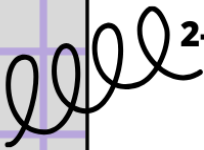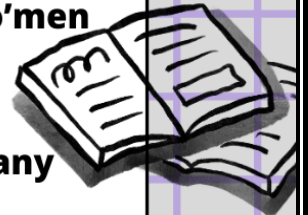# DataBase University Project

Team Members:

1- 23011534   Name: Mariam Medhat Omar Abdelmo'men
--------------->   ERD+Mapping

2- 23011105   Name: Abdelrahman Hany
--------------->   ERD+Mapping

3- 23011579   Name: Nancy Nabil Mohamed Emam
--------------->   DataBase SQL
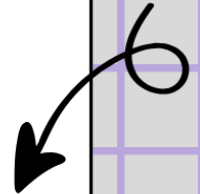
4- 23010090   Name: Habiba Mohammed Mohammed
--------------->   DataBase SQL
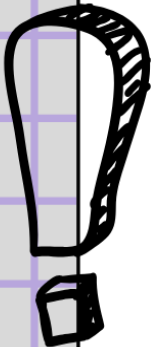
5- 23011182   Name : Warda Ahmed Gamal
--------------->   DataBase SQL
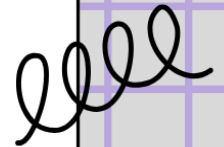
6- 23011135   Name : Mohamed Tarek Khalifa
--------------->   GUI Interface
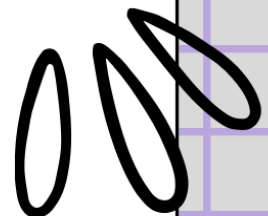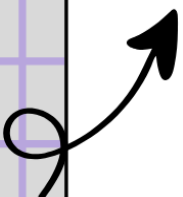
7- 23011065   Name : Habiba Mohamed Fathy
--------------->   GUI Interface

BUSINESS REQUIREMENTS

1- Project Overview

- **Project Title**: University Database Management System

- **Team Members**:

- **Project Objective/Scope**:
  To design a comprehensive database for university operations, which supports efficient management of student details, courses, faculty members, enrollment records, and department administration. The database will also facilitate tracking prerequisites, course enrollment, employee data, and department management.

- **Target Audience**:
  University administrators, faculty members, students, and other university staff.

2- Business Processes

The following are the key processes handled by the system:

Process Name	Description
Student Management	Manage student details including personal information, major, and registration number.
Course Management	Maintain course information, including course name, ID, credit hours, and prerequisites.
Enrollment Tracking	Track enrollment records, including enroll date, grade, and associated courses.
Instructor Assignment	Assign instructors to courses and track their degrees and departments.
Department Management	Manage department details, including names and assigned managers.
Employee Management	Handle employee data such as salaries, roles, and reporting managers.
Prerequisite Management	Link courses with their prerequisites to ensure proper academic progression.

3-Functional Requirements

The database must support the following functionalities:

Requirement ID	Description
Req_01	Store detailed student information, including name, registration number, major, and associated person details.
Req_02	Maintain employee records, including salaries, manager assignments, and personal information.
Req_03	Track and manage course details, such as course name, ID, credit hours, and prerequisites.
Req_04	Record enrollment data, linking students to courses with enrollment dates and grades.
Req_05	Assign instructors to courses and track their department and academic qualifications.
Req_06	Manage department data, including department names and the assigned manager.
Req_07	Facilitate queries for prerequisite relationships between courses.
Req_08	Link individuals (students, employees) to personal details such as address, phone number, and email.
Req_09	Enable department managers to oversee employees and courses within their department.

4- Non-Functional Requirements

The system should also meet the following non-functional requirements:

Requirement ID	Description
NFR_01	Ensure data consistency and referential integrity across all entities.
NFR_02	Provide secure access controls for different user roles (e.g., admin, faculty, student).
NFR_03	Optimize query performance for large datasets.
NFR_04	Offer scalability to accommodate future expansion of entities and processes.
NFR_05	Provide an intuitive interface for database administrators to manage data.
NFR_06	Ensure backup and recovery mechanisms to prevent data loss.

5- DATA ENTITIES AND RELATIONSHIPS

The database will include the following entities and relationships (based on ERD and Relational Schema):

Entities:

- **Person**: Stores personal information such as name, address, and contact details.

- **Student**: Extends "Person" with academic-specific attributes like registration number and major.

- **Employee**: Extends "Person" with job-specific attributes like salary and manager.

- **Instructor**: A specialized type of employee associated with courses and departments.

- **Course**: Contains course-specific details, including credit hours and prerequisites.

- **Department**: Tracks departmental information and its manager.

- **Enrollment**: Links students to courses with additional attributes like enrollment date and grade.

Relationships :

- **Person to Student/Employee**: "Person" is a generalization entity for both.

- **Student to Enrollment**: Students enroll in multiple courses.

- **Course to Prerequisite**: Courses can have other courses as prerequisites.

- **Instructor to Course**: Instructors are assigned to teach courses.

- **Department to Employee**: Departments are managed by employees.

6-ASSUMPTIONS AND CONSTRAINTS

- The university follows a semester-based academic calendar.

- Each department is managed by one employee at a time.

- Prerequisites for courses are mandatory for enrollment in dependent courses.

- Employees can have multiple roles but are classified as either instructors or administrative staff in the database.

- Data privacy and compliance with university policies are mandatory.

ERD AND Relational Schema
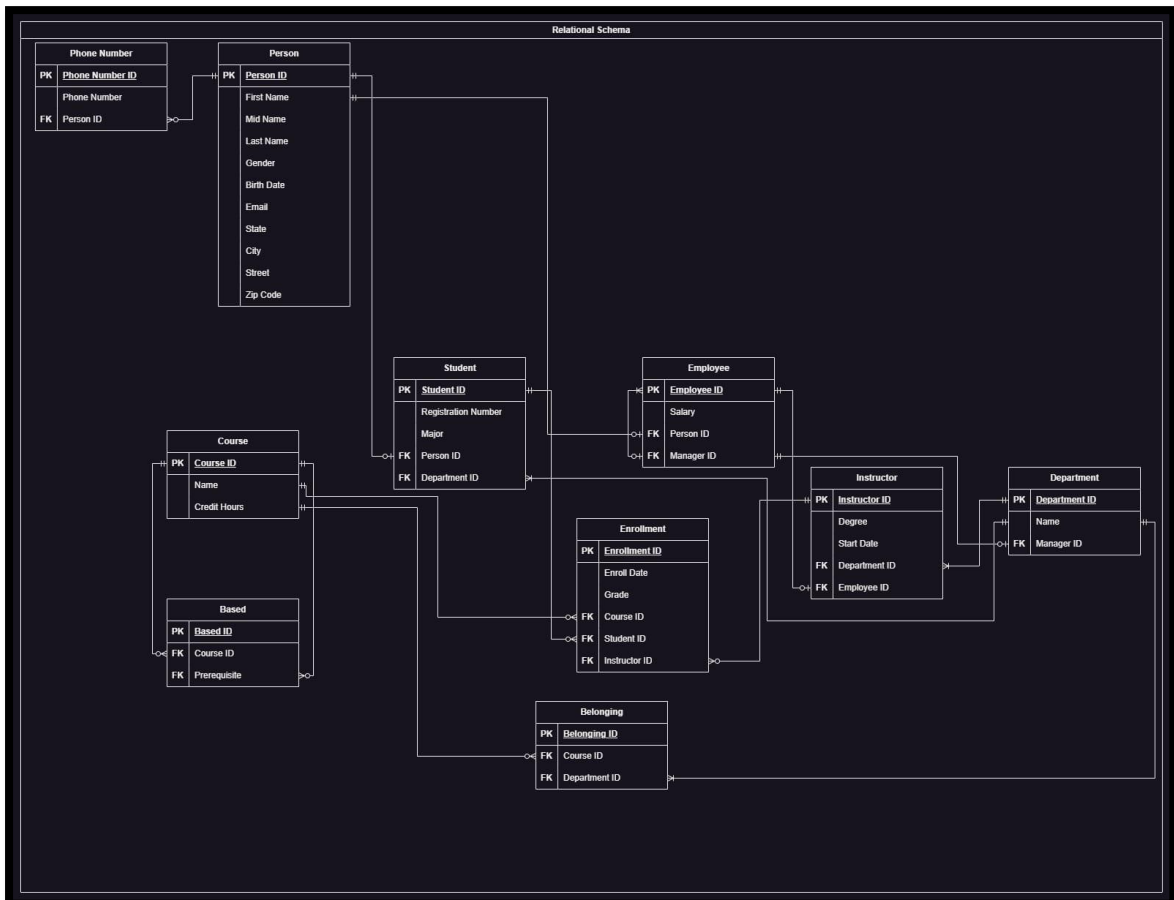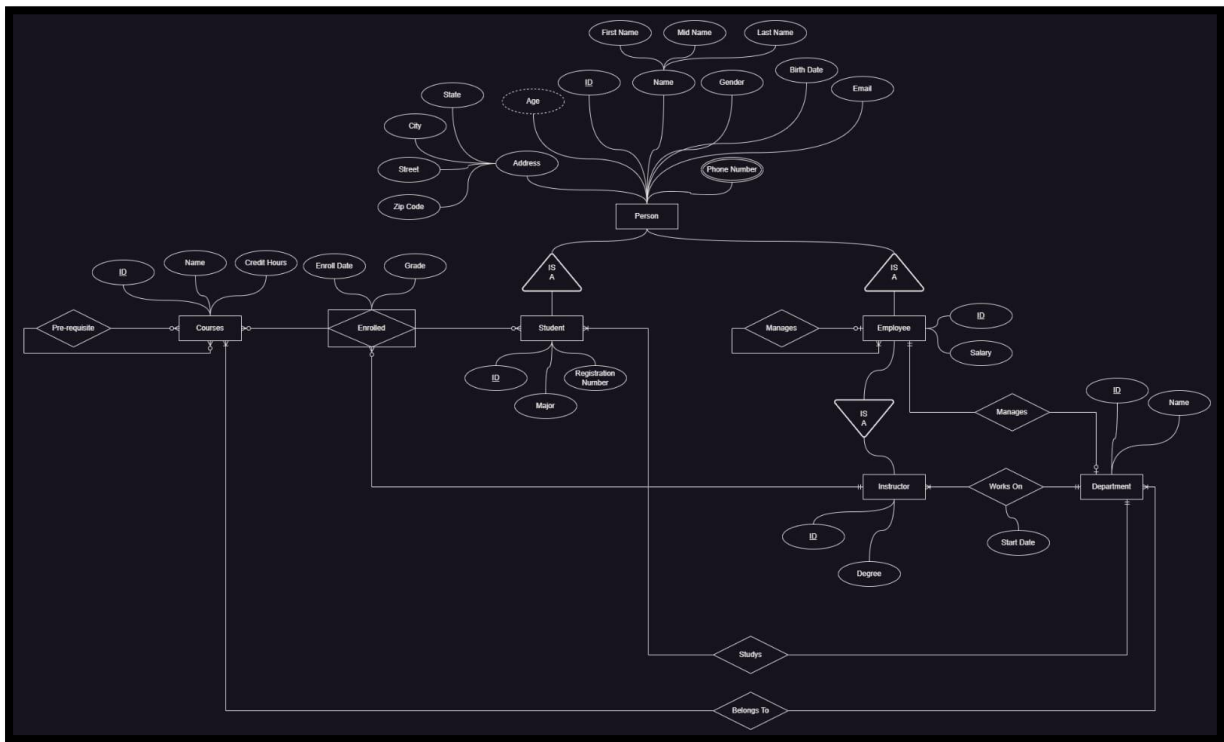
ANOTHER RELATIONAL SCHEMA
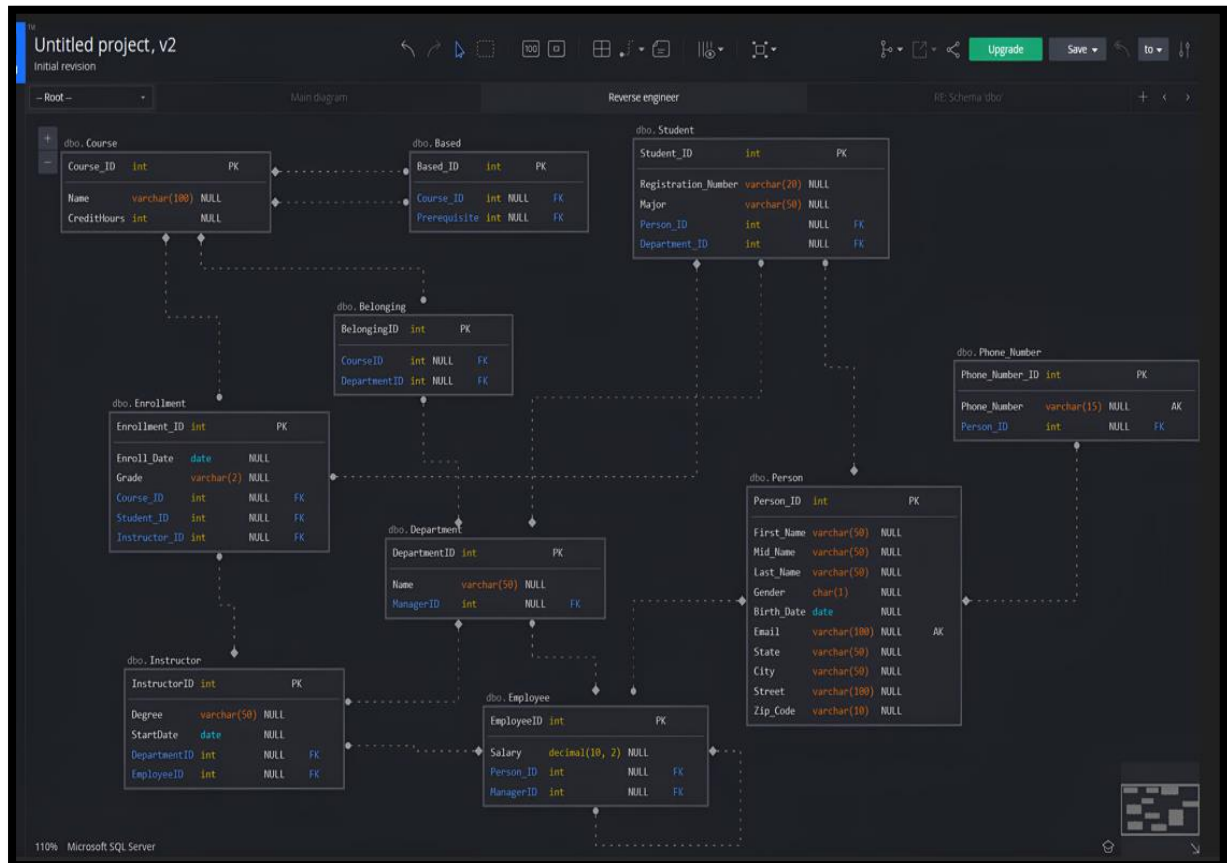
GUI OF UNIIVERSITY DATABASE

University System

Hello, Warda

- Info
- Courses
- Registration
- LogOut

Name: Warda Ahmed Gamal
ID: 14
Email: warda.gamal@example.com
Major: Chemistry
Phone: 01298765432

University System

Hello, Warda

- Info
- Courses
- Registration
- LogOut

Course: Engineering Drawing
Credit Hours: 3
Instructor: Ahmed Soliman
Grade: C

Course: Introduction to Programming
Credit Hours: 3
Instructor: Hassan Saeed
Grade: None

University System

Hello, Warda

Info
Courses
Registration
LogOut

Course: Introduction to Programming
Credit Hours: 3   Delete

Course: Data Structures
Credit Hours: 4   Add

Course: Database Systems
Credit Hours: 3   Add

Course: Operating Systems
Credit Hours: 4   Add

Course: Software Engineering
Credit Hours: 3   Add

Course: Linear Algebra
Credit Hours: 3   Add

Course: Calculus
Credit Hours: 4   Add

Course: Physics I
Credit Hours: 3   Add

Course: Biology I
Credit Hours: 3   Add

Course: Chemistry I   Add

University System

Hello, Warda

Info
Courses
Registration
LogOut

Course: Introduction to Programming
Credit Hours: 3   Delete

Course: Data Structures
Credit Hours: 4   Add

Course: Database Systems
Credit Hours: 3   Add

Course: Op...
Credit...   Add

Success ☓
ℹ Course added successfully!
OK

Course: Sof...
Cred...   Add

Course: Linear Algebra
Credit Hours: 3   Add

Course: Calculus
Credit Hours: 4   Add

Course: Physics I
Credit Hours: 3   Add

Course: Biology I
Credit Hours: 3   Add

Course: Chemistry I   Add

University System

Hello, Hassan 👤

- Info
- Courses
- LogOut

Name: Hassan Tarek Saeed
ID: 1
Degree: PhD in Computer Science
Email: hassan.saeed@example.com
Salary: 20000.00
StartDate: 2015-09-01
State: Giza
City: 6th of October
Phone: 01233445566

University System

Hello, Hassan 👤

- Info
- Courses
- LogOut

Course: Database Systems
Credit Hours: 3
Enrolled Students: 1

Course: Introduction to Programming
Credit Hours: 3
Enrolled Students: 2

Course: Software Engineering
Credit Hours: 3
Enrolled Students: 1

Course: Data Structures
Credit Hours: 4
Enrolled Students: 3

Course: Operating Systems
Credit Hours: 4
Enrolled Students: 1