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CSE 4308
Lab 7

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1. ER Diagram

The Entity Relationship (ER) diagram represents the structure of the research group system. The diagram includes the following entities, attributes, relationships, and cardinalities:

Entities and Attributes

ResearchGroup
GroupName (PK)
Lab
Budget
Head

Faculty
FacultyID (PK)
Name
ContactNumber
ResearchLab
GroupName (FK)

Student
StudentID (PK)
Name
ContactNumber
ResearchLab
Supervisor (FK)
GroupName (FK)

ResearchProject
ProjectTitle (PK)
StartDate

EndDate
ResearchDomain

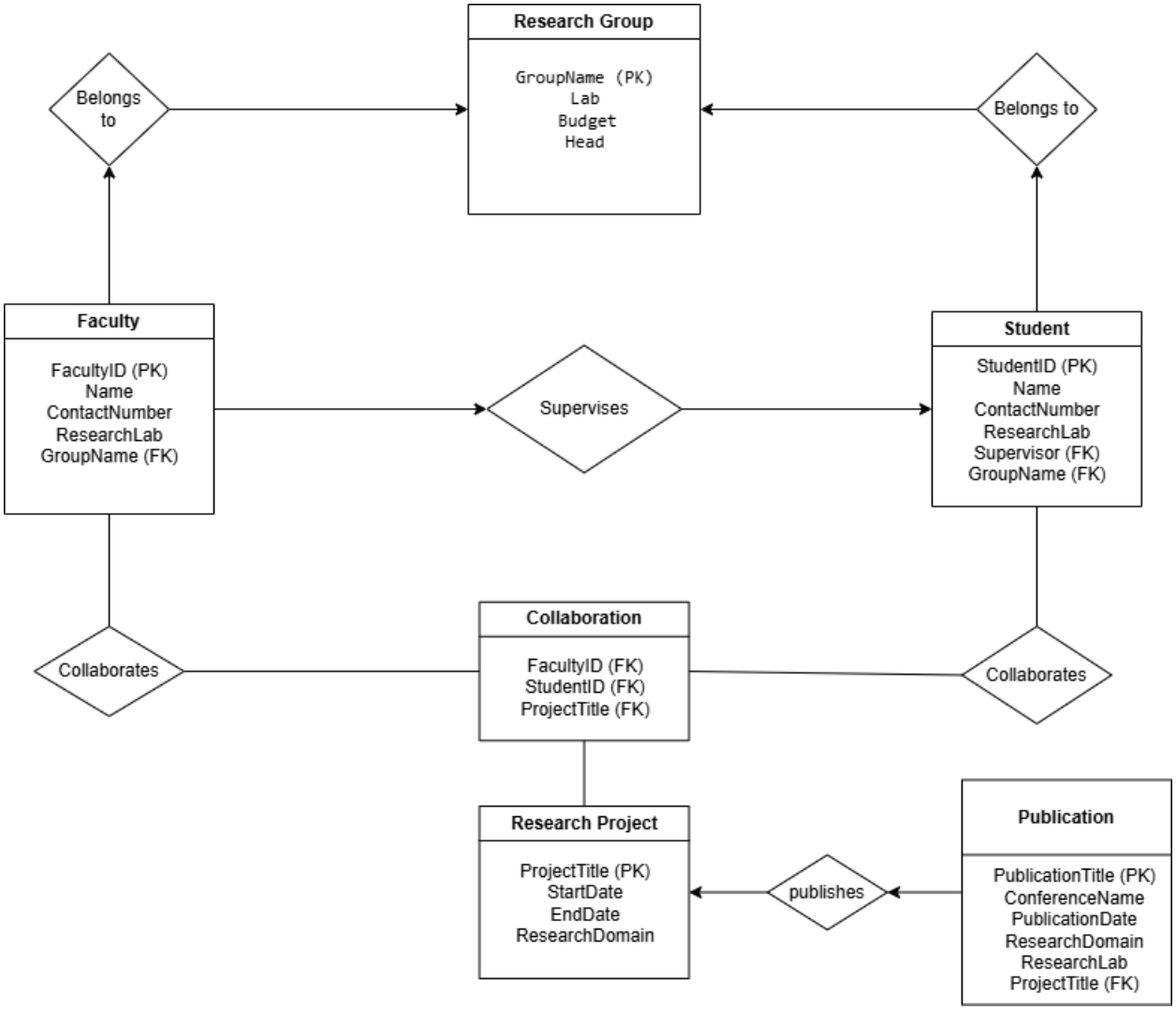
Collaboration
FacultyID (FK)
StudentID (FK)
ProjectTitle (FK)

Publication
PublicationTitle (PK)
ConferenceName
PublicationDate
ResearchDomain
ResearchLab
ProjectTitle (FK)

Relationships

1. **ResearchGroup ↔ Faculty/Student**:
    - One research group has many faculty members and students.
    - Participation: Total for students and faculty.
2. **Faculty ↔ Student (Supervisor)**:
    - One faculty member supervises multiple students.
    - Participation: Total for students, optional for faculty.
3. **Faculty/Students ↔ Research Projects (Collaboration)**:
    - Many-to-Many relationship.
    - Participation: Only pre-registered faculty and students can collaborate.
4. **ResearchProject ↔ Publications**:
    - One research project can lead to multiple publications.
    - Participation: Optional for projects.

ER Diagram:



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2. SQL Implementation

Create Tables

```sql
use lab7;

CREATE TABLE ResearchGroup (
    GroupName VARCHAR(255) PRIMARY KEY,
    Lab VARCHAR(255),
    Budget DECIMAL(10, 2),
    Head VARCHAR(255)
);


CREATE TABLE Faculty (
    FacultyID INT PRIMARY KEY,
    Name VARCHAR(255),
    ContactNumber VARCHAR(15),
    ResearchLab VARCHAR(255),
    GroupName VARCHAR(255),
    FOREIGN KEY (GroupName) REFERENCES ResearchGroup(GroupName)
);

CREATE TABLE Student (
    StudentID INT PRIMARY KEY,
    Name VARCHAR(255),
    ContactNumber VARCHAR(15),
    ResearchLab VARCHAR(255),
    Supervisor INT,
    GroupName VARCHAR(255),
    FOREIGN KEY (Supervisor) REFERENCES Faculty(FacultyID),
    FOREIGN KEY (GroupName) REFERENCES ResearchGroup(GroupName)
);


CREATE TABLE ResearchProject (
    ProjectTitle VARCHAR(255) PRIMARY KEY,
    StartDate DATE,
    EndDate DATE,
    ResearchDomain VARCHAR(255)
);


CREATE TABLE Collaboration (
    FacultyID INT,
    StudentID INT,
    ProjectTitle VARCHAR(255),
```

```
    PRIMARY KEY (FacultyID, StudentID, ProjectTitle),
    FOREIGN KEY (FacultyID) REFERENCES Faculty(FacultyID),
    FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
    FOREIGN KEY (ProjectTitle) REFERENCES ResearchProject(ProjectTitle)
);


CREATE TABLE Publication (
    PublicationTitle VARCHAR(255) PRIMARY KEY,
    ConferenceName VARCHAR(255),
    PublicationDate DATE,
    ResearchDomain VARCHAR(255),
    ResearchLab VARCHAR(255),
    ProjectTitle VARCHAR(255),
    FOREIGN KEY (ProjectTitle) REFERENCES ResearchProject(ProjectTitle)
);
```

Delete Tables

```
DROP TABLE IF EXISTS Collaboration;
DROP TABLE IF EXISTS Publication;
DROP TABLE IF EXISTS ResearchProject;
DROP TABLE IF EXISTS Student;
DROP TABLE IF EXISTS Faculty;
DROP TABLE IF EXISTS ResearchGroup;
```
