

TIANREN CHEN

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EDUCATION

Bachelor of Science in Computer Science

University of California, Davis, CA

Expected Fall August 2025

Associate of Science || Mathematics

Ohlone College, Fremont, CA

Graduation May 2023

Data Analytics Professional Certificate

Google

Completed Feb 2022

RELEVANT COURSEWORK

Software

Completed CS Courses: Web Programming, Algorithm Design and Analysis, Probability & Statistical Modeling for Computer Science, Computer Architecture, Software Engineering, Data Structures, Programming Languages, Object oriented Programming, etc.

Electrical

Completed Electrical Engineering Courses: Safety Utilization of Electric Power, Metal Process Training, Power Supply and Distribution Equipment Installation and Maintenance Training, Plant Electrical Control Equipment Design, Electric Power Measurement and Power System Protection, Microcomputer Interface Training, etc.

RELEVANT SKILLS

Technical Skills:

- **Programming Languages:** C++ (First Language), experience on Java, Python
- **Software Development:** Object-Oriented Programming, Modular Design, Data Structures, Algorithms
- **Mathematical Foundations:** Probability, Statistics, Linear Algebra, Calculus
- **Data Analytics:** Google Data Analytics Certificate, hands-on experience with data wrangling and visualization
- **Systems Knowledge:** Linux
- **Tools & Technologies:** Github (Version Control), VS Code (IDE)

Soft Skills:

Problem-solving and critical thinking || Collaboration and teamwork || Project management

PROJECTS

Canvas System Optimization

Collaborated with Professor Dr. Jim D. Pham

- Rebuilt and optimized part of the Canvas system in C++, enhancing its framework with new features and improved performance.
- Conducted system analysis to identify weaknesses, particularly the lack of modularity, and designed a more modular architecture for maintainability.
- Developed key components, including a rendering engine, input handler, and object manager, resulting in cleaner and more maintainable code.
- Leveraged advanced C++ features, such as pointers and memory management, to enhance performance, and implemented double buffering to reduce flickering during graphics display.
- Delivered a more efficient and flexible Canvas system, gaining hands-on experience in teamwork, technical problem-solving, and project management.

Web Application with OAuth Integration and Database Management

Dr.

- Developed a full-stack web application using **Node.js**, **Express**, **SQLite**, and **Handlebars** for managing user-generated posts and profiles.
- Implemented **Google OAuth 2.0** authentication using the Passport.js library to enable secure user login and registration.
- Built custom APIs for fetching and displaying data, including emojis from third-party services using **fetch**.

Digital Design of CPU and Cache Systems

- Developed CPU and cache architectures using logic gates and digital design techniques.
- Applied logic-based approaches to optimize memory access and data flow within the cache.

- Conducted simulations to test and validate the performance of the designs, ensuring reliability and functionality.

Operator System Project: Distributed File System with Multi-threading and File Distribution

- Designed and implemented a multi-threaded distributed file system using C++ to handle concurrent file operations more efficiently.
- Utilized threads and synchronization primitives (i.e., mutexes, condition variables) to ensure thread-safe operations and prevent race conditions in shared resources.
- Developed HTTP/REST API handlers to support GET, PUT, and DELETE operations for files and directories, ensuring compatibility with distributed storage models.
- Implemented a thread pool and FIFO scheduling policy to manage concurrent requests and optimize resource utilization.
- Maintained data consistency and fault tolerance through transactional operations (begin Transaction, rollback, commit) for on-disk structures.

Database System Project: L-Store Implementation

- Single Threaded, In-memory L-Store: Designed a foundational in-memory database using L-Store architecture with base pages, and tail pages for efficient data storage. Implemented operations like SQL (INSERT, SELECT, UPDATE, DELETE,) and a page walk directly for fast lookups.
- Durability: Rebuilt the system to include disk persistence with transactional operations (Begin Transaction, rollback, commit) to ensure data consistency and crash recovery. Development a merge process to optimize read performance by consolidating base and tail pages.
- Multi-threading: Introduced concurrent processing using a thread pool with synchronization primitives (Mutexes, condition, variable) to handle simultaneous transactional (OLTP) and analytical (OLAP) queries efficiently while ensuring thread-safe operations.

Power Distribution System Installation and Maintenance

- Designed and implemented power supply and distribution systems, ensuring optimal performance and reliability.
- Conducted hands-on installation and maintenance of electrical systems, troubleshooting faults in real-world scenarios.
- Applied safety practices to protect systems and personnel, focusing on reliable power delivery.

Work Experience

Golden Fastrack Corp. *Summer Intern* | 2023

- Performed software updates and maintenance to enhance system performance and reliability.
- Managed and optimized databases to ensure data integrity and efficient access.
- Assisted in troubleshooting technical issues and providing solutions to improve workflow.

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