

# Sumit Kumar

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in Sumit Kumar SumitKumar-17

## Academic Qualifications

Year	Degree/Certificate	Institute	CGPA/%
2022 - Present	5 year Dual Degree Course(BTech. + MTech.) in Computer Science	Indian Institute of Technology, Kharagpur	8.80/10
2022	Class XII (CBSE)	Delhi Public School, Kalyanpur	94.20%
2020	Class X (CBSE)	Delhi Public School, Kalyanpur	96.60%

## Work Experiences

### Spring Fest Website - Spring Fest

Aug'24-Jan'25

- Optimized and scaled the **backend architecture**, efficiently handling **100 million+** network requests, powering **real-time event updates**, **complaint resolutions**, and **secure payment processing**.
- Developed and integrated both **front-end and back-end APIs** for the **Spring Fest** app, enabling seamless **event registrations**, **team management**, and **deregistration**, supporting over **1 lakh participants**.
- Engineered a **secure authentication system** on the Spring Fest website, incorporating **Google login** and **OTP-based password resets**, facilitating smooth **user onboarding** and handling **transactions exceeding Rupees 60 lakhs**.
- Designed and implemented a robust **contingent system**, allowing users to **create, join, and manage contingents**, revolutionizing **group payments** and **accommodation allocation** through a **unified transaction model**.

## Key Projects

### skDB - Custom Database (Tech Stack: C++, Flex, Bison)

June '24 - Jul '24

- Developed skDB, a lightweight **RDBMS** in **C++**, with an **SQL parser** using **Flex, Bison** and storage powered by **RocksDB**.
- Implemented query execution with **efficient indexing**, **transaction handling**, and **concurrent access**.
- Built a **custom storage engine** using **key-value stores**, ensuring **ACID compliance** and optimized **disk I/O**.
- Integrated **automated testing** with **Google Test**, ensuring **query correctness**, **transaction consistency**, and **data integrity**.

### Raspberry Pi - Self project (Tech Stack: Docker, Kubernetes, Raspberry Pi OS)

May'24 - Jul'24

- Deployed four instances of website using **Docker** containers within **Kubernetes Pods** along with load balancing.
- Exposed the cluster's target port from my **home network** to the wider **internet** via **port forwarding** on home router.
- Used Dynu's **Dynamic DNS** to dynamically map **non-static IP Address** of my home network with a **level 3 domain name**.
- Deployed a **DNS Server** using **Pihole** for content filtering which was used as **DNS Server** by **DHCP Server** in home router.

### Route Optimization and Planning - Optimization Engine (Tech Stack: C++, gRPC, OR-Tools)

Nov'24 - Dec'24

- Developed a **Route Optimization Engine** for **last-mile delivery**, leveraging **clustering algorithms** and **optimal route generation**.
- Implemented **gRPC-based communication**, enabling **efficient interaction** between clients and the optimization system.
- Designed and built a **scalable delivery planning system**, integrating **OR-Tools** for route computation and **automated scheduling**.

## Skills & Expertise

- Programming Languages:** C/C++, Bash, Golang, Rust, Elixir, Awk, JavaScript, TypeScript, Python3, Java, Dart
- Libraries and Frameworks:** ReactJS, NextJS, React Native, Flutter, NodeJS, Pandas, NumPy, C++ STL, GraphQL, Redis, MongoDB, SQL(Postgres, MySQL), Docker, Kubernetes
- Tools:** Git, GitHub, Linux Shell, Android Studio, Visual Studio Code, GDB, Valgrind, Jupyter

## Relevant Courses

- Computer Science:** Programming and Data Structures, Algorithm-I, Algorithms Lab, Software Engineering, Software Engineering Laboratory, Computer Organization and Architecture, Computer Organization Laboratory, Compilers, Compilers Laboratory
- Mathematics:** Advanced Calculus, Linear Algebra and Numerical and Complex Analysis, Probability & Statistics, Discrete Structures, Formal Language and Automata Theory
- Electronics:** Basic Electronics, Switching Circuits and Logic Design, Basic Electronics Laboratory, Switching Circuits Laboratory

## Awards and Achievements

- Secured All India Rank of **2038** in Joint Entrance Examination Advanced, 2022 among 1.5 lakh students.
- Secured All India Rank of **1870** out of 1.2 million candidates in Joint Entrance Examination,Mains 2022.
- Secured All India Rank of **83** in WBJee, 2022 out of 1 lakh students.

## Positions of Responsibility

### Tech Head - Spring Fest

Aug'24 - till now

- Led website and app development for Spring Fest, IIT Kharagpur, implementing agile methodologies for efficient project management.
- Managed on-site technical operations during the festival, addressing real-time issues for a seamless digital experience for attendees
- Supervised event registration and coordinated attendee accommodations, showcasing effective leadership and organizational skills.