

Umar Ahmed

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About me

BSc Computer Science graduate with a strong background across backend development, applied AI/ML, and databases. Experienced in building full-stack applications in **Python**, **Java Spring Boot** and **PostgreSQL**, as well as deploying production-ready systems using **Docker**, **Caddy**, and **cloud VPS hosting**. Strong foundation OOP, databases, and API development. Experience in both academic and independent projects involving backend systems, database integration, and reinforcement learning environments. Passionate about problem-solving and hoping to contribute to professional software development teams where I can deliver value whilst further developing my skills.

Education

Bachelor of Science in Computer Science

Aston University

2022 – Oct 2025

Focus: Software Engineering, Databases, Distributed Systems, OOP, AI/ML

Learnt Skills:

- Backend development using Java and Python
- Bash/Linux scripting
- Knowledge and use of MySQL and phpMyAdmin for database design and development
- Version control using Git
- Project management methodologies in team environments (Agile, Scrum)
- Debugging and TDD (Test Driven Development)
- Exposure and use of software testing methods (unit, regression, exploratory).

Projects

Reinforcement Learning Environment (Python, 2025)

Project Link: <https://github.com/Shumair99/OmeletteEnvironment>

- Built a fully working custom Gymnasium-compatible RL environment in Python/PyBullet for robotic arm simulation.

- Created and iteratively improved physics and reward function tuning through feedback systems using SB3 and TensorFlow.
- Implemented backend logic, API-style interfaces, and reward shaping for training agents.
- Applied iterative testing practices including exploratory testing in simulation (PyBullet render GUI), functional validation of environment methods (step, reset), and regression-style checks after refactoring (especially for reward functions).
- Demonstrated debugging, system design, and backend software engineering skills.
- Reflected on setbacks and mistakes and learned from industry professionals in order to improve and optimise results for future work and updates.

Shorty – URL Shortener Web App (Java, Spring Boot, Docker, 2025)

Project Link: <https://github.com/Shumair99/shorty-url-shortener>

Web Link: <https://shortyurl.live>

- Built a production-ready URL shortener application using Java Spring Boot with a lightweight HTML frontend.
- Designed and implemented RESTful APIs for creating, redirecting, and managing short links.
- Integrated PostgreSQL for persistent data storage with environment-based configuration.
- Containerized the full stack using Docker Compose and deployed to a Hetzner VPS with custom domain.
- Configured Caddy as a reverse proxy and TLS certificate manager.
- Applied best practices for backend development including CI/CD iteration, version control, and environment configuration management.
- Delivered a functional, scalable, and user-accessible web application, showcasing full-stack engineering and cloud deployment experience.

PupperDB – A custom DB project (In Progress)

- Developing a production-style key-value database in Python with LSM-trees, write-ahead logging, and concurrency control.
- Includes indexing, crash recovery, and database compaction features, demonstrating backend architecture and system-level programming.
- Designed with unit testing, property-based testing, and CI for reliability.
- Building a companion Flask web app to showcase real-world use cases.

Clothing E-Commerce Website (HTML, JS, CSS, 2024)

- Developed a fully functional clothing website as part of a team project.
- Implemented user authentication, product catalogues, shopping cart, and checkout process.
- Contributed to both backend database integration (MySQL) and UI/UX design, following Agile methods.
- Implemented REST APIs for handling transactions, ensuring secure and consistent communication between frontend and backend.

Roblox Game Development (Lua, 2025)

- Designed and released a multiplayer game with thousands of visits in Roblox Studio with custom backend logic in Lua.
- Implemented data storage, API-style communication, and gameplay systems.
- Worked with custom APIs for in-game transactions, handling purchase validation and server–client communication.

Minecraft Modding (Java, 2023)

- Created Java-based Minecraft mods, extending game functionality via event-driven programming.
- Gained experience in working with APIs and system extensibility.
- Developed strong problem-solving skills by working with limited and outdated Forge modding documentation, reverse-engineering APIs and independently researching solutions.

Technical Skills

- **Programming & OOP:** Spring Boot, Java, Python, VB.NET, Lua, HTML, CSS, JavaScript, Typescript, Tailwind, React, PHP, strong technical knowledge in OOP, data structures and algorithms.
- **Databases:** PostgreSQL, SQL Server, MySQL – schema design, queries, stored procedures, reporting.
- **Tools:** Docker, Git/GitHub, Visual Studio, VS Code, PyCharm, Eclipse
- **Additional Knowledge:** Docker & Containerization, Cloud Deployment (Hetzner VPS), Reverse Proxy & TLS (Caddy), REST APIs, CI/CD pipelines, QA and testing, AI/ML, Multi-Agent Systems, Software Project Management, Information Security, Data Mining

Work Experience can be found on my LinkedIn profile.