

# Ruby Internals

Rails Girls TO, July 27 2016

Hi 

I'm Julie Haché

I've written some code and taught a bunch too

I work at Shopify

I like helping people get better at things

You can find me on the internets as @juliehache

# Ruby Internals, part I

From text to execution

# How does

3.times do

  puts "Chunky Bacon!"

end

become?

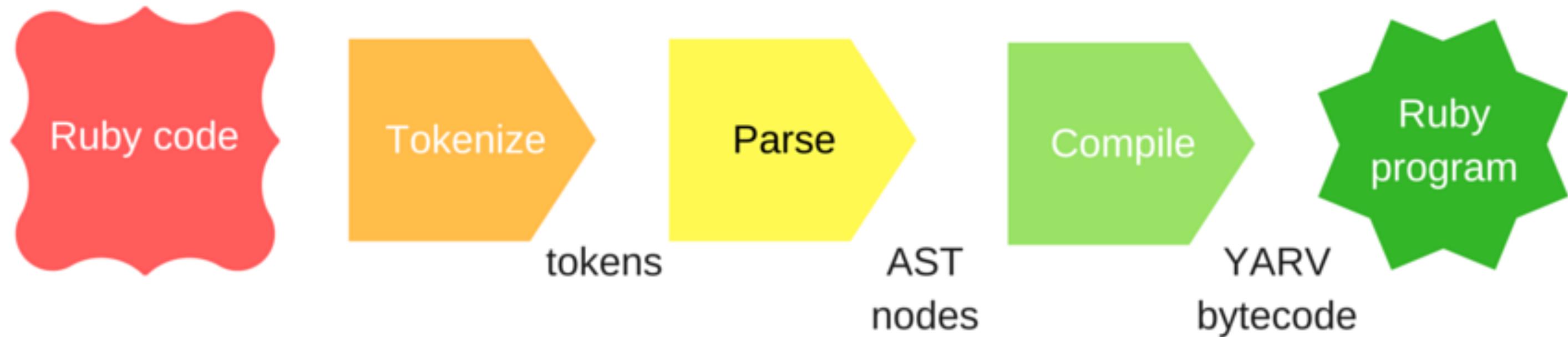
Chunky bacon!

Chunky bacon!

Chunky bacon!

Obviously: Tokenization, Parsing,  
Compile to Bytecode, Execution





# Tokenization

Transform text to meaningful tokens

from

**3.times do**

to

**`tINTEGER 3` `.` `tIDENTIFIER times` `keyword\_do`**

let's try ripper

# Parsing

Transform tokens to AST

from tokenized

```
`tINTEGER 3` `.` `tIDENTIFIER times` `keyword_do`
```

to parsed

```
|program|
  \
  |method_add_block|
    \
    |call|
      /
      \
|integer 3| |ident times|
```

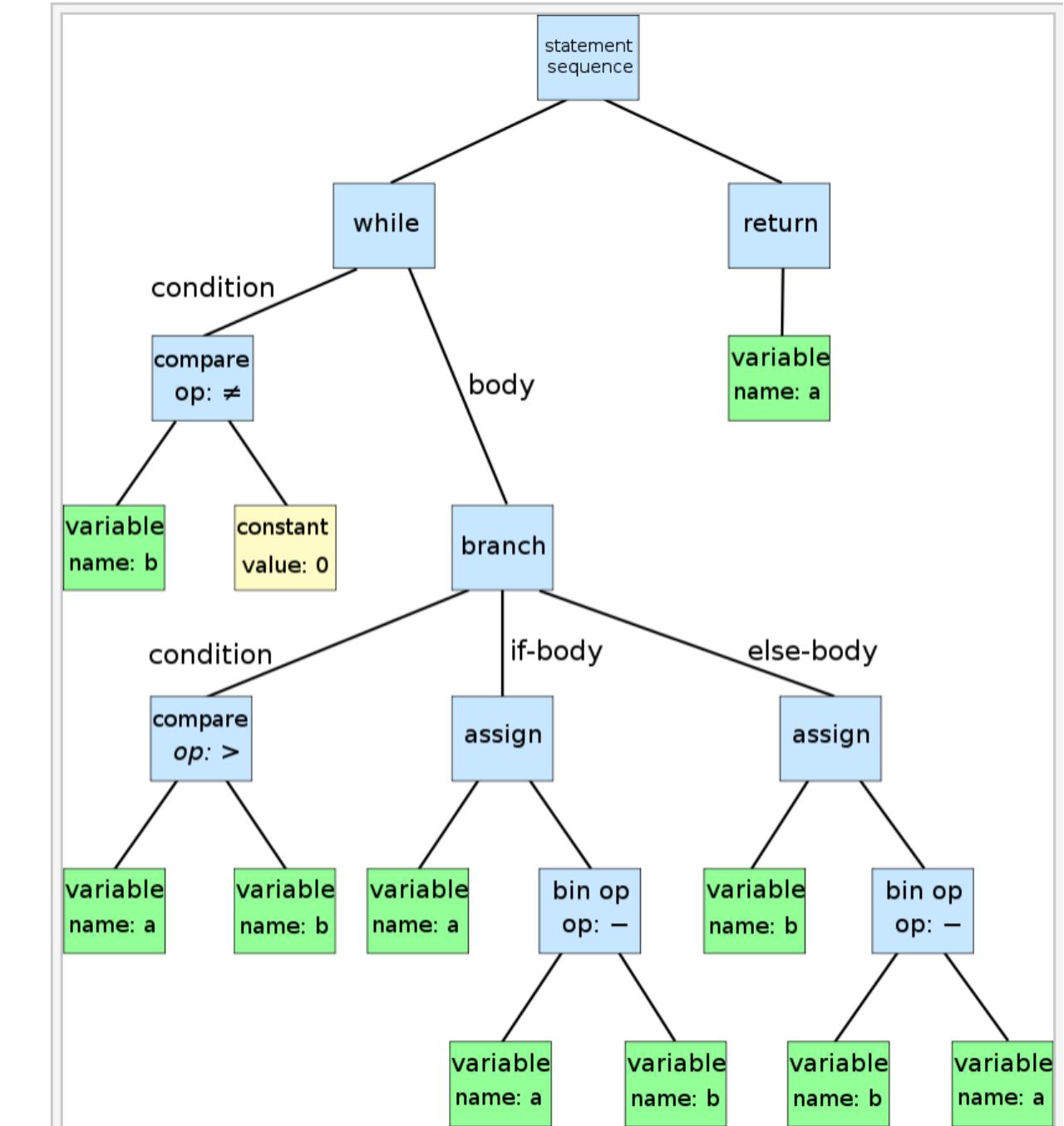
Bison and LALR (Look Ahead Left-to-Right rightmost derivation)

A close-up photograph of a very young, fluffy white kitten. The kitten has large, dark, expressive eyes and long, thin whiskers. It is looking directly at the camera with a curious expression. The background is slightly blurred, showing what appears to be a keyboard with some red and blue keys, suggesting a computer or laptop environment.

begin sidebar

# AST

Result of the syntax analysis phase of a compiler



An abstract syntax tree for the following code for the Euclidean algorithm:

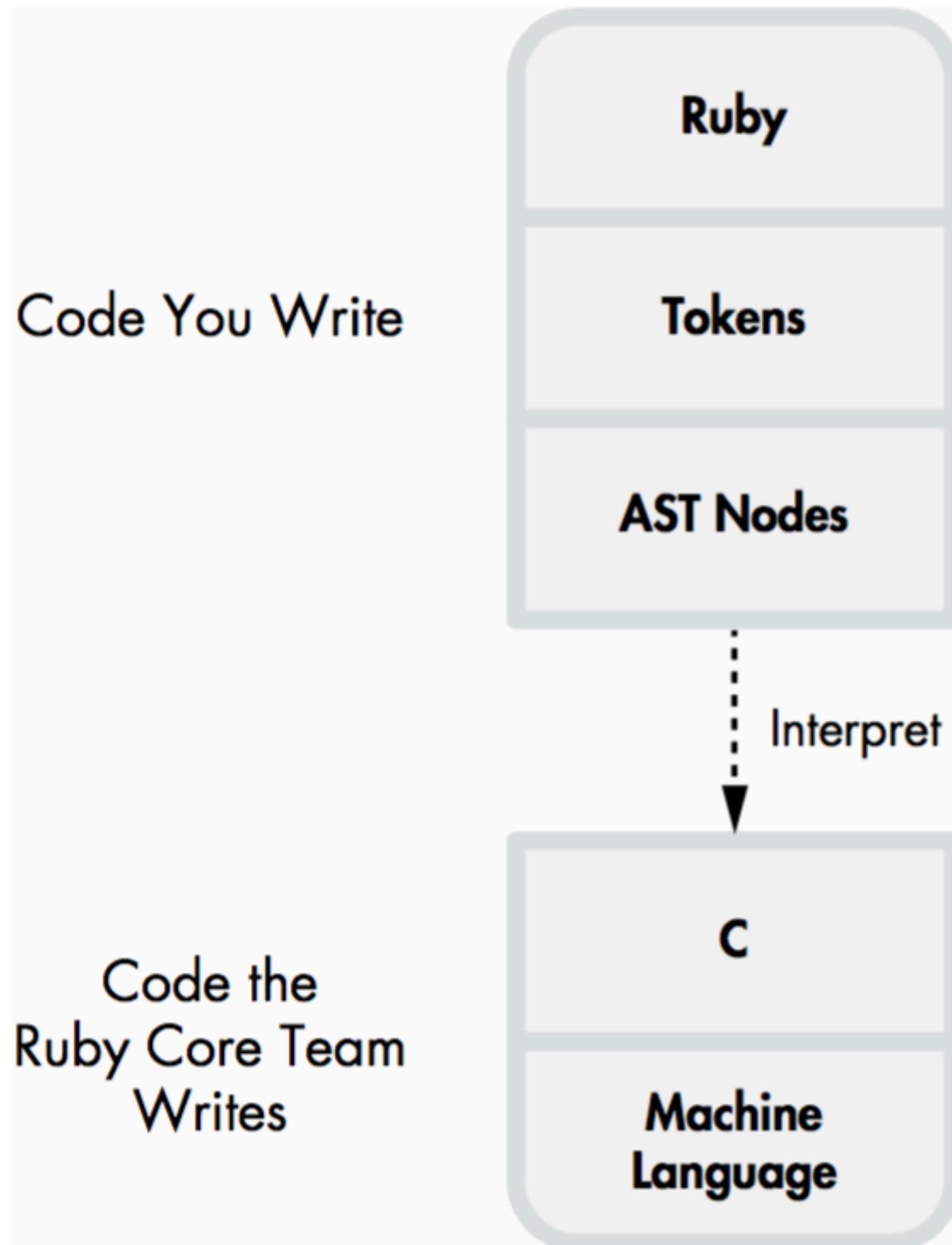
```
while b ≠ 0
    if a > b
        a := a - b
    else
        b := b - a
return a
```

A close-up photograph of a very young, fluffy white kitten. The kitten is sitting on a dark-colored keyboard, its front paws resting on the keys. It has large, dark, expressive eyes and long, thin whiskers. The background is slightly blurred, showing more of the keyboard and some warm lighting.

end sidebar

let's try Ripper again  
and

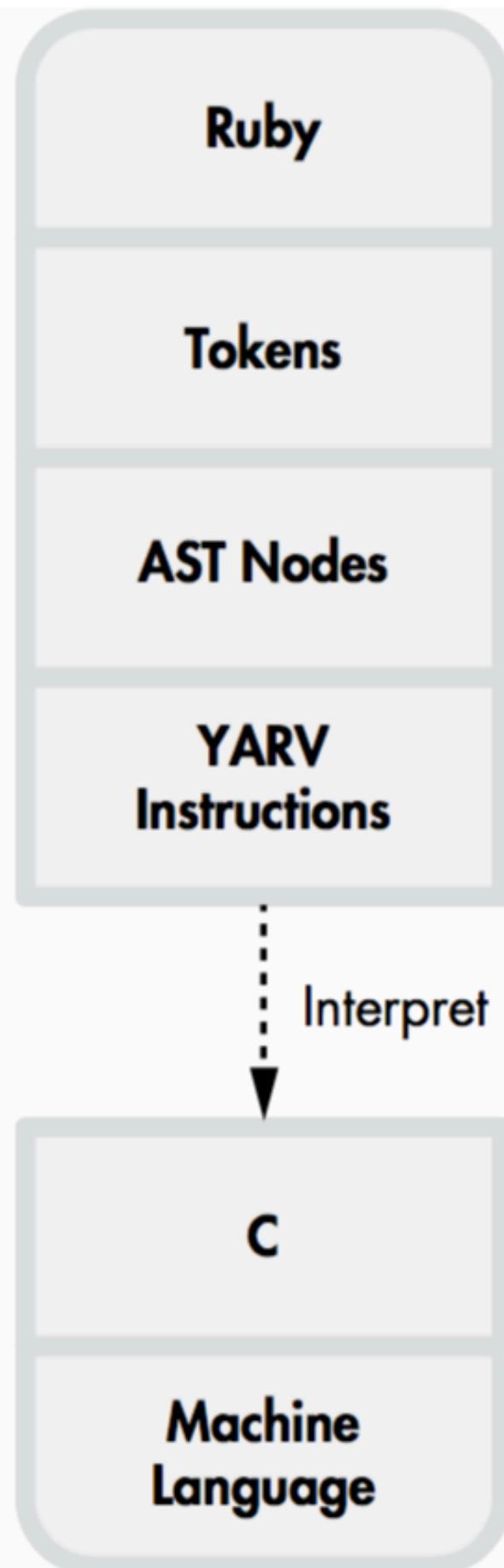
```
ruby --dump parsetree chunky_bacon.rb
```



Once upon a time,  
before Ruby 1.9

hey, that almost rhymes

Code You Write



# Compilation to YARV

Introduced in Ruby 1.9+ and still used today

Code the  
Ruby Core Team  
Writes

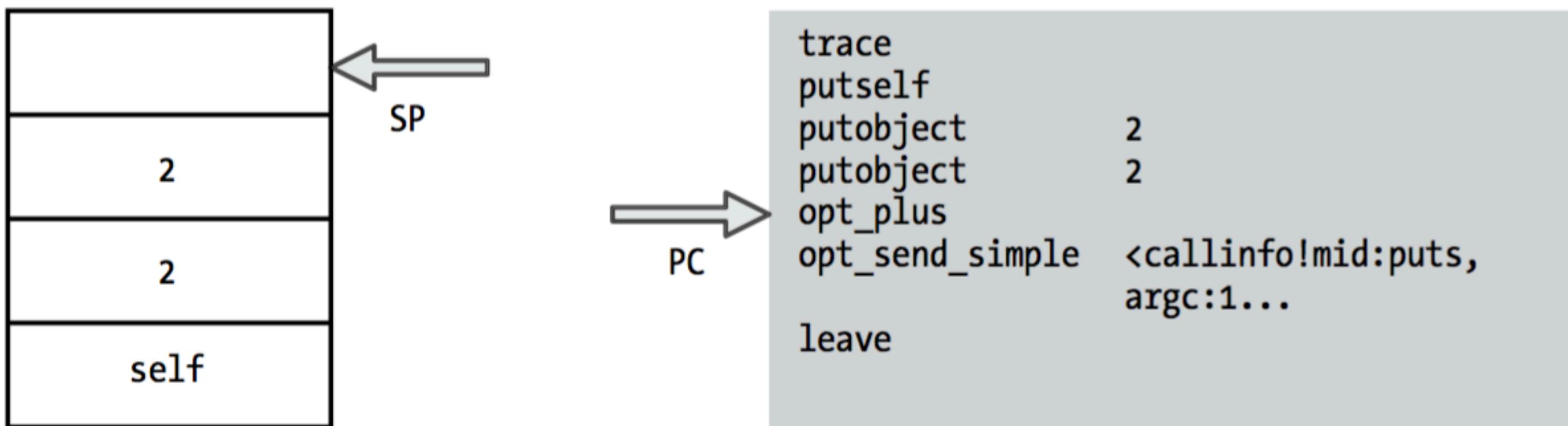
YARRRV 🏴‍☠️

# Wait, WHY?

more steps somehow faster?! 😠

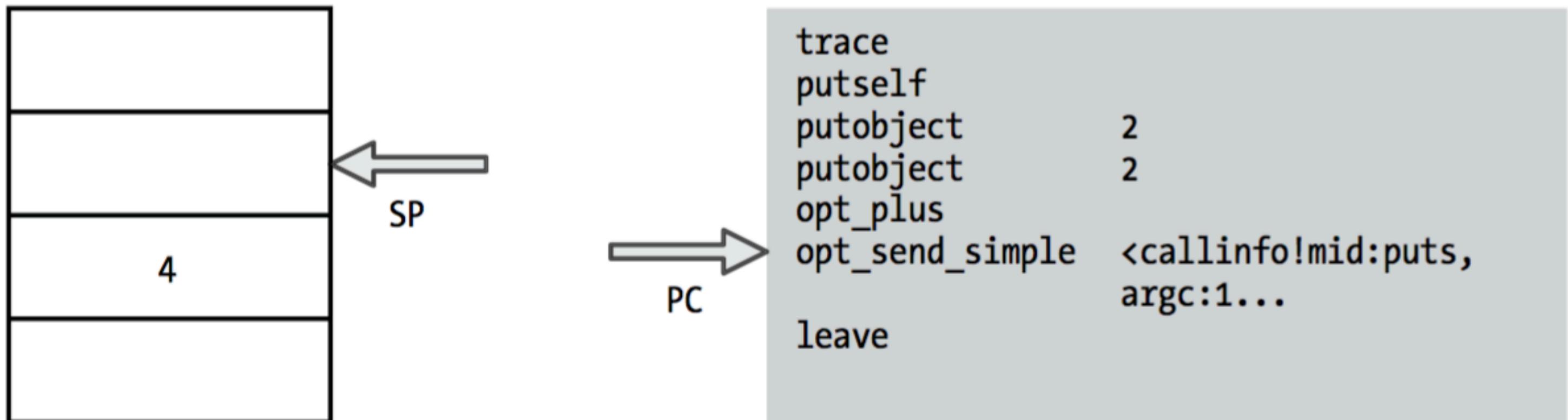
# Execution

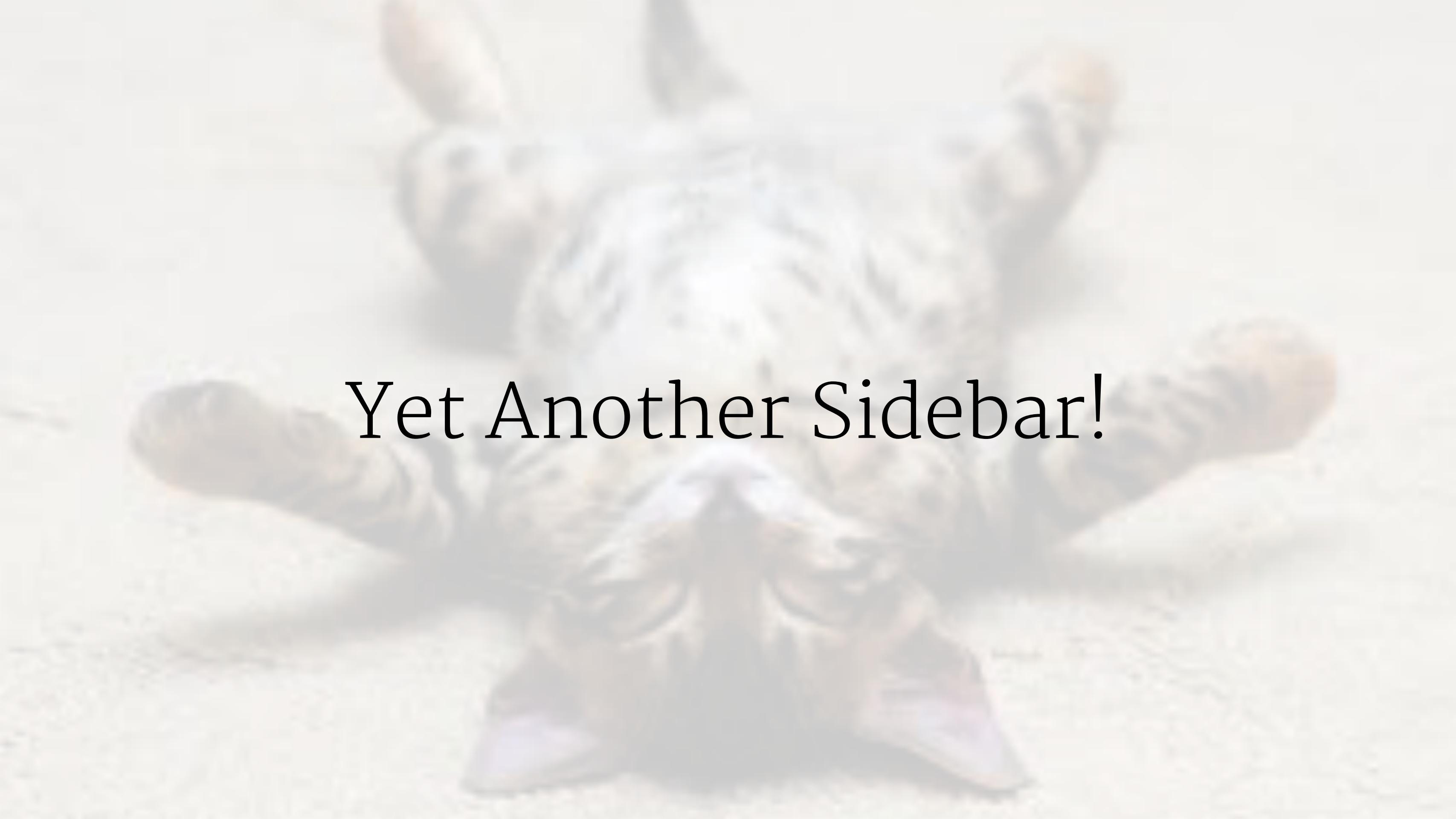
YARV Compiled, now YARV executes!



# Execution

YARV Compiled, now YARV executes!

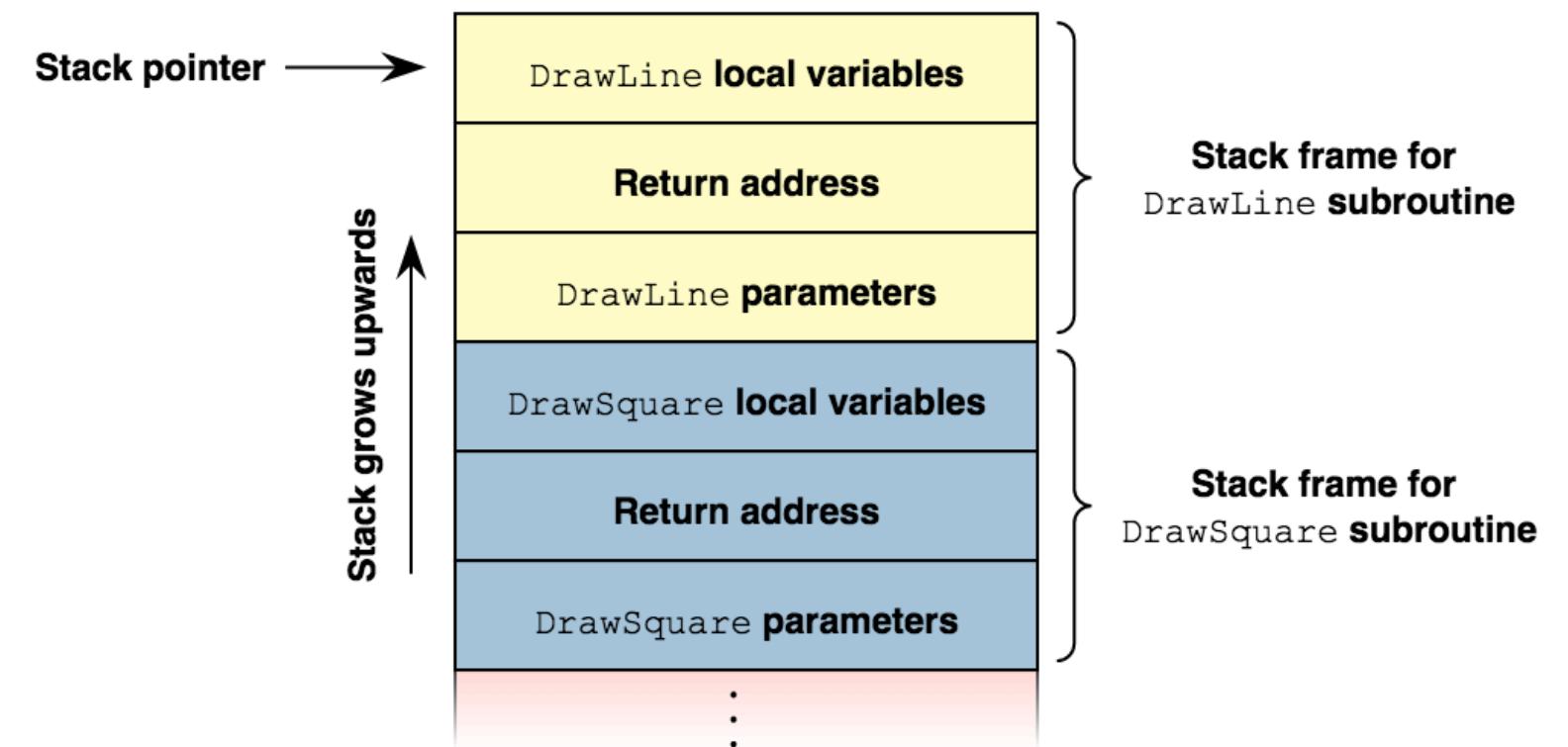


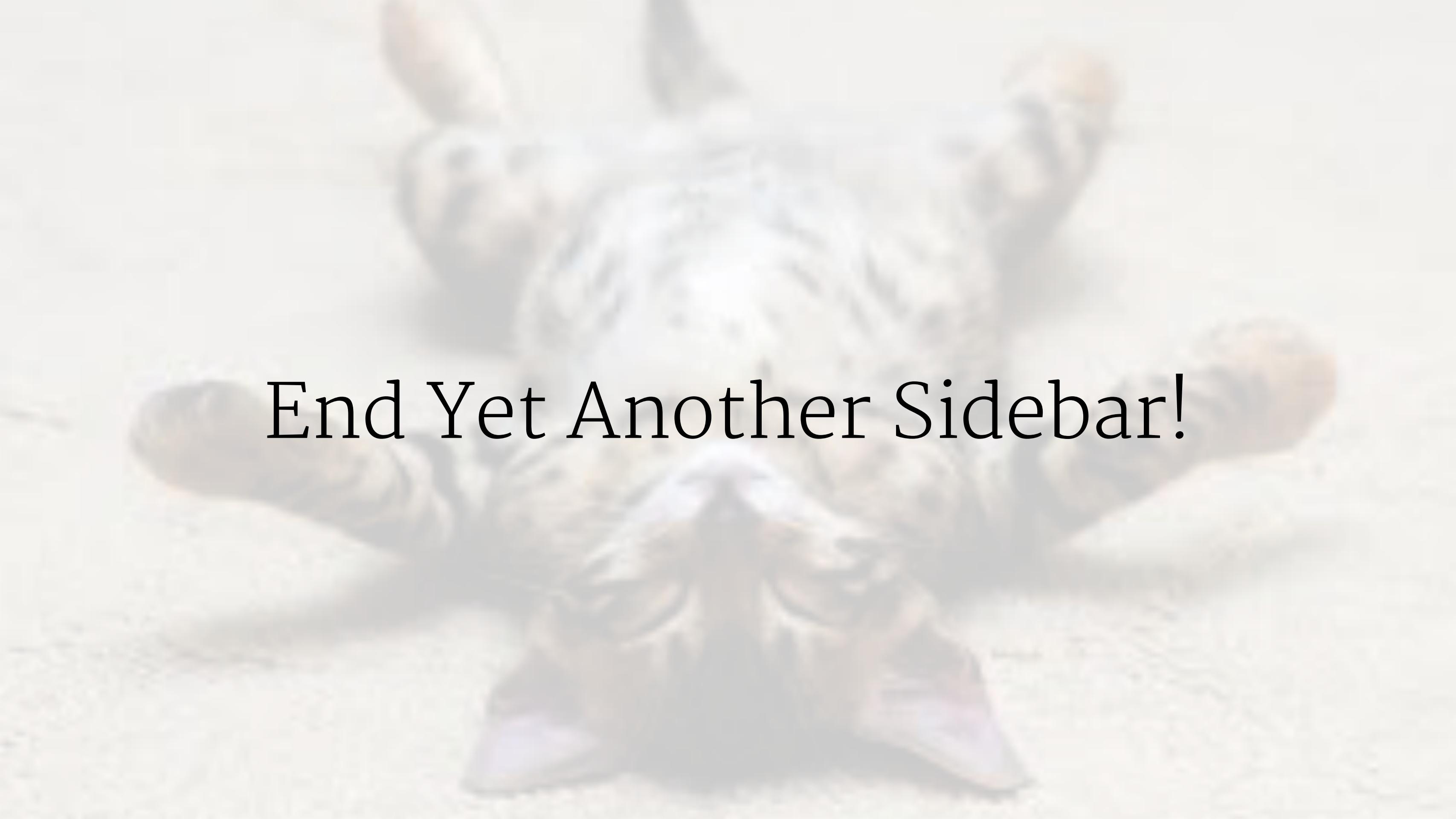


Yet Another Sidebar!

# Stacks

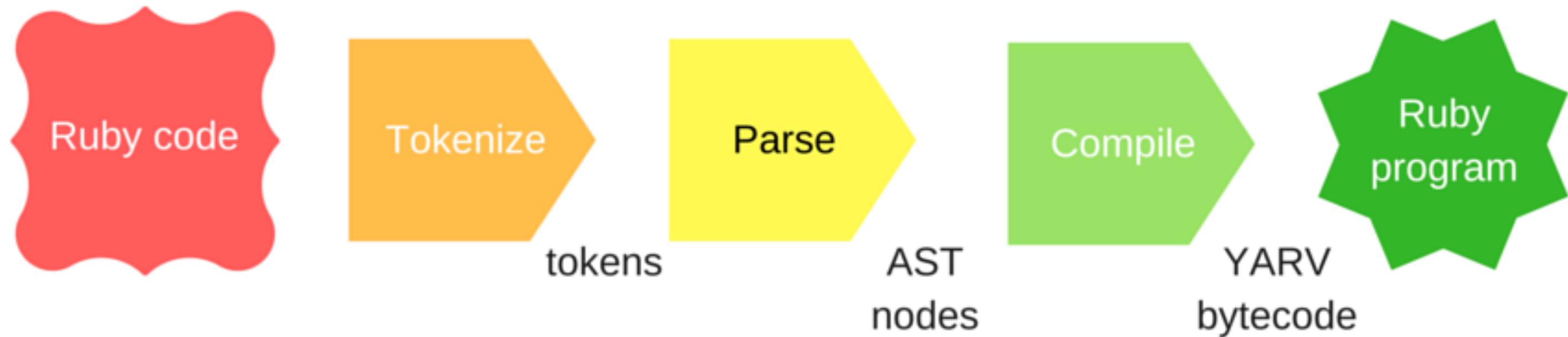
Local data storage  
Parameter passing  
Evaluation stack  
Pointer to current instance





End Yet Another Sidebar!

We're done! 



Instead of 😱  
Do we have 😊?

# Things we didn't cover that are also really, really cool

Control structures

Objects and modules

Method lookup

Metaprogramming

Garbage collection

Alternative Rubies and their approaches

♥ Thanks to: ♥

Pat Shaughnessy for "Ruby Under a Microscope"

Ruby Hacking Guide

Matz and the Ruby core team

Rails Girls and Shopify for hosting

To all of you for attending!