Haoxuan Han

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Qilu Insitute of Technology Computer Science •Bachelor 2001-01-25 Qingdao

Love and understand low-level and kernel development, Passionate about operating system technology. Developed kernels for x86 and RISC-V architectures. Familiar with Linux kernel and GNU/Linux. Experienced in embedded software development. With extensive experience in bare-metal development, and be capable of designing, implementing and debugging large projects independently. Knowing many popular development environments and toolchains. Good at learning new technologies rapidly. Outstanding practical application ability, capable of performing full-stack engineering work. Enjoy the open-source community, have open-sourced various personal projects on GitHub and contributed to some open-source projects. During school, served as the president of the Computer Association, won the title of outstanding student, and received scholarships multiple times.

Skills

Prog. Lang.	**C** Excellent , **Python** Excellent , **TypeScript** Proficient , **Rust** Proficient , **Shell** Excellent
Tools & Frameworks	**Git**, **Vue**, **Django**, **FreeRTOS**
Language	**English (CET4 604)** — Preferred reading and writing documents in English.

Internship

2023.12 – 2023.09 Technical Support Engineer @ **UnionTech Software Technology Co., Ltd. (Shenzhen Branch)**

- Packaging and maintenance of Linux open-source software.
- Wrote scripts for workflow automation and spider program. Participated in the department's technical support work.
- Independently developed the ShiroDEB scripts set and maintained automatic build scripts based on this.
- Participated in the company-hosted external technical sharing activities, shared technical insights, and introduced work results (2023-11 Wuhan LUG).
- Used Docker technology and Github Action to continuously integrate the ShiroDEB working environment, creating the clean room build environment.

Personal Projects

2023.12 – 2023.8 **Safety Training Information Platform and Surrounding Facilities**

Personal freelance project. Written and maintained in my spare time during the internship. Implemented a safety training signup information records and exam information management platform, and supports the import and export functions of Excel files. It is currently in the maintenance period.

- Use Django and Django REST Framework for backend implementation
- Use Vue3.0, Electron for the management system, and use Svelte for the student registration page.
- Implemented exam check-in software based on the ID100 ID card reader and Java FX. This software communicates with both this management platform and the Government-designated examination management system.
- Use Docker and Docker-Compose to implement containerization, improving deployment efficiency.

Full-stack Docker

2023.10 – 2023.7 **VirtIO Drivers implementation based on NXOS Kernel**

Project of OSPP 2023 (an event like GSOC), implemented VirtIO Drivers Framework and frontend devices drivers for NXOS Kernel. Project mentors expressed high approval of this project.

- Implemented VirtIO Over PCI Bus and VirtIO Over MMIO
- Implemented various VirtIO devices, such as Net, Block, Input, Sound, etc.
- Implemented generic framework for any other VirtIO devices to be implemented in the future
- Fixed Bugs in NXOS Kernel codebase
- Archived compatibility to error implementations beyond specification through studying the sources of Linux kernel and QEMU

C | VirtIO | QEMU | Low-level | Driver

2023.7 – 2023.4 **Safety Training Online Platform**

Personal freelance project. Implemented an online video training platform with features of online training, face recognition, quiz tests and comments.

- Using Django and Django REST Framework for backend implementation
- Using Vue3.0 and Vue-Pure-Admin framework for administration panel
- Implemented the same functionality by Vue and WeChat mini program for trainee frontend
- Containerize the whole project with Docker and Docker-Compose to improve the deployment efficiency

Python | Django | Django REST Framework | Vue | Full-stack | Docker

2022.7 – 2022.5 **OS Kernel on RISC-V Architecture**

Project for Kernel Design Competition to University Student, a macro-kernel based on RISC-V 64 architecture. Communicate with hardware via SBI and therefore the portability and universality could be archived.

- Implemented SMP multi-processor via spinlock and sleeplock
- Implemented Buddy Page Allocator and RB-Tree based Slab objects allocator
- Implemented CoW Fork to improve performance
- Implemented the support of Flatten Device Tree along with extensible driver framework
- Implemented some generic POSIX syscalls like execve, dup and pipe and some Linux syscalls
- Support QEMU and K210, and implemented virtio-mmio/virtio-disk for QEMU
- Developed `RISCV-GDB-Paging` for debugging SV39/SV48 paging information for RISC-V on QEMU. Written in Python and Scheme Lisp

C | CMake | Low-level | Kenrel | RISC-V | GDB | Python

2022.3 – 2021.10 **Self Service Car Washing Solution, Embedded Software**

Embedded part of Self Service Car Washing solutions, this project implemented the terminal electrical controlling and user-end GUI.

- As the project manager of the whole team, coordinated developers in other parts and collaborated with partner company
- Using STM32F4 as MCU and developed based on STM32 HAL
- Ported LVGL using DMA2D for higher performance, decoupling the LVGL GUI from embedded functionality for easier debugging and development
- Communicate with LTE IoT modules and ESP32 via AT commands, enabling interaction with server-side systems
- Implemented the configurating from PC via USB-FS and FATFS
- Use FreeRTOS as the embedded operating system, using tasks to handle different sub-procedures

C | STM32 | LVGL | FreeRTOS | Embedded

Other Personal Projects

- **OmochaOS**:
  Toy kernel for study of x86 development, using micro-kernel architecture. Implemented drivers for essential components such as HPET, PCI, APIC, and AHCI. Additionally, a modular framework to ensure extensibility and flexibility within the system has been implemented.
  C | CMake | Kernel development | Low-level developement
- **AiR Air Quality Monitoring System**:
  The AiR Air Quality Monitoring System based on ESP32. With MQTT, HTTP API and HTTP Frontend support, also with display support on onboard LCD.
  C | Embedded | FreeRTOS | ESP32
- **OmegaGomoku**:
  A Gomoku AI using PyTorch and the DQN algorithm. Optimized DQN reward calculation. Achieved moderate AI performance after 100k training games. Outperformed MiniMax with 95% max win rate and 50% average win rate at 2-level search depth. Report: Click Here
  Python | PyTorch | DQN | Machine Learning | Deep Learning
- **Rust-shunting_yard**:
  Expression evaluation tool written in Rust using the Shunting Yard algorithm, equipped with function definition capabilities.
  Rust | Algorithm
- **Rust-headless-chrome(Code contribution)**:
  Contributed code to the Chrome DevTools Protocol implementation API in Rust, enhancing and refining certain API application methods. Additionally, fixed errors within the code generation tool (`auto_generate_cdp`) to solve the functionality issue of the project.
  Rust | Library | Chrome DevTools
- **ShiroDL**:
  Asynchronous concurrent small-files download library in Rust, designed for versatility and extensibility. Includes a command-line program for batch downloading small files.
  Rust | Library | Tool developement

Awards and Certificates

- Google Code-in 2017
- 2020“FLTRP·ETIC Cup”English Reading Contest Shandong Provincial Final Third Award
- 2021 14th Chinese Collegiate Computing Competition Shandong Provincial Third Award
- 2021 3rd National College Computer Ability Challenge Program design-C++Easten China area Excellence Award
- “Sai Guan Cup”8th Shandong Provincial College Students’ Electronic and Information Techno Application Competition Second Award
- 2022 15th Chinese Collegiate Computing Competition Shandong Provincial Second Award
- 2022 Computer System Development Capability Competition - Kernel Design Competition Preliminary Excellence Award
- 13rd Blue Bridge Cup Shandong Provincal C/C++ College B Group First Award
- 13rd Blue Bridge Cup National Finals C/C++ College B Group Third Award
- National Copyright Administration of China Computer software copyright registration certificate AiR Air Quality Monitoring System