

# Letian Ruan

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## Education

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### Shanghai Jiao Tong University

Bachelor of Engineering in Mechanical Engineering

2022/08 – 2027/08

Shanghai, China

## Research

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### System Engineering Research Assistant

2024/10 – Present

Emerging Parallel Computing Center, advised by Shixuan Sun

SJTU-CSE

- Build a high-performance computing system for highly-skewed graphs and deploy it on AWS as a serverless service.
- Collaborated with Ant Group to work on real-world complex graphs to accelerate practical applications.

## Open-Source

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### jCourse *The largest unofficial course review platform of SJTU*

2024/07 – Present

- As of November 2024, more than 28,000 users have posted over 33,000 reviews for 4,500+ courses.
- One of the main developers and maintainers for the web service based on Next.js and Gin and integrated with Vite, Redis, PostgreSQL and LLM to provide more personalized and faster responses.

## Projects

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### Chfs *A simple distributed file system similar to Google File System*

2024/09 – Present

delivered by SJTU IPADS

[github: Risc-lt/chfs](https://github.com/Risc-lt/chfs)

- Constructed a basic single-machine inode-based filesystem and extended it into a robust distributed filesystem with file splitting, lock manager and crash recovery.
- Built the MapReduce framework and achieve the Raft consensus algorithm of leader election, heartbeat mechanism, log replication protocol and snapshot mechanism.

### BusTub *A complete row-store relational database system*

2024/07 – 2024/09

delivered by CMU Database Group

[github: Risc-lt/BusTub](https://github.com/Risc-lt/BusTub)

- Implemented a buffer pool to improve memory utilization, developed Extensible HashTable for indexing and used Crabbing Protocol to add read-write locks.
- Completed basic SQL operators and optimizers on the volcano model and built a centralized transaction manager based on the MVCC protocol, supporting snapshot isolation.

### xv6-riscv *A basic operating system based on the RISC-V architecture*

2024/02 – 2024/06

delivered by MIT PDOS

[github: Risc-lt/xv6-riscv](https://github.com/Risc-lt/xv6-riscv)

- Added Lazy Allocation and Copy On Write functionality to the virtual memory module of the xv6 operating system
- Completed thread libraries and synchronization barriers to the kernel module and optimized the buffer pool management in the file system module of xv6 using finer-grained hash tables.

### LSM-KV *A key-value storage engine based on lsm-tree*

2024/04 – 2024/05

- Built the in-memory skiplist and on-disk SSTable to form the lsm-tree and used vLog to realize the WiscKey design of key-value separation.
- Implemented basic CURD functions and advanced mechanisms of range queries and garbage collection.

## Teaching

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### UM-SJTU Joint Institute

Shanghai, China

Teaching Assistant for ENGR1510J Accel. Intro to Comp & Prog

2024/09 – 2024/12

- Worked with the teaching team to coordinate 72 students to reinforce course concepts such as Matlab, c/cpp, data structure & algorithm, and object-oriented programming as well as set up labs and projects for them.

## Skills

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- **Programming languages:** C++, Golang, Python, Elm and Typescript.
- **Tech Skills:** HPC(Graph), DB(OLTP), OS(Microkernel), Cloud(FaaS) and Web(React+Gin/Django)