ARINDAM SAL

ACADEMIC DETAILS

Year	Degree / Board	Institute	GPA / Marks(%)
---	M.Tech in Cyber Security	Indian Institute of Technology Delhi	7.38
2024	B.Tech in Computer Science and Engineering	MCKV Institute of Engineering	9.59
2020	West Bengal Council of HIgher Secondary Education (12th)	Santragachi Kedarnath Institution	83.6%
2018	West Bengal Board of Secondary Education(10th)	Tatarpur High School	92.71%

IIT DELHI THESIS

Title: Secure Boot and Trusted Logging for Automotive ECUs with HSM & TEE
Supervisor: Prof. Kolin Paul, Department of Computer Science and Engineering
Description: Building automotive microcontroller security stack to protect **ECUs** against firmware tampering, unauthorizedmodifications, and software attacks; Implementing **secure boot, trusted logging, and authenticated updates**, scaling from**Raspberry Pi** prototype to **Infineon AURIX™ TC375** with **HSM-backed** key storage and **TEE**-protected runtime.

- Implemented multi-stage validation (**Bootloader → U-Boot → Monitor**), ensuring only signed firmware executes.
- Prototyped secure boot on **Raspberry Pi**, achieving **100%** authenticated execution with **<5%** verification overhead.

PROJECTS

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• **Design and Implementation of Reliable Transport Protocol with Concurrency and Congestion Control (Prof. Tarun Mangla)** (July, 2024 - September, 2024) :
- Built a TCP-like reliable transport protocol over UDP in Python with cumulative ACKs, sliding window, adaptive timeouts, and congestion control (**TCP Reno & CUBIC**); evaluated loss-resilient file transfers in **Mininet** under 0–200 ms delays and 0–5% packet loss, with fairness analysis using **Jain's Index** on dumbbell topologies.
- Developed a **multi-threaded C++ socket** server supporting up to 32 concurrent clients, implementing centralized scheduling (**FIFO, Round-Robin**) and decentralized contention protocols (**Slotted ALOHA, BEB**) for performance and fairness.

• **Kernel Enhancements to xv6 Operating System (Prof. Smruti R. Sarangi)** (March, 2025 - June, 2025) :
- Extended **xv6** kernel with **syscalls** for **auth, process history, syscall control, file permissions, and signal handling** with custom handlers.
-Added advanced OS features including a **custom scheduler (limits, profiling, priority** boosting) and memory enhancements **(page swapping, adaptive replacement, fault handling)**.

• **Decentralized NFT Marketplace (ERC-721, Ethereum) (Prof. S.V. Sharma)** (August, 2024 - November, 2024) :
- Built a full-stack dApp for NFT minting, listing, selling, and burning using **Solidity** smart contracts, with metadata on **IPFS** (Pinata); implemented marketplace logic for secure ownership transfer, payment distribution, and listing management, optimized via **Hardhat optimizer**.
- Integrated a **React.js** frontend with **Metamask wallet authentication**, and deployed/tested on **Ethereum** using Hardhat + Alchemy with **Ether.js** for seamless blockchain interaction.

• **Traffic-Aware SDN Controller for Performance Optimization (Professor Tarun Mangla)** (Jul, 2024 - Aug, 2024) :
- Developed **SDN applications on Ryu** with **OpenFlow** in **Mininet**, implementing Hub, Learning Switch, STP, and shortest-path routing (NetworkX/Dijkstra).
- Built an adaptive SDN routing system using ICMP, traceroute, Wireshark, and OpenFlow PortStats to monitor traffic and dynamically update flow tables, enhancing latency, utilization, and QoS.

TECHNICAL SKILLS

• **Programming Languages:** C (Proficient), C++ (Proficient with STL), Python (Core), Java (Core, JDBC, Servlets/JSP, Spring Framework/Spring Boot), Solidity (Basics), SQL
• **Software & Tools:** Git, MySQL, Wireshark, Burp Suite, Android Debug Bridge, NMap, Jadx-Gui

SCHOLASTIC ACHIEVEMENTS

• Receieved **Outstanding Teaching Assistant Award** in COL100(Introduction to Computer Science) in Semester-II (2024-25)
• Qualified **GATE** 2024 CS/IT

POSITIONS OF RESPONSIBILITY

• **Teaching Assistant for the course** Introduction to Computer Science(COL100)-**Best TA Award** & Data Structures and Algorithms(COL106)**, IIT Delhi** (Jul, 2024 - Present)

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IIT COURSE

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M.Tech in Cyber Security	Indian Institute of Technology Delhi	7.38	---

COURSES DONE

Advanced Data Structures, Computer Networks, Cryptography & Computer Sec., Introduction To Blockchains, Cryptocurrencies, And Smart Contracts, Resource Management In Computer Systems, Minor Project, Networks & System Security, Special Topics In Cyber Security