Rust in 5 minutes

Raphael Nestler (@rnestler)

September 26, 2016

Coredump Rapperswil

Outline

What is Rust?

*«Rust is a systems programming language
that runs blazingly fast, prevents nearly all segfaults,
and guarantees thread safety.»*

— www.rust-lang.org

C / C++   Java / C#   Python / Ruby

More Control   More Safety

C / C++   Java / C#   Python / Ruby

More Control   More Safety

Rust
More control and more safety

C / C++   Java / C#   Python / Ruby

More Control   More Safety

Rust
More control and more safety

Fast, safe, concurrent, pick three!

- Fine grained control over memory
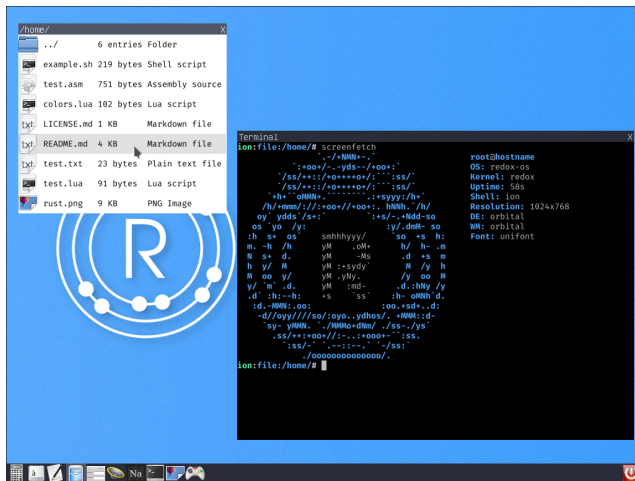- Close to bare metal
- It's possible to write an OS kernel with it

Figure 1: https://www.redox-os.org/

- Compiled language
- Uses LLVM for optimizations
- Zero cost abstractions

LIGHTSPEED IS TOO SLOW. WE'LL HAVE TO GO RIGHT TO LUDICROUS SPEED.

Safety

- No null pointers
- No dangling pointers
- No data races

Figure 2: Average C++ programmer

Ownership / Borrowing

- Every resource has *one owner*
- Variables are *moved* to new locations
- Owned values can be *borrowed*
    - Either: *One mutable* borrow
    - Or: *Many immutable* borrows
- These rules are enforced by the compiler

Cargo

- Awesome project and package manager
- Fetches and builds your project's dependencies
- Invokes rustc or another build tool with the correct parameters to build your project
- OSS packages on `https://crates.io` are immutable
  → No leftpad like disasters

Community

- Rust is known for its friendly and welcoming community
- The language is developed in the open through RFCs
- Active discussion on Github, Reddit, IRC, and the forum

Rust in the Wild
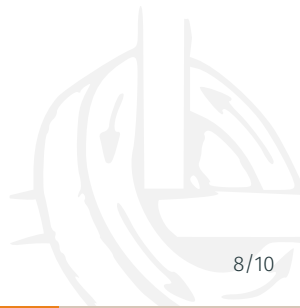
Rust is already used by companies[1]

- Mozilla: Servo, the Parallel Browser Engine
  https://servo.org
- Dropbox[2]
- Maidsafe — The New Decentralized Internet
  http://maidsafe.net
- Parity — Next Generation Ethereum Client
  https://ethcore.io/parity.html

---

[1]https://www.rust-lang.org/en-US/friends.html
[2]https://www.reddit.com/r/rust/comments/4adabk/the_epic_story_of_dropboxs_exodus_from_the_amazon/

Code Example

Code Example

- Traits based generics
- Pattern matching
- Type inference

```rust
fn main() {
    let program = "+ + * - - /";
    let mut accumulator = 0;
    for token in program.chars() {
        match token {
            '+' => accumulator += 1,
            '-' => accumulator -= 1,
            '*' => accumulator *= 2,
            '/' => accumulator /= 2,
            _ => { /* ignore everything else */ }
        }
    }
    println!("The program \"{}\" calculates the value {}",
            program, accumulator);
}
```
Output: "The program "+ + * - - /" calculates the value 1"

Thank you!

www.coredump.ch