owner: "Someone", color: "red")
privileged_brick = Brick.new(owner: "Jack", color: "blue")
forbidden_brick = Brick.new(owner: "Someone", color: "blue")
```

Hoarding Blue Bricks

What do we put in `color=`?

```
## The rest of Brick is the same

def color=(new_color)
  # ???
end

## The rest of Brick is the same
```

Our Goal

Let's state it in english:

- Jack is the Brick Master and he wants to keep all the blue bricks for himself.
  - Anyone can buy bricks as long as they are not blue.
  - Jack can buy blue bricks.
  - If someone other than Jack tries to buy a blue brick, they must be stopped.

Hoarding Blue Bricks

```
def color=(new_color)
```

» If this new color is not blue then I should change the color.

» If the owner is Jack then I should change the color.

» If this new color is blue and the owner is not Jack then we must not change the color.

```
end
```

Happy and Unhappy

```
def color=(new_color)
```

» These are the ways we can stay happy

  » If this new color is not blue then I should change the color.

  » If the owner is Jack then I should change the color.

» This is the way we are not happy

  » If this new color is blue and the owner is not Jack then we must not change the color.

```
end
```

The Happy Path

```
def color=(new_color)
```

1. If this **new color** *is not* **blue** then I should **change the color**.
2. If the **owner** *is* **Jack** then I should **change the color**.

```
end
```

Happy Path #1

Let's break this into smaller pieces

- If this
  - **new color**
  - *is not*
  - **blue**
  - then I should
  - **change the color**

Happy Path #1

Now we'll shed some English

- if
  - **new color**
  - *is not*
  - **blue**
- then
  - **change the color**

Happy Path #1

Now with some more Ruby

```
def color=(new_color)
```

» if

  » `new_color`

  » *is not*

  » **blue**

» then

  » `@color = new_color`

```
end
```

How do we write not blue?

Happy Path #1

Almost all Ruby?

```
def color=(new_color)
» if
   » new_color
   » !=
   » "blue"
» then
   » @color = new_color
end
```

Happy Path #1

Almost all Ruby?

```
def color=(new_color)
  if
    new_color
    !=
    "blue"
  then
    @color = new_color
end
```

Happy Path #1

Almost all Ruby?

```
def color=(new_color)
  if new_color != "blue"
  then
    @color = new_color
end
```

Happy Path #1

```
def color=(new_color)
  if new_color != "blue"
    @color = new_color
  end
end
```

The Happy Path

```
def color=(color)
```

1. If this **new color** *is not* **blue** then I should **change the color**.
2. If the **owner** *is* **Jack** then I should **change the color**.

```
end
```

Happy Path #2

Let's break this into smaller pieces

- If the
  - **owner**
  - *is*
  - **Jack**
  - then I should
  - **change the color**

Happy Path #2

Shed some English

» if

  » **owner**

  » *is*

  » **Jack**

» then

  » **change the color**

» end

Happy Path #2

Add some Ruby

» if

  » **owner**

  » *is*

  » **Brick Master**

» then

  » `@color = new_color`

» end

Happy Path #2

Add more Ruby

» if

  » **owner**

  » *is*

  » `BRICK_MASTER`

» then

  » `@color = new_color`

» end

Happy Path #2

Add more Ruby

```
» if
    » self.owner == BRICK_MASTER
» then
    » @color = new_color
» end
```

Ruby Fun Facts

```
true and true
```

```
true or false
```

Happy Path #2

Add more Ruby

```
if self.owner == BRICK_MASTER
  @color = new_color
end
```

Both Happy Paths

```
def color=(new_color)

  if new_color != "blue"
    @color = new_color
  end

  if self.owner == BRICK_MASTER
    @color = new_color
  end
end
```

The Unhappy Path

» If this new color is blue and the owner is not Jack then we must not change the color.

The Unhappy Path

```
if new_color == "blue" && self.owner != BRICK_MASTER
```

» We must not change the color.

```
end
```

The Unhappy Path

```
if new_color == "blue" && self.owner != BRICK_MASTER
  fail "We must not change the color."
end
```

It Works!

We're not quite done

```
def color=(new_color)

  if new_color != "blue"
    @color = new_color
  end

  if self.owner == BRICK_MASTER
    @color = new_color
  end

  if new_color == "blue" && self.owner != BRICK_MASTER
    fail "We must not change the color."
  end
end
```

What about `owned_by_the_brick_master?`

```
def color=(new_color)

  if new_color != "blue"
    @color = new_color
  end

  if owned_by_the_brick_master?
    @color = new_color
  end

  if new_color == "blue" && !owned_by_the_brick_master?
    fail "We must not change the color."
  end

end
```

Simpler?

```
def color=(new_color)

  if (new_color != "blue") || owned_by_the_brick_master?
    @color = new_color
  end

  if new_color == "blue" && !owned_by_the_brick_master?
    fail "We must not change the color."
  end

end
```

Pertinent Negatives

```
def color=(new_color)

  if (new_color != "blue") || owned_by_the_brick_master?
    @color = new_color
  end

  if new_color == "blue" && !owned_by_the_brick_master?
    fail "We must not change the color."
  end

end
```

Clearer message

```
def color=(new_color)

  if new_color == "blue" && !owned_by_the_brick_master?
    fail "Blue bricks are reserved for #{BRICK_MASTER}."
  end

  if (new_color != "blue") || owned_by_the_brick_master?
    @color = new_color
  end

end
```

else

```
def color=(new_color)

  if new_color == "blue" && !owned_by_the_brick_master?
    fail "Blue bricks are reserved for #{BRICK_MASTER}."
  else
    @color = new_color
  end

end
```

Hoarded Bricks

```
class Brick
  attr_accessor :owner
  attr_reader :color

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.owner = owner
    self.color = color
  end

  def color=(new_color)
    if new_color == "blue" && !owned_by_the_brick_master?
      fail "Blue bricks are reserved for #{BRICK_MASTER}."
    else
      @color = new_color
    end
  end

  def owned_by_the_brick_master?
    self.owner == BRICK_MASTER
  end

  def to_s
    "Owner: #{self.owner}\nColor: #{self.color}"
  end
end

someones_brick = Brick.new(owner: "Someone", color: "red")
privileged_brick = Brick.new(owner: "Jack", color: "blue")
forbidden_brick = Brick.new(owner: "Someone", color: "blue")
```

End of Day 3

Day 4

» Welcome back!

Review

- Conditionals
  - Happy/Unhappy Paths, Pertinent Negatives
  - `if` (then)
  - `else`
- Rejecting bad things
  - `fail`
- Translating English into Ruby
- Debugging

Our Goal

What is the problem we're solving?

- We work for the Brick Store
- They sell Bricks
- We are building a new website for them where
  - We manage the inventory of Bricks
  - Customers can buy Bricks
- Jack is our boss and he's keeping the blue bricks for himself

repl.it

```
class Brick
  attr_accessor :owner
  attr_reader :color

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.owner = owner
    self.color = color
  end

  def color=(new_color)
    if new_color == "blue" && !owned_by_the_brick_master?
      fail "Blue bricks are reserved for #{BRICK_MASTER}."
    else
      @color = new_color
    end
  end

  def owned_by_the_brick_master?
    self.owner == BRICK_MASTER
  end

  def to_s
    "Owner: #{self.owner}\nColor: #{self.color}"
  end
end
```

`BrickStore`?

Leave our `class Brick ..... end` code unchanged from now on.

```
class BrickStore
end
```

```
brick_store = BrickStore.new(name: "Ruby's Bricks")
```

BrickStore

```
class BrickStore
  attr_accessor :name
  def initialize(name:)
    self.name = name
  end
end

brick_store = BrickStore.new(name: "Ruby's Bricks")
```

What does a Brick Store need?

» Bricks?

» Strict controls on what brick colors are acceptable to society as a whole?

» Authoritarian enforcement of the brick supply chain as it manifests in each and every franchised store?

approved_brick_colors

In the REPL on the right side:

```
colors = [ "red", "green", "blue", "yellow", "gray" ]
colors.class
```

Arrays

```
colors.any?

colors.empty?

colors.size

colors.first

colors.last

colors.sort

colors.reverse

colors.shuffle
```

```
colors.sample
colors.include?("blue")
colors.index("yellow")
colors.at(0)
colors.at(2)
colors[3]
colors[99]
colors[1..4]
colors.sort.reverse[-2]
```

```
colors.push("brown")
colors << "magenta"
colors << 12345
colors << Time.now
colors << nil
colors.compact
colors.compact!
colors.delete("brown")
colors.delete_at(2)
colors.delete_at(-1)
colors.join("\n")
colors.join(" --- ")
```

BrickStore

```
class BrickStore
  attr_accessor :name
  def initialize(name:)
    self.name = name
  end

  def approved_brick_colors
    [ "red", "green", "blue", "yellow", "gray" ]
  end
end

brick_store = BrickStore.new(name: "Ruby's Bricks")
brick_store.approved_brick_colors
```

Symbols

```
class BrickStore
  attr_accessor :name
  def initialize(name:)
    self.name = name
  end

  def approved_brick_colors
    [ :red, :green, :blue, :yellow, :gray ]
  end
end

brick_store = BrickStore.new(name: "Ruby's Bricks")
brick_store.approved_brick_colors
```

Inventory

```
class BrickStore
  attr_accessor :name
  attr_reader :inventory
  def initialize(name:)
    self.name = name
    @inventory = []
  end

  def approved_brick_colors
    [ "red", "green", "blue", "yellow", "gray" ]
  end
end

brick_store = BrickStore.new(name: "Ruby's Bricks")
brick_store.approved_brick_colors
brick_store.inventory
```

Our Goal

What is the next part of the problem we can solve?

- We work for the Brick Store
- They sell Bricks
- We are building a new website for them where
  - Customers can buy Bricks
  - We can manage the inventory of Bricks
- Jack is our boss and he's keeping the blue bricks for himself

What does Inventory mean?

How do normal stores handle inventory?

A Shipment of `Bricks`

- Jack, as our boss, is in charge of receiving all shipments of bricks. When the shipment arrives, he effectively takes ownership of all the bricks until they are sold.
- Each shipment we receive has a total of 10 Bricks that are from a random assortment of acceptable colors.

```ruby
class Brick
  attr_accessor :owner
  attr_reader :color

  BRICK_MASTER = "Jack"

  def initialize(color: "gold", owner:)
    self.owner = owner
    self.color = color
  end

  def color=(new_color)
    if new_color == "blue" && !owned_by_the_brick_master?
      fail "Blue bricks are reserved for #{BRICK_MASTER}."
    else
      @color = new_color
    end
  end

  def owned_by_the_brick_master?
    self.owner == BRICK_MASTER
  end

  def to_s
    "Owner: #{self.owner}\nColor: #{self.color}"
  end
end

# my_brick = Brick.new(color: "red", owner: "Daddy")

class BrickStore
  attr_accessor :name
  attr_reader :inventory
  def initialize(name:)
    self.name = name
    @inventory = []
  end

  def approved_brick_colors
    [ "red", "green", "blue", "yellow", "gray" ]
  end

  def receive_new_shipment!
    10.times do
      @inventory << one_new_brick
    end
  end

  def one_new_brick
    Brick.new(owner: "Jack", color: approved_brick_colors.sample)
  end

end

brick_store = BrickStore.new(name: "Ruby's Bricks")
brick_store.approved_brick_colors
brick_store.receive_new_shipment!
brick_store.receive_new_shipment!
puts brick_store.inventory.join("\n")
```