

PREM LODHIA

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EDUCATION & ACADEMIC RECORD

Birmingham City University - BSc (Hons) Computer Science with Artificial Intelligence **Sept 2025 - July 2028 (Expected Graduation: July 2028)**
First Class Honours Trajectory (88% Year 1 Average) | Seeking 2027/2028 Placement & Summer 2027 Internships | British Citizen (Full UK Right to Work)
Relevant Modules & Grades: Computer Programming (96%), Data Structures & Algorithms (86%), Computer Systems & Architecture (86%), Innovation Project (91%), Web Design & Development (88%), Introduction to AI (80%)
George Dixon Academy (Birmingham, UK) - A Levels: Biology, Chemistry, Physics | *Independent Quantitative Study: A-Level Mathematics (Calculus, Linear Algebra & Statistics)*

TECHNICAL & SYSTEMS CAPABILITIES

Languages & Core Stacks: **Python** (NumPy, Pandas, FastAPI, PyTorch, Automation - Primary), **Java** (Core SE 17/21, Spring Boot, Multithreading), **C/C++** (Systems Programming, Memory Management, RAII), **TypeScript / JavaScript** (React, Node.js), C#, SQL (PostgreSQL), Bash Shell

Cloud, Systems & IP Networking: **Operating Systems & Linux Internals**, **Docker Containerization**, Kubernetes Foundations, AWS, **Cisco CCNA Certified** (IP Networking, TCP/IP Protocols, Network Routing, Packet Inspection), **Google Cybersecurity Certified** (System Hardening, Network Defense)

Architecture, Scale & Reliability: High-Throughput Telemetry Ingestion, Low-Latency Backends, In-Memory Caching & Accumulators (**Redis**), Distributed Concurrency & Synchronization, Test-Driven Development (TDD), Automated Regression Testing (**JUnit 5, PyTest, Jest**), Microservices

Developer Tooling & Delivery: **Git Version Control**, **CI/CD (GitHub Actions)**, **DevOps (IBM Certified)**, **AI-Native Tooling & Copilot**, Agile & Scrum Delivery, Technical Mentorship (Facilitating Labs for 60+ Students), Clear Architecture Runbooks & System Telemetry

FEATURED SOFTWARE & SYSTEMS PROJECTS

Sentinel: Real-Time Telemetry & Anomaly Detection Engine | C++, Python, FastAPI, Docker, Linux **github.com/PremKLodhia/financial-risk-engine**

- Architected a high-throughput event processing and observability engine in **C++ and Python**; engineered an in-memory sliding-window accumulator executing **sub-1ms statistical metrics computation** across continuous high-volume sensor streams (6.39ms P99, 198.5 tx/s).
- Constructed an autonomous **fail-secure state arbiter** evaluating operational invariant conditions and executing programmatic mitigations in **sub-10ms**, preventing cascading outages while persisting tamper-resistant cryptographic audit logs.
- Containerized services using **Docker on Linux**; engineered comprehensive verification test harnesses simulating out-of-order packet arrival, network jitter, and volume surges, ensuring 99.9%+ pipeline dependability and zero service disruption.

High-Performance Concurrent Memory & Distributed Ledger Engine | Java 21, Spring Boot, Concurrency, PostgreSQL, Redis, JUnit 5 **2026**

- Engineered an enterprise-grade transactional backend in **Java 21 and Spring Boot**, implementing clean modular abstractions, thread-safe memory management, and **idempotent RESTful APIs** eliminating duplicate execution under network retry states.
- Implemented distributed synchronization using **Redis distributed locks** and optimistic concurrency control, sustaining **2,500+ simulated ops/sec** under heavy thread contention with zero state drift, race conditions, or transactional anomalies.
- Embedded disciplined verification and automated regression testing; authored comprehensive JUnit 5 and Mockito suites achieving **90%+ code coverage** across rollback guarantees, database isolation levels, and deterministic system recovery.

KINORA: Real-Time Multi-Device Telemetry Platform | TypeScript, React, Node.js, WebSockets, REST APIs **1st Place Winner, Innovation Fest 2026**

- Led full-stack software development across an **Agile team of 4**; participated in daily stand-ups, sprint planning, and retrospectives, translating complex multi-device telemetry requirements into high-performance web applications.
- Architected real-time bi-directional streaming over **WebSockets and resilient REST APIs**, achieving **sub-50ms UI update latency** and robust client-side state caching with zero communication drops across distributed edge sessions.
- Established automated Jest testing suites and GitHub Actions CI/CD pipelines; conducted daily **peer code reviews** to maintain high code craftsmanship, data integrity, and operational resilience.

PROFESSIONAL & TECHNICAL EXPERIENCE

Software Engineer / Applied AI & Systems Contributor - Mercor **Feb 2026 - Present | Remote, UK**

- Develop automated verification test harnesses and evaluation benchmarks to analyze edge-case behavior, state drift, and concurrency defects across multi-step algorithmic codebases in **Python, Java, and C++**.
- Identify, isolate, and document subtle software defects; refactor codebase components to enforce defensive programming invariants, type safety, memory correctness, and conformance to rigorous enterprise standards.
- Author reproducible technical documentation, benchmark reports, and invariant specifications, communicating findings transparently across distributed engineering teams to drive platform reliability.

Technical Coordinator (Software Engineering) & Demonstrator - Student Computing Association & BCU **Jan 2026 - Present | Birmingham, UK**

- Appointed by faculty to deliver systems programming labs (from Jan 2026) and directed Software Engineering curriculum (from March 2026) for **60+ computer science students** across computer systems, data structures, and concurrent **Python and Java**.
- Spearheaded hands-on workshops on low-level systems architectures, memory management, and test-driven development (TDD); conducted structured peer code review clinics teaching clean abstractions, unit testing, and maintainable software design.

Software Engineering Intern - CivitasAccess **April 2026 - July 2026 | UK**

- Immersed in fast-paced **Agile sprint cycles**; actively participated in daily stand-ups, collaborative estimation, and sprint retrospectives, developing responsive, high-performance digital solutions using **TypeScript, React, and modern APIs**.
- Integrated RESTful API endpoints for dynamic search filtering, implementing robust client-side caching, input sanitization, and defensive error-handling abstractions to optimize performance and data workflows.
- Collaborated closely with QA engineers and senior mentors; actively engaged in Git version control workflows, automated regression testing, and **peer code reviews**, eliminating defects prior to production releases.

CERTIFICATIONS, HONORS & SYSTEMS FOUNDATIONS

Industry Certifications: Cisco Networking Academy: CCNA: Introduction to Networks (IP Networking, TCP/IP Protocols & Packet Routing) | Google: Cybersecurity Professional Certificate (Linux CLI & System Hardening) | IBM: DevOps, Cloud & Agile Software Engineering (CI/CD Pipelines, Git Version Control & Automated Testing) | Stanford University: Algorithms Specialization.

Technical Honors & Awards: 1st Place Winner, Innovation Fest 2026 (KINORA) | Unihack Hackathon Winner | First-Class Trajectory (88% Year 1 CS Average: 96% Computer Programming, 86% Data Structures & Algorithms, 86% Systems & Architecture).