

ABIR ROY

✉ royabirdhn@gmail.com • [in roy-abir05](#) • [gh roy-abir05](#) • [globe roy-abir05.dev](#)

Education

National Institute of Technology, Durgapur

Bachelor of Technology in Chemical Engineering (CGPA: 8.01/10)

Aug 2023 – Present

Durgapur, West Bengal

Experience

Contributor at [The HPX Project](#)

Mar 2026 – Present

Open Source Contributor

Remote

- **PR #7110 — Segmented Equal Algorithm:** Implemented `hpx::equal` and `detail::segmented_equal` to handle distributed execution across partition boundaries, optimizing for the single-segment fast path.
- **PR #7186 — Segmented Mismatch:** Authored the implementation for the `segmented mismatch` algorithm, extending distributed parallel algorithms for `partitioned_vector` containers and resolving complex CI pipeline failures

Contributor at [cal.com](#)

Nov 2025 – Present

Open Source Contributor

Remote

- **PR #24849 — Docker Environment Stability:** Resolved cross-platform onboarding friction by fixing a build context path issue in Docker Compose, restoring macOS/Linux environment consistency.
- **PR #25638 — Analytics Stability:** Added configurable Meta Pixel conversion events and integrated a custom History API hook for SPA transitions, utilizing Zod schemas to cut duplicate signals.
- **PR #25499 — Routing Form Redirect Logic:** Replaced fragile slugification with strict URI encoding and robust query handling, resolving a critical routing blocker for enterprise client Aiir.

Projects

FinRecon: AI-Powered Financial Reconciliation | *Next.js, Python, FastAPI, PostgreSQL, Gemini API* [Source Code](#)

- Architected a low-latency, multi-pass reconciliation pipeline that processes deterministic signals first via a high-speed Python engine, invoking an LLM resolver solely for ambiguous edge cases to optimize API cost and latency.
- Engineered a Top-K candidate generation system with structured JSON validation, ensuring LLM reasoning is strictly bound by deterministic financial invariants (e.g., fee variance limits, T+3 settlement drift) to prevent hallucinations.
- Built a stateful Next.js and Tailwind CSS analytics dashboard featuring a transactional money-flow funnel and an explainable AI audit trail, empirically evaluated against a custom synthetic adversarial dataset.

TradeForces: Distributed HFT Benchmarking Platform | *Go, C++, Docker*

[Source Code](#)

- Engineered a distributed orchestrator to provision isolated Docker containers, securely executing and evaluating contestant-submitted C++ limit order books for the IICPC Summer Trading Hackathon.
- Developed a Go-based load generator to flood matching engines with concurrent TCP traffic, capturing throughput and tail latency metrics via a custom telemetry ingester.
- Designed an actor-model WebSocket hub for real-time analytics and implemented deterministic chaos injection via YAML profiles to compute a comprehensive Exchange Reliability Score.

Micromatch: High-Performance Order Matching Engine | *C++17*

[Source Code](#)

- Engineered a highly **scalable** and low-latency Limit Order Book in **C++17**, leveraging memory **optimization** techniques for $O(1)$ cancellation via hash indexing, achieving **<100 ns** matching latency.
- Designed a linear memory arena to pre-allocate order objects, eliminating runtime heap allocations on the hot path.
- Developed a POSIX socket TCP/IP Gateway and a custom benchmarking suite, demonstrating a sustained CPU throughput of **12.3 million orders/sec**.

Achievements

- Olympiads: **INOI Bronze Medalist (2023)** (Top 64 nationally). Qualified via ZIO.
- Programs: **Amazon ML Summer School (2026)** | **AMS Derive** (Rank 208) | **Meta Hacker Cup** (5x R2)
- National Contests: **IICPC CodeFest Regionalist (2025)** (Prelims Rank - 201). Selected for onsite regionals.
- Competitive Programming: **Codeforces Specialist (Max: 1556)** | **CodeChef 4-Star (Max: 1924)**

Technical Skills

Languages: C/C++ (STL, Modern C++17/20), Python, SQL, Bash

Core Concepts: Concurrency, Low-Latency Systems, CPU Caches, Computer Networks, Data Structures & Algorithms

Developer Tools: Linux (Arch, Hyprland), Docker, Git, POSIX Sockets

Positions of Responsibility

GNU/Linux Users' Group (GLUG)

Apr 2024 – Present

Senior Coordinator & Competitive Programming Head

NIT Durgapur

- Organized **Codecracker 2025**, an ACM-style CP contest on [HackerRank](#) featuring 7 algorithmic problems.
- Managed **GCP infrastructure** for foobarCTF, orchestrating containerized environments to ensure high availability.
- Mentored 50+ students in **Linux internals** and **Shell Scripting** by conducting hands-on technical workshops.