Simran Mann

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EDUCATION

Simon Fraser University Sept 2022 – Dec 2026

Bachelor of Applied Science in Computing Science; GPA: 3.99/4.33 Burnaby, BC

- **Relevant Courses**: Distributed Systems, Compilers, Computer Architecture, Operating Systems

TECHNICAL SKILLS

Programming Languages: C/C++ (multithreading, atomics, STL, RAII), Python, x86-64 Assembly, Bash
Systems & Concurrency: POSIX threads, std::thread, mutexes, atomics, MPI, lock-free progress guarantees
Tools & Platforms: Linux/Unix, Git, Docker, LLVM, STM32

PROJECTS

Parallel and Distributed Graph Algorithms Sept – Dec 2024

- Implemented parallel PageRank and Triangle Counting algorithms using std::thread for shared-memory systems and MPI for distributed multi-node clusters
- Scaled implementations from single-node multithreaded execution to distributed MPI-based execution, optimizing message-passing to reduce synchronization overhead
- Evaluated vertex-based, edge-based, and dynamic task decomposition approaches to improve load balance and inter-process communication

Concurrent Data Structures Oct – Nov 2024

- Implemented non-blocking queues, stacks, and sets using lock-free linked lists
- Benchmarked data structures under multi-producer/multi-consumer workloads to analyze contention bottlenecks
- Addressed ABA problems via version-tagged pointers and compare-and-swap (CAS) atomic operations

C Language Compiler June – Aug 2024

- Developed compiler for C-like language using Flex/Bison and LLVM IR, including SSA-form code generation and short-circuit evaluation for booleans
- Implemented parsing, semantic analysis, and code generation pipelines
- Built C runtime and Python scripts to automate testing, validating compilation and execution of code

Custom Memory Allocator Jul 2024

- Built malloc/free implementation from scratch with Best Fit, Worst Fit, and First Fit allocation algorithms
- Implemented memory compaction to reduce fragmentation and improve allocation performance
- Managed free and allocated memory blocks using custom linked list data structures

EXPERIENCE

SFU Robot Soccer May 2025 – Present

Firmware Developer

- Designed and implemented the basestation firmware, enabling robots to receive and parse commands through UART from the software team and relay commands via LoRa to the motherboards for each robot
- Contribute to motherboard firmware development and testing, ensuring real-time task scheduling and responses
- Collaborate in a multidisciplinary team spanning firmware, software, and electronics to achieve robust match-ready performance for the robots

NETGEAR Sep 2024 – April 2025

Orbi Software Test Engineer

- Developed a Python tool to parse UART serial output for automated device testing and debugging
- Automated the main test plan, reducing test time from a full day to 2 hours
- Verified device behavior over TCP and UDP traffic, validating protocol-level correctness, latency, and stability during product verification