Why I  Rust

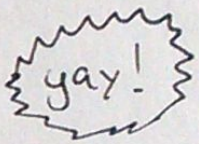
Julia Evans

@b0rk

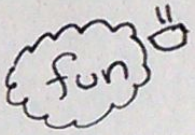
jvns.ca blog (contains many Rust stories)

a story about...

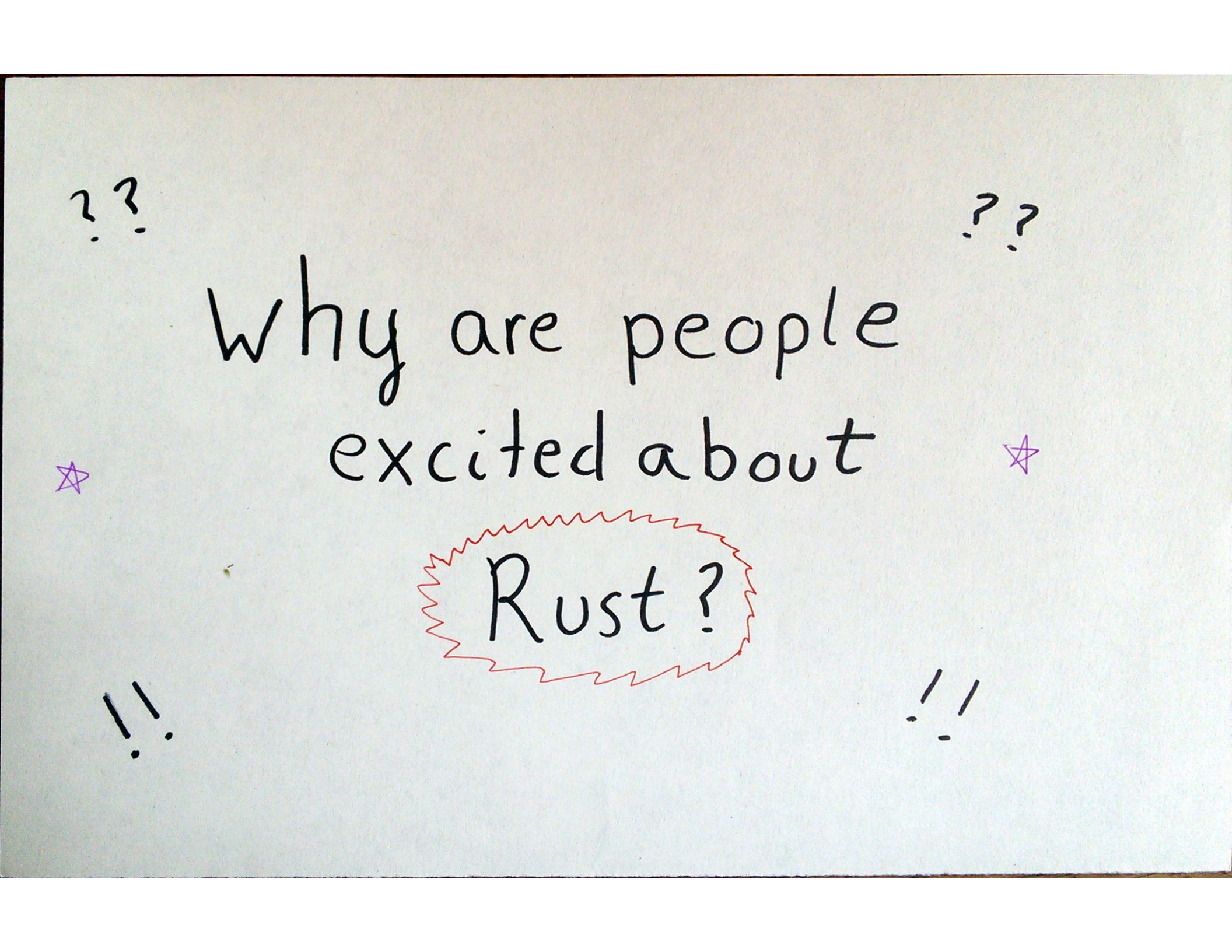
- writing operating systems



- ~~concurrency~~

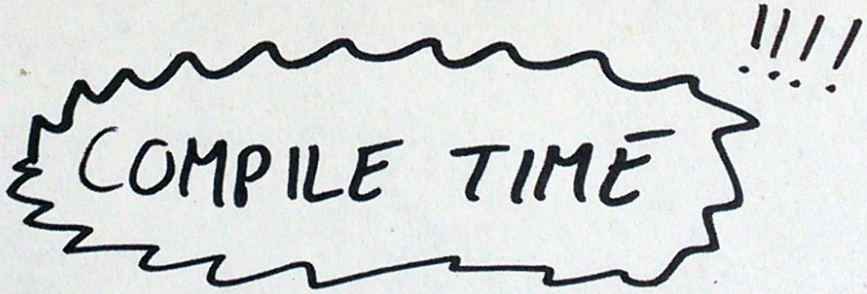


- how Rust taught me systems programming !!
- and levelling up my skills after 10 years


??
??
Why are people excited about
Rust?
!!
!!

What's exciting about Rust ☺

- safe memory management without garbage collection
- stops you from writing race conditions

... all at 

What's exciting about Rust ☆

it lets you trade

THINKING VERY CAREFULLY ABOUT CONCURRENCY

+

MEMORY LEAKS

(hard)

for

(still hard)

☆ what's exciting about Rust ☆

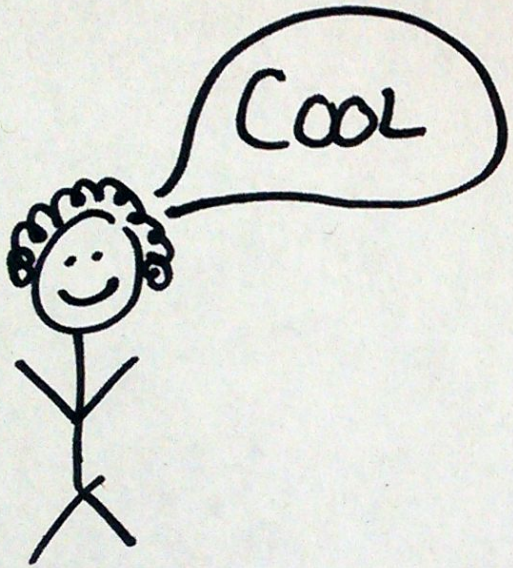
when you write unsafe code

it's like...

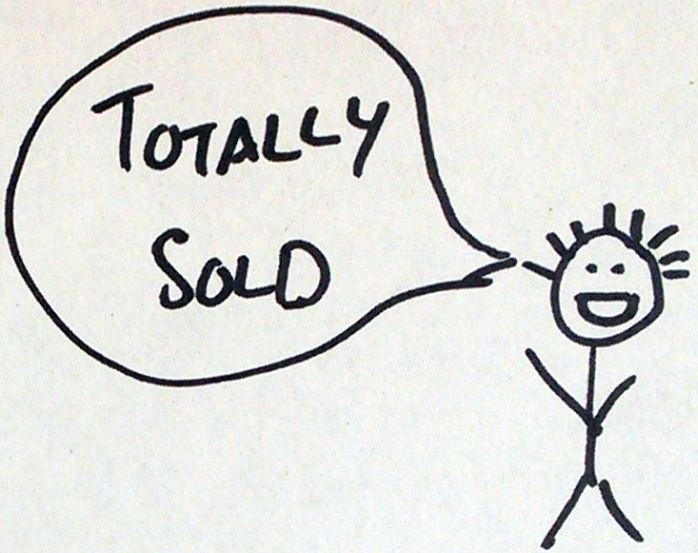
unsafe {

TRUST ME
IT'S OK I
PROMISE

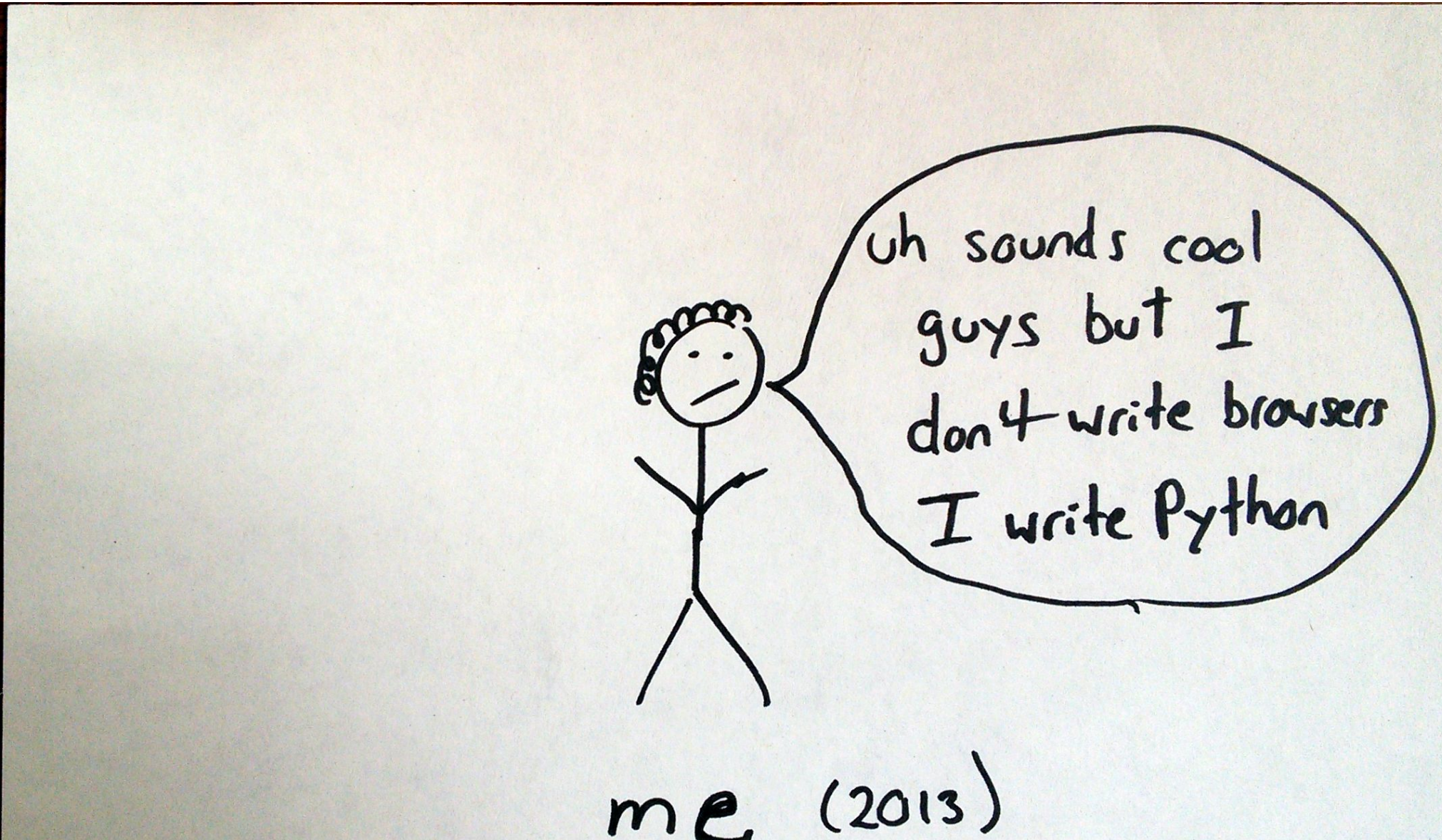
}



C++
programmer



embedded
programmer

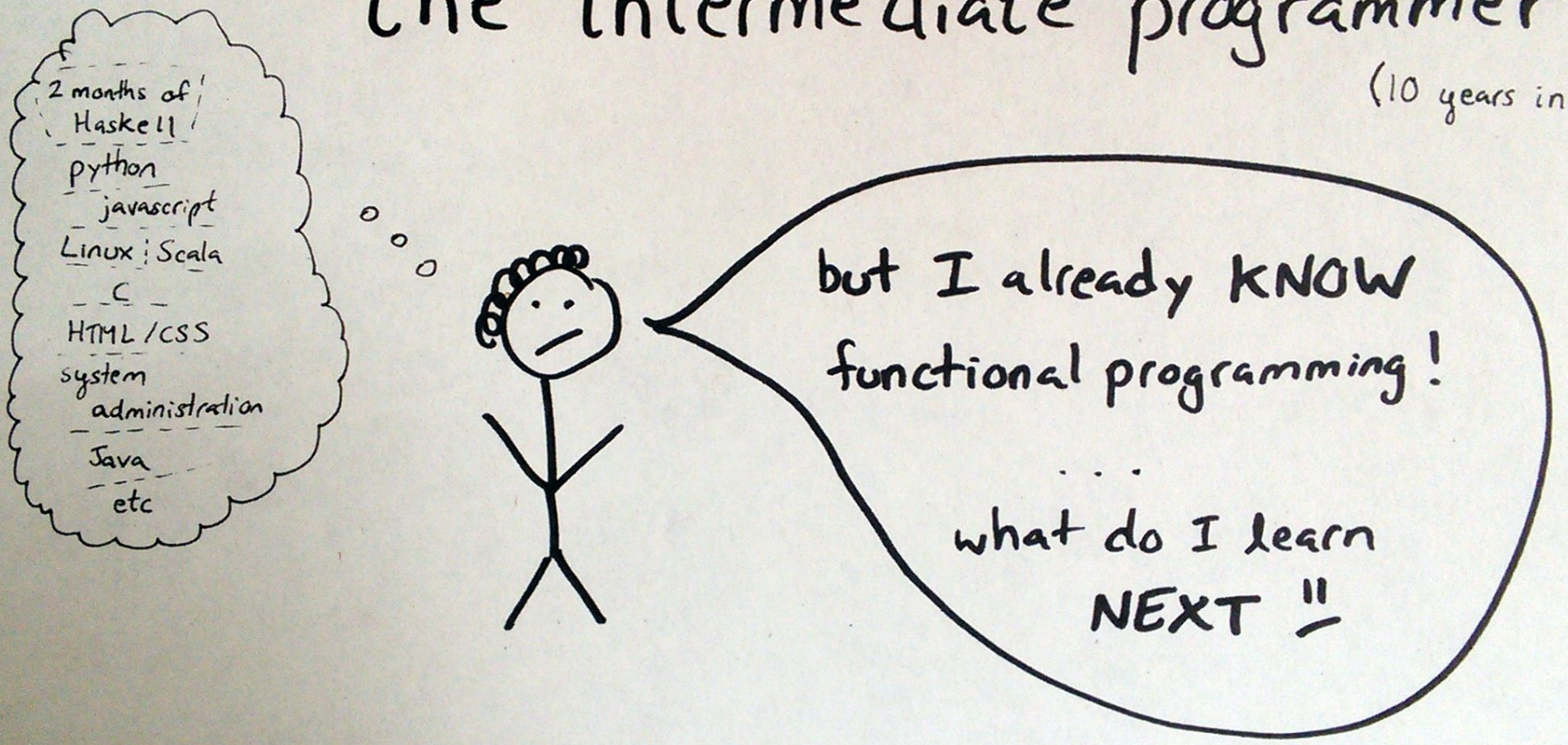

uh sounds cool guys but I don't write browsers I write Python
me (2013)

but this talk is called

Why I  Rust

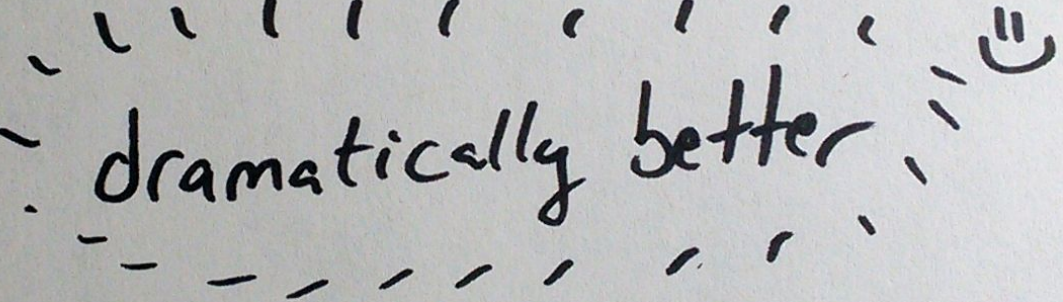
the intermediate programmer

(10 years in)



so in Fall 2013 I went to

spend 12 weeks becoming a

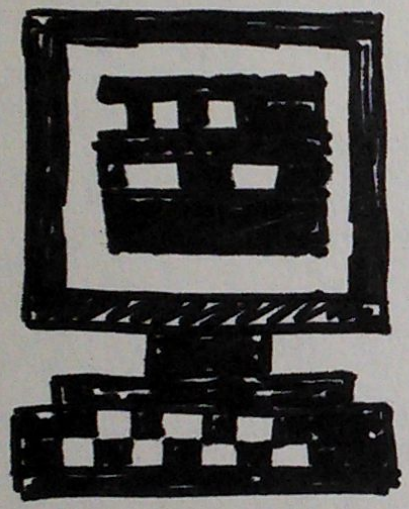


programmer

(it worked!)

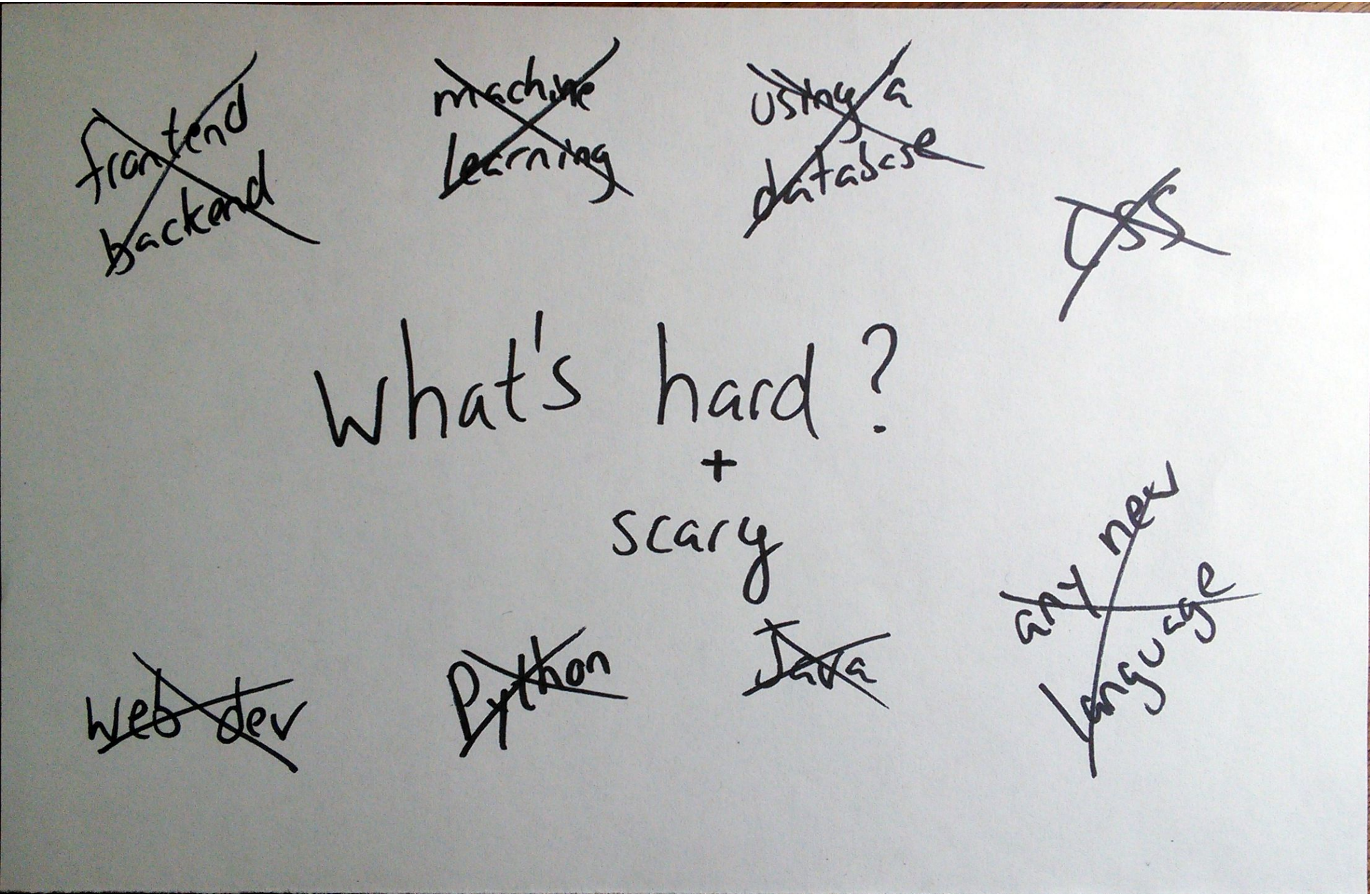
the Recurse Center

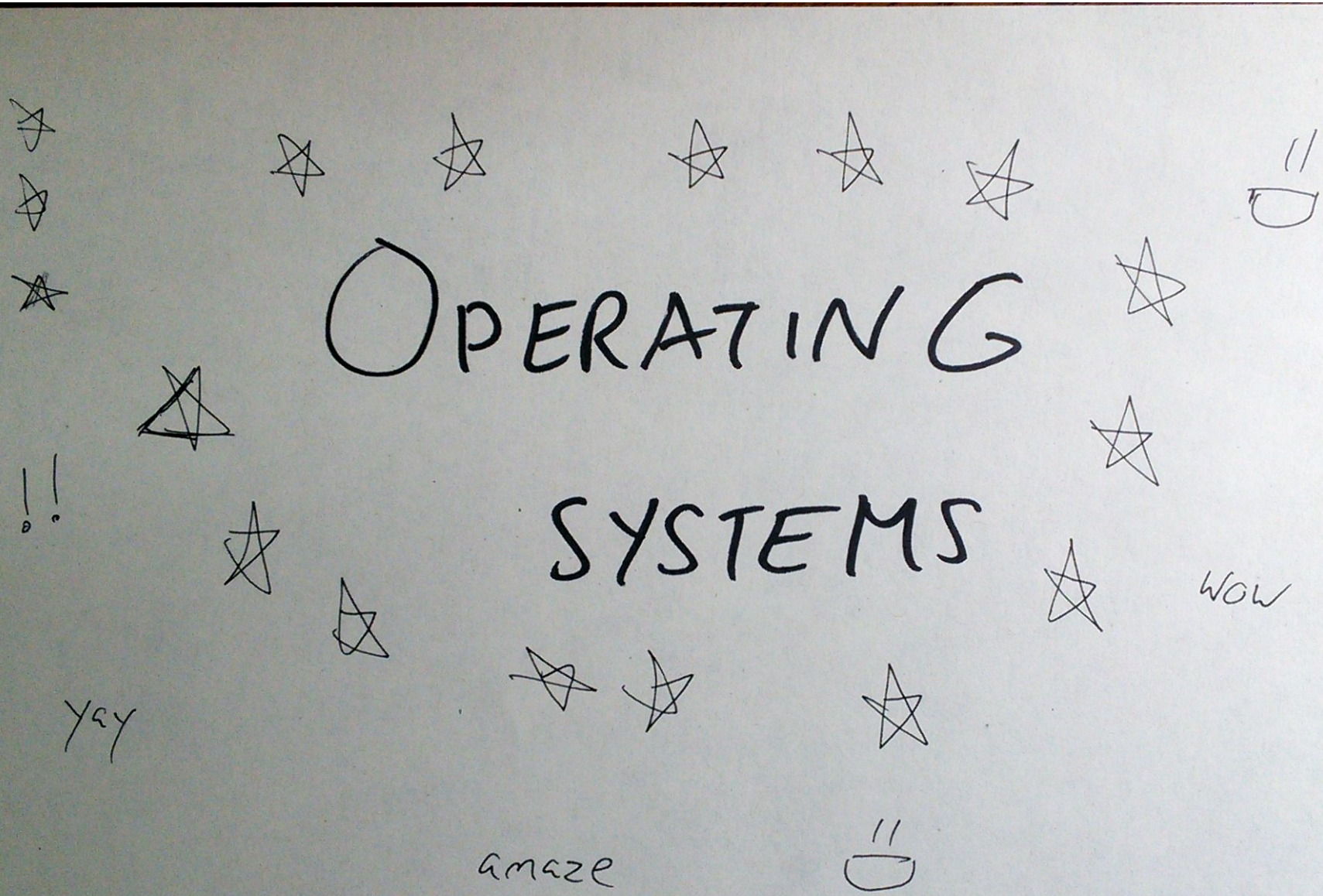
New York!
12 weeks!
free!

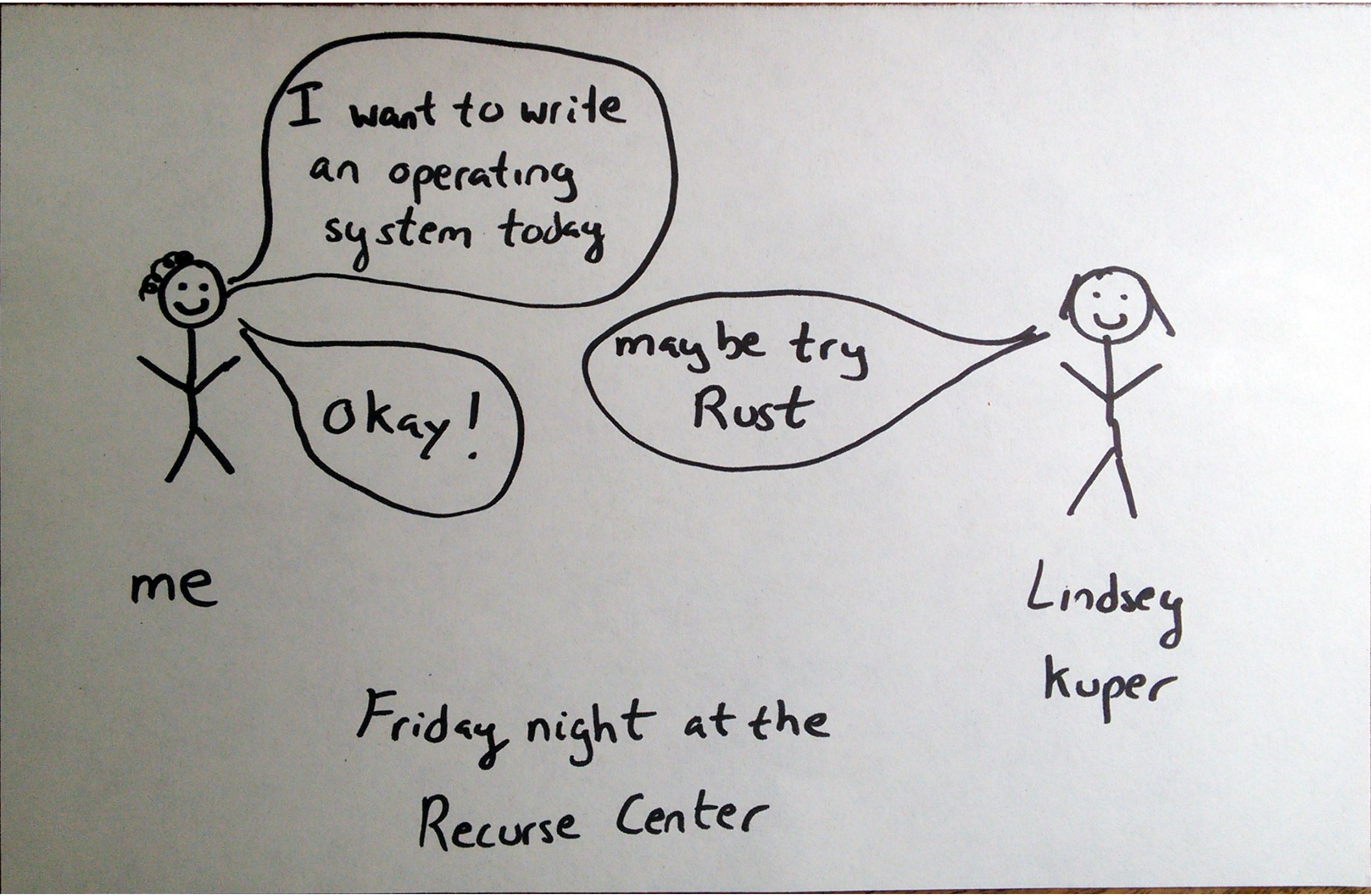


the best
programming
community
in the world

recurse.com


frontend
backend
machine learning
using a database
CSS
what's hard?
+
scary
web dev
Python
Java
any new language


OPERATING
SYSTEMS
!!
yay
amaze
WOW

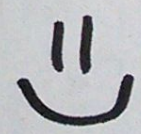

I want to write an operating system today
Okay!
me
maybe try Rust
Lindsey Kuper
Friday night at the Recurse Center

Can you write an OS in...

Python
Ruby
Java
> NO

Go
MAYBE

C
C++
Rust
> YES



but Rust knows about threads

and threads need an OS to exist

so don't I need to already have an OS to run Rust code?

(nope)

Why can you write an OS in Rust?

answer: `#![no_std]` + libcore

Rust lets you write your own

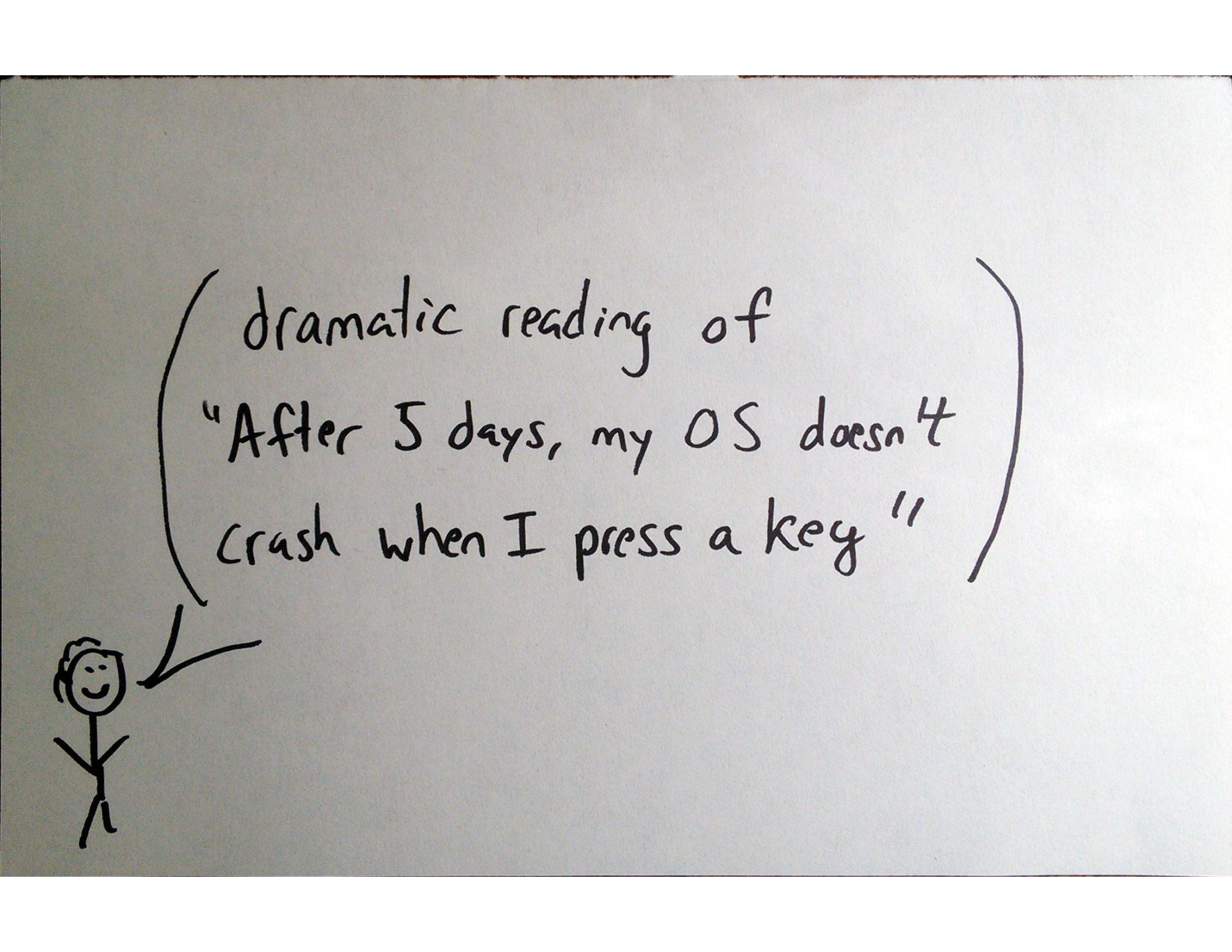
- malloc etc
- threads etc
- I/O

"~~freestanding mode~~"
libcore

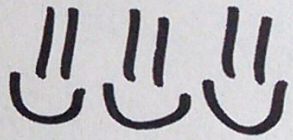
things you do not have when you write a kernel

- a hard drive
- files
- other processes
- a working keyboard
- memory protection
- any I/O
- libraries to use
- ANYTHING !!

"I'm just going to write a keyboard driver"


(dramatic reading of
"After 5 days, my OS doesn't
crash when I press a key")

remember how we don't

have malloc? 

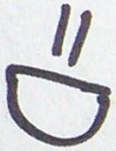
```
fn malloc(size: i32) {
    return 42;
}
```

now we have our weird malloc

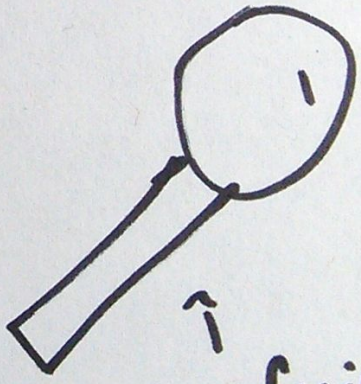
```
let x = Box::new(5)
let y = Box::new(88)
```

x=5

now x = 88



The Case Of The Missing Data



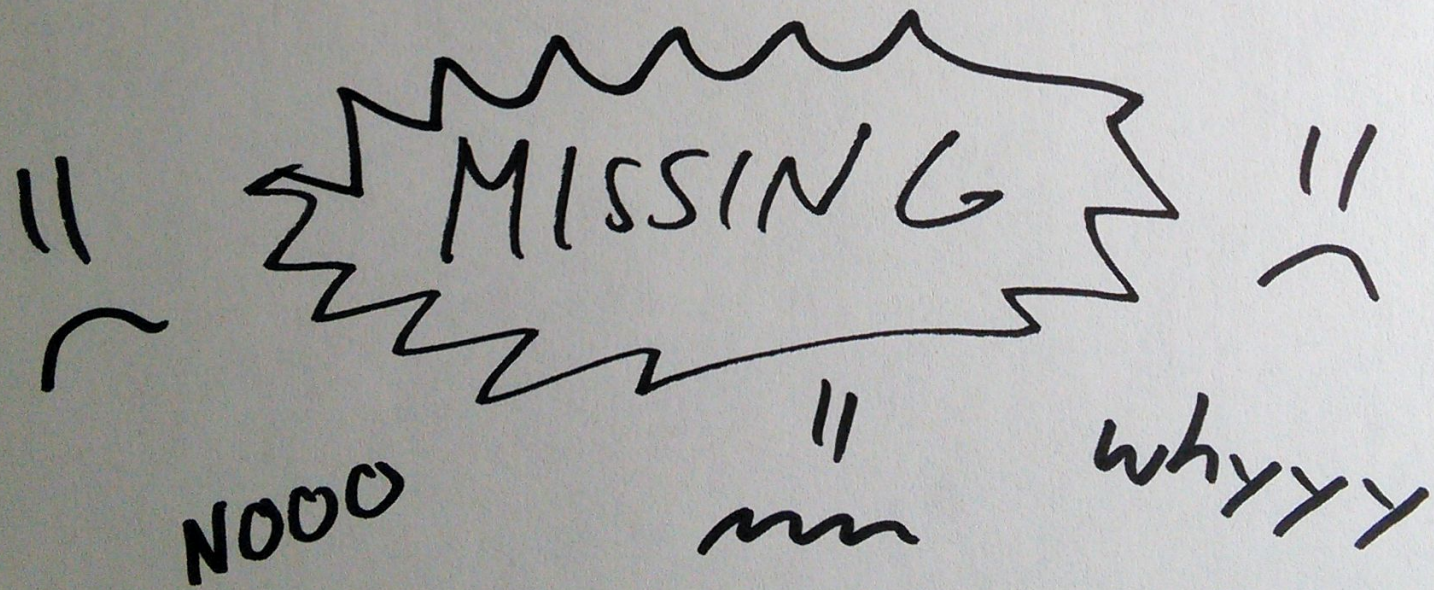
↑ magnifying glass

so I was writing a keyboard driver...

```
val keys = "qwertyuiop...
val keys-upper = "QWERTY...
```

... but when I tried to read

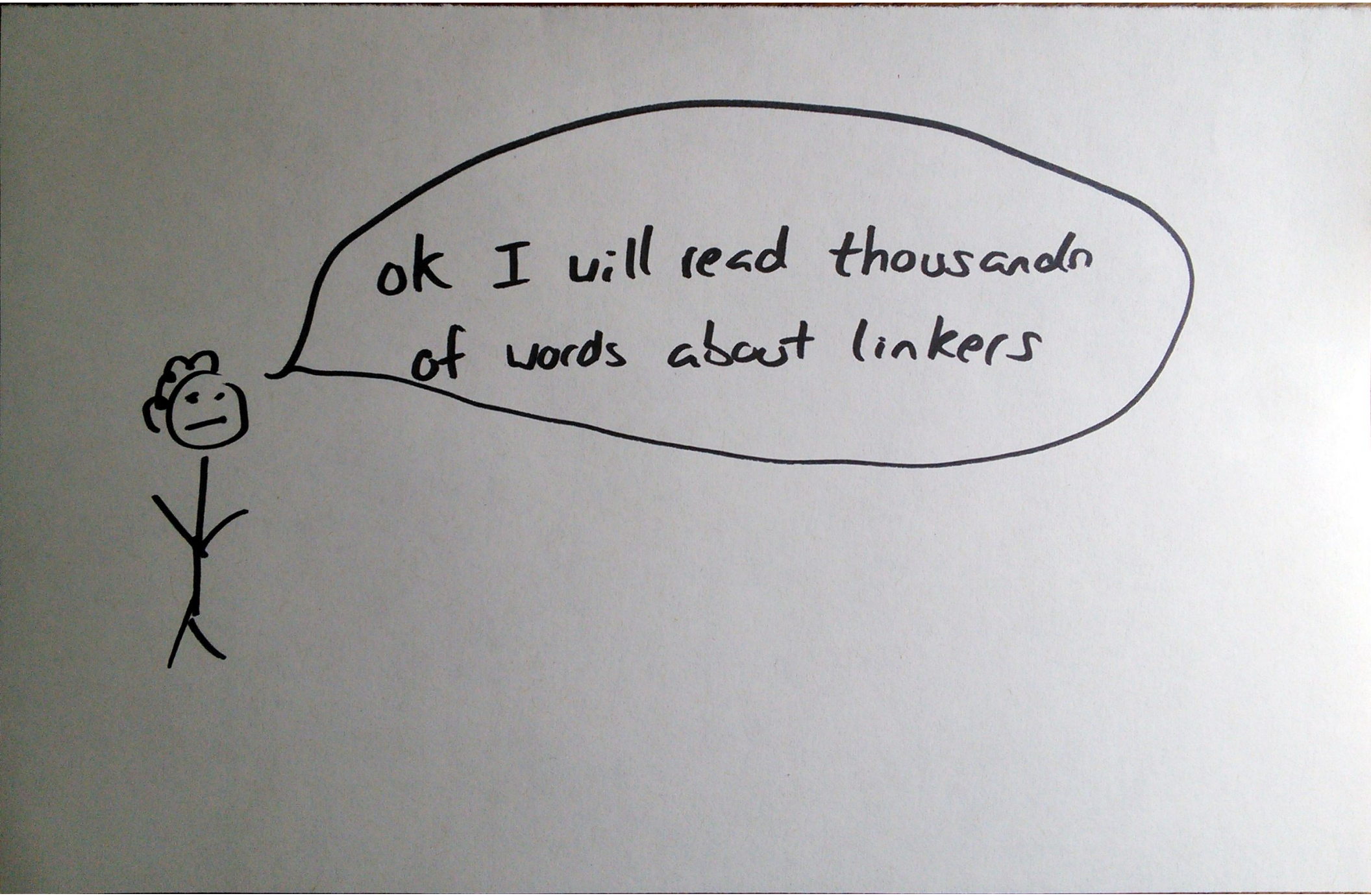
from those strings they were

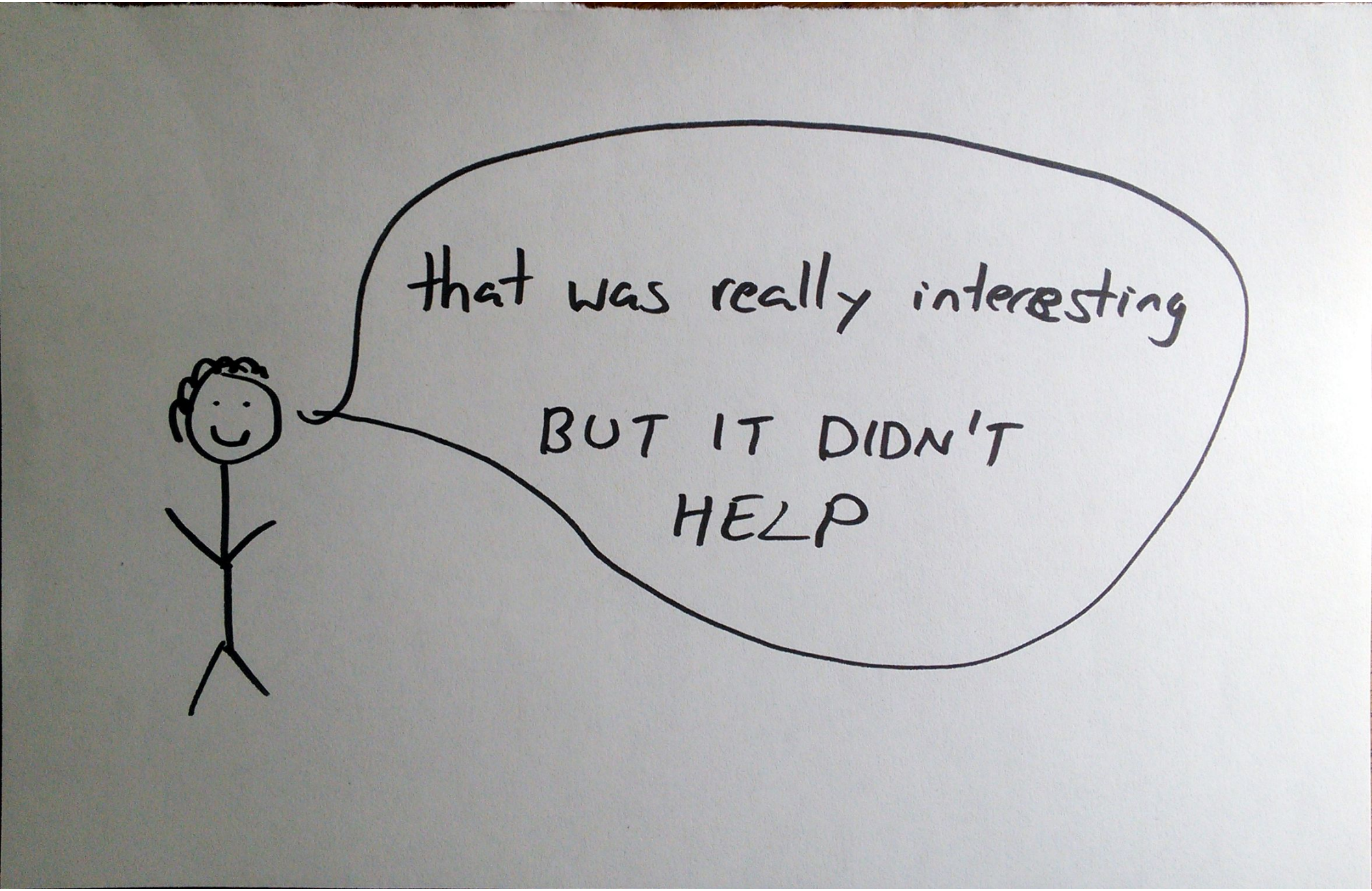


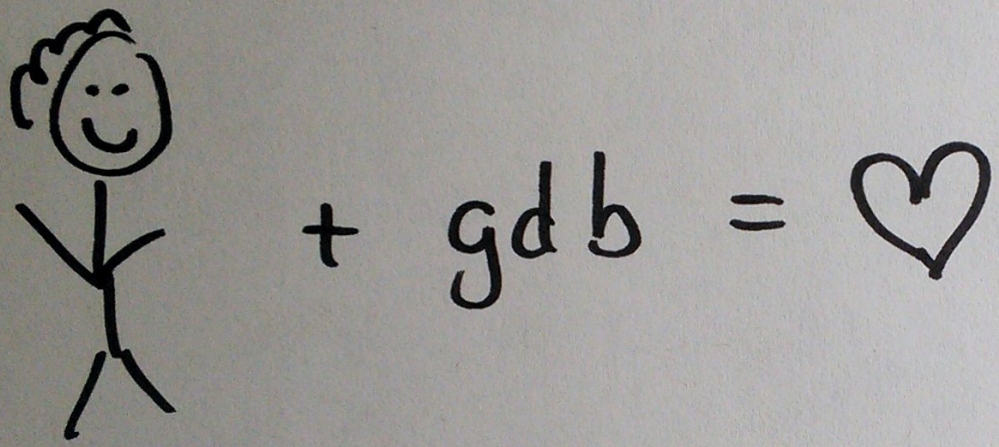
Someone suggests changing my linker scripts

IT WORKS!!

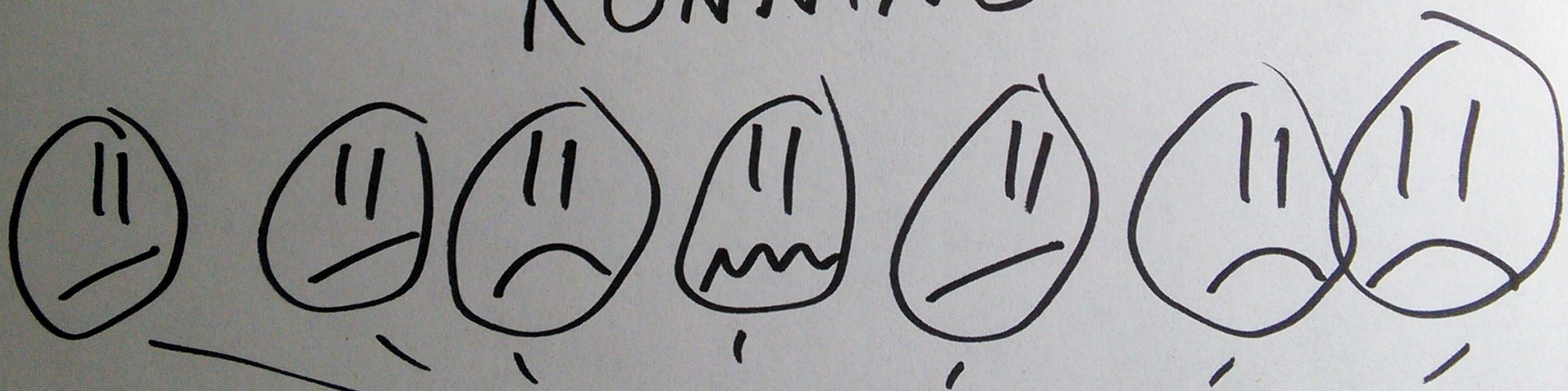
then it stops working


ok I will read thousands of words about linkers


that was really interesting
BUT IT DIDN'T HELP


+ gdb =
memory
my OS
supposed to be my OS.
ACTUALLY ALL ZERO

SOMETHING IS ERASING
MY PROGRAM WHILE IT'S
RUNNING



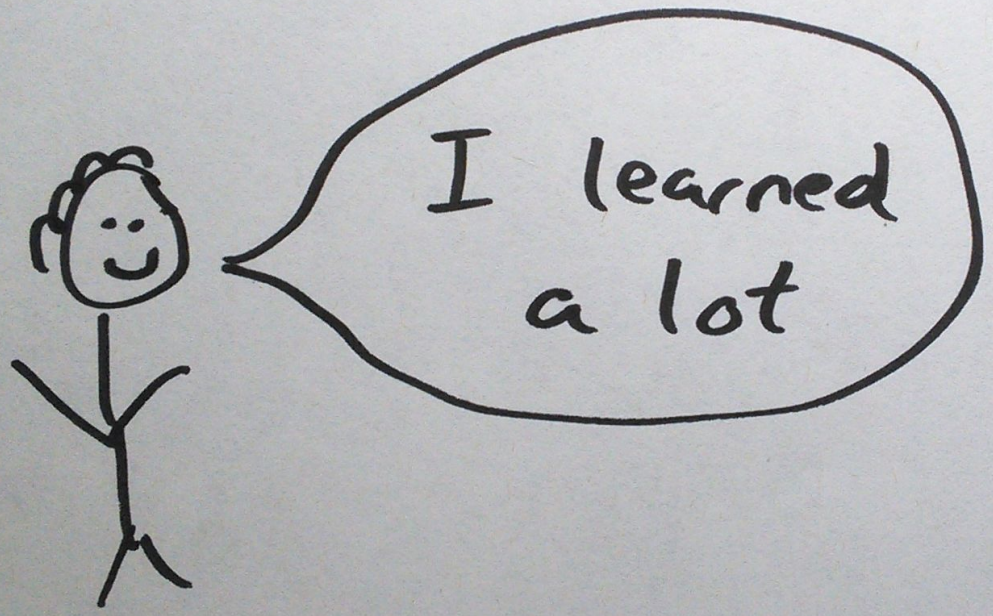
me

meanwhile in my boot loader

```
mov al, 24   ; 12 kb
```

... my OS is more than 12k. Oops.

after 3 weeks




I'm trying to write a kernel and I have no idea what I'm doing also how do Rust strings work. halp.
we can help!
#rust

basically writing
a toy kernel is
REALLY FUN

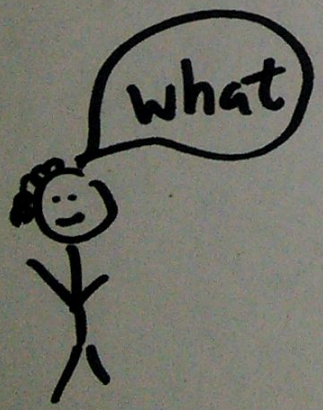
I learned SO MUCH.

In fact...

from: _@apple.com
to: julia@jvns.ca
subject: Opportunity with Apple

Hi,

I manage the Kernel Performance team at Apple...



(I don't work at Apple

... or do systems programming

at work at all, really...)

but writing a toy OS helped

me understand my REAL

OS much better

and now I'm a

better programmer

← programmer crown

Questions?

http://jvns.ca ← Blog of Many Rust Posts From 2013

@b0rk