

ADESH PAL

BS-MS, Mathematics and Computing | Indian Institute of Technology Roorkee

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EDUCATION

Indian Institute of Technology Roorkee — BS-MS, Mathematics and Computing, CGPA: 8.12/10 *Expected 2028*
Kendriya Vidyalaya, Noida Sector-24 — Class XII: 91.8% | Class X: 92.8% *2020 – 2022*

SUMMARY

Mathematics and Computing undergraduate with an open-source software engineering internship (Linux Foundation Mentorship, OpenCost) and merged pull requests to widely-used open-source systems (go-libp2p, IPFS/Kubo). Comfortable across Go, Python, TypeScript, and C++, with experience spanning backend/distributed systems, full-stack real-time applications, and applied machine learning. Strong competitive-programming background (Codeforces Expert) and a track record of reading unfamiliar codebases, writing tests, and shipping through code review with external maintainers.

INTERNSHIP EXPERIENCE

Open-Source Software Engineering Intern — OpenCost (Go) | *Linux Foundation Mentorship* *Sep 2025 – Nov 2025*

- Designed and shipped a Model Context Protocol (MCP) server (PR #3386) exposing Kubernetes allocation, asset, and cloud-cost data to AI agents; merged into the main binary and enabled by default across all deployments as of v1.118.0 — used by OpenCost's production user base.
- Integrated local Ollama LLMs for natural-language querying over cost data, added a cost-efficiency query tool (PR #3431), and authored integration tests validating MCP responses against OpenCost's canonical REST endpoints (opencost-integration-tests PR #49).

OTHER OPEN-SOURCE CONTRIBUTIONS

go-libp2p — *Core P2P Networking Library (Go)* | *libp2p* *Merged, Jan 2026*

- Implemented Prometheus observability for the libp2p Resource Manager, exposing configured system/transient limits for real-time utilization monitoring, with full unit test coverage. PR #3433.

Kubo — *Reference IPFS Implementation (Go)* | *ipfs* *Merged, Jan 2026*

- Implemented the `-l/--long` flag for the `ipfs ls` command with Unix-style permission-string formatting and 20+ tests; merged into Kubo v0.40. PR #11103.

SELECTED PROJECTS

Collaborative Whiteboard | *MDG Space, IIT Roorkee* | *React, TypeScript, Node.js, Socket.IO, Firebase* *May 2026 – Jun 2026*

- Built a real-time collaborative whiteboard supporting multi-user drawing, live cursor tracking, chat, and room-based collaboration, with Firebase authentication and low-latency Socket.IO sync.
- Deployed the full stack on Vercel and Render with canvas export functionality.

Memory Management System — *Allocators, Virtual Memory & Cache Simulators* | *ACM, IIT Roorkee* *Dec 2025 – Jan 2026*

- Implemented First Fit, Best Fit, Worst Fit, and Buddy memory-allocation algorithms from scratch.
- Built a virtual memory simulator (paging, FIFO/LRU replacement) and an L1/L2 cache simulator (FIFO, LRU, LFU).

Mamba-Based Medical Image Super-Resolution | *IIT Roorkee* *Jan 2026 – May 2026*

- Designed a compute-efficient Global-Local Vision Mamba architecture with FlipTrans scanning to reconstruct high-resolution MRI images from low-resolution inputs, achieving 41.90 dB PSNR and 0.9922 SSIM on BraTS 2021.

Akave SDK — *Decentralized Storage CLI/SDK (Go)* | *akave-ai* *Dec 2025*

- Built an AWS CLI / kubectl-style persistent configuration system (5 subcommands) to remove repetitive flag entry, with 0600-permission config storage and secure masking of sensitive values.
- Added the feature to a 51+ test suite with zero regressions. PR #56.

TECHNICAL SKILLS

Languages: Go, Python, C++, TypeScript, SQL
Systems & Backend: REST/gRPC APIs, resource management, virtual memory & caching, Kubernetes, Unix/Linux, Socket.IO, Git, Docker, CI/CD, Prometheus, Networking (TCP/UDP)
ML / Data: PyTorch, TensorFlow, scikit-learn, OpenCV, NumPy, XGBoost/LightGBM, MCP (Model Context Protocol), Ollama/LLM integration

AWARDS & LEADERSHIP

- First Place, Code Decipher Challenge (2023 & 2024) — ACM IIT Roorkee Algorithmic Problem Solving Competition.
- Winner, Best Use of Oasis Protocol — New Delhi Buildathon, Akindo.
- Winner, UNIDAO Track — StackTooDeep V2 Hackathon, BlocSoc IIT Roorkee.
- Bronze Medal, Mid-Prep Problem Solving — Fidelfolio Tech GC'25, IIT Roorkee.
- Codeforces Expert — peak rating 1786 (Handle: dart1hlord).
- Member, Web Development, Student Technical Council, IIT Roorkee | Web Development Manager, Student Mentorship Program, IIT Roorkee | Participant, EthGlobal New Delhi 2025.