SHIVAM VERMA

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EDUCATION

Indian Institute of Technology, Delhi
B.Tech & M.Tech in Computer Science and Engineering *November 2020 - May 2025*
GPA: 8.20 / 10.0
Relevant Coursework: Operating Systems, Cloud Computing, Multiprocessor Systems, Data Structures & Algorithms, Artificial Intelligence, Computer Networks, Database Management, Computer Architecture, Linear Algebra, Probability & Stochastic Processes

EXPERIENCE

Optiver Services B.V. Amsterdam
Software Engineering Internship *May 2024 - July 2024*
- Developed the Panic State Syncer in C++ to synchronize panic states between AMS panic server and US control server, utilizing a Reactor pattern architecture to efficiently handle multiple concurrent requests.
- Designed and implemented a framing protocol library from scratch for robust server-client communication, using Google Protobuf for structured message exchange and adding TCP heartbeats to monitor and maintain connection health.
- Employed GTest and GMock frameworks for unit testing of the component, ensuring robustness and correctness before deployment.
- Successfully deployed the Panic State Syncer component on Optiver's production server, and conducted thorough manual testing to ensure correctness and reliability under various scenarios.

Silence Laboratories Singapore
Summer Research Internship *May 2023 - July 2023*
- Integrated Wallet Connect Chat API into browser crypto wallets, enabling a decentralized peer-to-peer network for secure communication and transactions between wallets.
- Implemented an Automatic Repeat Request (ARQ) mechanism to ensure reliable communication and handle packet losses, ensuring seamless and uninterrupted data exchange between parties.
- Successfully utilized the communication channel to enable message sharing between two parties and implemented secure joint private key generation using secret shares, employing the MPC library of the firm.

ACHIEVEMENTS

- Secured a position in Top 0.7% in JEE Advanced-2020 among 0.15M & in Top 0.2% in JEE Main-2020 among 1.1M candidates
- Achieved distinction in CBSE AISSCE 2020 by securing a position in the top 0.1% of successful candidates in Physics & Mathematics.
- Finished Top 15 in Final Round of AlgoRush (Competetive Programming Hackathon Organised by IISC Bangalore).

PROJECTS

Multiprocessor Programming *Jan 2024*
- Implemented lock-free & wait-free consensus object using compare & swap instruction (asm directive) for concurrent stack and queue.
- Implemented and benchmarked various spin locks like TAS, TTAS, MCS, CLH and Anderson Lock in C++.
- Developed and benchmarked two shared memory parallel LU decomposition programs with row pivoting using Pthreads and OpenMP.

Compiler and Executor Design *March 2022*
- Developed a Lexer, Parser, and Compiler in Standard ML, utilizing ML-Lex and ML-Yacc, for a Toy Imperative Language.
- Constructed an Abstract Syntax Tree (AST) from the input program and transformed it into a Post-Fix Version for efficient execution.
- Employed a Stack Architecture for Intermediate Representation, facilitating efficient processing and manipulation of code instructions.

Peer-Server-Peer (PSP) Network *September 2022*
- Implemented Python-based file distribution system with central server and multi-threaded clients for seamless data transfers.
- Ensured reliable data transfer between clients leveraging both UDP and TCP protocols, addressing packet loss during data transfer.
- Incorporated a server-side cache with LRU replacement policy to improve data access and transfer speeds between the clients.

XV6 Kernel Modifications *March 2023*
- Implemented inter-process communication (IPC) in the xv6, enabling efficient unicast and multicast communication between processes.
- Leveraged IPC for distributed task execution across multiple cores, enhancing performance and parallelism in the system.
- Implemented Earliest Deadline First and Rate Monotonic Scheduling algorithms to execute time-critical tasks within strict deadlines.
- Implemented Address Space Layout Randomization (ASLR) in the xv6 to enhance security against buffer overflow attacks.

TECHNICAL SKILLS

- **Programming:** : C/C++, Java, Python, Prolog, Standard ML, VHDL, Assembly, SDL, Git, LaTeX, MySQL, Gtest, GMock, Protobuf
- **Software:** FreeCAD, ARMSim, MATLAB, GitHub, Tiled, Quartus, Visual Studio Code, CLion, Linux/Unix