Marvin Jirapongsuwan

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EDUCATION

University of Michigan, Ann Arbor — **Ann Arbor, MI**
B.S.E. in Computer Science — *August 2023 - May 2027*

- GPA: 3.78/4.00
- **Awards:** Walter G. Mitchell Memorial, Oskar and Elsie R. Loosme, Dean's List, University Honors
- **Relevant Courses:** Data Structures & Algorithms, Operating Systems**,** Distributed Systems, Computer Organization, Web Systems, Computer Security

SKILLS

Languages C++, C, Go, Python, JavaScript, Bash
Systems Linux, Unix, POSIX, ZFS, ext4
Technologies GDB, fio, io_uring, bpftrace, Valgrind, Git, Make, Apache Kafka

WORK EXPERIENCE

Nutanix — **San Jose, CA**
Software Engineer Intern — *May 2025 - Aug 2025*

- Spearheaded async I/O integration into core network file server (Ganesha NFS) using shared ring buffers (io_uring), enabling non-blocking I/O submission and cutting userspace threads by 68%, improving bandwidth (+14.6%) and latency (-31%) on batched, high latency workloads
- Modified internal file system (ZFS) to make io_uring interface correctly, enabling cache-aware, io_uring-driven kernel thread dispatch that scaled I/O from 1 to 27 CPU cores on a 32-core cluster and reduced redundant thread creation by 61%
- Evaluated io_uring performance on Linux file systems using fio, tracing thread behavior across I/O patterns with bpftrace
- Benchmarked custom io_uring designs with self-built test suite to measure I/O bandwidth and latency for NFS integration

Joy of Coding — **University of Michigan**
Teaching Assistant (TA) — *May 2025 - Aug 2025*

- Supported ~400 students in an online Python course in weekly 1-on-1 Zoom sessions and email support
- Mentored students on programming basics (functions, conditions, loops), AI fundamentals, and data visualization

UM Direct Brain Interface Lab — **Ann Arbor, MI**
Undergraduate Research Assistant — *Sep 2024 - May 2025*

- Developed EEG-based BCI applications in C++ for individuals with motor impairments to communicate via brain signals
- Improved AAC-BCI keyboard reliability with core bug fixes and error checks, reducing visual and hardware failures by 30%
- Enhanced Choice-Making module with stimuli-skipping, and refactored algorithms to improve response time and flexibility

PROJECTS

Nutanix Pinsir Security | *React, Flask, ClamAV, PostgreSQL, Nutanix Objects, Apache Kafka*

- Built real-time malware scanner for S3-compatible storage and led frontend implementation with backend API integration, enabling async file scanning and secure object access
- Designed Kafka-backed upload pipeline with scan-gating (blocking unscanned files), S3 tag-based access control for suspicious files, and on-demand screening of stored objects, ensuring scalable and secure object storage

Multithreaded Network File Server | *C++, Boost Library, Threads, Sockets*

- Built a heavily concurrent, crash consistent network file server supporting multiple users and nested file/folder structure
- Utilized committing writes to enable crash consistency, Boost threads and upgradeable reader-writer locks to optimize for maximum concurrency, and POSIX sockets to enable network communication with clients

Virtual Memory Pager | *C++, Virtual Memory, Page Faults, Process Lifecycle Management*

- Designed a C++ virtual memory pager managing multiple processes, supporting swap-backed and file-backed pages
- Managed process creation/forking/destruction, page faults, MMU bits, and swap disk all while supporting copy-on-write

Thread Library | *C++, Multi-threading, Mutexes, Condition Variables, Semaphores, Unix*

- Developed a kernel C++ thread library on Unix, handling CPU booting, thread management, management of 50+ CPUs, interrupts, atomicity, and FIFO scheduling order
- Designed spin-locks, mutexes, conditional variables utilizing advanced Unix context management

MapReduce | *Python, Threads, Sockets*

- Implemented Hadoop-like MapReduce Distributed System to process large datasets through TCP and UDP communication
- Devised Manager-Worker model with dynamic task assignment, fault tolerance, and support of partitioned clustered data

OTHER

Interests Filmography/Video Editing, Volleyball, Basketball