

Overview & Lab0 Intro

TA Session

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Deadlines

- Lab 0 Code will due next Thursday 11:59 pm
- Lab 0 Design Doc will due next Sunday 11:59 pm
- Start early! Setting up the environment can be exhausting!



Q1: What is Tacos?



Tacos is:

- an educational operating system developed fully in **Rust** for **RISC-V** platforms

Q: What is Rust? What is RISC-V?



Rust is:

- ~~(The best programming language)~~
- From Mozilla, for "system programming" designed by Graydon Hoare as a hobby
- Fast, reliable, productive
- most loved language according to Stack Overflow
- Inspired by a wide range of languages



GET STARTED

[Version 1.76.0](#)

designed by

ix years:-)



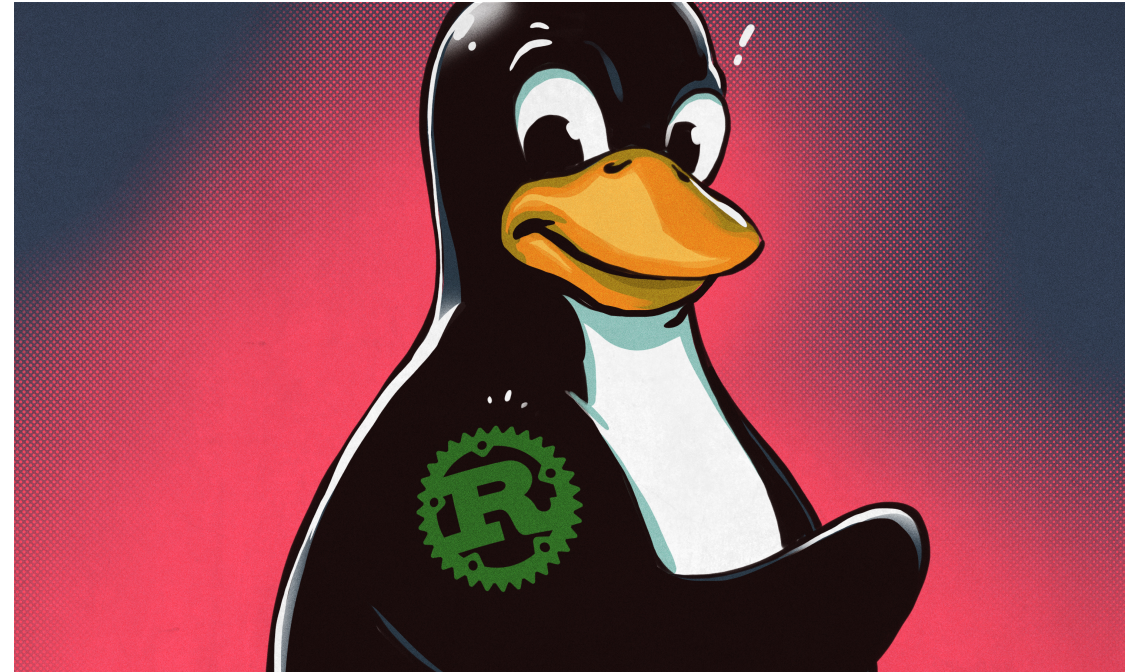
AKA

Welcome to the World of Operating System

AKA COS
RUST OS NEVER GETS RUSTY.

System programming in **Rust** is a trend!

- Adoption by large companies (“Friends of Rust”):
 - Mozilla, Dropbox, CloudFlare, Microsoft, Google, Amazon, Bytedance, ...
- Linux & Windows are embracing **Rust**!
 - **Rust** support was added to the Linux kernel in Linux 6.1.
 - Windows is using **Rust** to rewrite core libraries.



RISC-V is:

- ~~A RISC ISA~~
- from UC Berkeley
- was originally designed to support computer architecture research and education
- now will also become a standard free and open architecture for industry implementations.



Educational OSs

Programming Language

Architecture

C

Rust

X86



Pintos

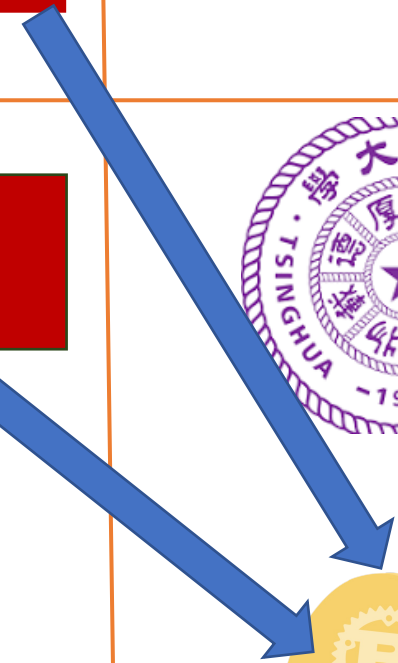
RISC-V



xv6



rCore



Tacos is:

- an operating system developed fully in **Rust** for **RISC-V** platforms
- is designed to be modular
 - which means that some components of the OS can be enabled by including the corresponding source code directory for compilation



Tacos Components

User
Mode

User Programs

User Programs Support

Basic Filesystem

Thread
Management

Synchronization
Primitives

I/O
Support

Device
Support

Supervisor
Mode

Memory Management

Trap Handling

SBI Support

Machine
Mode



Tacos is:

- an operating system developed fully in **Rust** for **RISC-V** platforms
- is designed to be modular
- has 4 challenging labs



Tacos Labs

User
Mode

User Programs

P2:Syscall Interfaces

User Programs Support

P2:Process Management

P2:File Management

P3:Memory Map

P1:Priority Scheduling & Donation

BASIC filesystem

Supervisor
Mode

Thread
Management

Synchronization
Primitives

I/O
Support

Device
Support

P3: Virtual Memory

Memory Management

Trap Handling

P0:Kernel
Monitor

SBI Support

Machine
Mode



Tacos is:

- an operating system developed fully in **Rust** for **RISC-V** platforms
- is designed to be modular
- has 4 challenging labs
- in active development! Welcome to join!



Q2: Tacos or Pintos?



Tacos or Pintos?

Vote for **Tacos**

- **Rust** is a beautiful language! (compared with C)
 - It is easier to make abstractions
 - It is strong, static typing with elaborate type system
 - It has functional programming support
 - Ownership and related rules helps concurrent programming
 - It has a good compiler, that will teach you how to code
 - It detects mistakes before running



PINTOS
Welcome to the World of Operating System



TACOS
RUST OS NEVER GETS RUSTY.

Tacos or Pintos?

Vote for **Tacos**

- **RISC-V** is a modern ISA
 - Do not need to deal with legacies
- **Tacos** is born at PKU
 - You will have a detailed walkthrough of how Tacos is written from scratch.
 - If you have better designs, and want to change/rewrite components in **Tacos**, you will receive immediate help!



Tacos or Pintos? Vote against Tacos

- RISC-V & Rust are too modern
 - Potential bugs in compilers/simulators/toolchain
 - Sometime it is not your problem
- X86 is like x86-64, which you have already learned in ICS
 - It is easier to start with something familiar



Tacos or Pintos? Vote against Tacos

- Rust compiler:
 - Compiles slowly
 - Correct design may not pass the compiler check



从另外一个角度说，虽然他编译检查能阻止很多同步问题的发生。

但是为了正确解决这些问题，找到一个良好的软件设计方式也是必不可少的。

但是他的编译器不会告诉你要怎么设计

而且他如此严格的检查，实际上也阻止了一些正确的设计。

全职写 Rust 一年，最大的收获来自于 Rust 的编译时间。刷完了豆瓣片单，肌肉也变大了，感谢 rustc，感谢 cargo 🙏

11:22 · 2022/8/5 · Twitter Web App

21 次轉推 4 則引用的推文 301 個喜歡



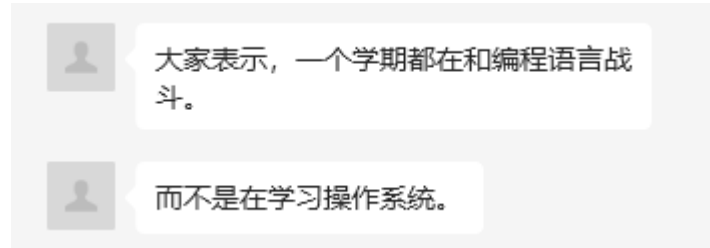
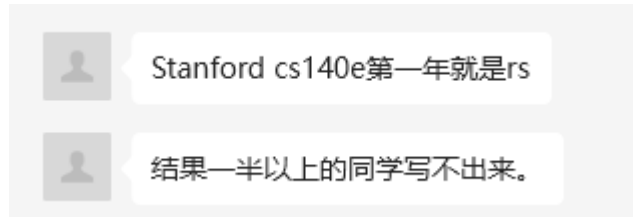
Xuanwo @OnlyXuanwo · 8 小時
回覆給 @leiisky
每次编译的时候都在坚持做俯卧撑是吧
4 16

耳先生 @HEHEHEHEHE2333 · 7 小時
我也是这样子，每次编译就做几个，一天下来基本能破百
1 6

leiisky @leiisky · 7 小時
一天一百个俯卧撑，两部电影，三天一部剧
1 1 7

Tacos or Pintos? Vote against Tacos

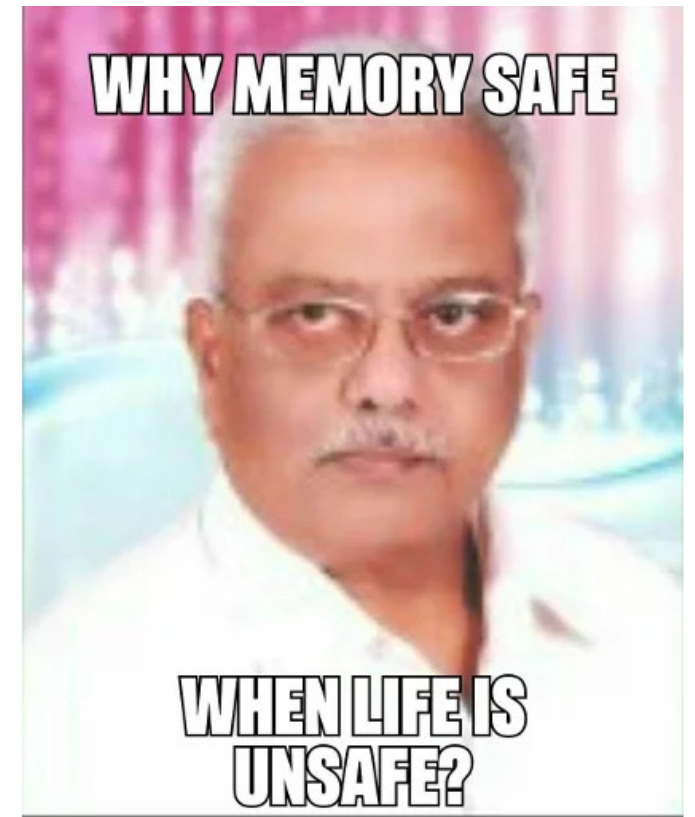
- Rust is (extremely) difficult to learn
 - Even for students in top universities



- This is an OS course. Rust is not in the syllabus, you do not need to learn it in this course
- Implementing OS is hard, using an unfamiliar language makes it more challenging



🔒 Rust is too hard to learn
help



Tacos or Pintos? Vote against Tacos

- **Tacos** is developing, and it is the first time we use it as the course practice
 - The document is not as elaborate as Pintos
 - Labs are only tested by a small number of people in the development team
 - Potential bug in implementation



Lab0 Intro

- GDB demo
- Tacos booting process

