Adinath Badwe

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Education

Department of Computer Science, Savitribai Phule Pune University, Pune — Pune, Maharashtra
Masters in Computer Applications (Science) - 9.35 GPA — *August 2023 - July 2025*

Pemraj Sarda College, Ahmednagar — Ahmednagar, Maharashtra
Bachelors in Commerce - 9.0 GPA — *August 2020 - July 2023*

Experience

Academic Internship — February 2025 - June 2025
Department of Computer Science, Savitribai Phule Pune University, Pune — *Pune, Maharashtra*

- Pursued an academic internship under the guidance of a university professor
- Objective of the internship was to solidify the foundations of computer science by means of project development
- Major chunk of the internship was focused on learning compiler design through construction of a simple C compiler
- Gained hands on experience in low level programming concepts, compiler design and systems programming

Projects

C Compiler (Prototype in Python, targeting AArch64) — Feb 2025 – June 2025

- Developed a prototype C compiler in Python supporting a subset of the C language, focusing on language parsing, semantic analysis, and code generation.
- Implemented recursive descent parser and parser combinators for syntax analysis.
- Performed semantic checks including local variable scoping, symbol table management, and type checking.
- Generated LLVM Intermediate Representation (IR) targeting AArch64 assembly for low-level code generation.
- Applied compiler optimizations: constant folding, constant propagation, dead code elimination, and code motion.
- Used Git for version control and maintained modular, extensible code architecture.

File System Migration Framework — Aug 2024 – Dec 2024

- Designed and implemented a framework for migrating data between ext4 and NTFS file systems by reading and writing directly to raw disk devices as file streams.
- Developed low-level file system parsing and metadata reconstruction to ensure data integrity during migration.
- Managed concurrent disk access and error handling to ensure robust data migration.
- Used Linux system calls and raw device I/O for direct disk manipulation.
- Employed Git for source code management and collaboration.

Rudimentary File System (Virtual Disk Manager) — Aug 2024 – Dec 2024

- Built a virtual disk file system to efficiently manage files and metadata at the bit level to optimize storage space.
- Supported file operations including creation, insertion, deletion, listing, and retrieval on the virtual disk.
- Implemented defragmentation via linear compaction to optimize disk space and update metadata.
- Used bit manipulation and efficient data structures for metadata organization.

Cryptography Library — Sep 2024 – Dec 2024

- Developed a modular cryptographic library implementing RSA, ElGamal, Diffie-Hellman key exchange, and Digital Signature Algorithm (DSA).
- Leveraged Number Theory Library (NTL) in C++ for large prime arithmetic and modular operations.
- Applied cryptographic principles such as Discrete Logarithm Problem (DLP) and Elliptic Curve DLP for secure communications.
- Focused on secure, performant cryptographic operations suitable for network security applications.

Technical Skills

Programming Languages: C, C++, Python (prototyping), Assembly (AArch64), SQL
Development Tools: Git, Linux, Make, GCC, Clang/LLVM
Libraries: Number Theory Library (NTL)
Core Competencies: Data Structures, Algorithms, Compiler Design, File Systems, Cryptography

NOTABLE ACHIEVEMENTS

Rank: Secured AIR 7 in MAH-MCA CET 2023