

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Deemed to be University)

Patiala, Punjab



A Mini Project On “University Management System”

For the partial complement of Database Management System 2025

Under the supervision of

Department of Computer Science and Engineering

Submitted By:

“Sajid Miya” 102367013

“Nikshitha” 102317043

“Arshdeep Singh” 102317064

“Manjot Singh Gill” 102317068

Submitted To:

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

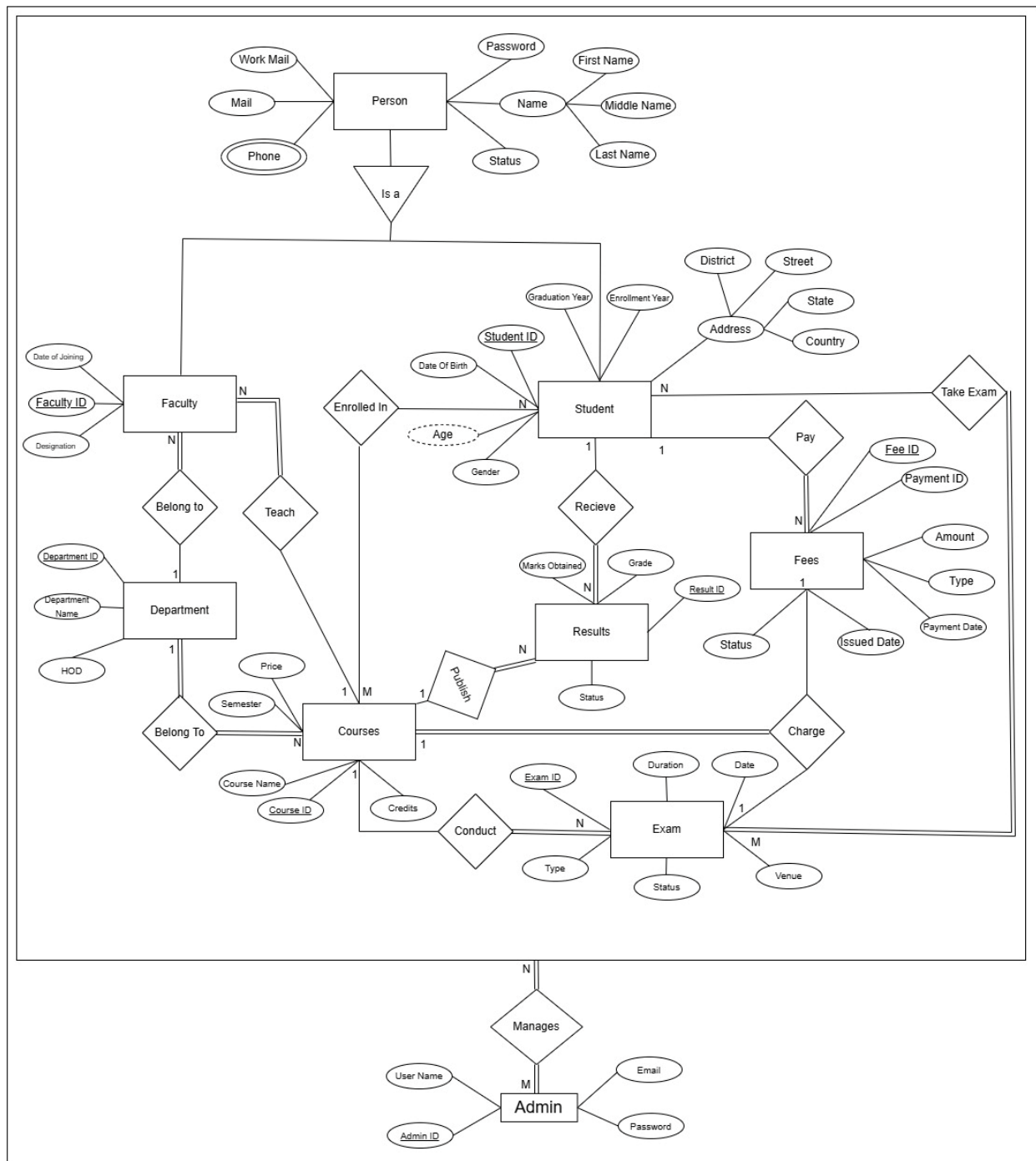
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ER DIAGRAM



ER To Table

The University Management System requires a well-structured database with 12 (including two tables for multivalued attributes of students and faculty) tables to handle various entities and their relationships. The relationships between entities are outlined below:

1. Students and Courses (N:M Relationship)

- **Tables Required:** students, courses, enrollment
- Students can enroll in multiple courses, and a course can have multiple students.
- The enrollment table establishes the relationship, with a composite primary key comprising student_id and course_id.
- An additional attribute, enrollment_date, is included.

2. Faculty and Department (1:N Relationship)

- **Tables Required:** faculty, department
- A faculty member belongs to a single department, but a department can have multiple faculty members.
- The department table is independent, while the faculty table includes department_id as a foreign key.

3. Faculty and Course (1:N Relationship)

- **Tables Required:** faculty, courses
- A faculty member can teach only one course, but a course can be taught by multiple faculty members.
- The faculty table includes course_id as a foreign key.

4. Courses and Exams (1:N Relationship)

- **Tables Required:** courses, exams
- A course can conduct multiple exams, but each exam is associated with only one course.
- The exam table includes course_id as a foreign key and exam_id as the primary key.
- A unique constraint is applied to the combination of course_id and type.

5. Courses and Results (1:N Relationship)

- **Tables Required:** courses, results
- A course can have multiple results published, but each result belongs to only one course.
- The results table includes course_id as a foreign key.

6. Students and Exams (N:M Relationship)

- **Tables Required:** students, exams, takes_exams
- A student can take multiple exams, and an exam can be given by multiple students enrolled in the same course.
- The takes_exams table contains a composite primary key of student_id and exam_id.

7. Students and Results (1:N Relationship)

- **Tables Required:** students, results

- A student can receive multiple results, but each result is associated with only one student.
- The results table includes student_id as a foreign key.

8. Students and Fees (1:N Relationship)

- **Tables Required:** students, fees
- A student can pay multiple fees, but each fee is linked to only one student.
- The fees table includes student_id as a foreign key.

9. Courses and Fees (1:1 Relationship)

- **Tables Required:** courses, fees
- Each course charges only one fee.
- The fees table includes course_id as a foreign key.

10. Exams and Fees (1:1 Relationship)

- **Tables Required:** exams, fees
- Each exam charges only one fee.
- The fees table includes exam_id as a foreign key.

11. Admin Management (1:1 Relationship)

- **Tables Required:** admin
- The admin manages all entities. Since all entities are managed by the admin, no relationships need to be explicitly established.

PARTICIPATION ANALYSIS

The participation of entities in various relationships within the University Management System is described below:

1. **Students and Courses:**

- **Partial Participation (Both)** A student may not be enrolled in any course, and some courses may have no students enrolled. Therefore, both entities participate partially in the relationship.

2. **Faculty and Department:**

- **Total Participation (Faculty) & Partial Participation (Department):** Every faculty member must belong to a department, but a department can exist without any faculty members. Faculty participation is total, while department participation is partial.

3. **Faculty and Courses:**

- **Total Participation (Faculty) & Partial Participation (Course):** Every faculty member must teach at least one course. However, some courses may not be assigned to any faculty. Therefore, faculty participation is total, while course participation is partial.

4. **Departments and Courses:**

- **Total Participation (Both):** Every department must offer at least one course, and every course must be offered by a department. Thus, both department and course participation are total.

5. **Courses and Exams:**

- **Total Participation (Exam) & Partial Participation (Course):** Every exam must be associated with a course, but a course may not necessarily conduct exams. Therefore, exams participate totally, while courses participate partially.

6. **Students and Exams:**

- **Total Participation (Exam) & Partial Participation (Student):** Every exam is taken by one or more students, but some students may not have participated in any exams. Hence, exams participate totally, while students participate partially.

7. **Courses, Exams, and Fees:**

- **Total Participation (Course & Exam) & Partial Participation (Fee):** Every course and exam have associated fees, but some fees may not be related to any specific course or exam (e.g., registration fees). Therefore, fees participate partially.

8. **Students and Fees:**

- **Total Participation (Fee) & Partial Participation (Student):** Every fee must be associated with a student, but a student may not have paid any fees. Thus, fees participate totally, while students participate partially.

9. **Admin Management:**

- **Total Participation (Both):** Every entity in the system is managed by an admin, and an admin cannot exist without management authority. Therefore, both participate totally.

10. **Students and Results:**

- **Total Participation (Result) & Partial Participation (Student):** Every result is linked to a student, but not all students may have results published. Thus, results participate totally, while students participate partially.

11. **Courses and Results:**

- **Total Participation (Result) & Partial Participation (Course):** Every result is associated with a course, but some courses may not have any results published. Therefore, results participate totally, while courses participate partially.

TABLES

1. Student

Students(Student_ID, First_Name, Middle_Name, Last_Name, street, district, state, country, Gender, Date_of_Birth, mail, College_Mail, Password, Enrollment_Year, Graduation_Year, Status)

2. Student Phone No

PhoneNumbers(Student_ID, Phone)

3. Courses

Courses(Course_ID, Course_Name, Semester, Credits, Price)

4. Enrollment

Enrollment(Student_ID, Course_ID, Enrollment_On)

5. Fees

Fees(Fee_ID, Student_ID, Exam_ID, Course_ID, Amount, Issued_Date, Payment_Date, Type, Status, payment_ID)

6. Exams

Exams(Exam_ID, Course_ID, Exam_Date, Exam_Duration, Exam_Type, Venue, Status)

7. Takes Exam

Takes_Exam(Student_ID, Exam_ID, Status)

8.. Results

Results(Result_ID, Exam_ID, Student_ID, Course_ID, Marks_Obtained, Grade, Status)

9. Department

Department(Department_ID, Department_Name, Head_Of_Department)

10. Faculty

Faculty(Faculty_ID, First_Name, Middle_Name, Last_Name, Date_Of_Joining, Designation, Mail, Official_Mail, Password, Status, Course_ID, Department_ID)

11. Faculty Phone No

FacultyPhone(Faculty_ID, Phone)

12. Admin

Admin(Admin_ID, User_Name, Password, Email, Password)