# Examination System

Team Tigers

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# Project Overview

The Examination System is a software solution for an e-learning organization that wants to generate, grade, and customize their exams for their students. The software enables the instructors to fill in the questions bank, then generate an exam based on the course type. The exam is generated fairly based on specific criteria given in the business logic. The students can then take exams in the desired courses. On submission, the exam is graded, and the student's grade is then stored so he can review it whenever. Both the instructor and the student can also view their details via the system UI.

# Architecture

## Data Layer:

Utilizes a Microsoft SQL Server database to store and manage organization data.

Firstly, the analysis phase, where the requirements were gathered.

Then came the ERD designing phase, where it was determined that there were three main entities (Exam, Instructor and Student).

Based on that ERD, the mapping process took place, after it, a clear schema of the database emerged.

Finally, the implementation phase began, using the MS SQL Server, scripts were formed from the schema, generating stored procedures and detailed tables that will build the software underlying structure.

## Logic Layer:

At the start of the system, the system administrator creates an account for the user through the database using the email provided by them. The user is then prompted to enter their username and password, from which the system determines whether the logged in person is an instructor or a student. After being logged in, the system redirects each user to either an instructor layout or a student layout.

The instructors can view their details in their layout. They also have the ability to create questions in the questions bank and generate exams in only the courses they are assigned to. They can also view their department's details, and depending on whether they are the manager or not, they can update the department details. Lastly, they can view their students' grades.

The students can view and edit their details in their layout accordingly. They can take exams in the courses they are assigned to. Lastly, they can view their grades in the courses they are assigned to.

## Presentation Layer:

After wrapping up the data and logic layers, comes the presentation layer. The system uses Windows Forms .NET as a user interface to provide accessibility of the system's functions through a friendly interface. The system also uses MetrosetUI as it provides a more elegant look to the forms.

It consists of 3 parts, Login Form, Instructor Form, and Student Form.

- Login Form is responsible for handling the authentication of the user, passing the type of the current user to the business logic.
- Instructor Form is responsible for the instructor's actions and details.
- Student Form is responsible for the student's actions and details.

# Database Schema

## Main Tables:

- Course: Stores the courses provided by the organization. Consists of **Cr_ID**, **Cr_Name**.
- Topic: Stores topics that go under each course. Consists of **Topic_ID**, **Topic_Name**, **Cr_ID ->** (Relation between Course and Topic)
- Department: Stores the departments. Consists of **Dept_ID**, **Dept_Name**, **Dept_Description, Location, Mgr_ID ->** (Relation between Instructor and Department), **MGR_HireDate**.
- Instructor: Stores the instructors' information. Consists of **Ins_ID**, **Ins_Name**, **Ins_Salary**, **Ins_Degree**, **Dept_ID ->** (Relation between Department and Instructor), **Username**.
- Student: Stores the students' information. Consists of **St_ID**, **St_Name**, **St_Phone**, **St_Age**, **Street**, **City**, **Zip_Code**, **St_Email**, **Username**, **Dept_ID ->** (Relation between Department and Student)
- Exam: Stores the exams generated and whether they are taken or not. Consists of **Ex_ID**, **Cr_ID**, **IsAssigned**.
- Question: Stores information about questions. Consists of **Q_ID**, **Q_Head**, **Q_Grade**, **Q_Difficulty**, **Type**, **Model_Answer**, **Cr_ID->** (Relation between Course and Question)
- Question_Choices: Stores the choices for the questions. Consists of **Choice_Desc**, **Choice Selector, Q_ID ->** (Relation between Question and Question Choices)

## Relation Tables:

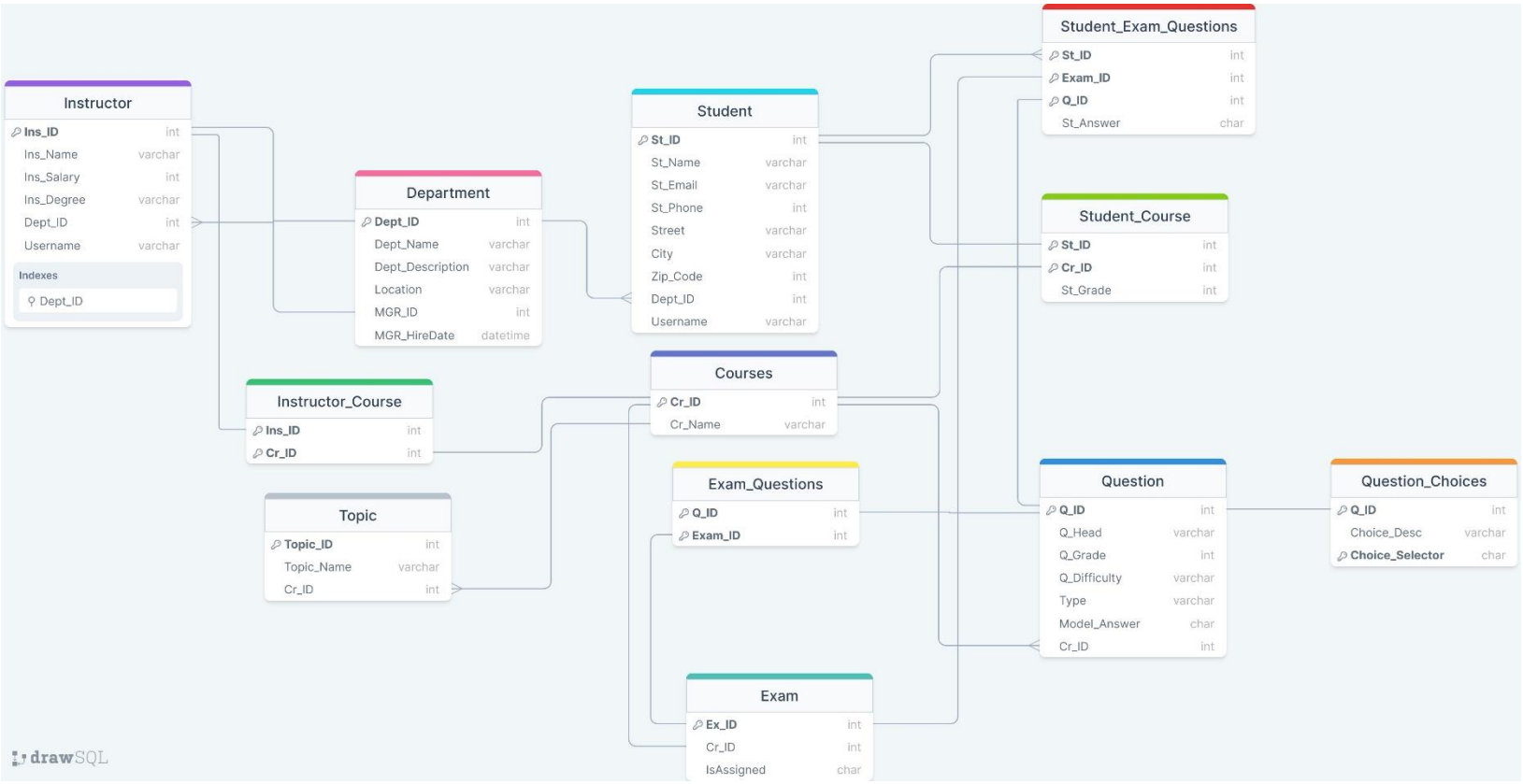
- Instructor_Course: Represents the M-M relationship between the two tables. Consists of
  **Ins_ID**, **Cr_ID**
- Exam_Questions: Represents the M-M Relationship between the two tables. Consists of
  **Q_ID**, **Ex_ID**
- Student_Exam_Questions: Represents the relationship between the Exam, Student and Question tables. Consists of
  **St_ID**, **Exam_ID**, **Q_ID**, **St_Answer**
- Student_Course: Represents the M-M relationship between the two tables as well as their grade in said course. Consists of
  **St_ID**, **Cr_ID**, **St_Grade**

## Login Tables:

- Logins: Stores the Authentication information for the users. Consists of
  **Username**, **Password**, **AccountType**

# ERD

# Mapping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Ins_Salary int
Ins_Degree varchar
Dept_ID int
Username varchar
Indexes
Dept_ID
Department
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Dept_Name varchar
Dept_Description varchar
Location varchar
MGR_ID int
MGR_HireDate datetime
Student
St_ID int
St_Name varchar
St_Email varchar
St_Phone int
Street varchar
City varchar
Zip_Code int
Dept_ID int
Username varchar
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Cr_ID int
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Topic_Name varchar
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Q_Grade int
Q_Difficulty varchar
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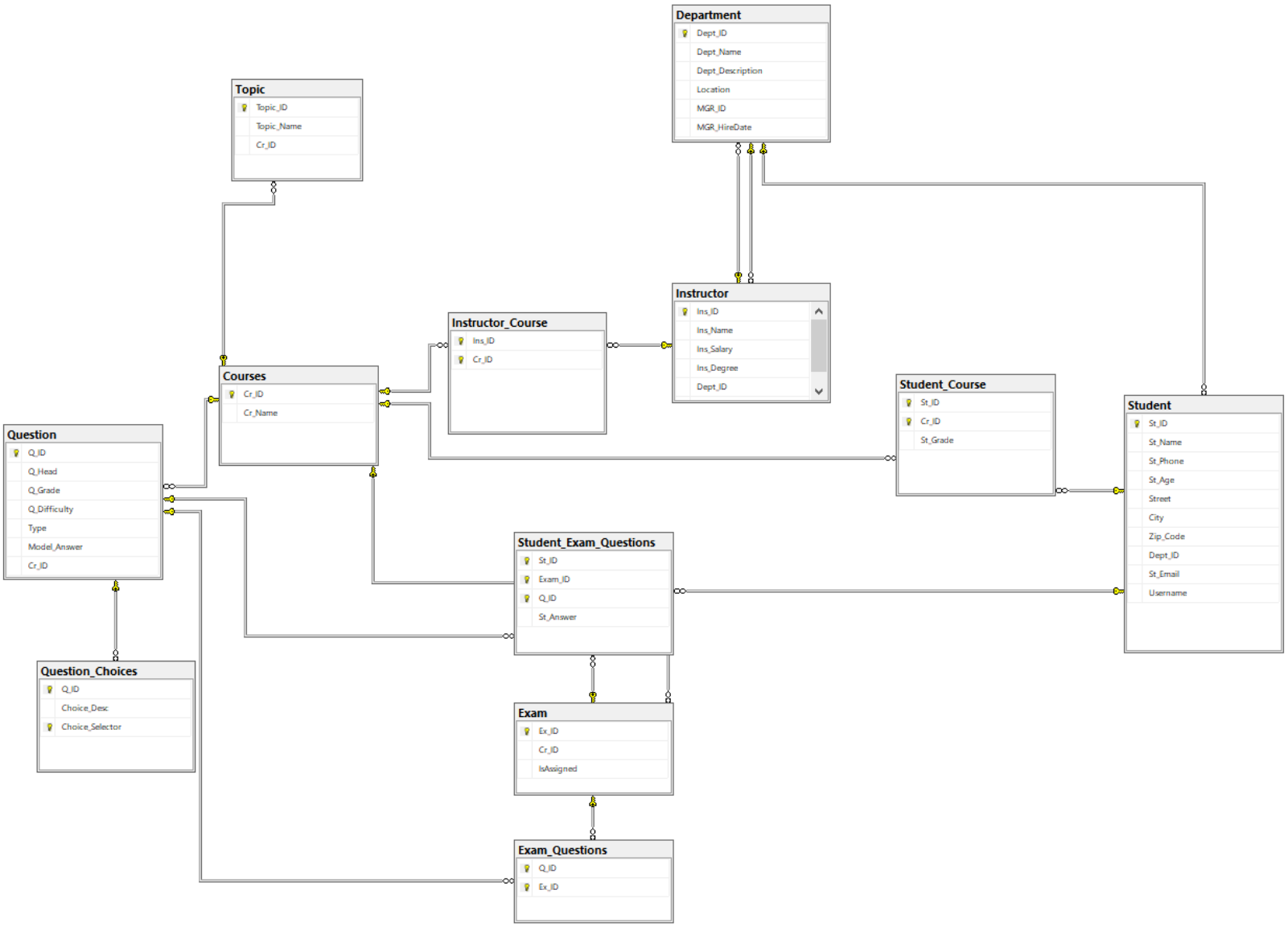
Cr_ID int
IsAssigned char
drawSQL

# Diagram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Dept_Name
Dept_Description
Location
MGR_ID
MGR_HireDate
Topic
Topic_ID
Topic_Name
Cr_ID
Instructor
Ins_ID
Ins_Name
Ins_Salary
Ins_Degree
Dept_ID
Instructor_Course
Ins_ID
Cr_ID
Courses
Cr_ID
Cr_Name
Student_Course
St_ID
Cr_ID
St_Grade
Student
St_ID
St_Name
St_Phone
St_Age
Street
City
Zip_Code
Dept_ID
St_Email
Username
Question
Q_ID
Q_Head
Q_Grade
Q_Difficulty
Type
Model_Answer
Cr_ID
Student_Exam_Questions
St_ID
Exam_ID
Q_ID
St_Answer
Question_Choices
Q_ID
Choice_Desc
Choice_Selector
Exam
Ex_ID
Cr_ID
IsAssigned
Exam_Questions
Q_ID
Ex_ID