



RITVIK SINGH

Course : **B.E. (Hons.)**, Computer Science, 2026

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CGPA : 9.94



ACADEMIC DETAILS

COURSE	INSTITUTE/COLLEGE	BOARD/UNIVERSITY	SCORE	YEAR
CLASS XII	Maa Bharti Senior Secondary School, Kota	CBSE	96.2 %	2022
CLASS X	St. Gregorios Senior Secondary School, Kota	CBSE	96.2 %	2020

Subjects / Electives	Data Structures and Algorithms, Computer Architecture, Computer Networks, Operating Systems, Design and Analysis of Algorithms, Machine Learning, Compiler Construction, Object Oriented Programming, Combinatorics, Database Systems, Quantum Computing, Probability and Statistics, Theory of Computation, Digital Design, Microprocessors and Interfacing, Discrete Structures for Computer Science, Multivariate Calculus, Linear Algebra, Differential Calculus
Technical Proficiency	C++, C Programming, Python, STL, Java, Data Structures, Algorithms, SQL, PyTorch, OCaml

INTERNSHIP AND WORK EXPERIENCE

Quant Research Intern, Quadeye Securities LLP - Gurugram

May 2025 - Jul 2025

- Designed and implemented a **Python-based event graph framework** that modeled dependencies between high-frequency events, supporting **causal inference** and large-scale analysis. The framework was modular and extensible, allowing new event types and dependency rules to be added.
- Developed a **systematic data pipeline** to ingest, normalize, and structure **event streams from multiple sources**, emphasizing scalability, modular design, and low-latency performance. The pipeline included validation layers and parallelized components to maintain reliability under heavy workloads.
- Built and **optimized filtering algorithms** that leveraged cross-stream timing and dependency rules to remove unrelated activity, improving causal detection while reducing computational overhead. Profiling and refactoring ensured consistent performance across varying input sizes.
- Engineered a **classification module** for event relationships that applied timing constraints, volume thresholds, and propagation patterns to distinguish direct from derived events. The module was configurable and adaptable, enabling use in multiple research and analysis workflows.
- Collaborated with researchers** to validate framework outputs against empirical behaviors, integrating unit tests, performance profiling, and iterative refinement to ensure correctness and maintainability. Regular reviews aligned implementation with both research needs and coding best practices.
- Contributed to **internal analysis** and **visualization tooling** by exposing reusable APIs and building interfaces for tracing event reaction chains. These tools improved debugging, enhanced transparency, and accelerated development by providing clear visualizations of event dependencies.

Software Developer Intern, Amazon - Bengaluru

May 2024 - Jul 2024

- Designed and developed **JSONCover**, a robust **JSON Schema Coverage Analysis Library** that provides comprehensive and detailed coverage reports.
- The library offers **line coverage** metrics, enabling developers to evaluate payloads against JSON schemas and gain in-depth insights into their adequacy.
- Modelled JSONCover as a **language-agnostic library**, designed to **seamlessly integrate** with widely-used build tools such as Gradle and Maven.
- Implemented configurable **coverage thresholds** within JSONCover, enabling automatic build failures if coverage metrics fell below predefined levels.

PROJECTS

Experimental Algorithmic Analysis - Data Structures and Algorithms

Jan 2025 - Present

- Under Prof. Jagat Sesh Challa, BITS Pilani, conducted an in-depth study focused on bridging the gap between **theoretical algorithm analysis** and **real-world performance**. Explored how factors like memory hierarchy, locality, I/O bottlenecks, etc. significantly influence the execution efficiency of algorithms.
- Designed and executed **targeted benchmarks** to analyze performance characteristics of algorithms, matrix traversals, search trees, hash tables, etc. Investigated locality, caching strategies, and external memory algorithms. Ongoing work includes additional experiments to evaluate real-world efficiency.
- Findings are being compiled into a **Coursera course** to be taken by **Prof Shan B**, to bridge academic theory with practical systems-level insights.

Compiler for a Custom Programming Language - Compiler Construction

Jan 2025 - May 2025

- Developed the **Lexical Analyzer** and **Syntax Analyzer** for a statically-typed modular programming language designed with custom syntax and semantics.
- Implemented **tokenization** for a variety of lexical patterns including specialized variable and function identifier formats, numbers and keywords.
- Built a parser based on **LL(1) grammar** to support complex constructs such as conditional/iterative statements, function definitions, and tagged unions.
- Ensured **error handling** for tokens and grammar violations, including feedback for ambiguous cases like partial operators or malformed numerics.

CampusPay : The Student Credit Management System - Database Management, Object Oriented Programming

Feb 2024 - Apr 2024

- Developed a robust **Java** application (CampusPay) facilitating seamless **payment and order management** for students and vendors within the campus.
- Employed **MySQL** for efficient database interactions, **Java Swing** for a user-friendly interface and **JDBC** for reliable seamless database connectivity.

FUSIONNET : A multi-modal deep learning framework for predicting progression of Diabetic Retinopathy - AI/ML

Jan 2024 - May 2024

- Developed a **hybrid model** for predicting the progression of **Diabetic Retinopathy** using retinal fundus images and clinical numerical and categorical data.
- Employed **multimodal learning** by integrating **DenseNet** and **Multi-layer Perceptron (MLP)** using PyTorch, achieving an AUC score of approximately 0.9.

COMPETITIVE PROGRAMMING

ICPC Regionalist – ICPC Asia West Regionals (2024)

- Successfully qualified for the Kanpur and Chennai regional sites of the ICPC through a highly competitive national-level online round.
- Represented BITS Pilani at the **Kanpur onsite regional**, where we secured an **33rd rank** among the teams from all institutes across the country.

Active participant on competitive programming platforms such as **Codeforces**, **Codechef**, and **AtCoder**

- Ranked as **Expert** on Codeforces (**Max Rating - 1611**) and **5 Star** on Codechef (**Max Rating - 2096**).
- Codechef** : Global Rank **6** (Codechef Starters 120 Div 3), Global Rank **62** (Codechef Starters 127 Div 1) and Global Rank **69** (Codechef Starters 122 Div 2).
- AtCoder** : **AIR 64** (AtCoder Beginner Contest # 341), **AIR 65** (AtCoder Beginner Contest # 360) and **AIR 66** (AtCoder Beginner Contest # 340).

AWARDS, SCHOLARSHIPS, VOLUNTEERING AND ACHIEVEMENTS

Teaching Assistant - Data Structures and Algorithms CS F211 BITS Pilani - Pilani Campus	Jan 2025
<ul style="list-style-type: none"> Assisted in conducting lab sessions for undergraduate students, reinforcing core concepts in Data Structures and Algorithms CS F211 course. Provided one-on-one guidance, debug support, and conceptual clarity on topics including trees, graphs, sorting, searching, and dynamic programming. 	
BITS Pilani 100% Merit Scholarship BITS Pilani - Pilani Campus	Jul 2022
<ul style="list-style-type: none"> Awarded the Merit Scholarship for consistently ranking in the top 1% of the class across all semesters, reflecting academic excellence and dedication. 	
Joint Entrance Examination (JEE) Main National Testing Agency (NTA)	Jul 2022
<ul style="list-style-type: none"> Secured an All India Rank of 223 out of over 1 million candidates in one of India's most prestigious and competitive engineering entrance examinations. 	
Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship Department of Science and Technology, Government of India	Jun 2022
<ul style="list-style-type: none"> Awarded the prestigious KVPY Fellowship by IISc for securing AIR 15 in the KVPY 2021-22 SX Stream and AIR 699 in the KVPY 2020-21 SA Stream. 	
National Talent Search Examination (NTSE) Scholarship Ministry of Education, Government of India	Mar 2021
<ul style="list-style-type: none"> Awarded the prestigious NTSE scholarship by NCERT for exceptional performance in a nationwide competitive exam, recognizing outstanding aptitude. 	

POSITION OF RESPONSIBILITY

Apogee Joint Coordinator - Coding Club BITS Pilani	May 2024 - May 2025
<ul style="list-style-type: none"> Coordinated all Coding Club events for APOGEE 2025, managing planning, logistics, and execution single-handedly across four events: Hackathon, International Coding League (Codeforces-based international contest), Decrypt (cryptic puzzle hunt), and Gaming Stall (custom-made game by club). Created and tested problems for the International Coding League, which saw participation from 700+ coders internationally, held on Codeforces. Also served as problem setter for multiple campus-wide coding contests with 200+ participants throughout the year Active member of the Competitive Coding Vertical, contributing to community engagement and technical mentorship. Conducted technical sessions for juniors on Data Structures and Algorithms since Dec 2022. 	
Joint Secretary - Computer Science Association BITS Pilani	Sep 2023 - Dec 2024
<ul style="list-style-type: none"> Orchestrated and supervised a Campus Wide TreasureHunt during Sports Fest 2024, with a team of 4 members and attracting over 700 participants. Active Member and Lead of the Competitive Coding Vertical since February 2023, inspiring numerous student's participation in Coding Contests. 	
Member - Google Developers Student Club BITS Pilani	May 2023 - Present
<ul style="list-style-type: none"> Member of the Competitive Coding Vertical, providing mentorship and guidance to junior members, fostering their development in competitive coding. 	