

# Tushar Chenan

✉ tusk2002@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 at graduation.
- **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 ([alternatewriterthrough](#)), 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 24x7 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

- Orchestrated a scalable Snowflake data pipeline to automate freight cost allocation across terabyte-scale datasets, improving logistics traceability and reducing manual effort.
- Reduced query latency on multi-terabyte tables by re-engineering complex SQL joins, optimizing execution based on an analysis of Snowflake's distributed query planner.
- Designed a Python-based heuristic matching model and translated it into optimized SQL to leverage Snowflake's distributed compute engine, reducing compute time significantly.
- Delivered a production system for accurately accounting for over \$250,000 in logistics expenses quarterly.

### Google | Cloud Databases, MySQL

Bangalore, India

Software Engineering Intern

June 2023 – August 2023

- Built a low-level C++ validation tool to verify SSD-based cache integrity in MySQL/InnoDB, operating directly on physical page structures.
- Performed a first-principles analysis of the InnoDB storage engine, reverse-engineering its on-disk data structures and checksum algorithms to implement validation logic.
- Parallelized I/O with C++ multithreading to exploit SSD concurrency, slashing validation time on multi-gigabyte caches from minutes to under 60 seconds.
- Authored comprehensive end-to-end tests using the MySQL Test Run (MTR) framework to validate the tool's correctness and robustness within the database kernel.

## PROJECTS

---

### Concurrent Matrix Multiplication | C, Pthreads, IPC, Shared Memory

November 2022 – January 2023

- Designed a concurrent, multi-process pipeline in C to decouple I/O-bound file reading from CPU-bound computation, enabling high-throughput data transfer between processes via shared memory.
- Utilized fine-grained parallelism using POSIX threads (pthreads), strategically distributing the workload across threads to accelerate both file processing and the matrix multiplication algorithm.
- Engineered a custom user-space Round Robin scheduler using Linux signals (SIGSTOP, SIGCONT) for preemptive multitasking across I/O and compute processes.
- Executed a rigorous performance evaluation using a custom Python benchmarking suite to analyze the trade-offs between thread count and context-switching overhead, visualizing the impact on turnaround and wait times.

### Mini C Compiler | C++, Flex, Bison

March 2023 – May 2023

- Engineered a multi-stage compiler frontend for a C subset, using Flex for lexical analysis and Bison/YACC to parse tokens into a comprehensive Abstract Syntax Tree (AST).
- Established robust semantic analysis with a hierarchical symbol table to manage nested scopes, enforce strict type-checking, and validate variable declarations and usage.
- Formulated an Intermediate Representation (IR) generation stage, traversing the AST to produce machine-independent three-address code (TAC) in a quadruple format.
- Built a tree-walking interpreter to execute ASTs directly, handling function calls, program state, and dynamic array memory — enabling full runtime support for the C subset.

### Polygon Decomposition | C++, Computational Geometry, Performance Analysis

January 2023 – March 2023

- Implemented a high-performance application to implement a two-phase algorithm for minimal convex polygon decomposition, drawing from a [published research paper](#).
- Devised a Doubly Connected Edge List (DCEL) data structure to efficiently represent the planar subdivision, enabling robust geometric queries and manipulations.
- Crafted a comprehensive Python-based testing and visualization suite to validate the algorithm's correctness and analyze its performance on polygons with up to 3000 vertices.
- Conducted a rigorous performance analysis, benchmarking the algorithm's pseudo-polynomial time complexity and evaluating the impact of initial conditions on decomposition efficiency.

## AWARDS & ACHIEVEMENTS

---

**Merit Scholarship:** Awarded a 100% Merit Scholarship for ranking in the top 0.7% academically in my batch.

**ICPC Regionalist:** Placed 117<sup>th</sup> 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.