Database Fundamental Project

Danyil Tymchuk | B00167321

Table of Content

Introduction

This project is intended to assess understanding of database design and implementation including Conceptual data modeling, logical & physical data modeling, Data Definition Language, and Structured Query language.

Task One - Database Design

---

1. Identify Relevant Entities with Attributes, Types, and Primary Keys

   Entities:

   - Departments
     - **Attributes**: department_id (PK), name, school, phone_number.
     - **Entity Type**: Strong.
     - **Primary Key (PK)**: `department_id`.
   - Courses
     - **Attributes**: course_id (PK), title, academic_level, department_id (FK), delivery_method, semesters, participants.
     - **Entity Type**: Strong.
     - **Primary Key (PK)**: `course_id`.
   - Students
     - **Attributes**: student_id (PK), first_name, last_name, date_of_birth, address, email, course_id (FK), outstanding_fees_due, year, status.
     - **Entity Type**: Strong.
     - **Primary Key (PK)**: `student_id`.
   - Results
     - **Attributes**: result_id (PK), student_id (FK), grade.
     - **Entity Type**: Strong.
     - **Primary Key (PK)**: `result_id`.
   - Opening_Times
     - **Attributes**: time_id (PK), department_id (FK), day, opening_time, closing_time.
     - **Entity Type**: Weak (dependent on Departments).
     - **Primary Key (PK)**: `time_id`.
   - Staff
     - **Attributes**: staff_id (PK), name, job_title, department_id (FK), years_at_university, days_off.
     - **Entity Type**: Strong.
     - **Primary Key (PK)**: `staff_id`.

---

2. Explain Why Each Relation is Needed

Entities:

- Departments
  - **Purpose**: This entity represents the various academic and administrative units of the university.
  - **Key Attributes**:
    - `department_id`: Unique identifier for each department.
    - `name`: Name of the department.
    - `school`: The larger organizational unit, such as a college or faculty.
    - `phone_number`: University or Department phone number.
  - **Importance**: Departments serve as the organizing body for courses, and associating courses with departments enables the university to track academic programs by organizational structure.
- Courses
  - **Purpose**: This entity stores details of all courses offered by the university, including their academic levels and organizational affiliation.
  - **Key Attributes**:
    - `course_id`: Unique identifier for each course.
    - `title`: The name of the course.
    - `academic_level`: Represents the level of difficulty.
    - `department_id` (FK): Associates the course with the department that offers it.
    - `delivery_method`: Indicates how the course is delivered.
    - `semesters`: Tracks the duration of the course in semesters.
    - `participants`: Participants on the course.
  - **Importance**: This table helps manage course offerings, associate students with courses, and allows analysis of courses by department or academic level.
- Students
  - **Purpose**: This entity tracks all students at the university, both personal and academic details.
  - **Key Attributes**:
    - `student_id`: Unique identifier for each student.
    - `first_name` and `last_name`: Essential for identifying and displaying student information.
    - `date_of_birth`: Used for age-based queries or requirements.
    - `address` and `email`: Necessary for communication and contact.
    - `course_id` (FK): Links each student to their enrolled course.
    - `outstanding_fees_due`: How long have not been paid.

        - `year`: Tracks the academic year of the student.
        - `status`: Indicates whether the student is active, graduated, or inactive.
    - **Importance**: Without this table, the university cannot manage student information or associate students with their courses, grades, or statuses.
- Results
    - **Purpose**: This entity records the grades or results achieved by students in their courses.
    - **Key Attributes**:
        - `result_id`: Unique identifier for each result entry.
        - `student_id` (FK): Links the result to the student who achieved it.
        - `grade`: Stores the actual grade earned by the student.
    - **Importance**: This table is crucial for tracking academic performance and generating reports for both students and the university.
- Opening_Times
    - **Purpose**: Tracks when departments or university facilities are open for students, staff, and visitors.
    - **Key Attributes**:
        - `time_id`: Unique identifier for each time entry.
        - `department_id` (FK): Links the opening time to a specific department.
        - `day`: Indicates the day of the week.
        - `opening_time` and `closing_time`: Specify the department's hours of operation.
    - **Importance**: This table supports operational management by defining when facilities or services are available. It is especially useful for scheduling, planning, and communicating availability.
- Staff
    - **Purpose**: Stores details of the university's employees, including faculty and administrative staff.
    - **Key Attributes**:
        - `staff_id`: Unique identifier for each staff member.
        - `name`: Staff member's name.
        - `job_title`: Their role at the university.
        - `department_id` (FK): Links staff to their respective department.
        - `years_at_university`: Tracks experience or seniority within the university.
        - `days_off`: Used to track absences or leaves.
    - **Importance**: This table is essential for HR and administrative purposes, allowing the university to manage its workforce, track departmental roles, and plan workloads.

---

3. Identify Relationships, Cardinalities, and Participation Constraints

Relationships:

- Students → Courses:
  - **Relationship**: Enrolls In.
  - **Cardinality**: Many-to-One (a student can enroll in one course; a course can have many students).
  - **Participation**: Mandatory for Students (a student must be enrolled in a course), optional for Courses (a course may not have any students).
- Courses → Departments:
  - **Relationship**: Belongs To.
  - **Cardinality**: Many-to-One (a course belongs to one department; a department can have many courses).
  - **Participation**: Mandatory for Courses, optional for Departments.
- Results → Students:
  - **Relationship**: Grades.
  - **Cardinality**: Many-to-One (a student can have many grades, student can have result for each year)
  - **Participation**: Mandatory for Results. (every grade must be associated with a student).
- Opening_Times → Departments:
  - **Relationship**: Has Opening Times.
  - **Cardinality**: Many-to-One (a department can have multiple opening time entries for different days; each entry belongs to one department).
  - **Participation**: Mandatory for Opening_Times.
- Staff → Departments:
  - **Relationship**: Works In.
  - **Cardinality**: Many-to-One (a staff member works in one department; a department can have many staff members).
  - **Participation**: Mandatory for Staff.

---

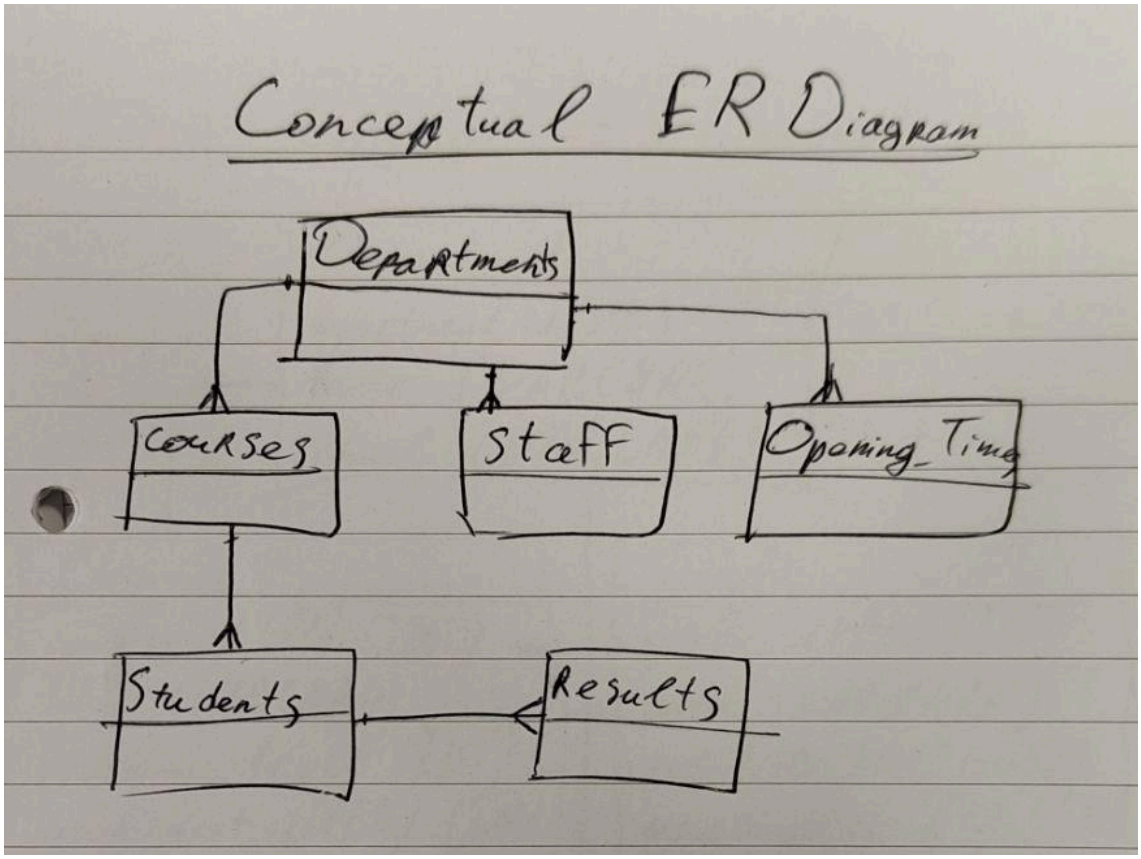
4. Conceptual ER Diagram

Description of the diagram

- Entities:
  - **Departments**: Represents university departments like the School of Computing or School of Business.
  - **Courses**: Represents courses offered by the university.

    - **Students**: Tracks student information.
    - **Results**: Tracks student grades in their courses.
    - **Opening_Times**: Stores department opening hours.
    - **Staff**: Represents university employees.
- Relationships:
    - **Students** → **Courses** ("Enrolls In"): A student can enroll in one course, but a course can have many students. *Many-to-One* relationship.
    - **Courses** → **Departments** ("Belongs To"): A course belongs to one department, but a department can offer many courses. *Many-to-One* relationship.
    - **Results** → **Students** ("Grades"): A student can have many grades (one for each course), but each result is linked to a single student. *Many-to-One* relationship.
    - **Opening_Times** → **Departments** ("Has Opening Times"): Each department can have multiple opening times, but each opening time belongs to a department. *Many-to-One* relationship.
    - **Staff** → **Departments** ("Works In"): A staff member works in one department, but each department can have many staff members. *Many-to-One* relationship.
- Cardinalities:
    - For each relationship, indicate the **cardinality**: many-to-one, one-to-many, or many-to-many.
    - Indicate **participation constraints** (mandatory vs. optional). For instance, a student must enroll in a course (mandatory participation for students) but a course may not have any students enrolled initially (optional participation for courses).

Draw ER Diagram



---

5. Logical ER Diagram

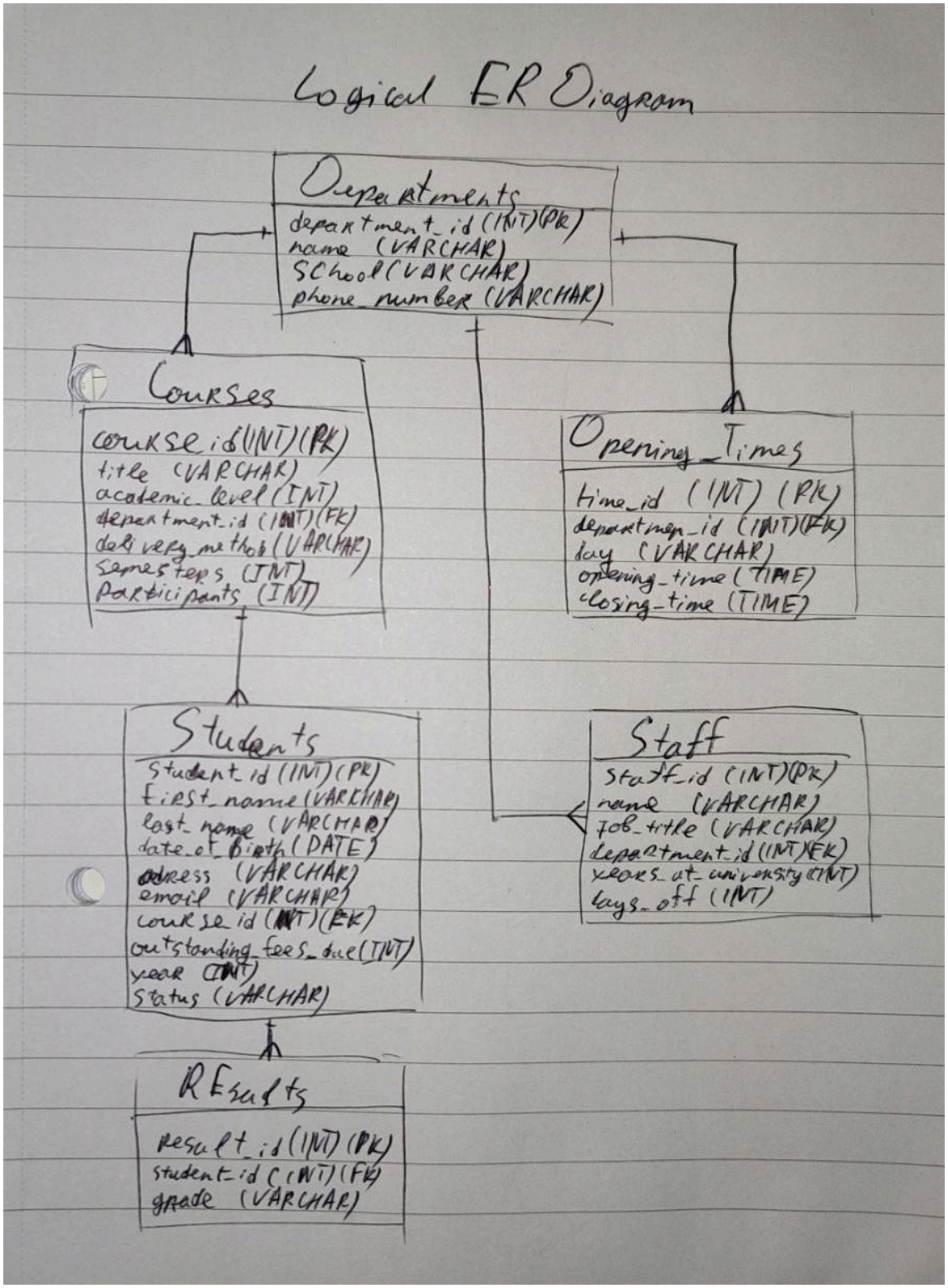
Description of the diagram

- Entities and Attributes in the Logical ERD
  - **Departments**:
    - `department_id` (PK) – Primary Key.
    - `name` (VARCHAR) – Name of the department.
    - `school` (VARCHAR) – School to which the department belongs.
    - `phone_number` (VARCHAR) – Phone number.
  - **Courses**:
    - `course_id` (PK) – Primary Key.
    - `title` (VARCHAR) – Name of the course.
    - `academic_level` (INT) – Academic level.
    - `department_id` (FK) – Foreign Key referencing `Departments(department_id)`.

        - `delivery_method` (VARCHAR) – How the course is delivered.
        - `semesters` (INT) – Number of semesters the course runs.
        - `participants` (INT) – Participants on the course.
    - **Students**:
        - `student_id` (PK) – Primary Key.
        - `first_name` (VARCHAR) – Student's first name.
        - `last_name` (VARCHAR) – Student's last name.
        - `date_of_birth` (DATE) – Date of birth.
        - `address` (VARCHAR) – Student's address.
        - `email` (VARCHAR) – Student's email address.
        - `course_id` (FK) – Foreign Key referencing `Courses(course_id)`.
        - `outstanding_fees_due` (INT) – How long have not been paid.
        - `year` (INT) – Year of study.
        - `status` (VARCHAR) – Current status.
    - **Results**:
        - `result_id` (PK) – Primary Key.
        - `student_id` (FK) – Foreign Key referencing `Students(student_id)`.
        - `grade` (VARCHAR) – Grade awarded to the student.
    - **Opening_Times**:
        - `time_id` (PK) – Primary Key.
        - `department_id` (FK) – Foreign Key referencing `Departments(department_id)`.
        - `day` (VARCHAR) – Day of the week the department is open.
        - `opening_time` (TIME) – Time the department opens.
        - `closing_time` (TIME) – Time the department closes.
    - **Staff**:
        - `staff_id` (PK) – Primary Key.
        - `name` (VARCHAR) – Name of the staff member.
        - `job_title` (VARCHAR) – Job title.
        - `department_id` (FK) – Foreign Key referencing `Departments(department_id)`.
        - `years_at_university` (INT) – Number of years the staff member has worked at the university.
        - `days_off` (INT) – Number of days off taken by the staff member.
- Relationships in the Logical ERD
    - **Students** → **Courses** ("Enrolls In")
        - **Cardinality**: **Many-to-One** (Many students can enroll in a single course, but each student can only enroll in one course at a time.)

        - **Foreign Key**: `course_id` in `Students` table referencing `Courses(course_id)`.
    - **Courses** → **Departments** ("Belongs To")
        - **Cardinality**: **Many-to-One** (Each course belongs to one department, but a department can offer many courses.)
        - **Foreign Key**: `department_id` in `Courses` table referencing `Departments(department_id)`.
    - **Results** → **Students** ("Grades")
        - **Cardinality**: **Many-to-One** (A student can have many results (grades), but each result corresponds to one student.)
        - **Foreign Key**: `student_id` in `Results` table referencing `Students(student_id)`.
    - **Opening_Times** → **Departments** ("Has Opening Times")
        - **Cardinality**: **Many-to-One** (A department can have multiple opening times, but each opening time belongs to a specific department.)
        - **Foreign Key**: `department_id` in `Opening_Times` table referencing `Departments(department_id)`.
    - **Staff** → **Departments** ("Works In")
        - **Cardinality**: **Many-to-One** (Each staff member works in a single department, but a department can have many staff members.)
        - **Foreign Key**: `department_id` in `Staff` table referencing `Departments(department_id)`.

Draw ER Diagram



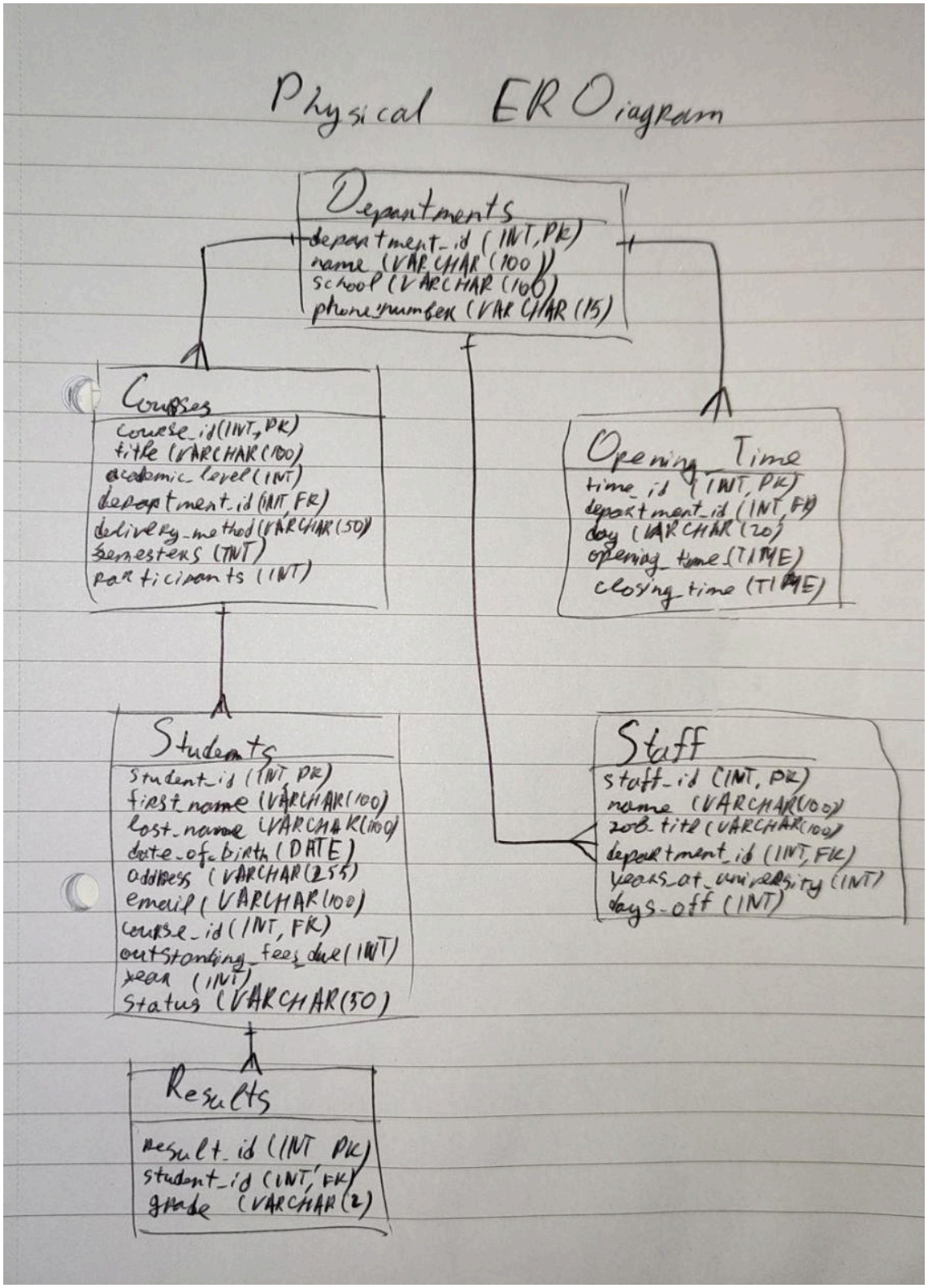
6. Physical ER Diagram

Description of the diagram

- Entities, Attributes, and Foreign Keys in the Physical ERD
  - **Departments**:
    - `department_id` (INT, PK) – **Primary Key**.
    - `name` (VARCHAR(100)) – Name of the department.
    - `school` (VARCHAR(100)) – School under which the department falls.
    - `phone_number` (VARCHAR(15)) – Phone number.
  - **Courses**:
    - `course_id` (INT, PK) – **Primary Key**.
    - `title` (VARCHAR(100)) – Name of the course.
    - `academic_level` (INT) – Academic level.
    - `department_id` (INT, FK) – **Foreign Key**: referencing `Departments(department_id)`.
    - `delivery_method` (VARCHAR(50)) – The delivery method.
    - `semesters` (INT) – Number of semesters the course runs.
    - `participants` (INT) – Participants on the course
  - **Students**:
    - `student_id` (INT, PK) – **Primary Key**.
    - `first_name` (VARCHAR(100)) – Student's first name.
    - `last_name` (VARCHAR(100)) – Student's last name.
    - `date_of_birth` (DATE) – Date of birth.
    - `address` (VARCHAR(255)) – Student's address.
    - `email` (VARCHAR(100)) – Student's email address.
    - `course_id` (INT, FK) – **Foreign Key**: referencing `Courses(course_id)`.
    - `outstanding_fees_due` (INT) – How long have not been paid.
    - `year` (INT) – Year of study.
    - `status` (VARCHAR(50)) – Status.
  - **Results**:
    - `result_id` (INT, PK) – **Primary Key**.
    - `student_id` (INT, FK) – **Foreign Key**: referencing `Students(student_id)`.
    - `grade` (VARCHAR(2)) – The grade the student received.
  - **Opening_Times**:
    - `time_id` (INT, PK) – **Primary Key**.

        - `department_id` (INT, FK) – **Foreign Key**: referencing `Departments(department_id)`.
        - `day` (VARCHAR(20)) – Day of the week.
        - `opening_time` (TIME) – Opening time of the department.
        - `closing_time` (TIME) – Closing time of the department.
    - **Staff**:
        - `staff_id` (INT, PK) – **Primary Key**.
        - `name` (VARCHAR(100)) – Name of the staff member.
        - `job_title` (VARCHAR(100)) – Job title.
        - `department_id` (INT, FK) – **Foreign Key**: referencing `Departments(department_id)`.
        - `years_at_university` (INT) – Number of years the staff member has worked at the university.
        - `days_off` (INT) – Number of days off taken by the staff member.

Draw ER Diagram



7. Relational Model (Tables in 3NF)

Steps to Ensure 3NF

1. **1NF (First Normal Form)**:
    a. Ensure all attributes contain atomic (indivisible) values.
    b. Ensure there are no repeating groups or arrays.
2. **2NF (Second Normal Form)**:
    a. Ensure the table is in 1NF.
    b. Eliminate partial dependencies (non-key attributes depending on a part of the primary key).
3. **3NF (Third Normal Form)**:
    a. Ensure the table is in 2NF.
    b. Eliminate transitive dependencies (non-key attributes depending on other non-key attributes).

Relational Model

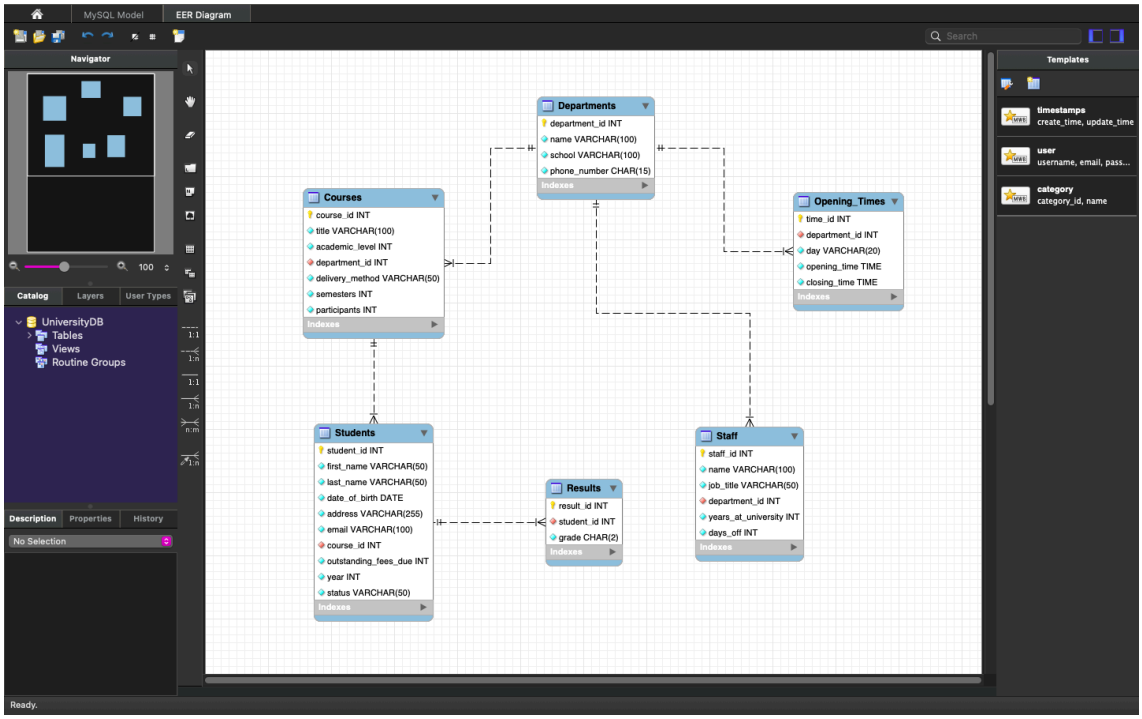
- Entities and Attributes
    - **Departments Table**:
        - `department_id` (PK)
        - `name`
        - `school`
        - `phone_number`
    - **Courses Table**:
        - `course_id` (PK)
        - `title`
        - `academic_level`
        - `department_id` (FK referencing `Departments(department_id)`)
        - `delivery_method`
        - `semesters`
        - `participants`
    - **Students Table**:
        - `student_id` (PK)
        - `first_name`
        - `last_name`
        - `date_of_birth`
        - `address`
        - `email` (unique constraint)
        - `course_id` (FK referencing `Courses(course_id)`)
        - `outstanding_fees_due`

        - `year`
        - `status`
    - **Results Table**:
        - `result_id` (PK)
        - `student_id` (FK referencing `Students(student_id)`)
        - `grade`
    - **Opening_Times Table**:
        - `time_id` (PK)
        - `department_id` (FK referencing `Departments(department_id)`)
        - `day`
        - `opening_time`
        - `closing_time`
    - **Staff Table**:
        - `staff_id` (PK)
        - `name`
        - `job_title`
        - `department_id` (FK referencing `Departments(department_id)`)
        - `years_at_university`
        - `days_off`

Relational Model Representation

Table	Attributes
Students	`student_id` (PK), `first_name`, `last_name`, `date_of_birth`, `address`, `email`, `course_id` (FK), `year`, `status`
Courses	`course_id` (PK), `title`, `academic_level`, `department_id` (FK), `delivery_method`, `semesters`
Departments	`department_id` (PK), `name`, `school`
Results	`result_id` (PK), `student_id` (FK), `grade`
Opening_Times	`time_id` (PK), `department_id` (FK), `day`, `opening_time`, `closing_time`

Draw ER Diagram



Task Two – Create & Populate the Database

---

1. DDL Statements

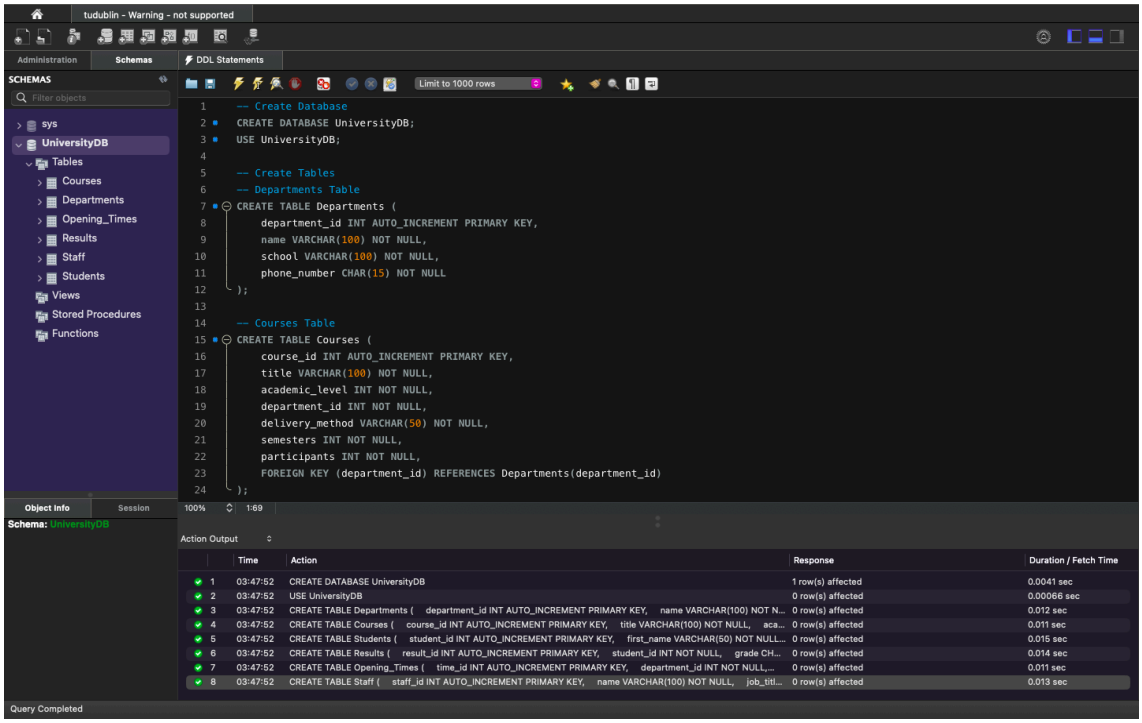
Code in “DDL Statements.sql”

```
-- Create Database
CREATE DATABASE UniversityDB;
USE UniversityDB;

-- Create Tables
-- Departments Table
CREATE TABLE Departments (
    department_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    school VARCHAR(100) NOT NULL,
    phone_number CHAR(15) NOT NULL
);

-- Courses Table
CREATE TABLE Courses (
    course_id INT AUTO_INCREMENT PRIMARY KEY,
    title VARCHAR(100) NOT NULL,
    academic_level INT NOT NULL,
    department_id INT NOT NULL,
    delivery_method VARCHAR(50) NOT NULL,
    semesters INT NOT NULL,
    participants INT NOT NULL,
    FOREIGN KEY (department_id) REFERENCES
Departments(department_id)
);

-- Students Table
CREATE TABLE Students (
    student_id INT AUTO_INCREMENT PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
```

```
    date_of_birth DATE NOT NULL,
    address VARCHAR(255) NOT NULL,
    email VARCHAR(100) UNIQUE NOT NULL,
    course_id INT NOT NULL,
    outstanding_fees_due INT DEFAULT 0 NOT NULL,
    year INT NOT NULL,
    status VARCHAR(50) NOT NULL,
    FOREIGN KEY (course_id) REFERENCES Courses(course_id)
);

-- Results Table
CREATE TABLE Results (
    result_id INT AUTO_INCREMENT PRIMARY KEY,
    student_id INT NOT NULL,
    grade CHAR(2) NOT NULL,
    FOREIGN KEY (student_id) REFERENCES Students(student_id)
);

-- Opening_Times Table
CREATE TABLE Opening_Times (
    time_id INT AUTO_INCREMENT PRIMARY KEY,
    department_id INT NOT NULL,
    day VARCHAR(20) NOT NULL,
    opening_time TIME NOT NULL,
    closing_time TIME NOT NULL,
    FOREIGN KEY (department_id) REFERENCES
Departments(department_id)
);

-- Staff Table
CREATE TABLE Staff (
    staff_id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    job_title VARCHAR(50) NOT NULL,
    department_id INT NOT NULL,
    years_at_university INT NOT NULL,
    days_off INT NOT NULL,
```

```
    FOREIGN KEY (department_id) REFERENCES
Departments(department_id)
);
```

Screenshot



---

2. DML Statements

Code in “DML Statements.sql”

```
-- Populate Tables
-- Departments Table
INSERT INTO Departments (name, school, phone_number) VALUES
('School of Computing', 'Computing', '123456789'),
('School of Business', 'Business', '123456789'),
('School of Magic', 'Magic', '123456789'),
('School of Arts', 'Arts', '123456789'),
('School of Sciences', 'Sciences', '123456789'),
('School of Law', 'Law', '123456789'),
('School of Medicine', 'Medicine', '123456789'),
('School of Education', 'Education', '123456789'),
```

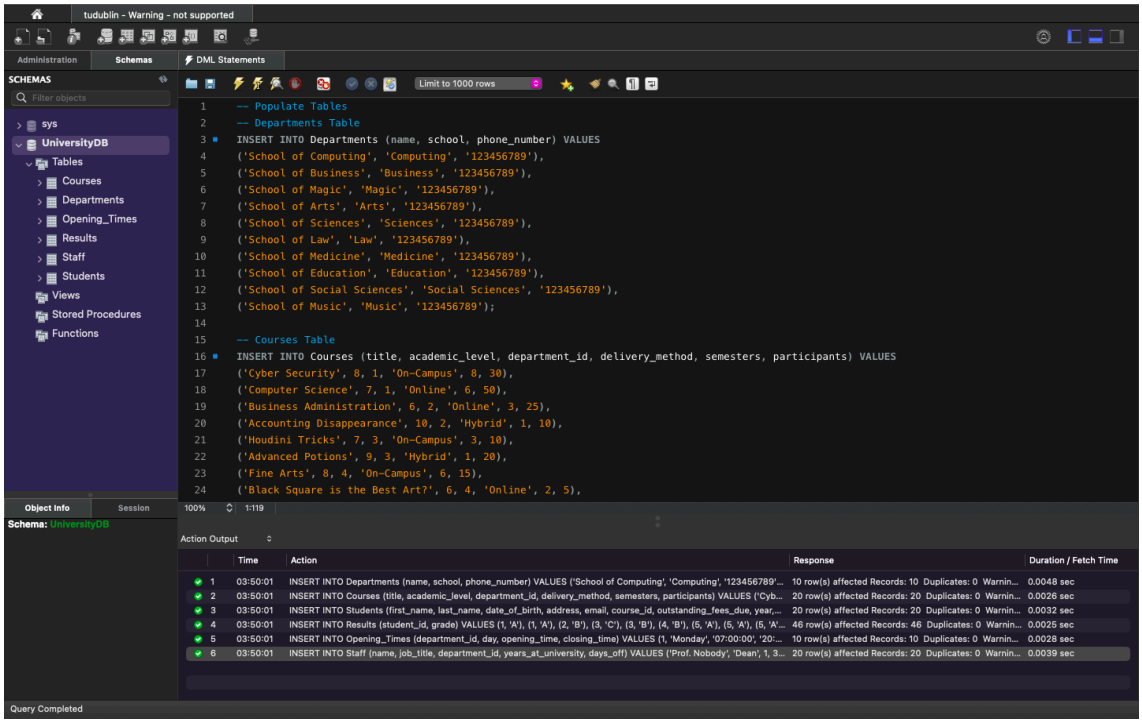
```
('School of Social Sciences', 'Social Sciences', '123456789'),
('School of Music', 'Music', '123456789');

-- Courses Table
INSERT INTO Courses (title, academic_level, department_id,
delivery_method, semesters, participants) VALUES
('Cyber Security', 8, 1, 'On-Campus', 8, 30),
('Computer Science', 7, 1, 'Online', 6, 50),
('Business Administration', 6, 2, 'Online', 3, 25),
('Accounting Disappearance', 10, 2, 'Hybrid', 1, 10),
('Houdini Tricks', 7, 3, 'On-Campus', 3, 10),
('Advanced Potions', 9, 3, 'Hybrid', 1, 20),
('Fine Arts', 8, 4, 'On-Campus', 6, 15),
('Black Square is the Best Art?', 6, 4, 'Online', 2, 5),
('Physics', 9, 5, 'Online', 8, 30),
('Astrophysics', 10, 5, 'Online', 2, 12),
('Corporate Law', 9, 6, 'On-Campus', 2, 18),
('Batman\'s Law', 10, 6, 'On-Campus', 10, 1),
('Pharmacy', 9, 7, 'On-Campus', 8, 30),
('Medical Sciences', 10, 7, 'Hybrid', 9, 35),
('Education Theory', 5, 8, 'Online', 1, 22),
('Artificial Intelligence', 10, 8, 'Online', 6, 15),
('Cultural Studies', 7, 9, 'On-Campus', 2, 28),
('Civil Engineering', 8, 3, 'Hybrid', 6, 18),
('Musical Composition', 10, 10, 'Hybrid', 9, 10),
('Stop Listenig Pop', 4, 10, 'Online', 1, 10);

-- Students Table
INSERT INTO Students (first_name, last_name, date_of_birth,
address, email, course_id, outstanding_fees_due, year, status)
VALUES
('Dany', 'qwerty', '2004-12-08', 'Far Far Away',
'qwerty@dany.com', 1, 0, 2, 'Active'),
('John', 'Doe', '2000-05-15', '123 Maple Street',
'johndoe@gmail.com', 1, 0, 1, 'Active'),
('Jane', 'Smith', '1999-10-22', '456 Oak Avenue',
'janesmith@gmail.com', 2, 2, 2, 'Active'),
```

```
('Alice', 'Brown', '2001-01-17', '789 Pine Lane',
'alicebrown@gmail.com', 3, 6, 1, 'Active'),
('Bob', 'White', '1998-07-10', '321 Elm Drive',
'bobwhite@gmail.com', 4, 0, 3, 'Active'),
('Charlie', 'Green', '2002-09-25', '654 Birch Road',
'charliegreen@gmail.com', 5, 3, 1, 'Active'),
('David', 'Black', '2000-02-14', '987 Cedar Boulevard',
'davidblack@gmail.com', 6, 0, 2, 'Active'),
('Emma', 'Gray', '1999-06-30', '111 Spruce Street',
'emmagray@gmail.com', 7, 0, 4, 'Completed'),
('Frank', 'Blue', '2001-12-12', '222 Walnut Way',
'frankblue@gmail.com', 8, 4, 3, 'Active'),
('Grace', 'Yellow', '2000-03-21', '333 Chestnut Court',
'gracey@gmail.com', 9, 0, 2, 'Active'),
('Hannah', 'Purple', '1998-11-11', '444 Aspen Place',
'hannahp@gmail.com', 10, 0, 4, 'Completed'),
('Ivy', 'Orange', '2001-05-05', '555 Maple Lane',
'ivyorange@gmail.com', 12, 0, 1, 'Active'),
('Jack', 'Red', '1997-07-16', '666 Pine Court',
'jackred@gmail.com', 13, 8, 3, 'Active'),
('Karen', 'Pink', '2003-11-23', '777 Cedar Drive',
'karenpink@gmail.com', 14, 0, 2, 'Active'),
('Leo', 'Brown', '2002-08-10', '888 Birch Avenue',
'leobrown@gmail.com', 15, 1, 1, 'Active'),
('Maria', 'Silver', '1999-09-18', '999 Aspen Street',
'mariasilver@gmail.com', 16, 0, 4, 'Completed'),
('Nathan', 'Gold', '2000-04-12', '101 Elm Road',
'nathangold@gmail.com', 17, 0, 3, 'Active'),
('Olivia', 'Teal', '2001-06-28', '202 Walnut Boulevard',
'oliviateal@gmail.com', 18, 0, 2, 'Active'),
('Paul', 'Green', '1998-02-20', '303 Spruce Lane',
'paulgreen@gmail.com', 19, 6, 4, 'Completed'),
('Quinn', 'Blue', '1997-01-14', '404 Chestnut Drive',
'quinnblue@gmail.com', 20, 0, 1, 'Active');

-- Results Table
INSERT INTO Results (student_id, grade) VALUES
(1, 'A'), (1, 'A'),
```

```
(2, 'B'),
(3, 'C'), (3, 'B'),
(4, 'B'),
(5, 'A'), (5, 'A'), (5, 'A'),
(6, 'C'),
(7, 'B'), (7, 'A'),
(8, 'A'), (8, 'A'), (8, 'A'), (8, 'A'),
(9, 'B'), (9, 'B'), (9, 'A'),
(10, 'C'), (10, 'B'),
(11, 'A'), (11, 'A'), (11, 'A'), (11, 'A'),
(12, 'B'),
(13, 'C'), (13, 'B'), (13, 'A'),
(14, 'C'), (14, 'B'),
(15, 'B'),
(16, 'A'), (16, 'A'), (16, 'A'), (16, 'A'),
(17, 'B'), (17, 'A'), (17, 'A'),
(18, 'C'), (18, 'B'),
(19, 'A'), (19, 'A'), (19, 'A'), (19, 'A'),
(20, 'B');

-- Opening_Times Table
INSERT INTO Opening_Times (department_id, day, opening_time,
closing_time) VALUES
(1, 'Monday', '07:00:00', '20:00:00'),
(2, 'Tuesday', '08:30:00', '17:30:00'),
(3, 'Tuesday', '09:00:00', '19:00:00'),
(4, 'Wednesday', '08:00:00', '19:00:00'),
(5, 'Wednesday', '08:00:00', '18:00:00'),
(6, 'Thursday', '09:00:00', '18:00:00'),
(7, 'Thursday', '09:00:00', '17:00:00'),
(8, 'Friday', '10:00:00', '17:00:00'),
(9, 'Saturday', '10:00:00', '14:00:00'),
(10, 'Sunday', '12:00:00', '14:00:00');

-- Staff Table
INSERT INTO Staff (name, job_title, department_id,
years_at_university, days_off) VALUES
('Prof. Nobody', 'Dean', 1, 37, 0),
```

```
('Dr. Amy Watson', 'Lecturer', 1, 5, 12),
('Mr. Mark Johnson', 'Administrator', 2, 10, 5),
('Ms. Sarah Brown', 'Assistant', 2, 2, 8),
('Dr. Michael Lee', 'Researcher', 3, 7, 10),
('Ms. Olivia Davis', 'Lecturer', 3, 3, 9),
('Mr. James Harris', 'Technician', 4, 6, 15),
('Dr. Linda Martinez', 'Researcher', 4, 9, 6),
('Ms. Emily Clark', 'Office Worker', 5, 1, 5),
('Mr. Ryan King', 'Lecturer', 5, 4, 11),
('Dr. Angela Wright', 'Lecturer', 6, 12, 18),
('Mr. Daniel Evans', 'Technician', 6, 8, 14),
('Ms. Rebecca Adams', 'Office Worker', 7, 3, 7),
('Prof. Christopher Scott', 'Dean', 7, 20, 22),
('Mr. Kevin Carter', 'Administrator', 8, 5, 9),
('Dr. Isabella Young', 'Researcher', 8, 6, 10),
('Ms. Mia Hill', 'Assistant', 9, 4, 8),
('Dr. Liam Walker', 'Lecturer', 9, 11, 16),
('Mr. William Hall', 'Technician', 10, 9, 12),
('Ms. Sophia Allen', 'Office Worker', 10, 2, 4);
```

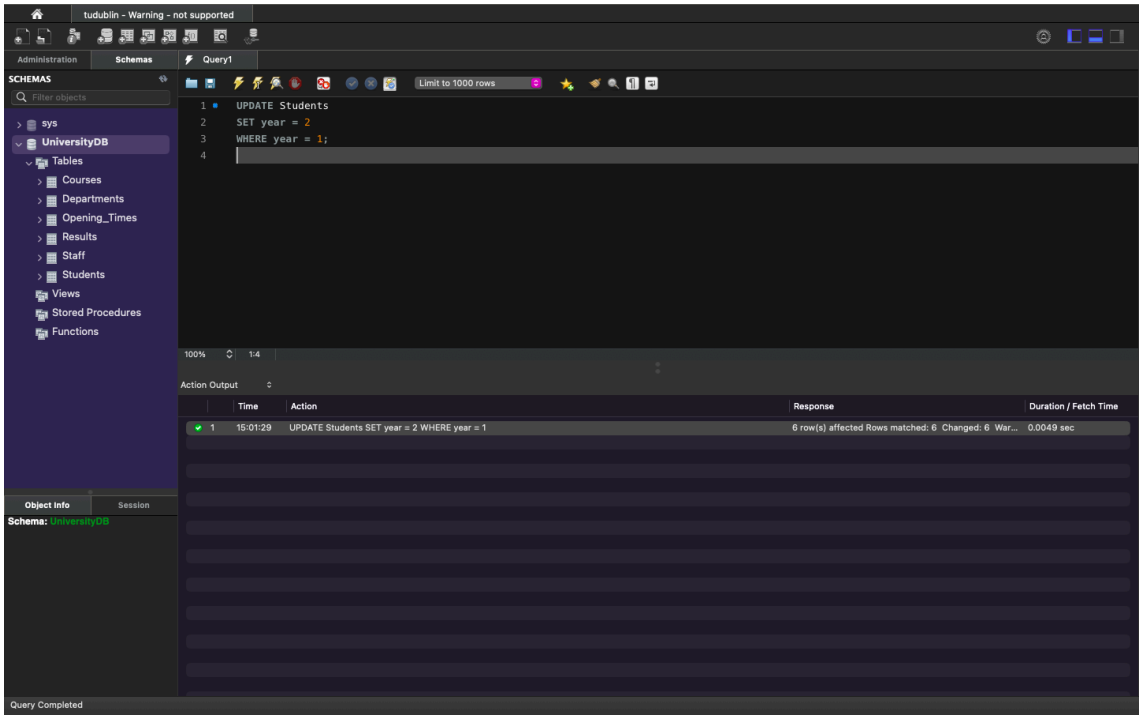
Screenshot



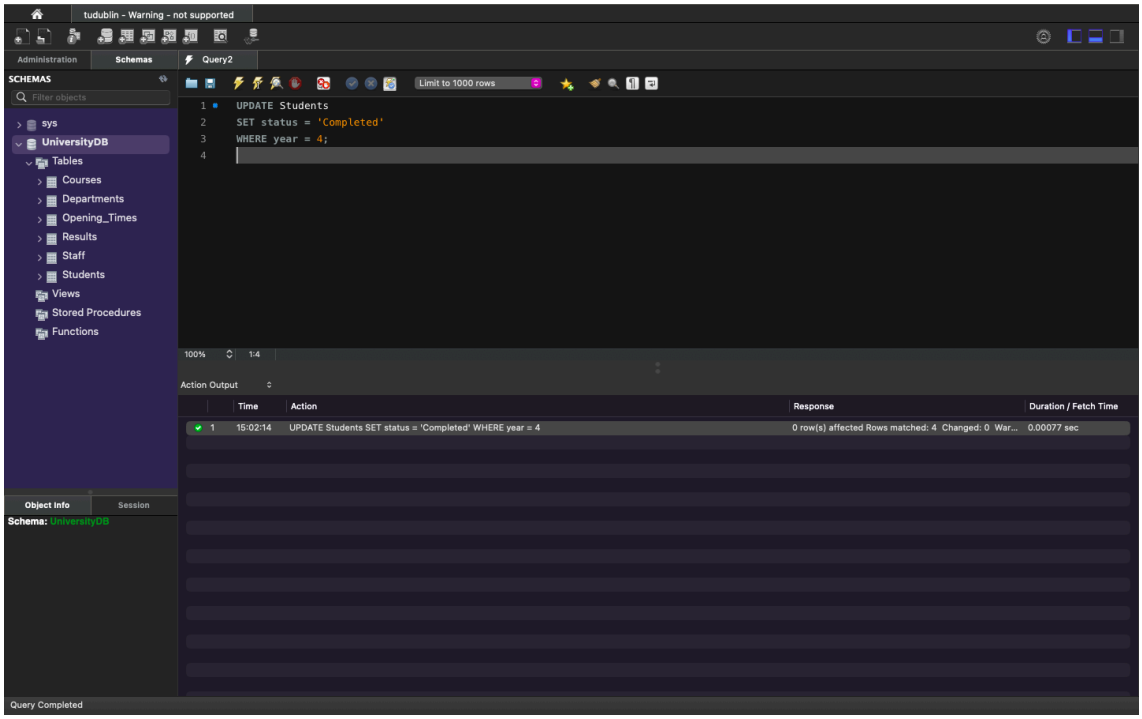
Task Three – Query The Dataset

---

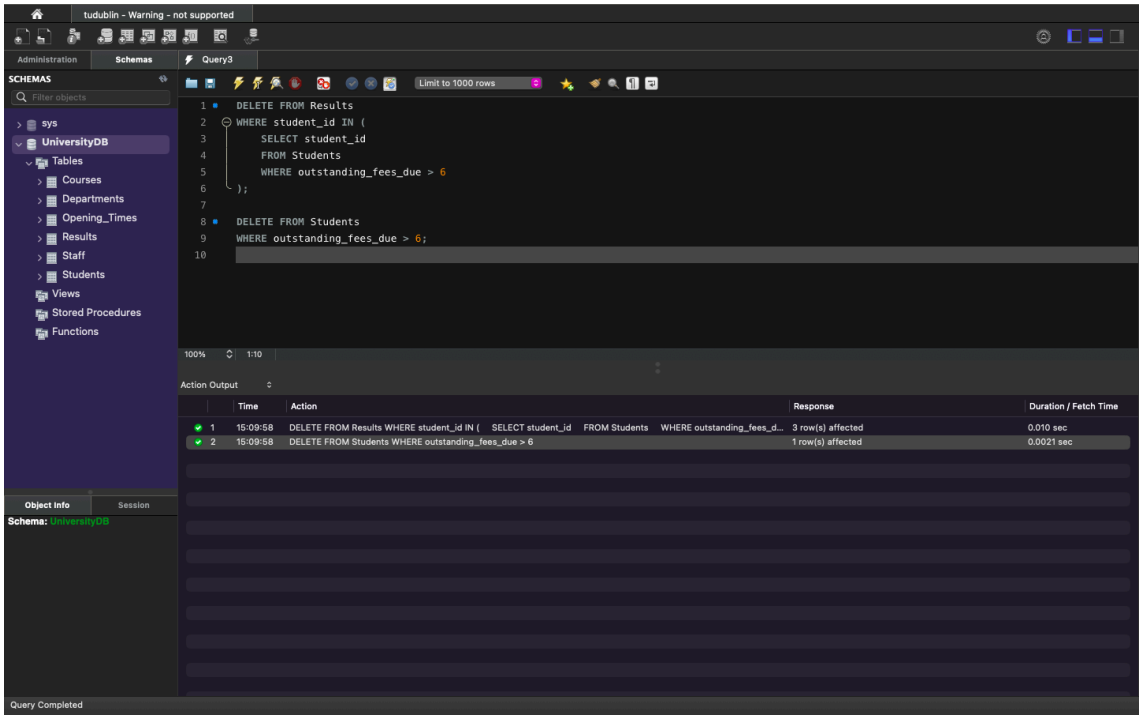
1. Change all students in year one of any course to year two.



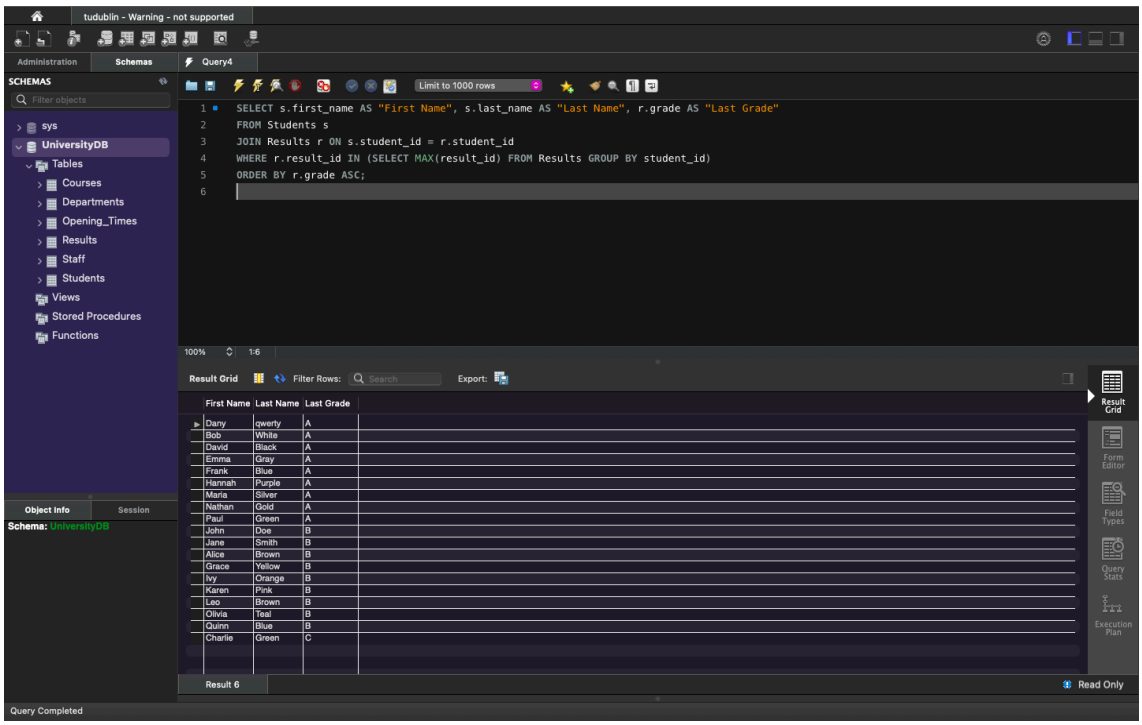
2. Modify the status of any student in year 4 of all courses to indicate that they have now completed the course.



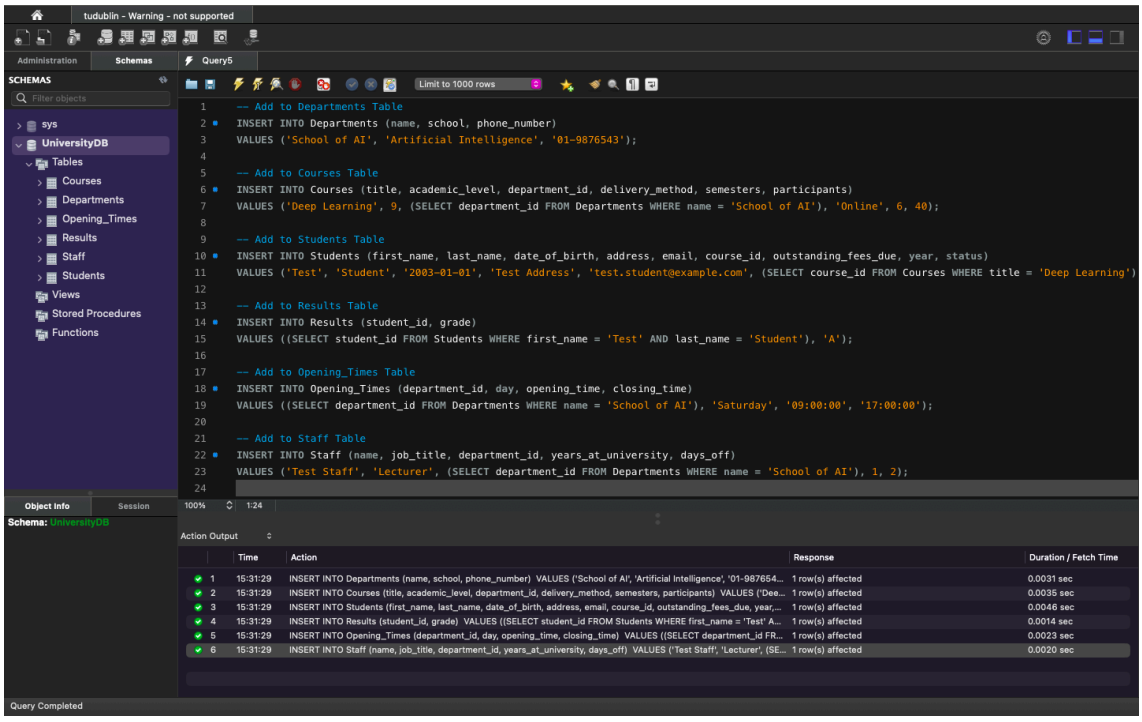
3. Delete all students who have outstanding fees which have not been paid for more than 6 months.



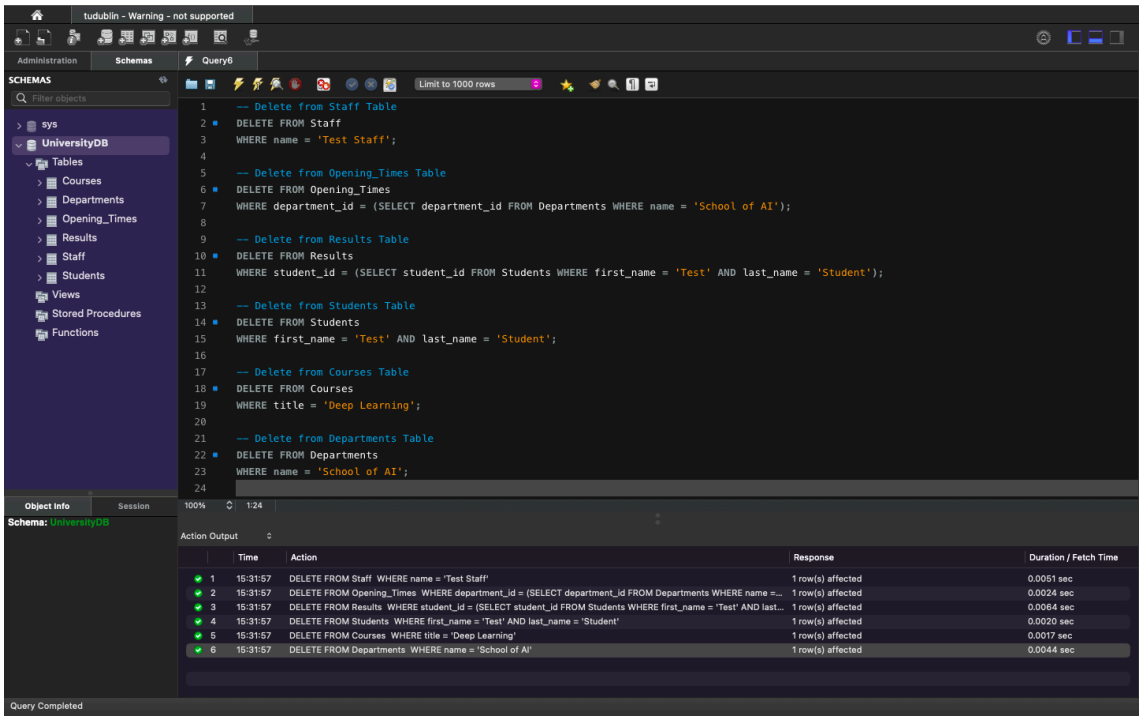
4. Display the first name surname and grade of all students sorting the results so the highest grades are first.



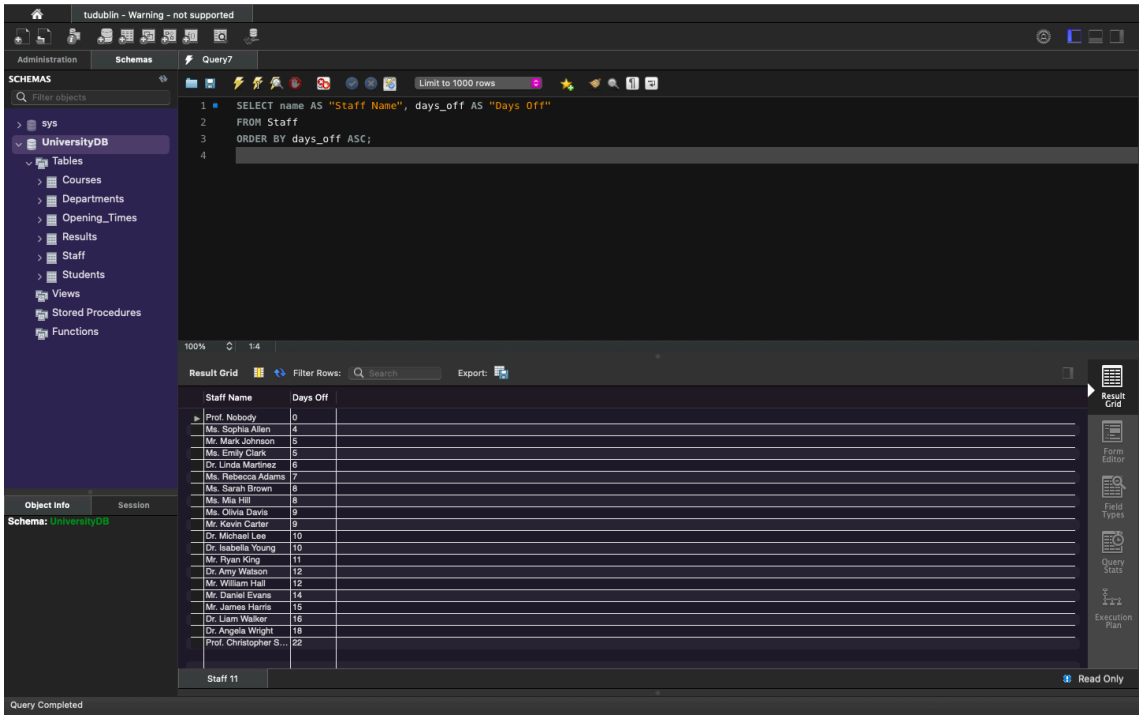
5. Add one new record to each table.



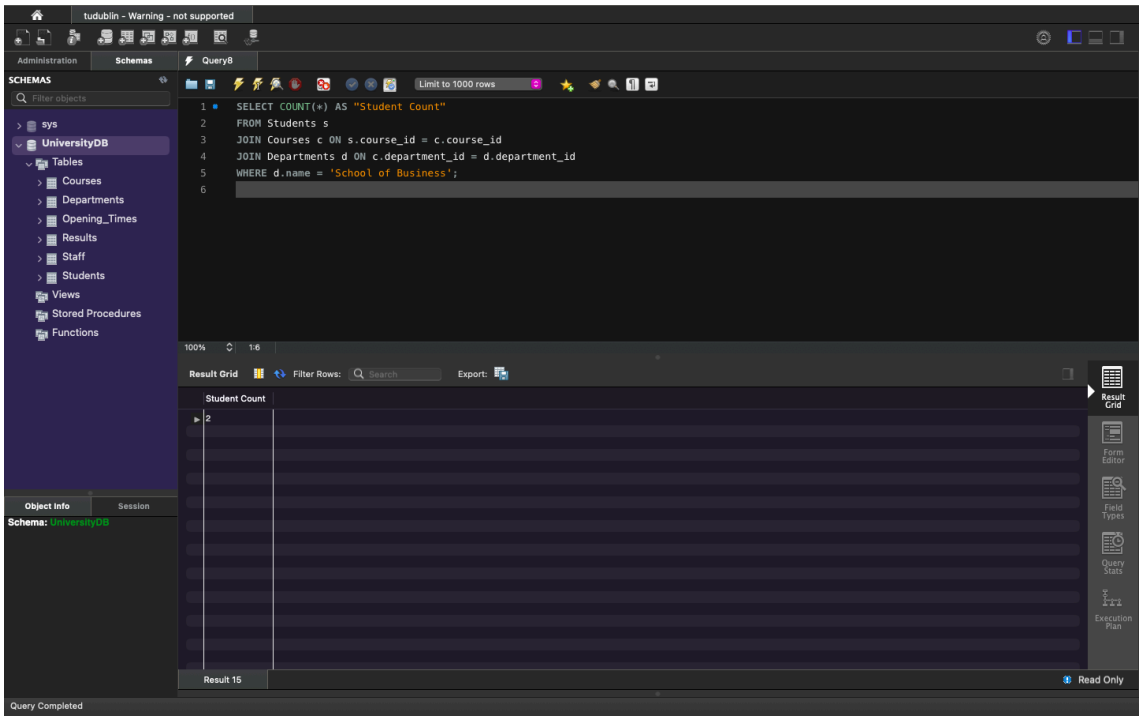
6. Delete one record from all tables.



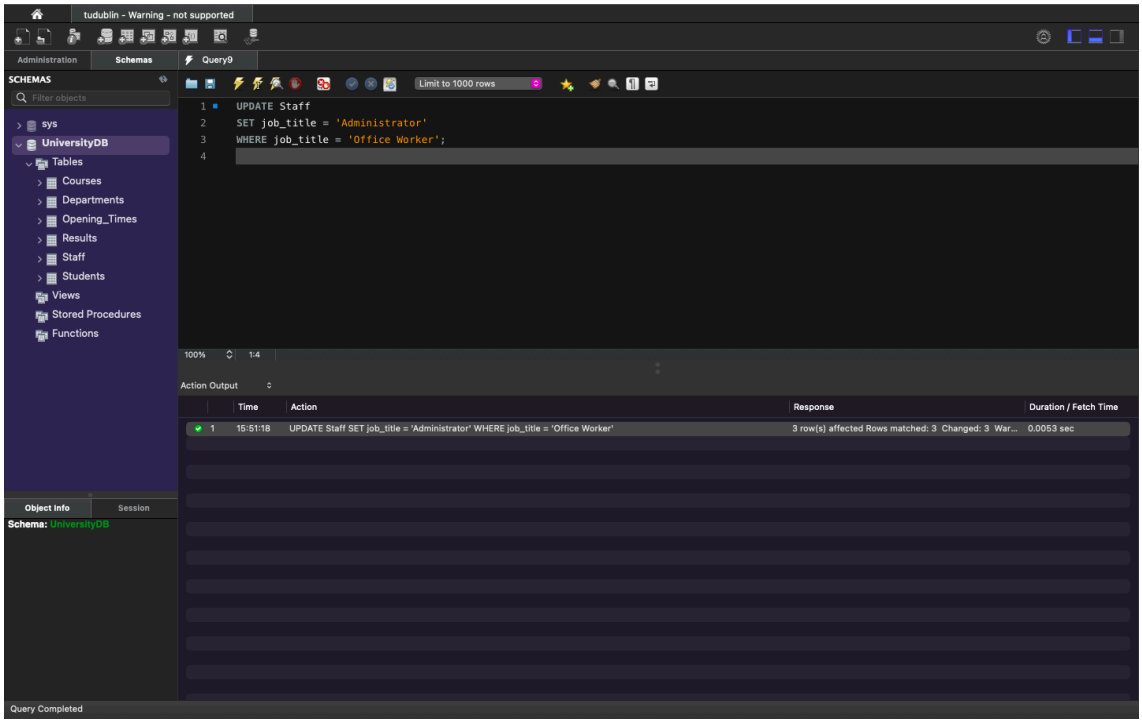
7. Find the total number of days off for all staff, order this by least days off.



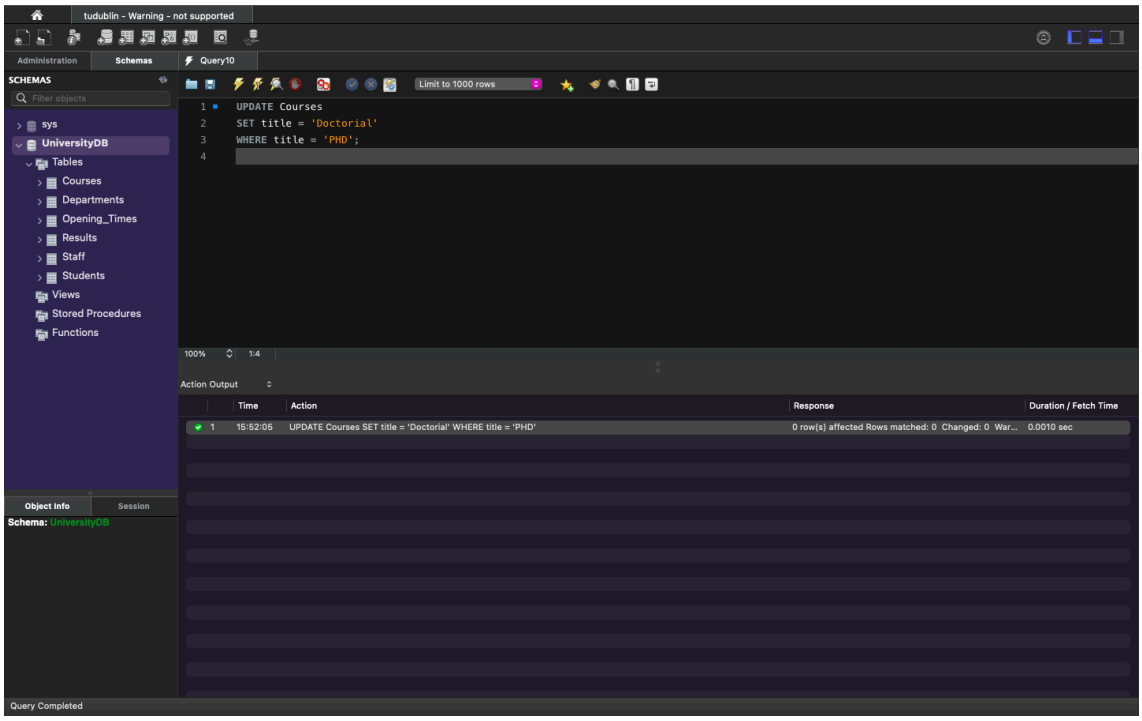
8. Count how many students are doing a business course.



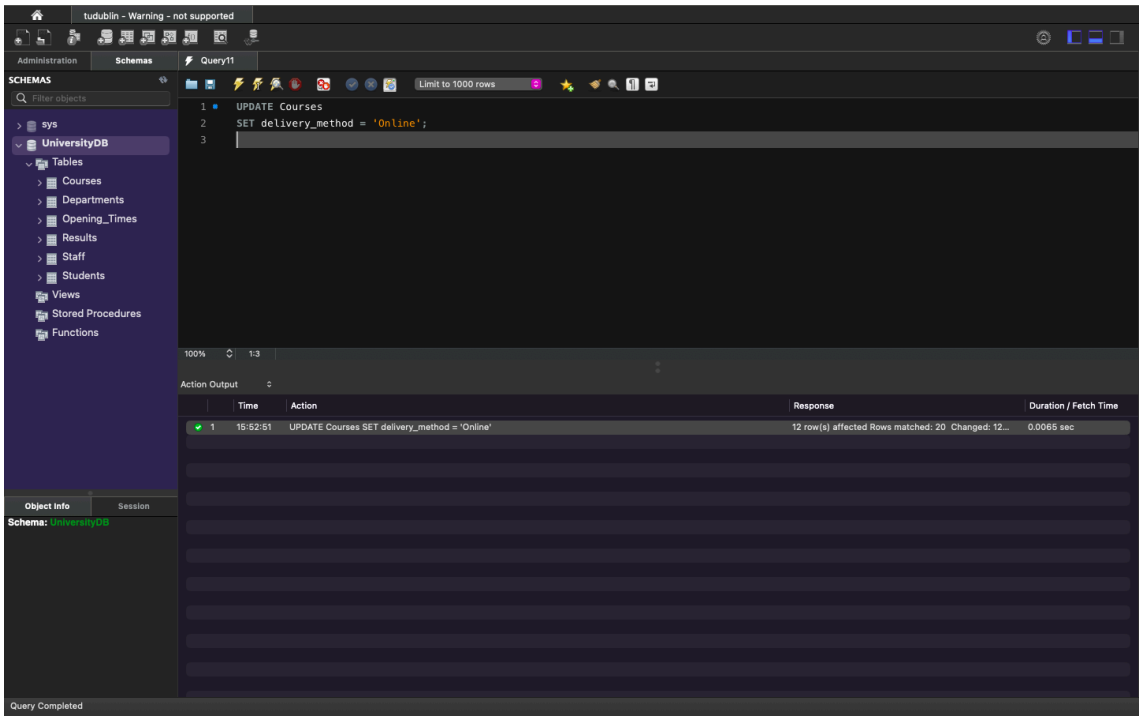
9. Change the roll of all staff who have a job title Office worker to Administrator.



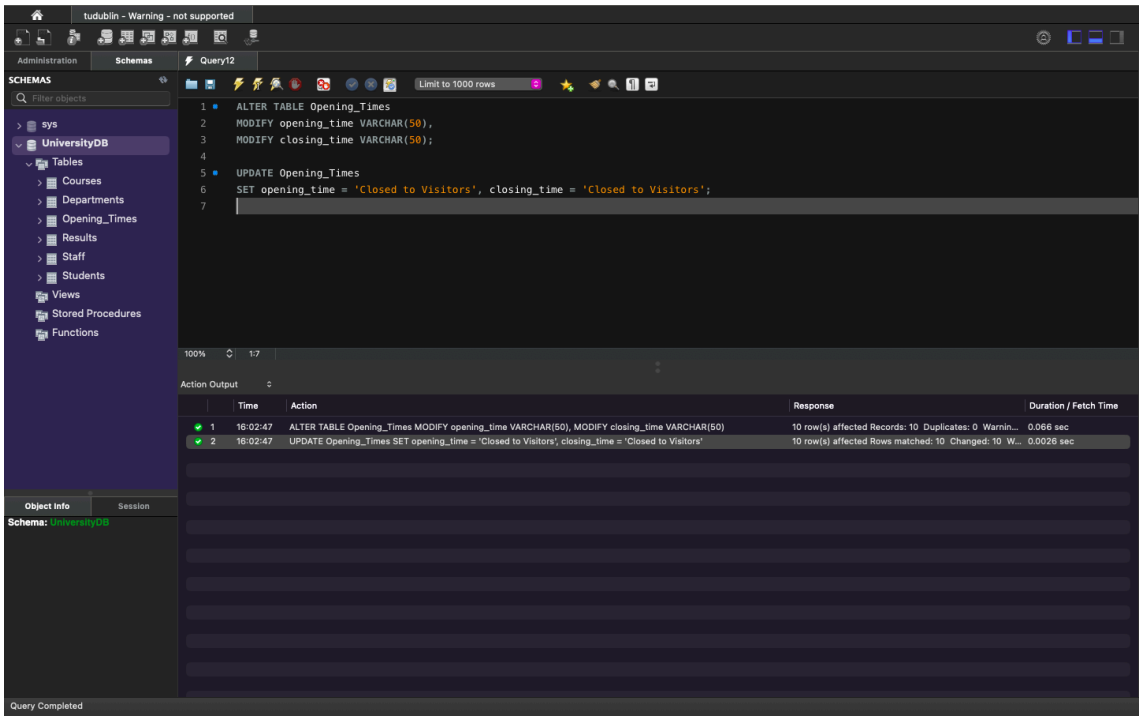
10. Change all courses entitled PHD to Doctorial.



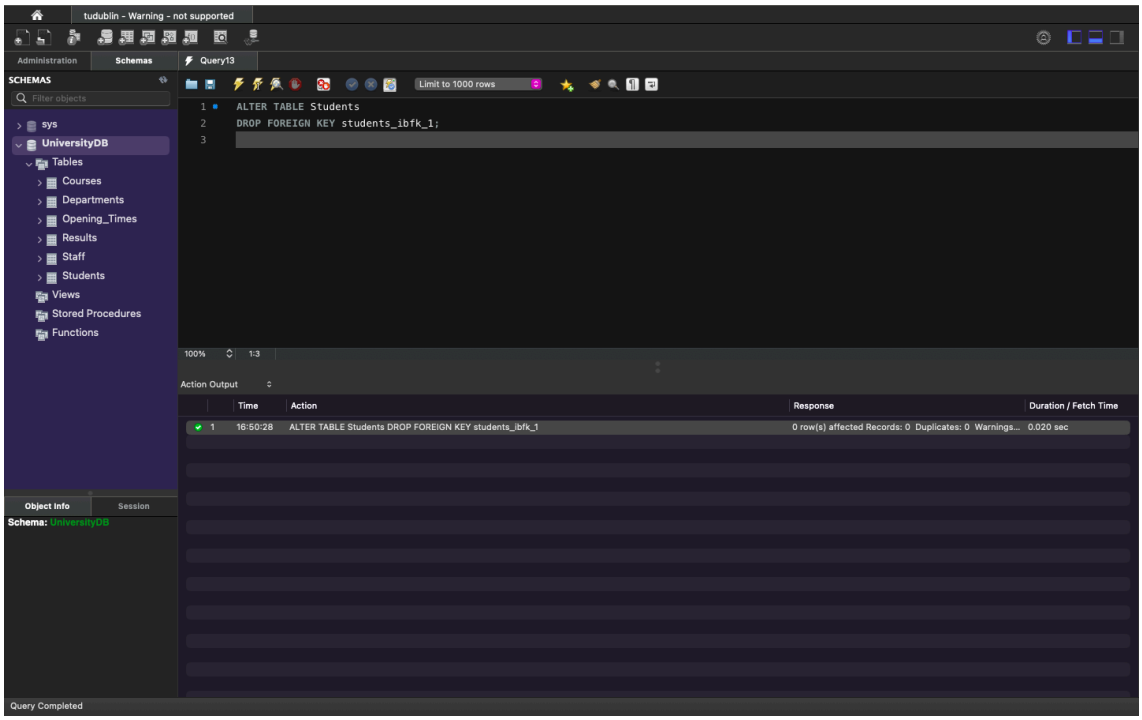
11. Set the delivery method of all courses to online.



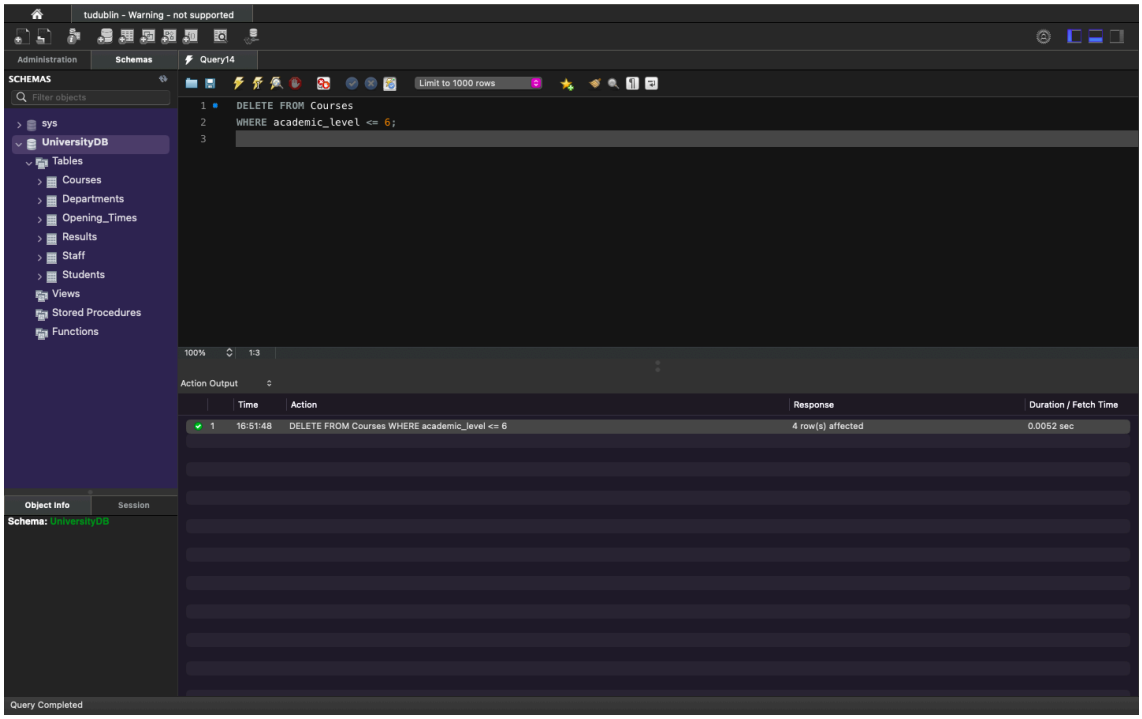
12. Update the opening times of the university to say closed to visitors.



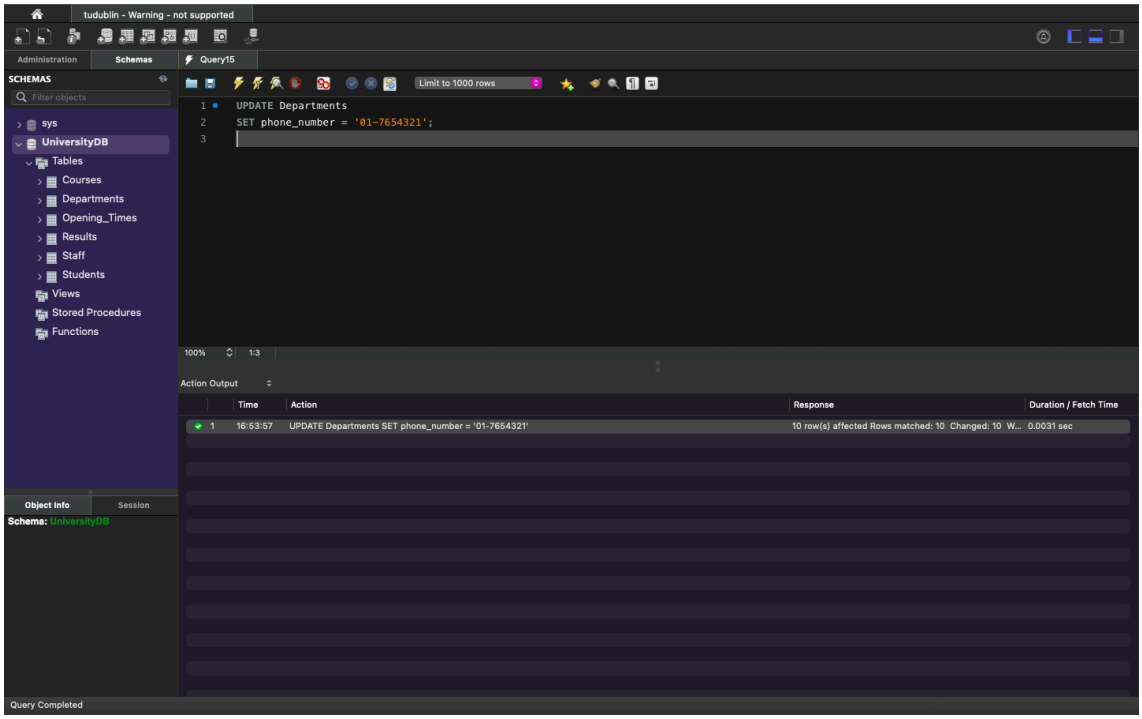
13. Drop all information contained in the courses relation.



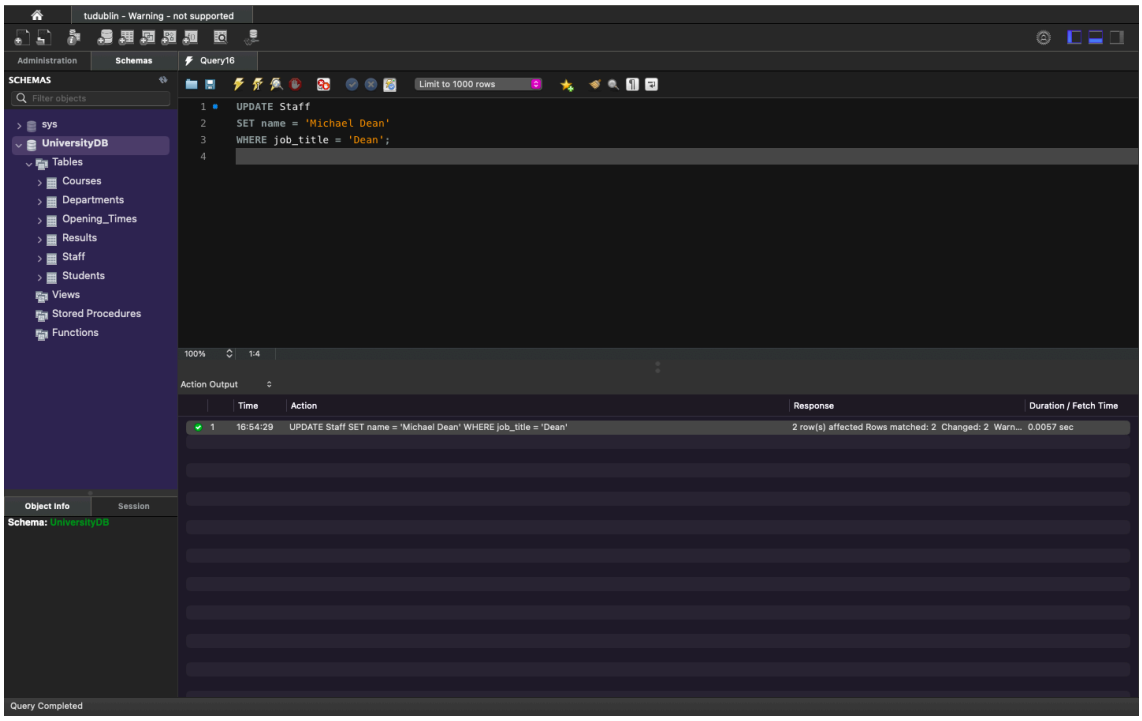
14. Delete all courses from the database with ab academic level of 6 or less.



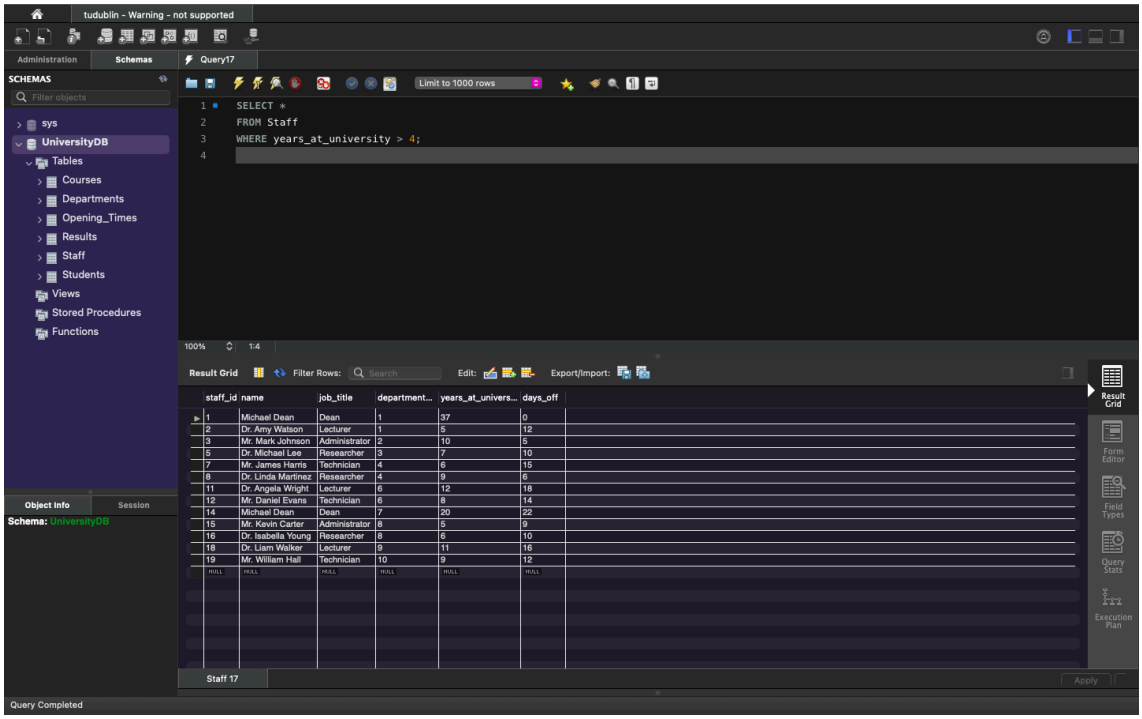
15. Set the university phone number to be 01-7654321.



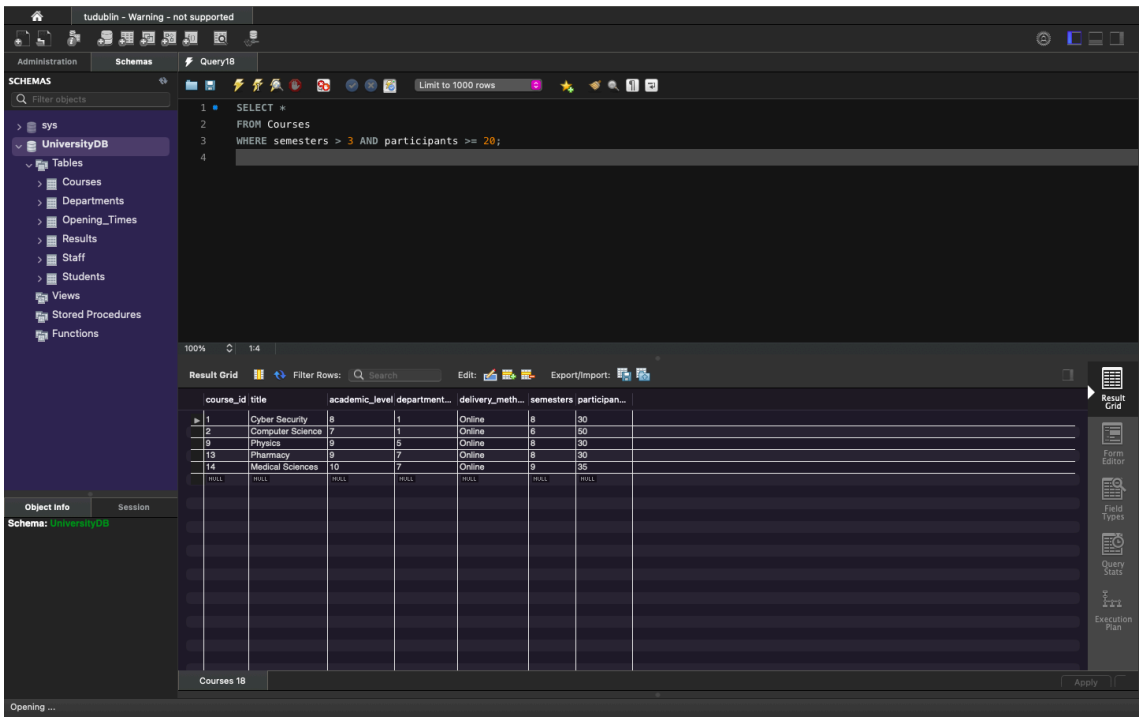
16. Set the dean of the university to be called Michael Dean.



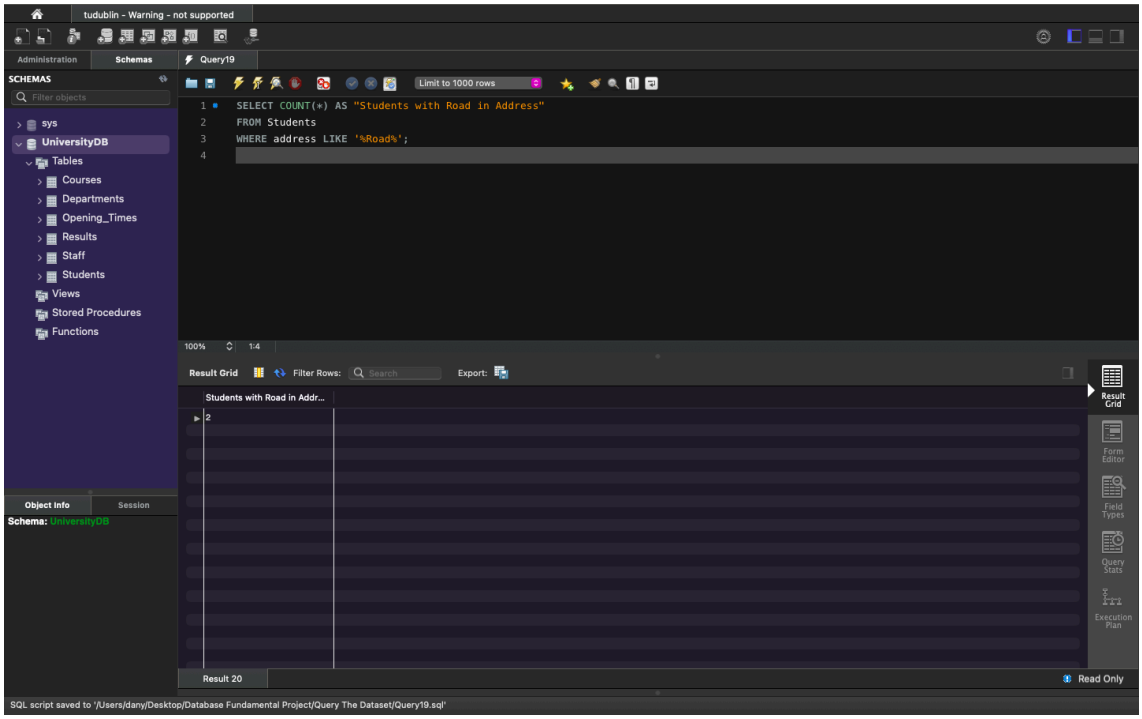
17. Show all staff members who have been working there for longer than 4 years.



18. Show all courses that the university offers which run over 3 semesters and have a minimum of 20 participants per class.



19. Identify how many students have the word road in their address.



20. Create a view that will show the result of a query drawing information from three tables at once.