Tushar Chenan

✉ tusky2002@gmail.com | 🔗 LinkedIn | ⚙ GitHub | 🆑 CodeChef | </> CodeForces

EDUCATION

Birla Institute of Technology & Science, Pilani — Hyderabad, India
*B.E. in Computer Science and Engineering (**CGPA: 9.73/10.00**)* — *November 2020 – July 2024*

- **Distinction:** Ranked 7th university-wide (top 0.7%) among 1000+ students, earning a **100% Merit Scholarship**.
- **Major coursework:** Operating Systems, Computer Networks, Compiler Construction, Computer Architecture, Theory of Computation, Microprocessors & Interfacing, Design & Analysis of Algorithms, Principles of Programming Languages
- **Additional coursework:** Number Theory, Computational Geometry, Computer Graphics, Graphs and Networks, Game Theory, Discrete Structures for Computer Science, Logic in Computer Science, Foundations of Data Science, Digital Design
- **Standardized Tests:** GRE: 170/170 Q, 153/170 V, 4.5/6 AWA | TOEFL: 113/120 (R:29, L:27, S:29, W:28)

National Public School — Bangalore, India
*CBSE Class XII (**96.4%**)* — *July 2020*
*CBSE Class X (**95.6%**)* — *July 2018*

TECHNICAL SKILLS

Programming Languages: C/C++, Python, Go, JavaScript & TypeScript, HTML/CSS, SQL

Databases & Data Management: MySQL (InnoDB, Buffer Pool), SQL Server (Locking & MVCC, Query Execution, B+ trees), MongoDB (LSM trees), Snowflake, MapReduce, Data Warehousing & Data Lakes, ETL Pipelines, SQL Query Optimization

Systems Engineering & Performance: Performance Benchmarking (HammerDB TPC-C & TPC-H, Sysbench), CPU Caches, Linux Kernel (Concurrency, Memory Management, Filesystems, Containers), Network Sockets/gRPC, Low-Level C/C++ (SIMD)

Web Frameworks & DevOps Tools: React.js, Bootstrap, Node.js, Express.js, Django, GraphQL, Git, Docker, Kubernetes

WORK EXPERIENCE

Google | Cloud Databases, SQL Server — Bangalore, India
Performance and Software Engineer — *July 2024 – Present*

- Spearheaded the fleet-wide adoption of Forced Unit Access (FUA) on EXT4 for SQL Server, increasing TPM by up to 20% and overturning Microsoft's default (XFS), which led to an update in their official documentation.
- Deployed a new SQL Server durability setting (`alternatewritethrough`), yielding an 18% TPM gain; discovered and reported 3 critical bugs, resulting in fixes in official Microsoft Cumulative Updates (CU16, CU18, CU20).
- Resolved the long-standing internal XFS vs. EXT4 performance debate by engineering a custom multi-client HammerDB TPC-C orchestrator to generate highly parallelized workloads, producing definitive at-scale benchmark data.
- Architected and benchmarked an isolated Write-Ahead Logging (WAL) disk configuration, proving a low-cost disk could reduce write I/O latency and boost transaction throughput by 12%.
- Enhanced a Go-based stress testing framework for database integrity by introducing complex concurrency scenarios (e.g., online shrinking, indexing), catching critical storage bugs pre-deployment.
- Responded to 100+ production alerts in 24×7 on-call rotations, including leading a high-priority escalation for a financial client by debugging a complex replication failure.
- Led a technical deep-dive on Log-Structured Merge-Trees (LSM Trees) for an org-wide study of 'Database Internals', earning a peer bonus for exceptional clarity and knowledge sharing.

Apple | IS&T Global Business Intelligence — Hyderabad, India
Software Engineering Intern — *January 2024 – June 2024*

- Engineered a scalable Snowflake data pipeline for freight cost allocation on terabyte-scale datasets, improving logistics traceability and enabling accurate accounting of over $250,000 quarterly.
- Reduced query latency on multi-terabyte tables by forensically analyzing and re-engineering complex SQL joins, optimizing execution paths based on a deep understanding of Snowflake's distributed query planner.
- Achieved an $\sim 800\times$ speedup on terabyte-scale data by translating a Python heuristic model into a massively parallel SQL implementation, exploiting Snowflake's MPP architecture to cut runtime from days to minutes.

Google | Cloud Databases, MySQL — Bangalore, India
Software Engineering Intern — *June 2023 – August 2023*

- Built a low-level C++ tool to validate MySQL/InnoDB's auxiliary SSD cache, directly manipulating physical page structures. Reverse-engineered InnoDB's on-disk formats and checksum algorithms to ensure data integrity at the block device level.
- Improved performance significantly by parallelizing I/O operations using C++ multithreading, exploiting SSD concurrency to reduce validation time on multi-gigabyte caches from several minutes to under 60 seconds.
- Authored comprehensive end-to-end tests within the MySQL Test Run (MTR) framework, rigorously validating the tool's correctness and robustness at the database kernel level.

Advanced Coursework Projects

Mini C Compiler | ⍉ C++, Flex, Bison   March 2023 − May 2023
- Tackled the challenge of understanding compiler architecture by engineering a multi-stage compiler frontend for a C subset, featuring a Flex-based lexer and a Bison/YACC-based parser that generates a comprehensive Abstract Syntax Tree (AST).
- Implemented semantic analysis with a hierarchical symbol table for nested scopes and type-checking, and an Intermediate Representation (IR) generation stage for machine-independent three-address code (TAC).
- Achieved full runtime support by building a tree-walking interpreter to execute ASTs directly, successfully managing function calls, program state, and dynamic memory.

Polygon Decomposition | ⍉ C++, Computational Geometry, Performance Analysis   January 2023 − March 2023
- Authored a high-performance C++ application for minimal convex decomposition based on a two-phase algorithm from a research paper, using a Doubly Connected Edge List (DCEL) for efficient geometric manipulations.
- Validated the algorithm's correctness and performance by designing a comprehensive Python-based testing and visualization suite, enabling rigorous analysis on polygons with up to 3000 vertices.
- Produced a detailed performance analysis that benchmarked the algorithm's pseudo-polynomial time complexity and evaluated the impact of initial conditions on decomposition efficiency.

Concurrent Matrix Multiplication | ⍉ C, Pthreads, IPC, Shared Memory   November 2022 − January 2023
- Solved the performance bottleneck of sequential matrix multiplication by designing a concurrent, multi-process pipeline in C that decoupled I/O-bound file reading from CPU-bound computation using shared memory and Pthreads.
- Maximized parallelism by engineering a custom user-space Round Robin scheduler with Linux signals (SIGSTOP, SIGCONT) for preemptive multitasking across processes.
- Delivered a rigorous performance evaluation using a custom Python benchmarking suite, analyzing the trade-offs between thread count and context-switching overhead to identify optimal concurrency levels.

Awards & Achievements

ICPC Regionalist: Placed 117th out of 1107 teams at the 2020 ICPC Asia Gwalior-Pune Regionals.

Meta Hacker Cup: Global rank 833 in Meta Hacker Cup 2023 Round 2.

Indian Olympiad in Informatics (INOI): Top 158 among 835 students who qualified for the Indian Olympiad in Informatics.

Competitive Programming: Peak rating of 1601 (Expert) on CodeForces and 2054 (5 stars) on CodeChef.

HP Codewars: Rank 1 out of 100+ schools at HP Codewars, Bangalore 2019.