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Github LinkedIn Portfolio Blog

Education

- **BTech in IT, IIIT Allahabad** *Dec 2021 - June 2025*
  - CGPA : 7.98 / 10
  - Courses : Operating Systems, Computer Networks, DBMS, Object Oriented Methods, Automata Theory
  - Extracurricular Activities : Senior Member, Music Society. Coordinator, Literary Society.
- **Intermediate** *May 2019 - April 2021*
  - 12th grade, ISC 85%
  - Participated in Google Code-In 2019-20.
- **High School** *April 2008 - April 2019*
  - 10th grade, ICSE 92.67%
  - Participated in Google Code-In 2017-18.

Software Projects

- **IIIT A Software Engineering Research Lab Website**
  - Developed a RESTful API that supports CRUD operations for users, publications, learning resources and research scholars for normal and administrative users.
  - Implemented an ORM layer between the H2 database and the server application using Spring Data JPA and Hibernate.
  - Performed server-side rendering (instead of client-side rendering) to optimise for infrequent data changes.
  - Tech : MVC Architecture, Spring Boot and Kotlin.
- **TutorsPoint**
  - Developed a video-based platform for teachers and students to interact
  - Co-authored a RESTful API supporting CRUD applications for comments, likes, users and videos.
  - Implemented an ORM layer between the Apache Derby database and the server application using Hibernate.
  - Co-authored a JavaFX frontend with support for watching, liking and commenting videos along with subscriptions and notifications.

k8 - A CHIP 8 Emulator

- Implemented the fetch-decode-execute cycle of the CHIP 8 CPU architecture.
- Implemented the graphics context interface using JavaFX, enabling the CPU emulator to be completely decoupled from the graphics library.
- Exploited atomic booleans to implement interrupt handling between the graphics and CPU coroutines.
- Achieved peak FPS of 133 on the JavaFX frontend.

- **An implementation of the Scheme programming language**
  - Developed an interpreter and a compiler (to JavaScript) for a subset of the Scheme programming language written in Scheme.
  - Implemented the interpreter as a series of interpreters for successively more complicated subsets of Scheme.
  - Utilised a variant of the untyped λ calculus as an intermediate representation in the compilation process.

Research Project

Towards Univalent Methods in Systems Programming : Safety and Liveness by construction

- Researching the application of univalent type theory to design a framework in which well-typed programs are guranteed to ensure safety and liveness.
- Exploring the application of F-coalgebras to the mathematical modelling of systems and their properties.

Technical Writing

- **Exploring nullability in Kotlin**.
  - Highlighted the differential treatment of nullability in Kotlin and Java.
  - Provided detailed insights into the JVM level representation of nullability in Kotlin.
  - Explored the interaction of nullability at the type level with inheritance and subtyping in Kotlin.
- **Using fixedpoint combinators to implement recursion**
  - Explored challenges in implementing recursion within the interpreter.
  - Reviewed the mathematical theory of fixed-point combinators and thereby derived an implementation of recursion.
  - Demonstrated the use of fixed-point combinators concretely within the interpreter.

Skills

- **Languages:** Java, Kotlin, C++, Rust, Scheme, Haskell, Agda
- **Frameworks:** JavaEE,Spring Boot, Hibernate
- **Tools:** Shell, Git, Github, Pandoc, Gradle
- **OS:** Linux