Mental Health Counseling Center Database Project

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Intro

The objective of this project was to design a database for a mental health counseling center, a facility where clients book appointments with counselors, receive treatment plans, and manage insurance and payments. This mini-world was chosen because it represents a real-world system that combines multiple entities, such as clients, counselors, appointments, and financial tracking, making it a meaningful exercise in database design. The database is designed to handle both individual and group appointments, store detailed client information, track treatment plans and diagnoses, and manage payments and insurance coverage.

System Design Requirements

To gather requirements for this system, I had an interview with a staff member of a counseling center that I know, named Willie Vega.

Key requirements identified from the interview include:

- Each client must have personal details tracked, including emergency contacts.

- Counselors have licenses, specialties, and may supervise other counselors.

- Appointments connect clients to counselors and, if applicable, to rooms. Telehealth sessions may not require a room.

- Treatment plans include multiple diagnoses and specific goals, and a client may have multiple plans over time.

- Payments must be linked to clients and appointments, and insurance coverage may be multi-client and multi-policy.

- Session notes are generated by counselors for appointments and linked to clients.

Additional requirements were identified from research on standard counseling center workflows, such as the need for user accounts for staff with different roles (admin, counselor, front desk).

Entity-Relationship Diagrams

Chen ER Diagram

- A hand-drawn Chen ER diagram was created to represent entities, attributes, and relationships.

- **Entities include:** Client, Counselor, Appointment, TreatmentPlan, Diagnosis, Insurance, Payment, Room, Staff, and SessionNote.

- **Relationships include:** Attends (Client ↔ Appointment), Conducts (Counselor ↔ Appointment), Has_Plan (Client ↔ TreatmentPlan), Includes (TreatmentPlan ↔ Diagnosis), Covered_By (Client ↔ Insurance), Made_By (Payment ↔ Client/Appointment), Creates (Counselor ↔ SessionNote), and Occurs_In (Appointment ↔ Room).

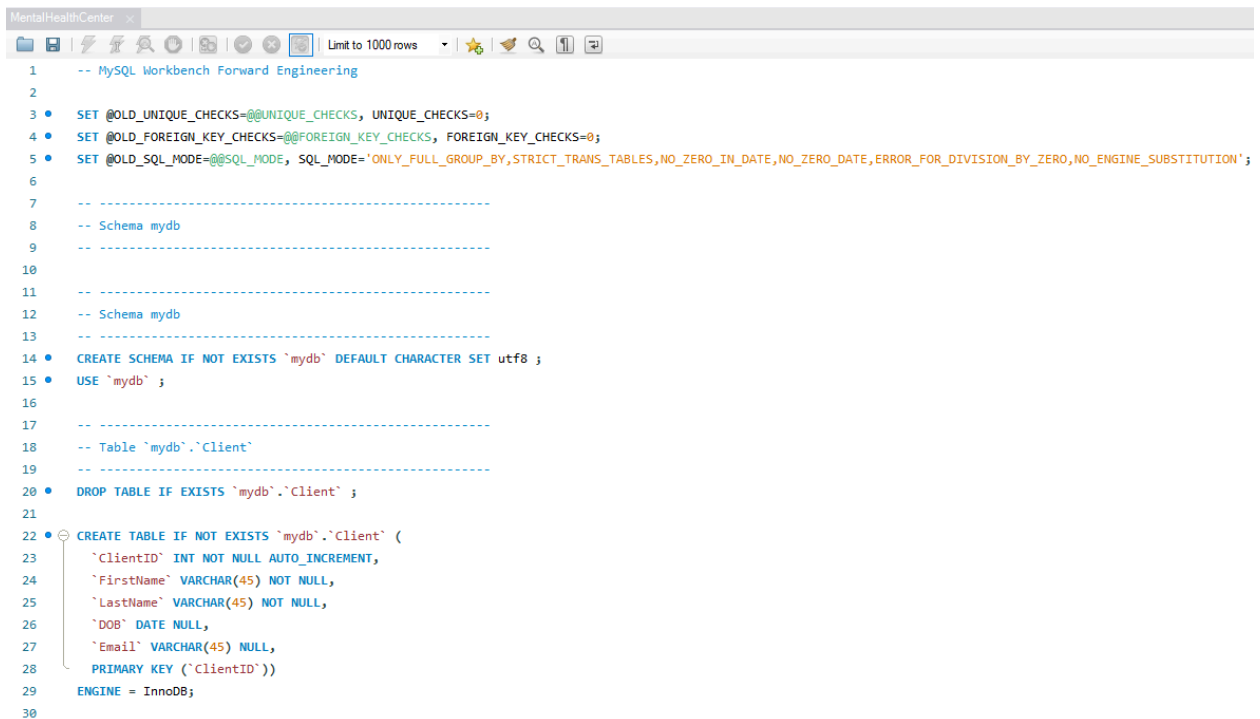- A multi-valued attribute (e.g., Counselor.Specialties) was included.
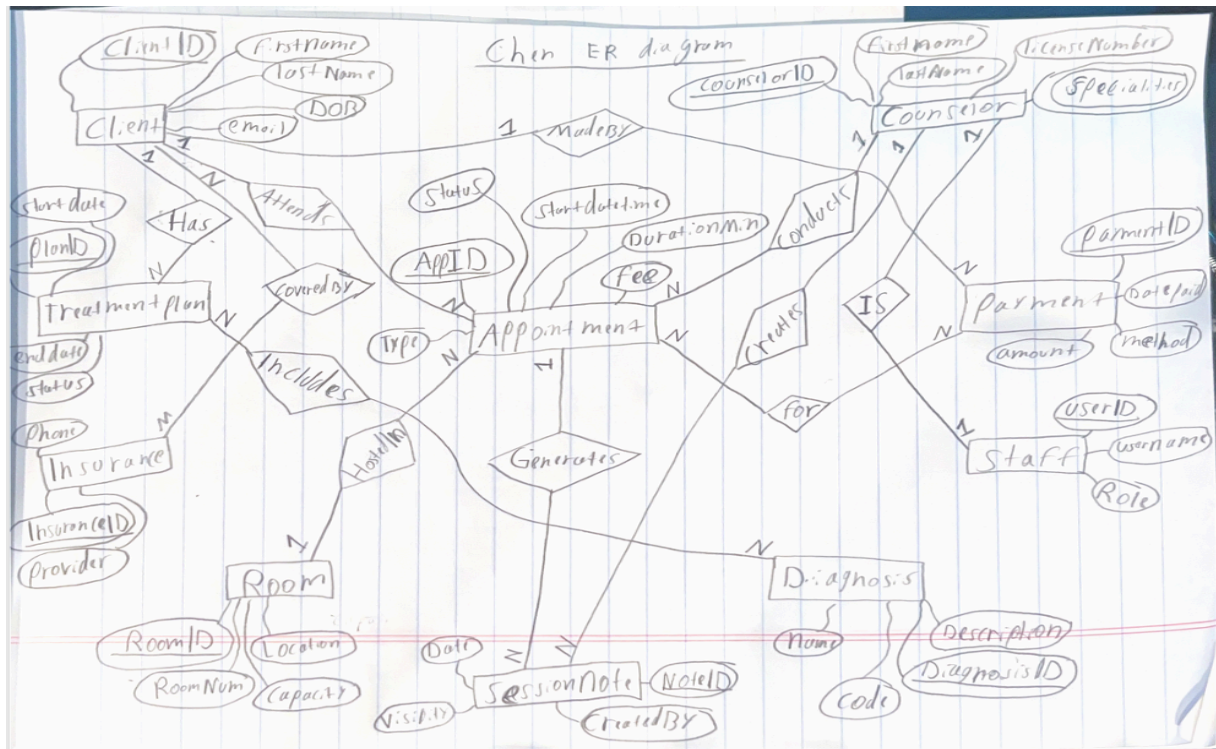
UML ER Diagram

- A UML ER diagram was created in **MySQL Workbench** to accurately represent entities, primary keys, foreign keys, and relationships using standard UML notation.

- Join tables were used for M:N relationships such as Client ↔ Insurance (ClientInsurance) and TreatmentPlan ↔ Diagnosis (PlanDiagnosis).

- Foreign keys were created during diagram relationships setup in Workbench.
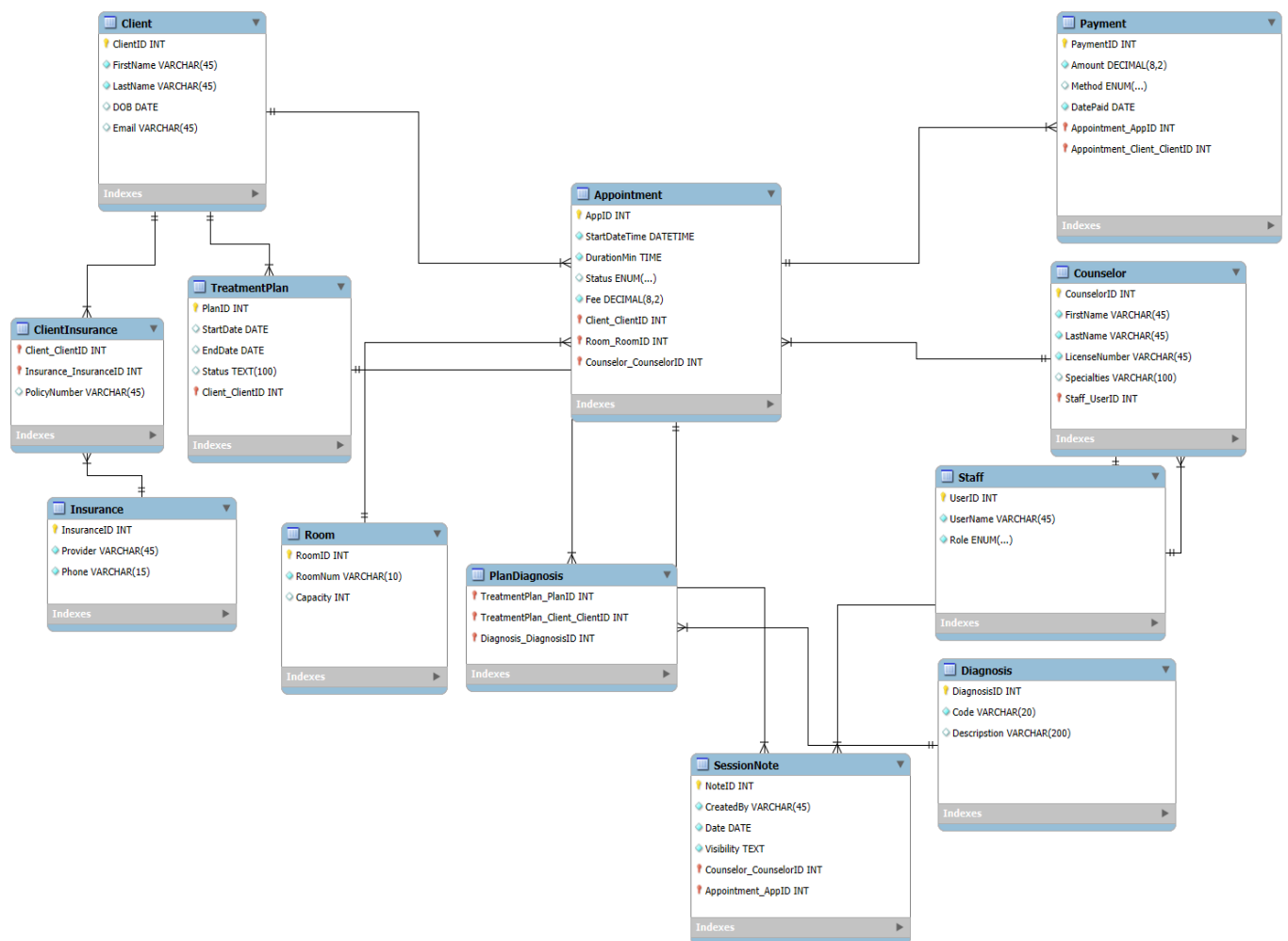
Database Creation

The UML diagram was forward-engineered in MySQL Workbench to create the database schema. All tables, primary keys, and foreign key constraints were generated automatically, ensuring referential integrity.

Example SQL snippet:

```
     -- MySQL Workbench Forward Engineering

     SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;
     SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0;
     SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE_SUBSTITUTION';


     -- -----------------------------------------------------
     -- Schema mydb
     -- -----------------------------------------------------


     -- -----------------------------------------------------
     -- Schema mydb
     -- -----------------------------------------------------
     CREATE SCHEMA IF NOT EXISTS `mydb` DEFAULT CHARACTER SET utf8 ;
     USE `mydb` ;


     -- -----------------------------------------------------
     -- Table `mydb`.`Client`
     -- -----------------------------------------------------
     DROP TABLE IF EXISTS `mydb`.`Client` ;

     CREATE TABLE IF NOT EXISTS `mydb`.`Client` (
       `ClientID` INT NOT NULL AUTO_INCREMENT,
       `FirstName` VARCHAR(45) NOT NULL,
       `LastName` VARCHAR(45) NOT NULL,
       `DOB` DATE NULL,
       `Email` VARCHAR(45) NULL,
       PRIMARY KEY (`ClientID`))
     ENGINE = InnoDB;
```

Conclusion

The final database design successfully models a mental health counseling center, with all required entities, attributes, and relationships represented. The system is ready to store client information, manage appointments, track treatment plans and diagnoses, and handle payments and insurance coverage.

The Chen ER diagram provides a clear conceptual view, while the UML ER diagram and MySQL database implement a structured, functional schema that can be populated with real data if needed.