While we wait to get started

1 - Find someone to work with

2 - Clone from Github:

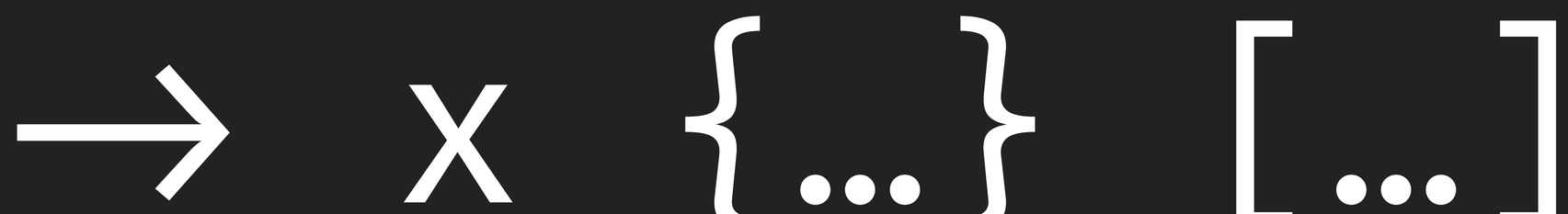
https://github.com/bricef/Using-and-Abusing-Ruby

Then run

```
bundle install --path vendor/bundle
```

BRICE FERNANDES @FRACTALLAMBDA

USING AND ABUSING RUBY FOR COMPUTER SCIENCE GREAT GOOD



Proc

All The Things!

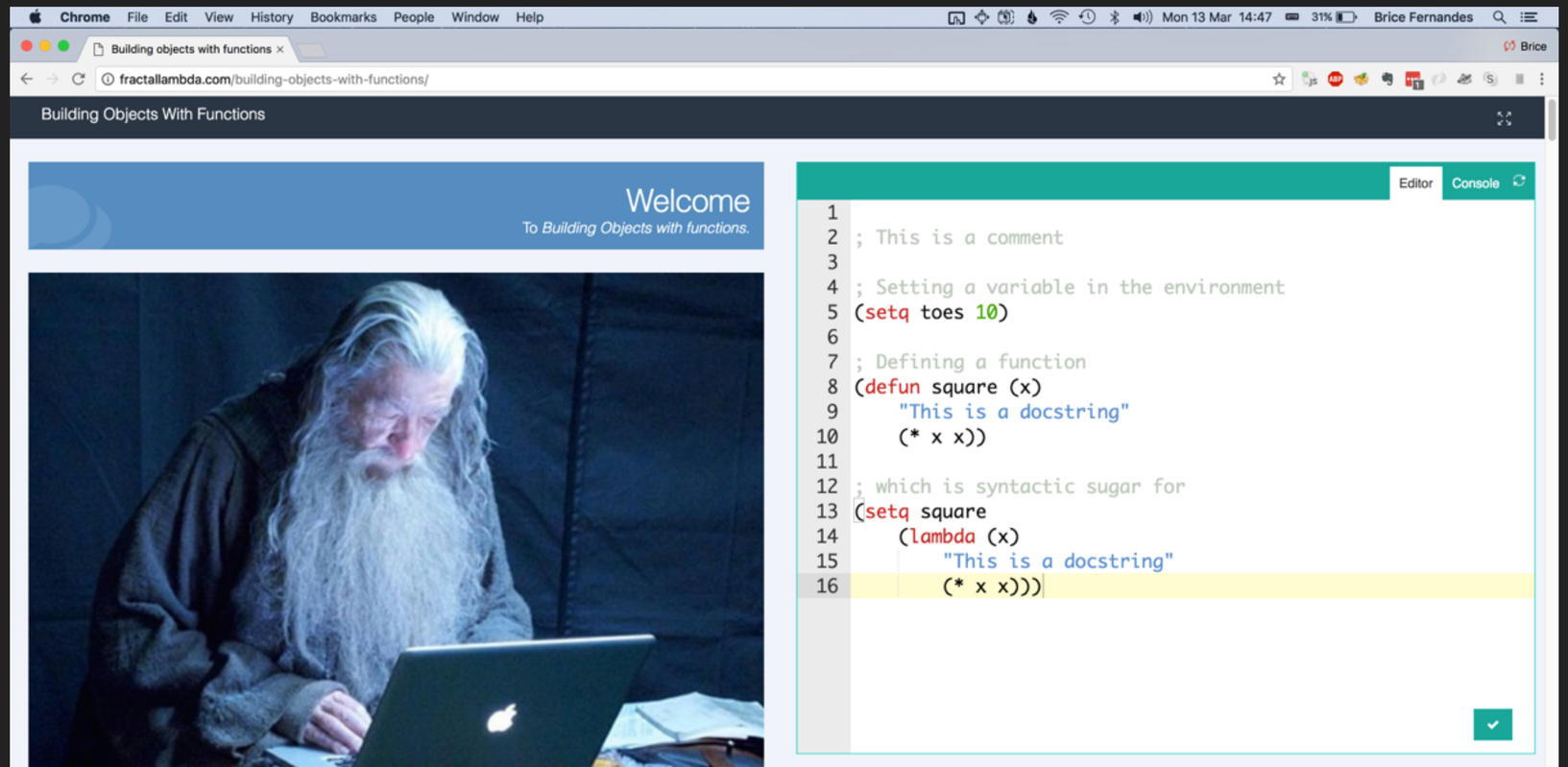
KEEP
CALM
IT'S
DEMO
TIME

Procs & Currying

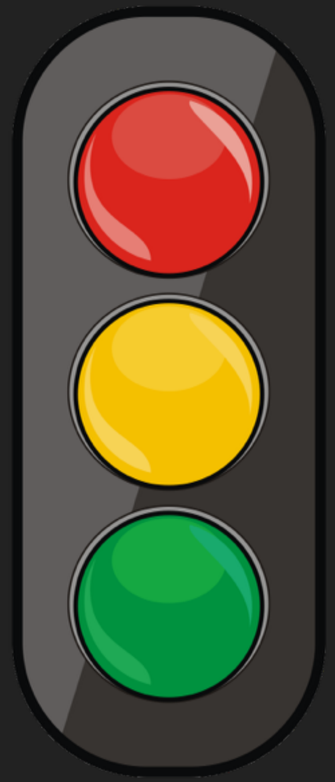
if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

We can build an object oriented language with these features!

http://fractallambda.com/building-objects-with-functions/



Clone



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Then run

```
bundle install --path vendor/bundle
```

1 Truth & Logic

Proc TRUE, when given A and B returns A

Proc FALSE, when given A and B returns B

```
TRUE  = → a { → b {…}}
FALSE = → a { → b {…}}
TRUE[1][2] #→ 1
FALSE[1][2] #→ 2
```

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True
&
False

if	Bool	and
list	equal	not
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1 Truth & Logic

Proc TRUE, when given A and B returns A

Proc FALSE, when given A and B returns B

Proc AND, when given A and B ...

Proc OR, when given A and B ...

Proc NOT, when given A ...

Proc IF, when given C returns A if C else B

1 Truth & Logic

```
AND = → a { → b {…}}
OR = → a { → b {…}}
NOT = → a {…}
IF = → condition {
        → consequence {
            → alternative {…}}}
```

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IT'S
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TIME

If, And, Or & Not

if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

2 Data Structures

Proc PAIR, LEFT and RIGHT

Proc PAIR takes two things and returns a pair

Proc LEFT takes a pair and returns the first item

Proc RIGHT takes a pair and ...

Hint: PAIR must return a Proc, and the Proc must *remember both* items somehow

2 Data Structures

```
PAIR = → a { → b {…}}

LEFT = → pair {…}

RIGHT = → pair {…}


my_pair = PAIR[1][2]

LEFT[my_pair] #→ 1

RIGHT[my_pair] #→ 2
```

KEEP
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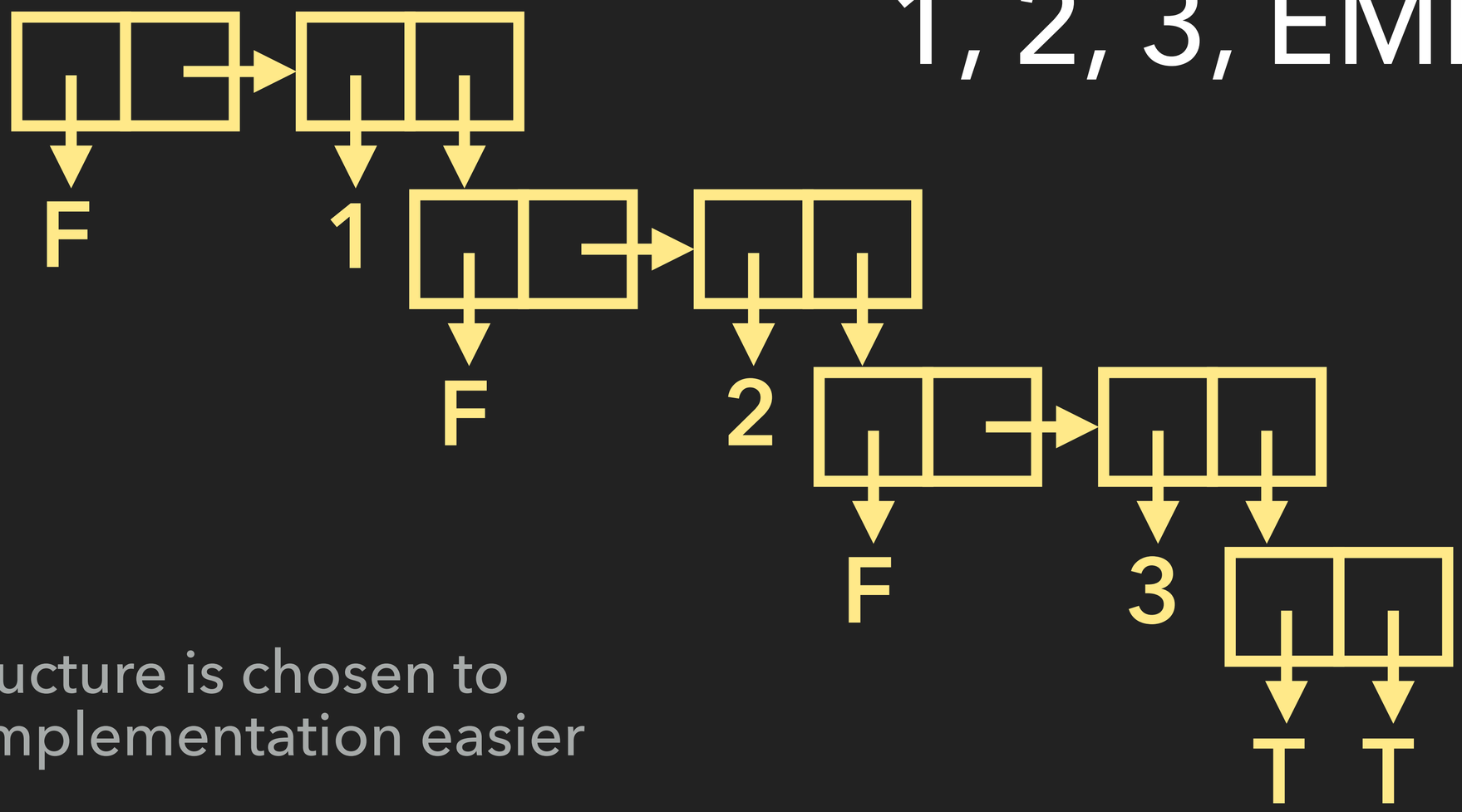
TIME

Pair, Left
& Right

if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

2 Data Structures - List example

1, 2, 3, EMPTY



This structure is chosen to
make implementation easier

2 Data Structures - List example

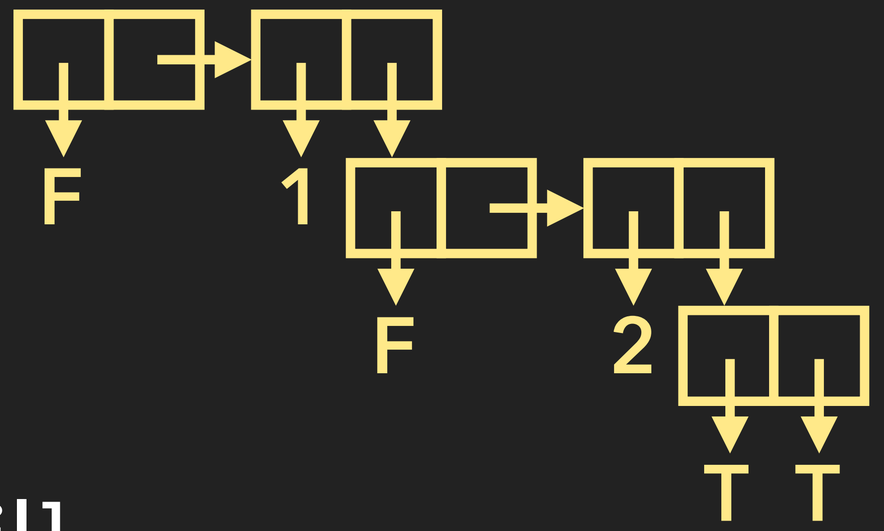
EMPTY is PAIR[TRUE][TRUE]

Lists nodes are nested PAIRS,

with the LEFT as FALSE

and the RIGHT as PAIR[head][tail]

CONS adds an item to the beginning of a list



Define the CONS, HEAD, TAIL and IS_EMPTY Procs

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List, Empty?, Head & Tail

if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

3 Numbers

A number is a Proc, that when passed in a Proc and a value, applies the Proc n time to the value

```
ZERO(f,x) = x
ONE(f,x) = f(x)
TWO(f,x) = f(f(x))
```

3 Numbers

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```
ZERO(f,x) = x
ONE(f,x) = f(x)
TWO(f,x) = f(f(x))
```

```
→ f {
    → x {
        ...
    }
}
```

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CALM
IT'S
DEMO
TIME

Church Numerals

if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

3 Math

ADDONE is a Proc which will add one

ADD is a proc that will add two numbers

MINUSONE will return a subtract one

MINUS is a Proc that will subtract two numbers

MULT is a Proc that will multiply two numbers

EXP is a Proc that will raise a number to a power

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TIME

Math operators

if	Bool	and
list	equal	not
first	pair	math
rest	or	Ints

4 Equal?

IS_ZERO is a Proc that returns TRUE if given ZERO

LEQ is a PROC that returns TRUE if A ≤ B

EQ is a PROC that returns TRUE if A = B

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Equal?

if	Bool	and
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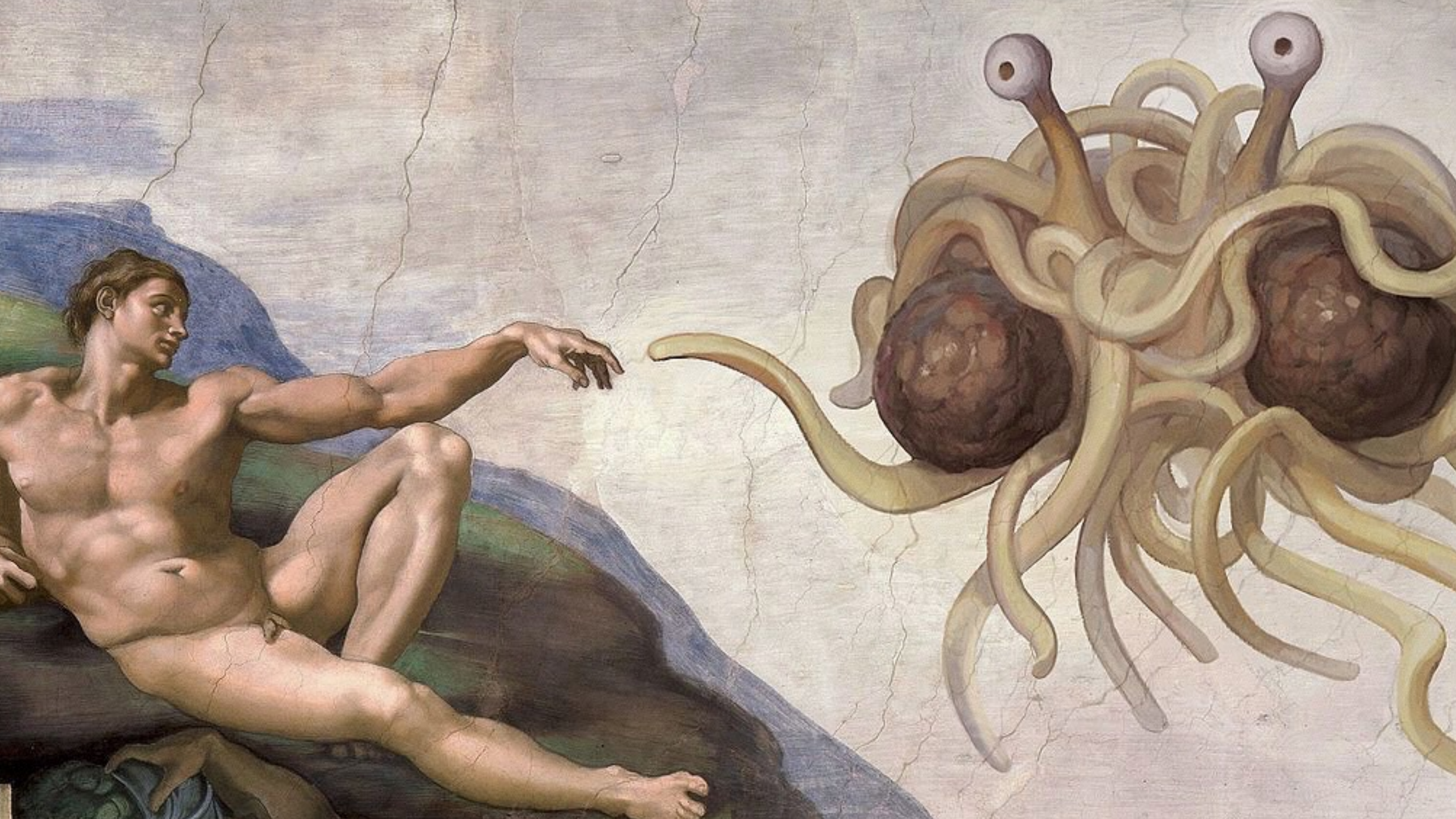


IO?

Loops/Recursion?

Strings?

So wat?

List operations?
(reduce)

Dude, Where's
my float?

IO?

Loops/Recursion?

Z?

Y?

Strings?

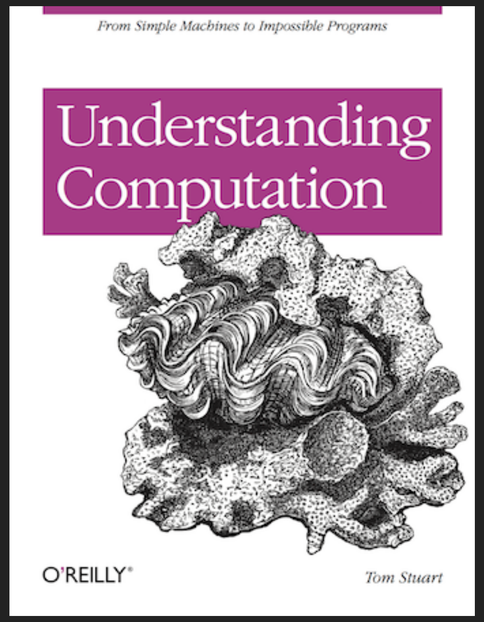
So wat?

List operations?

(reduce)

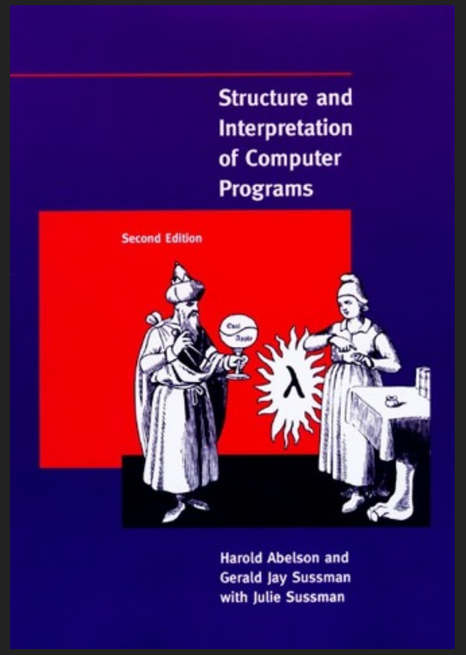
Dude, Where's

my float?



Understanding Computation

(Tom Stuart)



SICP

(Abelson & Sussmans)

On Lisp

(Paul Graham)

http://tinyurl.com/programming-with-nothing
http://codon.com/programming-with-nothing
http://tinyurl.com/objects-with-functions
http://fractallambda.com/building-objects-with-functions/

THANK YOU!

BRICE FERNANDES

@FRACTALLAMBDA

BRICE@FRACTALLAMBDA.COM

(I SUCK AT ✉️🔁 - KEEP TRYING)