Mmukul Khedekar

✉ mmukulkhedekar34@gmail.com   📞 +91 86575 26108   🔗 kh4rg0sh.github.io   in mmukul khedekar

 kh4rg0sh

Education

Indian Institute of Technology, Roorkee (IIT Roorkee)   *Oct 2022 – May 2026*
B. Tech in Computer Science and Engineering

- CGPA: 8.47 / 10.0

Experience

Summer Analyst, Goldman Sachs   *Bengaluru, India*
Trading Blotter Enhancement   *May 2025 – Aug 2025*

- Optimised data retrieval for the Trading Blotter by constructing **materialised MongoDB Views** with efficient aggregation pipelines.
- Refactored core API endpoints for the Trading Blotter, consolidating multiple API calls into a single external API request and DB fetch in the backend, **reducing page loading time from 4-5 sec. to 1-2 sec.**, and cutting network overhead.
- Designed **Server-Side DB-level Filtering**, reducing the amount of data fetched and loaded by the Trading Blotter UI.
- Enhanced Trading Blotter UI experience with **Live Polling** and **Delta Updates** to fetch only those documents that changed in the DB, to the Trading Blotter UI.
- Tech Stack: MongoDB, Spring Boot Web, Spring Data Mongo, React.js, Redux Toolkit, JUnit5 and Mockito.

Cloud Security Intern   *Remote*
CloudDefense.AI   *Nov 2024 – Feb 2025*

- Implemented GCP Compute Engine Scanner using OSLogin in Python.
- Researched detection of Container Runtime Vulnerabilities using OSQuery.

Achievements

Secured All-India Rank **387/150,000** in **JEE Advanced 2022**.
Secured All-India Rank **213/900,000** in **JEE Mains 2022** (99.98%ile).
Secured All-India Rank **383/150,000** in **KVPY SX 2022**.
Selected for **IMO Training Camp (IMOTC 2020)**; ranked among the **top 30 nationwide** in INMO 2020.
Competed in **Capture The Flag** competitions with InfoSecIITR (#2 ranked CTF team in India).
Competitive Programming:

- Max. Rating **1788 (Expert)** on Codeforces.
- Max. Rating **2187 (5-star)** on Codechef.

Projects

Post-Quantum Secure Email Signatures   *Jan 2025 - May 2025*

- A custom implementation of the **DKIM Digital Signature** generation using **CRYSTALS-Dilithium** (an NIST-standardised Post Quantum Algorithm) to **future-proof against quantum attacks**.
- Designed and implemented the underlying **Emailing Infrastructure** from scratch, including a **custom SMTP client/server** and **DNS server** in Python/Flask.

Toy C Compiler   *Jan 2025 - April 2025*
- Built a toy **C Compiler** in Python that supports basic **C11 features** such as C11 data types and operators, control flow statements and loops, printf and scanf, pointers and arrays.
- Used **PLY (Python-Lex-Yacc)** to write a lexer and a parser, implemented the **Three-Address Code (3AC)** Intermediate Representation and code generation for the **x86-64 assembly**.

Coll-IDE: Online Collaborative IDE for Competitive Programming   *Feb 2024 - April 2024*
- Built a real-time **Collaborative Coding IDE** designed for Competitive Programming, featuring **collaborative code editing**, integrated **test case fetching** from Codeforces, **direct submission** capabilities, along with a **collaborative whiteboard** for brainstorming.
- Implemented **Real-time synchronisation** with **Web Sockets (Socket.IO)**; Built the UI with **React.js**, Backend with **Express.js** and used **MongoDB** for data persistence.

SIC/XE Assembler with Program Blocks   *Feb 2024 - April 2024*
- Two Pass Assembler for **SIC/XE (Simplified Instruction Computer)** that converts Assembly Code to Machine Code and has additional support for features like **Literals**, **Expressions**, **Program Blocks** implemented in C++.

Technologies

Languages: C, C++, Python, Java, Javascript

Backend Frameworks: Spring Boot, Django REST, Flask, FastAPI, Express.js

Frontend Frameworks: React.js, Redux Toolkit

Databases & Tools: MongoDB, JUnit5, Mockito

Extra-Curricular

InfoSecIITR   *March 2023 - Present*
A Students Club Group of Cyber-Security Enthusiasts
- Recruited to the Club in March, 2023.
- Selected in the Core Team of InfoSecIITR in June, 2023.
- Promoted to the position of **Additional Technical Secretary** in May, 2025.

Programming & Algorithms   *March 2023 - Present*
A Club Group for Competitive Programming
- Recruited to the club in March, 2023.
- Became a permanent member of the club in October, 2023.