

# Mahmoud Abdo

Software Engineer | Backend (.NET)

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## PROFILE

Backend engineer specializing in scalable, production-grade systems built with .NET and SQL Server. Built on a rigorous Computer Science foundation in Data Structures, Algorithms, OOP, and System Design. Skilled in Clean Architecture and CQRS while designing secure backend systems covering authentication, authorization, and transactional consistency. Focused on maintainability, performance, and clean engineering practices.

## PROJECTS

### E-Commerce Web API

- **Architected and deployed** a production-grade E-Commerce backend using Clean (Onion) Architecture with strict layer separation.
- **Engineered** a defense-in-depth security model including JWT, refresh rotation, RBAC, ownership policies, rate limiting
- **Designed** a complete lifecycle including email verification and password reset/change workflows, using Hangfire for reliable background email dispatching, secure token with expiration policies, and salted password hashing.
- **Integrated** Stripe payments with idempotent transactions, webhook verification, automated refunds, and failure recovery.
- **Ensured** transactional consistency, concurrency handling, and request validation using Annotations and centralized middleware.
- **Established** production observability through Serilog logging, global exception handling, and audit tracing.
- **Deployed** live on MonsterASP.NET with HTTPS enforcement, granular CORS configuration, and hardened production settings.

### DVLD Management System Enterprise Desktop Application

- Architected a full-scale governmental Driving License & Vehicle Department system using structured 3-Layer Architecture.
- Designed and implemented workflows including license issuance, renewal, replacement, detention, release, test scheduling.
- Built a centralized Business Layer enforcing validation rules, state transitions, and transactional consistency across all operations.
- Developed an ADO.NET data access layer using parameterized queries and transactions to ensure data integrity.
- Managed multi-entity lifecycle coordination (People, Drivers, Applications, Licenses, Users, Tests) with separation of concerns.
- Integrated structured logging through Windows Event Log for auditing, monitoring, and error traceability.
- Applied SOLID principles and modular design to ensure maintainability, scalability, and long-term extensibility.

### Banking System C++ (Built from Scratch)

- A fully functional banking management system from scratch, simulating real-world financial operations and user workflows.
- Designed client and account lifecycle management including deposits, withdrawals, transfers, and currency exchange
- Implemented secure multi-user access control using encrypted passwords and bitwise role-based permission management.
- Built a lightweight file-based persistence engine to simulate database storage for clients, users, currencies, and transaction logs.
- Developed real-time balance tracking and transaction validation to maintain financial integrity across operations.
- Integrated logging and monitoring mechanisms to track user sessions, transfers, and administrative activities.

## TECHNICAL SKILLS

**Languages:** C#, C++, Python(Basics), JavaScript, HTML5, CSS3

**Backend & Frameworks:** .NET, ASP.NET Core, Windows forms, Entity Framework Core, ADO.NET, LINQ, RESTful APIs

**Architecture & Design:** N-Layerd and Clean Architecture, CQRS (MediatR), SOLID Principles, DDD, Repository Pattern, Unit of Work

**Database:** SQL Server, T-SQL, Database Design, Caching (Redis)

**Security:** JWT Authentication, Identity Framework, Role-Based Access Control, Data Integrity

**Tools:** Git, GitHub, Swagger, Postman, Linux, SSMS, Visual Studio, Visual Studio code

## EDUCATION

**B.Sc. in Computer Science, Mansoura University:** Faculty of Computers & Information

**Relevant courses:** Data Structures & Algorithms, OOP, Operating Systems, Database Systems, Computer Architecture, Discrete Mathematics, Software engineering, Data communications, Web programming

## LANGUAGES

Arabic (Native) | English (B2 Upper-Intermediate) | German (A2 Basic User)