

Examination System Website

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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 Access 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.

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.

Business 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 email 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 make CRUD operation on the exams and questions. They also can create questions in the questionsbank and generate exams in only the courses they are assigned to.

The students 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 ASP.NET MVC as a user interface to provide accessibility of the system's functions through a friendly interface.

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)

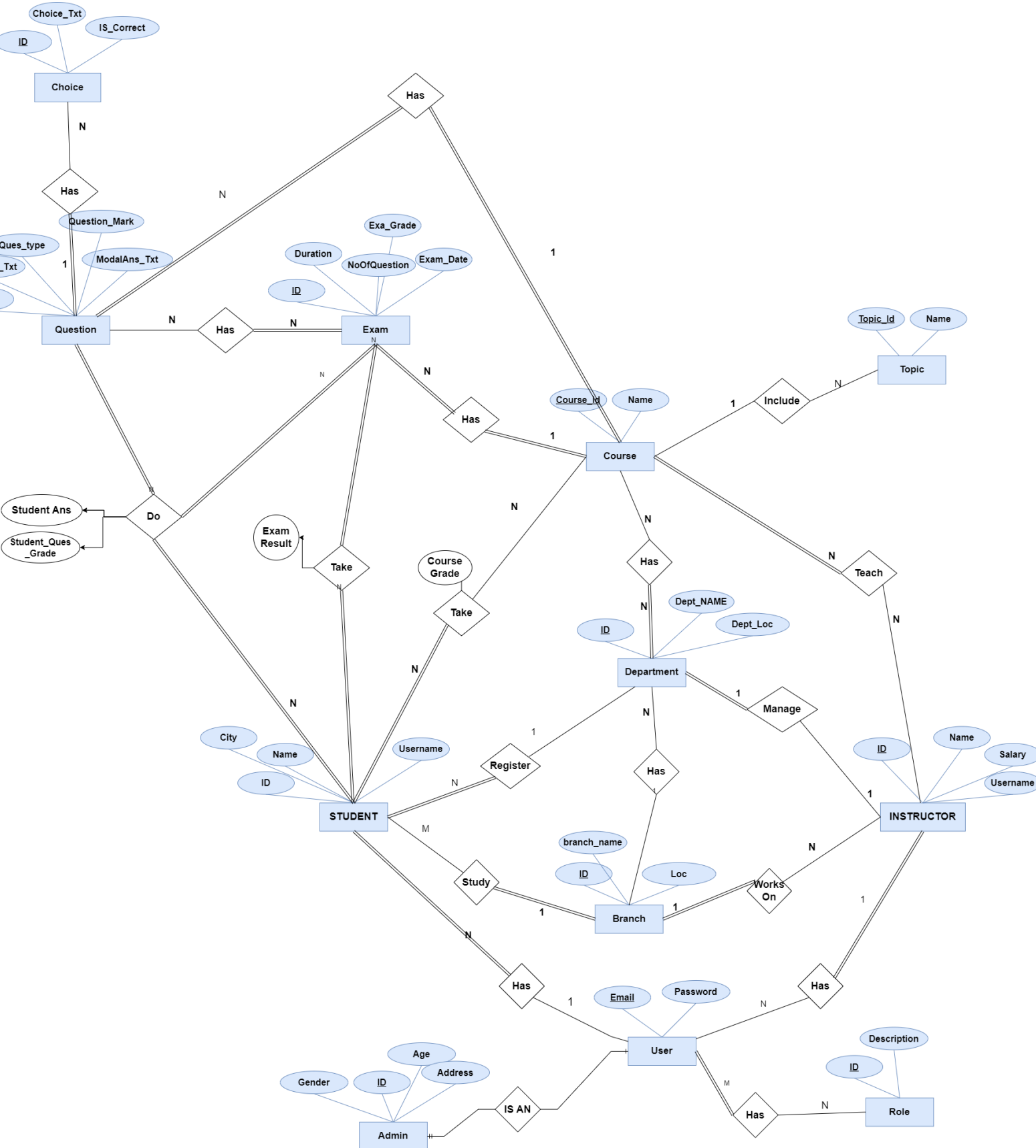
Relation Tables:

- 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

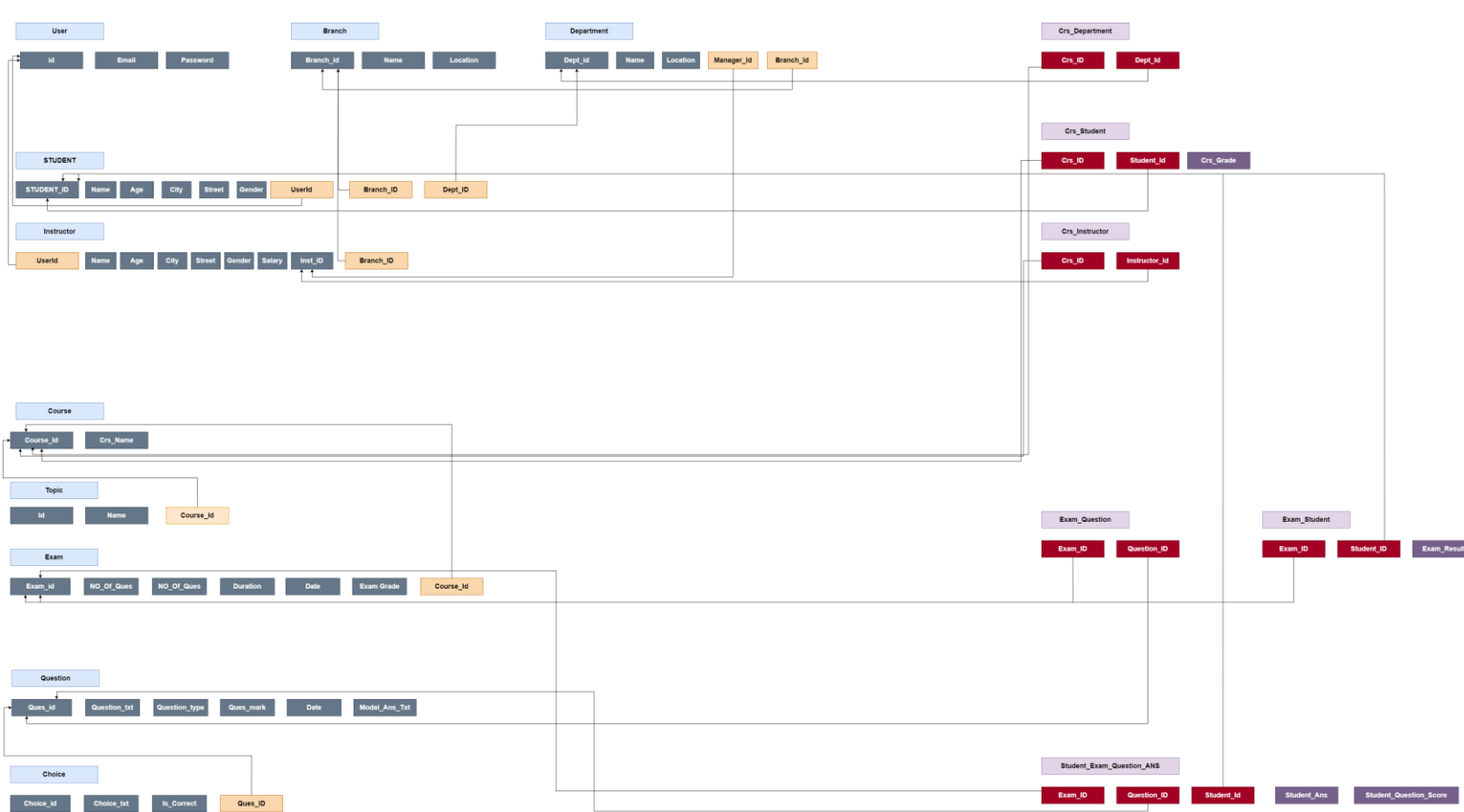
Identity Tables:

- Logins: Stores the Authentication information for the users. Consists of
Username, Password, AccountType
- For the system's safety, it was decided that the Login tables would be in a different database to protect it from any possible data breaches or singular database crash with the information database.

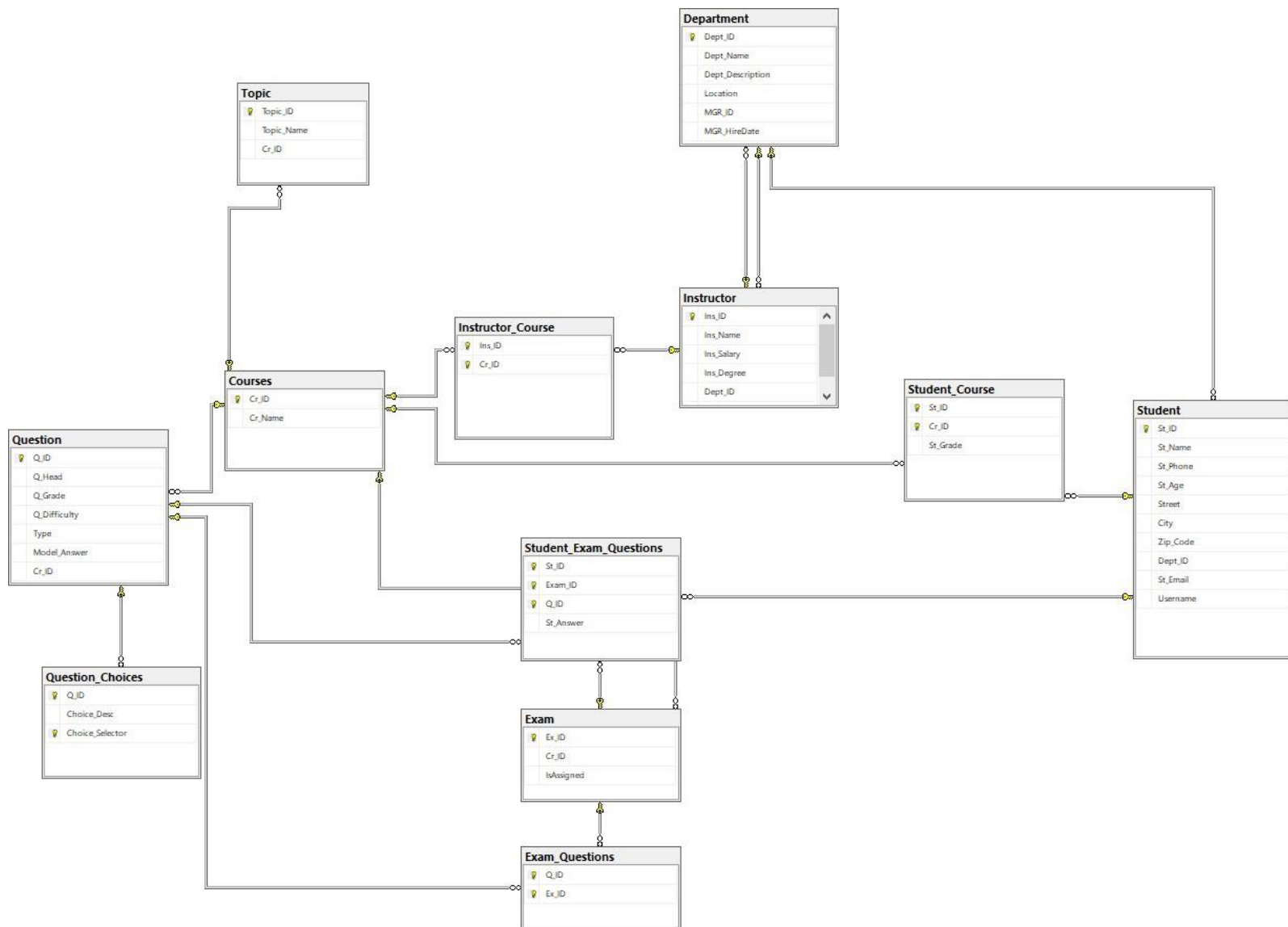
ERD



Mapping



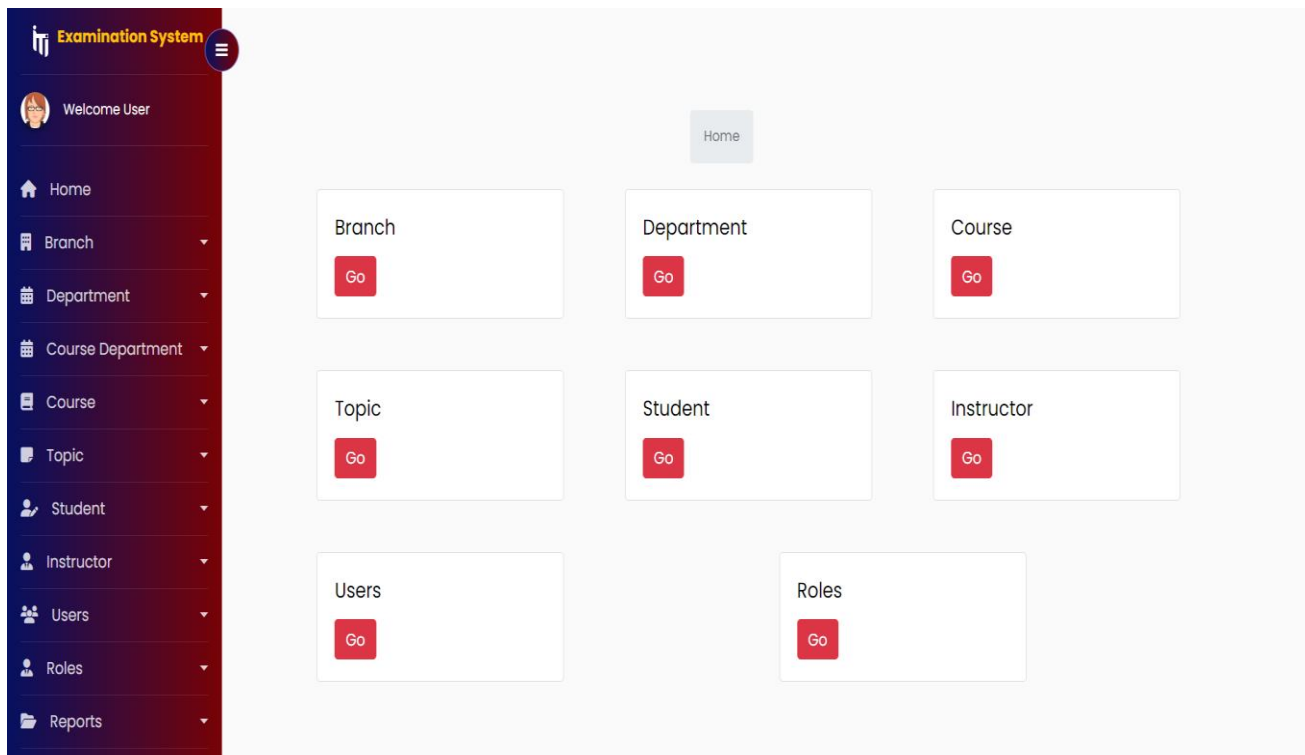
Diagram



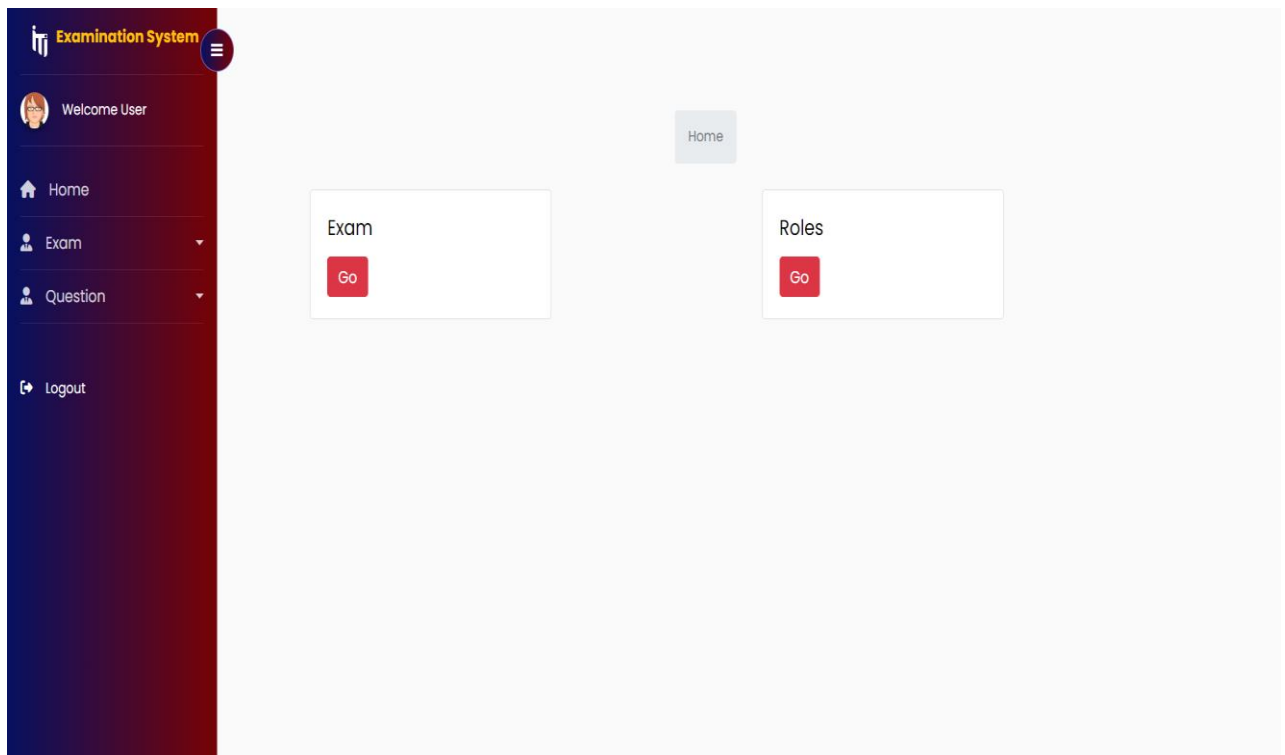
User Interface

- The user interface can be divided into 3 interfaces:
- Admin Interface.
- Instructor Interface.
- Student Interface.

1- Admin Interface:



2- Instructor Interface:



3- Student Interface:

Examination System

Logout

Choose a Course to Start your Exam

C++

START YOUR EXAM

Exam number 1

1- encapsulation

☐ oop11

☐ oop22

☐ oop33

☐ oop44

2- how are you

☐ fine

☐ okay

☐ not fine

☐ bad

Examination System

Logout

Your grade: 0

Your Correct Answer: 0

Your Wrong Answer: 6

show other exams

Installation Guide

- To install the examination system you need the following items:
 - Visual Studio and Sql Server Management Studio (SSMS)
 - Project files ([MariemMohamed04/Examination-System \(github.com\)](https://github.com/MariamMohamed04/Examination-System))
 - Databases .bak
- Steps:
 1. Install Visual Studio and SSMS
 2. Download the project files (clone if using GitHub)
 3. Download the database restore files (ProjectMVC.bak)
 4. Restore the databases through SSMS.
 5. Configure the context connection string through the App.Config file.

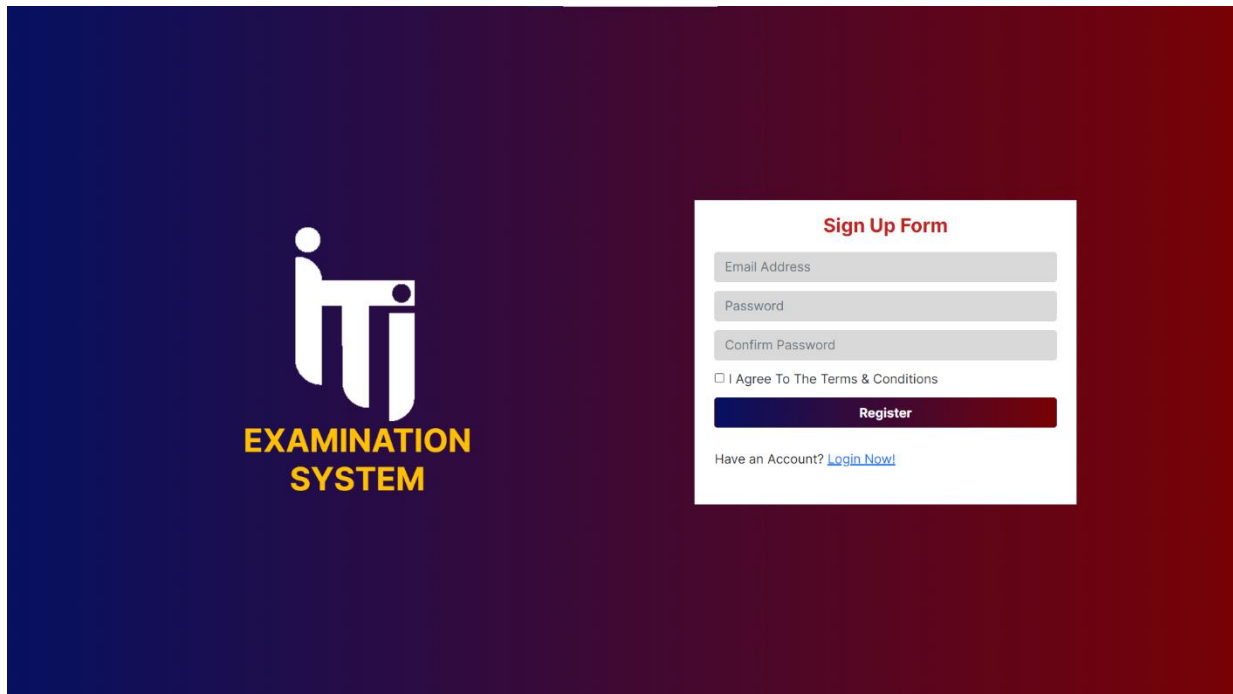
```
<connectionStrings>
  <add name="ConnectionString" connectionString="Data Source=.;Initial
Catalog=Examination_System;TrustServerCertificate=True;Integrated Security=True"/>
  <add name="LoginConnectionString" connectionString="Data Source=.;Initial
Catalog=EXAMINATION_SYSTEM_LOGINS;TrustServerCertificate=True;Integrated
Security=True"/>
</connectionStrings>
```

6. Build the application and run.

Usage Guide

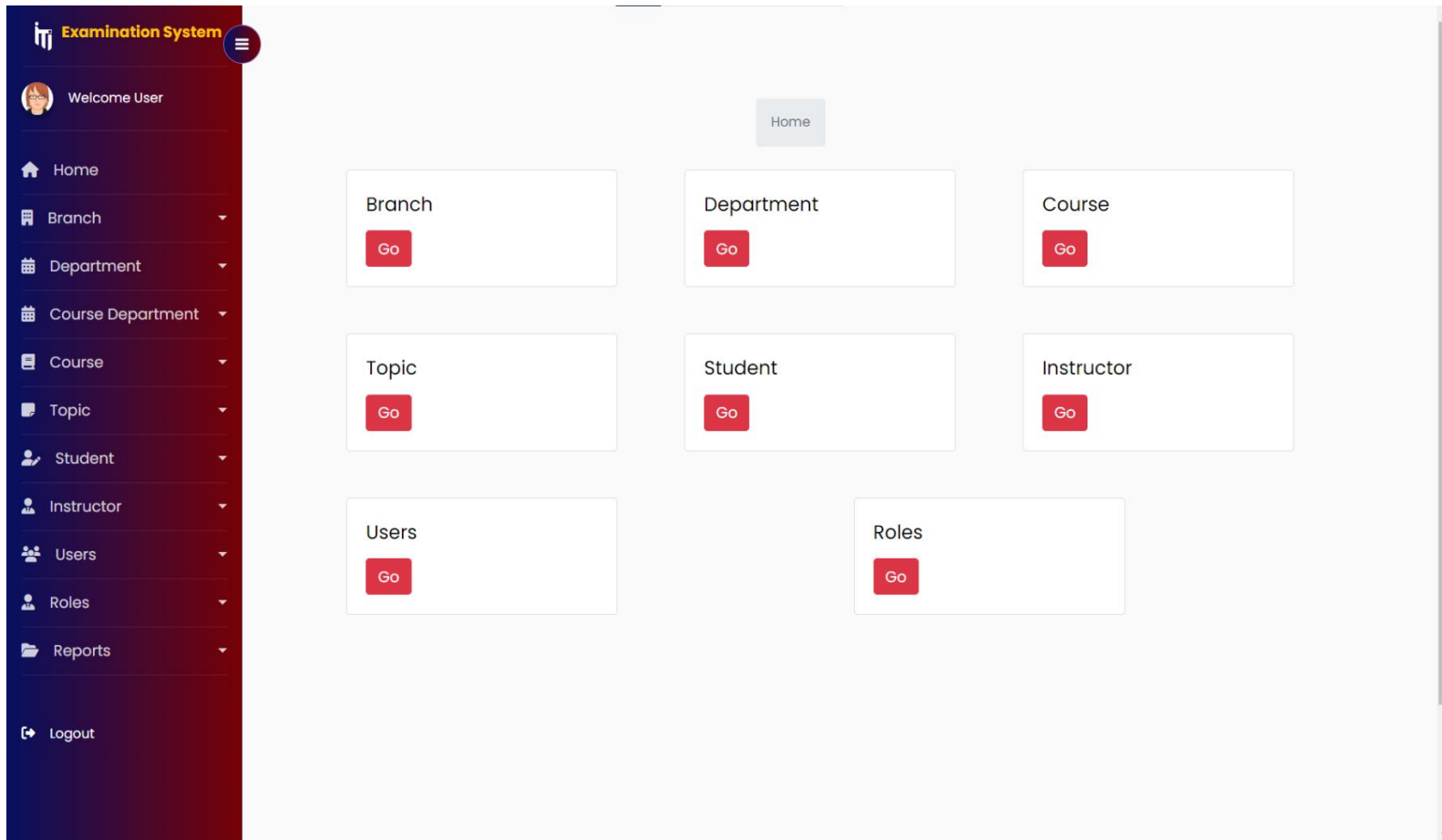
Admin:

1. Sign-up through the Sign-up form using email and password.





The screenshot displays the 'Sign Up Form' for the 'EXAMINATION SYSTEM'. The form is set against a dark blue and maroon gradient background. On the left, there is a logo consisting of a stylized white figure sitting at a desk with a computer, with the text 'EXAMINATION SYSTEM' in yellow below it. The form itself is a white box on the right containing the following elements: a title 'Sign Up Form' in red, three input fields for 'Email Address', 'Password', and 'Confirm Password', a checkbox for 'I Agree To The Terms & Conditions', a dark blue 'Register' button, and a link 'Have an Account? [Login Now!](#)'.

2. After Signing-up, Admin can select any table to perform CRUD operations.



3. All Users and Admin can add users and give them roles

 Examination System

 Welcome User

Home

Branch

Department

Course Department

Course

Topic

Student

Instructor

Users


Roles


Reports

Logout

Home / Users

Users			
Id	UserName	Email	
1f3714e6-30e0-4d57-abc3-e75a0560e3e0	hazem	hazem@gmail.com	<div>ViewEditDelete</div>
3ee15ced-d7a4-49db-b590-190ce1692fae	omnia	omnia@gmail.com	<div>ViewEditDelete</div>
49645ec8-e97d-436d-b533-26e9d419fde5	Brie	brie.beau29@gmail.com	<div>ViewEditDelete</div>
5db0821d-a0d2-4389-8151-bab8a4b3b113	mohamed159	mohamed159@gmail.com	<div>ViewEditDelete</div>
938c20f1-3b69-41d1-b632-9337861e2390	yasmen	yasmen@gmail.com	<div>ViewEditDelete</div>
a2b4f66d-dd97-44eb-ab60-3d180e640cc3	h	h@gmail.com	<div>ViewEditDelete</div>
c8356345-2e2e-4fe2-bf3a-b9f378a871c0	mariem	mariem@gmail.com	<div>ViewEditDelete</div>
e8ff37a1-6840-4679-90a3-	ahmed	ahmed@gmail.com	<div>ViewEditDelete</div>

 Examination System

 Welcome User

Home

Branch

Department

Course Department

Course

Topic

Student

Instructor

Users

Roles

Reports

Logout

Register Form

Email Address

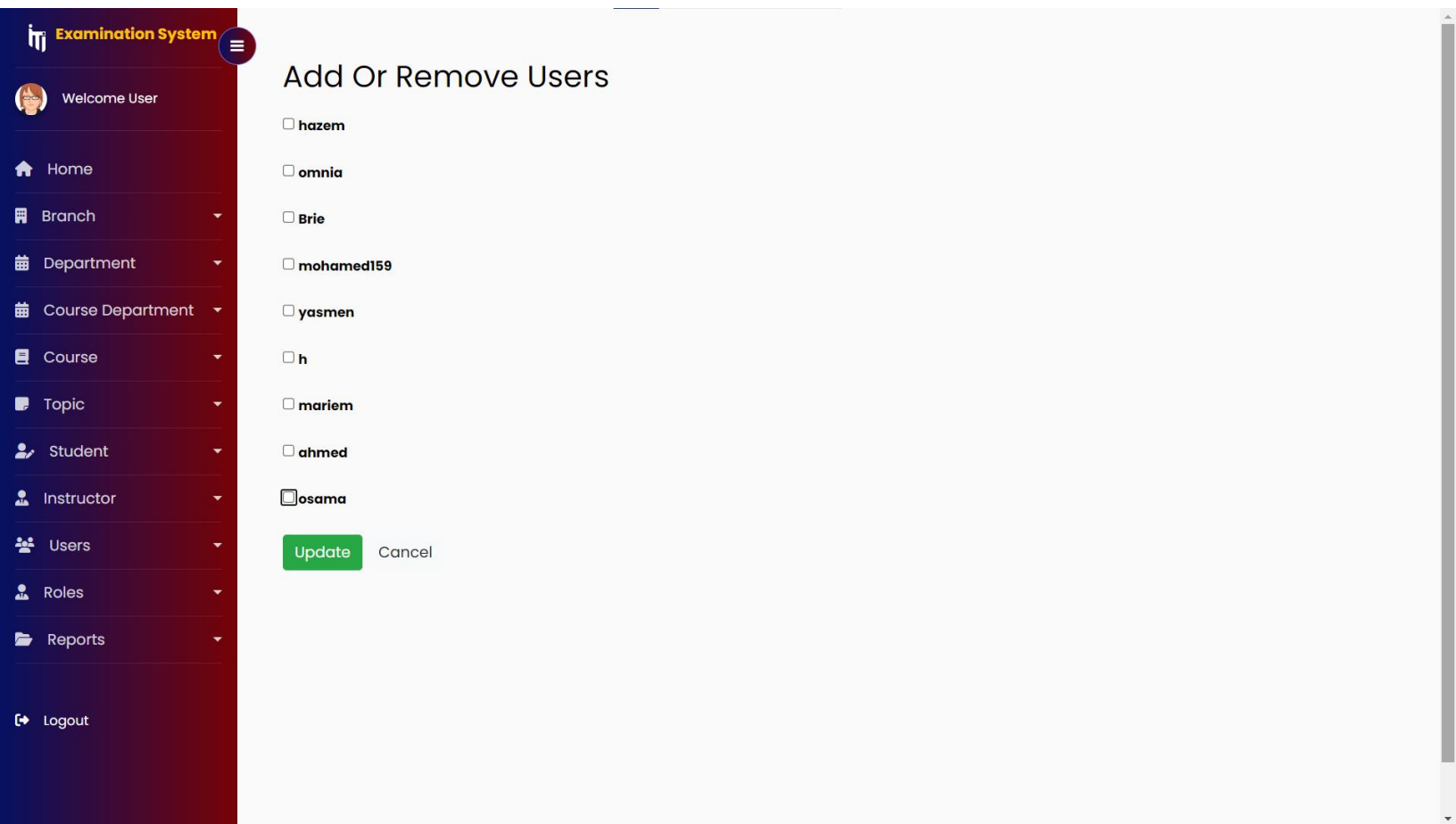
Password

Confirm Password

Register

Roles			
Id	Name		
04978ae6-dc1c-4f8e-9f74-1a09ab7293ca	Student	<div>Add Role To User</div>	<div><div>View</div><div>Edit</div><div>Delete</div></div>
1d291df4-269c-4429-987a-1fcc270d5610	Admin	<div>Add Role To User</div>	<div><div>View</div><div>Edit</div><div>Delete</div></div>
ccd6ee3a-b842-426b-ba94-14dba1a00863	Instructor	<div>Add Role To User</div>	<div><div>View</div><div>Edit</div><div>Delete</div></div>

Create new Role



Instructor:

1. Login through the Login form using email and password.



Login Form

yasmen@gmail.com

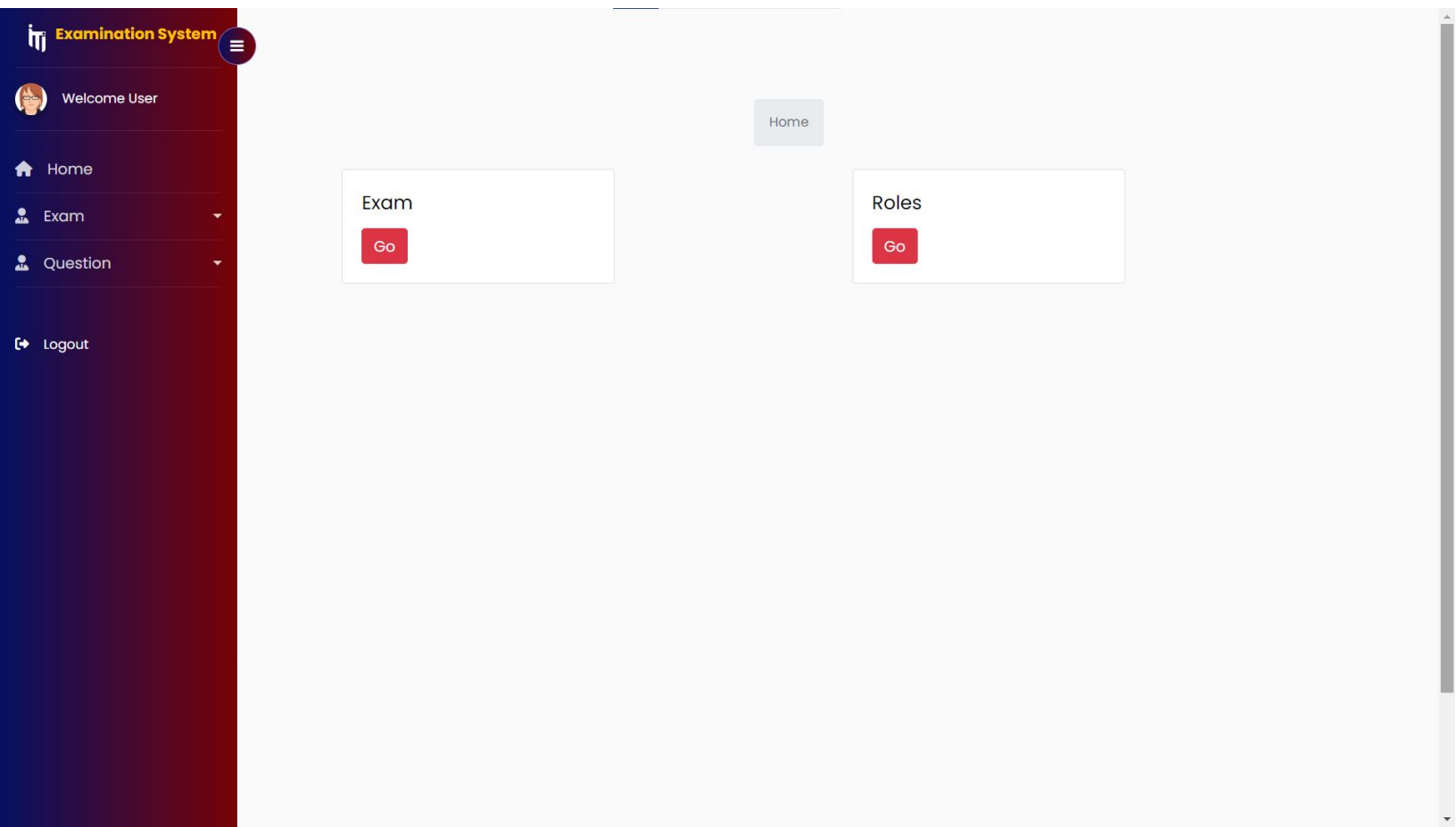
.....

☒ Remember Me

Login

Don't have an Account?
[Register Now!](#) [Forgot Password?](#)

2. After Logging-in, Instructor can select any table to perform CRUD operations.



Add Exam

Exam Duration

Num Of TF Questions

NumOfQuestions

Exam Grade

Course

--- Select Course ---

Add

Back To List

AddQuestion

Multiple Choices

Question Body:

Choice 1:

Choice 2:

Choice 3:

Choice 4:


Model Answer:


1


Course Name:


Programming Languages


Confirm


 Examination System


 Welcome User


 Home


 Branch


 Department


 Course Department


 Course


 Topic


 Student

 Instructor

 Users

 Roles

 Reports

 Logout

Add Or Remove Users

- ☐ hazem
- ☐ omnia
- ☐ Brie
- ☐ mohamed159
- ☐ yasmen
- ☐ h
- ☐ mariem
- ☐ ahmed
- ☒ osama
- Update

Cancel

Conclusion

In conclusion, the Examination System represents a robust and comprehensive solution tailored for e-learning organizations seeking efficient exam generation, grading, and customization capabilities. Throughout the development process, **Our Team** accurately analyzed requirements, designed an appropriate database schema, and implemented a multi-layered architecture to ensure scalability, reliability, and security.

The software's architecture, building distinct layers for data management, business logic, and presentation, facilitates seamless interaction between users and the system. Leveraging Microsoft SQL Server for data storage ensures the integrity and accessibility of organization data, while MVC, augmented with HTML and CSS made views, provides a user-friendly interface for instructors and students alike.

With features such as exam generation based on predefined criteria, question bank management, and grade tracking, the system empowers instructors to efficiently manage courses and assessments. Similarly, students benefit from streamlined exam-taking experiences and easy access to their grades and profile information.

The installation process, outlined in the documentation, ensures a smooth setup for administrators, while the usage guide offers clear instructions for users to navigate the system's functionalities effectively.

In essence, the Examination System exemplifies **our team's** commitment to delivering a tailored software solution that meets the evolving needs of e-learning organizations, enhancing productivity, and fostering an enriched learning experience for both instructors and students.