

**Auto Parts Shop Database - Midterm Project**

**Team Information**

**Project Manager:** Bekbol Ormoteov

**Team Members:** Bekbol Ormotoev (Worked on the project independently due to unavailability of team members)

**Project Description**

This project is a **relational database model** for an **Auto Parts Shop**, designed to efficiently manage products, suppliers, customers, orders, and transactions. The database provides structured storage and retrieval of essential information, ensuring data integrity and optimized queries.

**Database Structure & Design**

The database follows **strict constraints and best practices**, including:

* **Surrogate Primary Keys** with AUTO\_INCREMENT.
* **Foreign Keys** to enforce relationships.
* **Unique, Default, and Check Constraints** for data integrity.
* **At least one 1-to-Many and one Many-to-Many Relationship**.
* **ON DELETE CASCADE** for proper referential integrity.
* **Engine Type:** InnoDB for all tables to support foreign keys.

***Tables Created***

1. **Categories** - Stores different categories of auto parts.
2. **Suppliers** - Contains information about suppliers.
3. **Products** - Lists products, pricing, stock, and supplier references.
4. **Customers** - Holds customer information.
5. **Orders** - Tracks customer purchases.
6. **OrderDetails (Bridge Table)** - Manages many-to-many relationships between orders and products.

**Steps Taken**

1. **Designed the Database Schema** following MySQL best practices.
2. **Developed the SQL Script**, ensuring all required constraints were met.
3. **Inserted Sample Data** (at least 10 records per table).
4. **Created Verification Queries** to confirm constraints and relationships.
5. **Reverse-Engineered the Database** into an **EER Diagram (.mwb file)** using **MySQL Workbench**.
6. **Documented the Entire Process** in this report for submission.

**Challenges & Solutions**

* **Lack of Team Collaboration:** Since I could not reach my teammates, I had to complete the entire project independently.
* **Ensuring Constraint Compliance:** Used verification queries to confirm PKs, FKs, and constraints worked correctly.
* **Maintaining Data Integrity:** Enforced CHECK, DEFAULT, and UNIQUE constraints to avoid invalid data.
* **Foreign Key Errors:** Resolved by ensuring proper table creation order and setting InnoDB as the engine for all tables.

**Project Files for Submission**

* **SQL Script (final\_auto\_parts\_shop.sql)** – Contains database creation, constraints, insert statements, and validation queries.
* **ERD (auto\_parts\_shop.mwb)** – Reverse-engineered MySQL Workbench file.
* **This Document (Midterm\_Project\_Document.docx)** – Explains the project in detail.

**Final Thoughts**

This project successfully implements a structured database model for an Auto Parts Shop, following best SQL practices and ensuring efficiency and data integrity. Despite working alone, the project meets all requirements and is fully functional.

**Submitted by:** Bekbol Ormotoev

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