BCIS - 5420

Project - Part – 1

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Project Overview:

This project showcases the design and implementation of a relational database for managing Broadway Construction's operations, utilizing SQL Server Management Studio (SSMS) for database creation and data retrieval. The database structure supports complex relationships between engineers, projects, clients, skills, and evaluations, facilitating comprehensive data management and analysis capabilities.

Database Schema

Entities & attributes:

Engineer (Engineer_ID (PK), Name, Address, City, state, Zipcode, PhoneNumber, Email_address)

Project (ProjectID (PK), Project_Name, Project_Manager, Required_skills, Client_ID)

Sub project (Subproject_ID (PK), project_ID (FK))

Client (Client_ID(PK), client_Name, Contact_Name, Phone_Number)

Skill (skill_ID(PK), skill_Name)

Certification (Certification_ID (PK), Engineer_ID (FK), Skill_ID (FK))

Evaluation (Evaluation_ID(PK), Evaluation_Name, Date, Score, Comment, Project_ID (FK), Engineer_ID (FK))

Project assessment (ProjectAssignment_ID(PK), Start_Date, End_Date, Total_Hours, Engineer_ID(FK))

Relationships:

One-to-One Relationships:

- Each project is assigned to one project assignment.

One-to-Many Relationships:

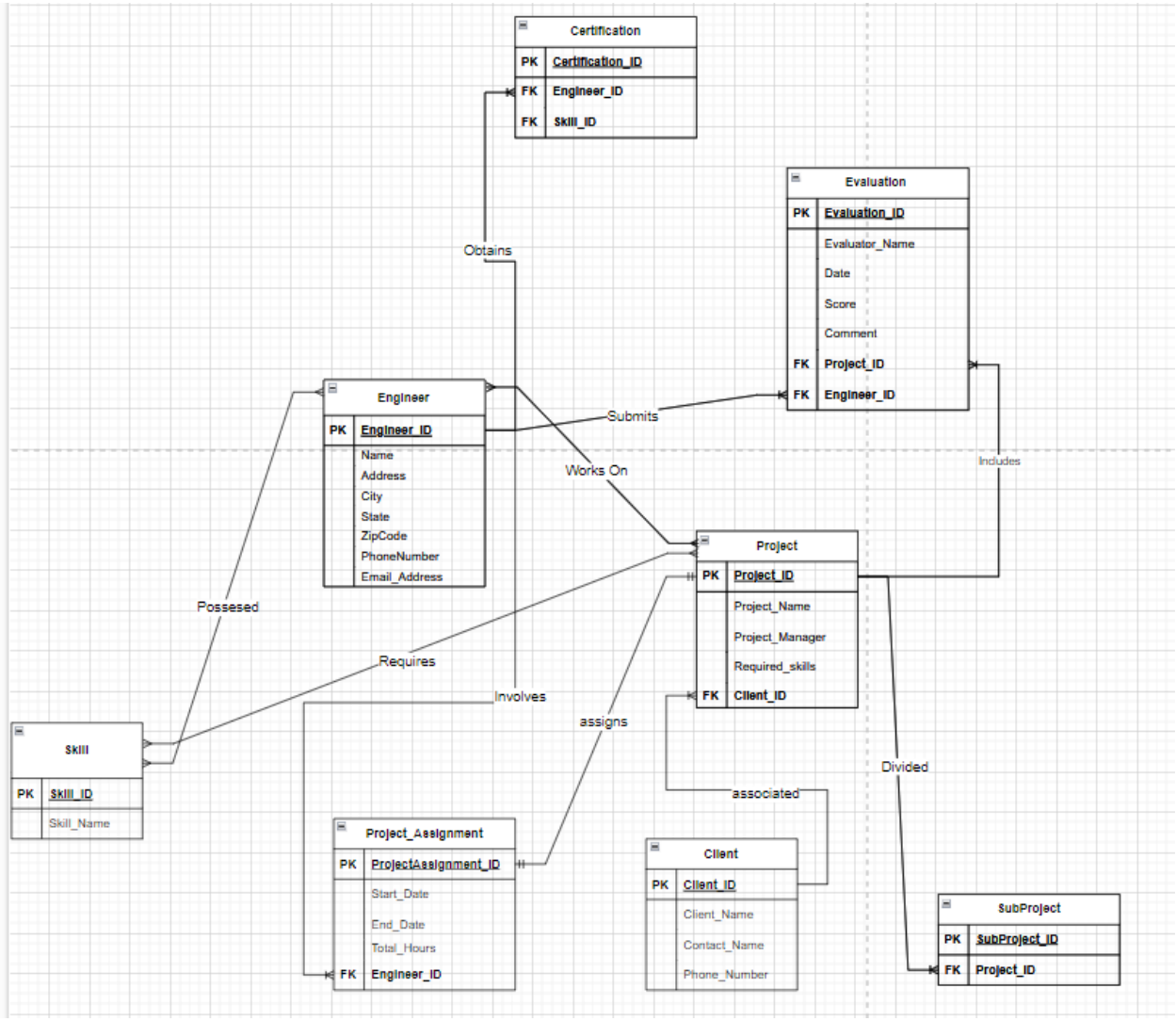
- Each engineer obtains one or more certifications.
- Each engineer can be involved in many project assignments.

- Each project includes multiple evaluations.
- A project can be divided into multiple sub projects.
- A client can be associated with one or more projects.
- One engineer can submit one or more evaluations.

Many-to-Many Relationships:

- Engineers possess multiple skills, and each skill is associated with many engineers.
- A project can require multiple skills, and each skill can be associated with multiple projects.
- Each engineer works on multiple projects, and each project is assigned to multiple engineers.

Broadway Construction ERD:



Assumptions:

- Each engineer is uniquely identified by an Engineer_ID attribute.
- Each engineer can possess one or more skills.
- Skills are described in the skill table, and each skill entity is uniquely identified by a Skill_ID attribute.
- A record must be kept regarding whether an Engineer has a certification for a particular skill.
- Certifications are represented in the Certification table, and each certification is uniquely identified by a Certification_ID attribute.
- Each client is uniquely identified by a client_ID attribute.
- Each Project is uniquely identified by a Project_ID attribute.
- Each project has a name and is associated with a single client.
- A project can be divided into multiple subprojects, each uniquely identified by a Subproject_ID attribute.
- Each project has a project manager assigned from the pool of Engineers.
- Projects can require multiple skills, and the required skill sets are described in the skill table.
- Each project assignment is uniquely identified by a ProjectAssignment_ID attribute.
- An engineer can be assigned multiple project assignments, and each project assignment is associated with a single engineer.
- Each project can have multiple project assignments, and each project assignment is associated with a single project.
- The dates when an Engineer starts and finishes working on a specific project, as well as the total hours spent on the project, are tracked in the project assignment table.
- Each evaluation is uniquely identified by an Evaluation_ID attribute.
- Evaluations are associated with a specific project and are performed by an engineer.
- Evaluation scores and comments are recorded in the evaluation table.

Conclusion:

This project demonstrates the effective use of SSMS and SQL for managing and analyzing construction project data. The insights gained from the data can help Broadway Construction optimize its operations, improve project execution, and enhance client satisfaction.