# MOHAMED HAMED

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## ENGINEERING EXPERIENCE

**SAP** Budapest, Hungary
*Application Developer* Sep 2026 – Present
- Fixed a duplicate-key defect in an application within the SAP HANA ecosystem by implementing a data migration and a uniqueness constraint.
- Contributed to data center observability tooling by integrating NetBox DCIM data and live power telemetry with Three.js rack and room visualizations.

*Software Developer → Backend Developer* Aug 2025 – Aug 2026
- Refactored legacy ABAP business logic into Java services using SAP CAP and Spring Boot, with domain modeling and structured error handling.
- Implemented REST/OData v4 endpoints and CDS domain models in SAP CAP Java with SAP HANA persistence. Built automated API tests and integration checks to catch regressions.
- Remediated vulnerabilities in npm dependencies and extended CodeQL coverage to the TypeScript frontend.

**ExxonMobil** Budapest, Hungary
*Automation Developer → Full Stack Developer → Backend Software Developer* Jun 2023 – Jul 2025
- Built Spring Boot background jobs and polling endpoints for document analysis, with Spring MVC intake APIs, Spring Security role checks, and JPA/Hibernate job state.
- Migrated internal vulnerability management services to .NET Core, updated SQL Server schemas, indexes, and scan-history queries, and supported the AWS migration.
- Developed full-stack configuration and automation tooling using TypeScript, Next.js, and Node.js with CI/CD deployment automation pipelines across MongoDB and relational databases.

**Eötvös Loránd University (ELTE)** Budapest, Hungary
*Teaching Assistant | Telecommunications & Network Protocols* Sep 2025 – Present
- Lead Rust labs on TCP/UDP sockets, I/O multiplexing, and protocol framing. Mentor students on ownership and concurrent server design.

## EDUCATION

**Eötvös Loránd University (ELTE)** Budapest, Hungary
*Master of Science in Computer Science – Software Architecture* Jan 2027
M.Sc. research: *Java Virtual Threads in Spring Boot*. Measured monitor pinning and lock contention with k6 and JFR.
*Bachelor of Science in Computer Science* Jun 2025 Average: 4.47
B.Sc. thesis: *Parallel Code*, collaborative VS Code editing using Yjs over WebSockets.

## SELECTED SYSTEMS PROJECTS

**AetherKV — Rust LSM Storage Prototype**
- Implemented an arena-backed concurrent skiplist MemTable, an append-only WAL with aligned Linux direct I/O, block SSTables, AVX2 Bloom filters and leveled compaction. Recovery of acknowledged writes across restarts remains a known issue.

**mini-columnar-engine — Rust Analytical Operators**
- Implemented contiguous typed columns, bit-packed validity masks, dictionary encoding and direct-indexed grouping. In Criterion on Apple Silicon, a 1M-integer scan plus sum took 0.253 ms.
- Grouping 1M rows across 8 pre-encoded keys took 1.03 ms versus 16.81 ms with owned-string hashing and 30.22 ms with borrowed-string hashing. Encoding was outside the timed workload.

**RESP Storage Engine (Go)**
- Built an in-memory RESP2 server with per-connection command queues and replication. Race-enabled tests reported no races in the tested paths.

## TECHNICAL SKILLS

- **Programming:** Rust, Go, Modern C++ (C++20), Java (21 LTS), TypeScript, SQL, C, Python
- **Systems & Concurrency:** Concurrency Primitives, Memory Arenas, Lock-Free SkipLists, Cache Locality, Storage Engine Architecture, Network Protocols, Linux Systems Programming
- **Storage & Runtimes:** LSM-Trees (WAL, SSTables, Bloom Filters, Compaction), Columnar Layouts, Redis (RESP2), SAP HANA, PostgreSQL, Tokio, Spring Boot
- **Tooling & Analysis:** Linux (perf), Docker, Git, Criterion.rs, ThreadSanitizer (TSan), Go race detector, JFR, CI/CD
- **Spoken Languages:** English and French (fluent), Arabic (native)