CLO Mapper and Rubric Analyzer

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Contents

Abstract

This project report details the creation and execution of a database system designed to manage rubric-based assessment evaluations. Beginning with a predefined system design, the report documents the developmental steps taken and the final implementation process. The database system, constructed using Transact-SQL, encompasses student information, attendance logs, assessment and assessment component data, rubric and associated levels, and Course Learning Outcome (CLO) details. Furthermore, the report offers an extensive examination of the database schema, inter-table relationships, and operational business rules. Additionally, it delves into the testing procedures employed and the encountered development challenges.

1 Introduction

1.1 Background

The project is all about a system called CLO Manager, short for Course Learning Outcome Manager, which helps teachers figure out what students should learn in a course and track their progress.

With CLO Manager, teachers work with experts and people from different industries to decide what students need to learn. Then, they pick teaching methods and tests that match those goals. This way, they can see if students are learning what they're supposed to.

CLO Manager is great because it helps teachers keep track of what students are learning and ensures they're learning skills that will help them in their future jobs. But setting up CLO Manager can be tough since it needs a lot of teamwork and constant checking to make sure it's working well.

Overall, the goal of the project is to make education better by using CLO Manager to make sure students are learning the right things and getting ready for their future careers.

1.2 Description

This project wants to make grading students in the computer science department at UET Lahore easier and fairer. Right now, the grading system there has a lot of mistakes and takes up too much time for both students and teachers. So, the project suggests using something called rubric levels to give grades. These rubric levels make grading more fair and objective.

To make this happen, the project team created a computer program using C and Windows Forms. This program does a bunch of things like keeping track of student information, grading criteria, and attendance records all in one place.With this program, teachers can grade students using rubric levels and make detailed reports in PDF format. These reports help teachers see how students are doing and find areas where they need to improve. This software also gets rid of manual calculations, which means fewer mistakes and less time wasted. It's easy for teachers to use, and it helps them keep track of student progress and manage grading information more efficiently.

Overall, this project makes grading computer science students at UET Lahore better. It saves time for everyone involved and makes the grading process fairer and more consistent.

1.3 Motivation

The main objective of this project was to make it easier for users to learn how to retrieve data from a database. The goal was to teach users how to extract specific information from different parts of the database using both basic and advanced queries. To achieve this, the project was built using C .NET Framework, and SQL Server was used as the database management system.

1.4 Target Audience

The system is specifically designed for instructors in the computer science department at UET Lahore, aiming to transform the current evaluation process into a more objective, fair, and efficient system for both teachers and students. By utilizing rubric levels for assessment, the software enables instructors to pinpoint students' weak areas, allowing for targeted improvement efforts.

This initiative targets faculty members responsible for student evaluation and the students undergoing the assessment process, providing a centralized platform to manage evaluation data and generate insightful progress reports.

1.5 Operational Details

The system is developed for only one user. It enables the teacher to:

1. Manage Students
2. Manage CLOs
3. Manage Rubric
4. Manage Rubric Level
5. Manage Assessment
6. Manage Assessment Component
7. Manage Student Attendence
8. Manage Student Result
9. Generate Report

Requirements

Programming language	C
IDE	Visual Studio 2022
Library	We use several libraries, including: • System.Data.SqlClient

2 Database Design

Figure 1: Database Diagram of Project

2.1 Lookup

It's a table that keeps track of certain codes, like foreign keys, but stores them as words instead of numbers. This helps to easily find the corresponding values for those keys.

2.2 Student

The student relation includes the student registration number along with personal information such as name, email, etc. Each student is identified uniquely by their ID which serves as the primary key.

2.3 Clo

The relation has attribute like Clo details, Date created and Date updated the relation has no foreign key. Id is the primary key of this relation.

2.4 Rubric

This relation contain the rubrics that are marking cretria for an assessment. It contains an ID that is primary key and CloId that is foreign key.

2.5 RubricLevel

This is a table that stores the information about the measursing Level of a rubric. Id is the primary key and RubricId is the foreign key of this relation.

2.6 Assessment

The assessment relation has attributes like Title, TotalMarks, TotalWeightage, and DateCreated.

2.7 AssessmentComponent

The assessment component contains the name, rubric id, total marks, date created, date updated, and assessment id. This information is used in calculating the result of the student by the formula:

$$\text{ObtainedRubricLevel} = \text{ObtainedMarks} \times \text{ComponentMarks}/\text{MaxRubricLevel} \quad (1)$$

2.8 StudentAttendence

This table records the attendance of a particular student on a specific day, with references to the ClassAttendance Table. The table includes two foreign keys: StudentId, sourced from the Student table, and AttendanceId, obtained from the ClassAttendance table. Furthermore, there is a composite attribute named AttendanceStatus, which derives its value from the Lookup table.

2.9 ClassAttendence

The Class Attendance relation comprises solely the dates of attendance, each associated with a unique identifier for that specific date.

2.10 StudentResult

The Student Result relation includes the student's identification number, assessment component identification, rubric measurement identification, and evaluation date. The first two attributes serve as foreign keys as well

3 Activity Diagram

3.1 Student Management

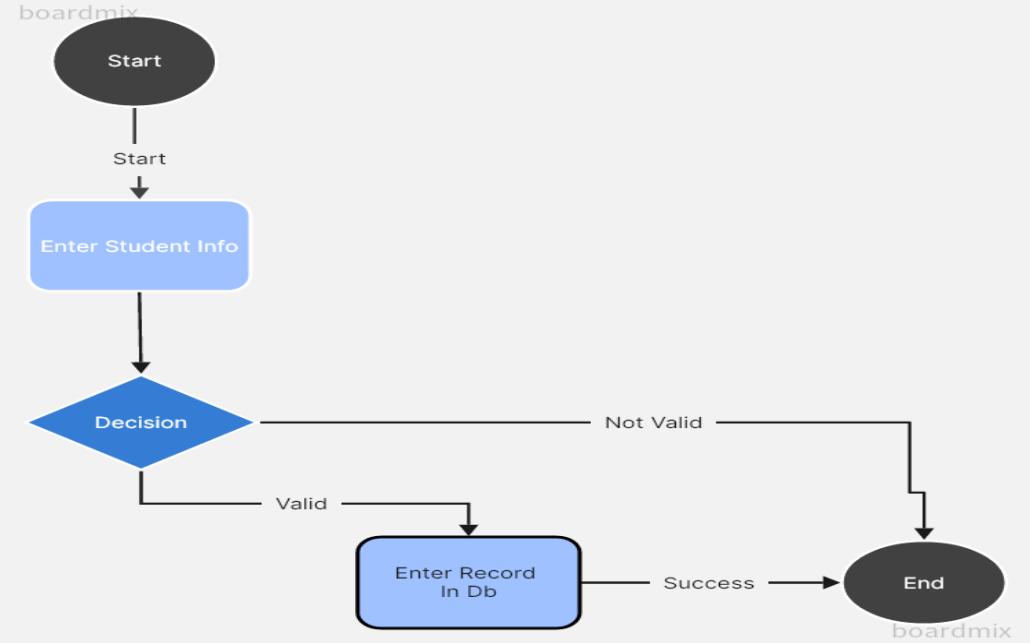

Figure 2: Data flow Diagram of student management

3.2 CLO Management

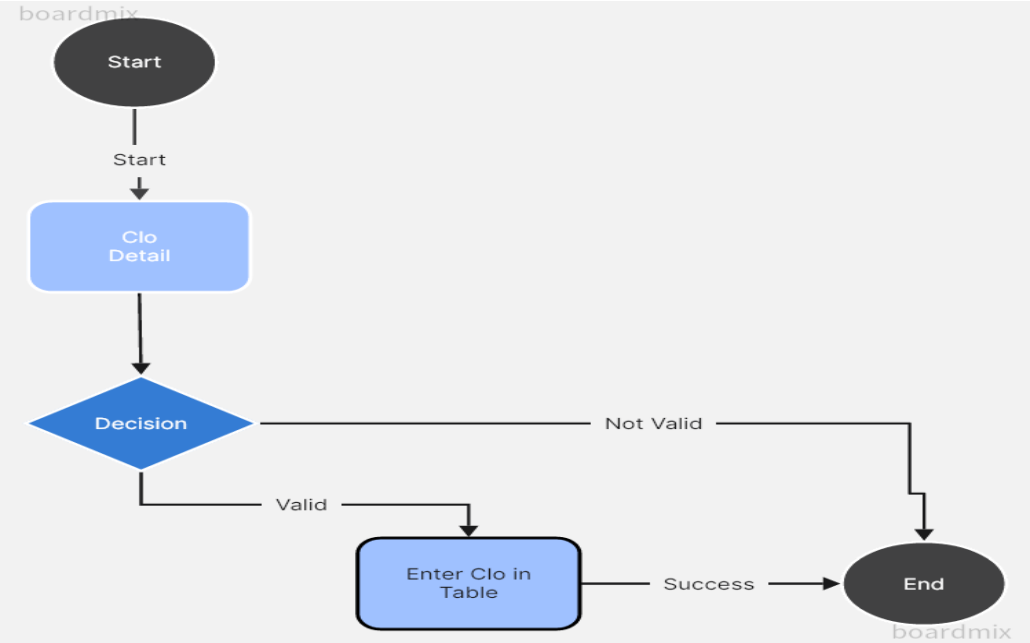

Figure 3: Data flow Diagram of Clo management

3.3 Rubric and RubricLvl Management

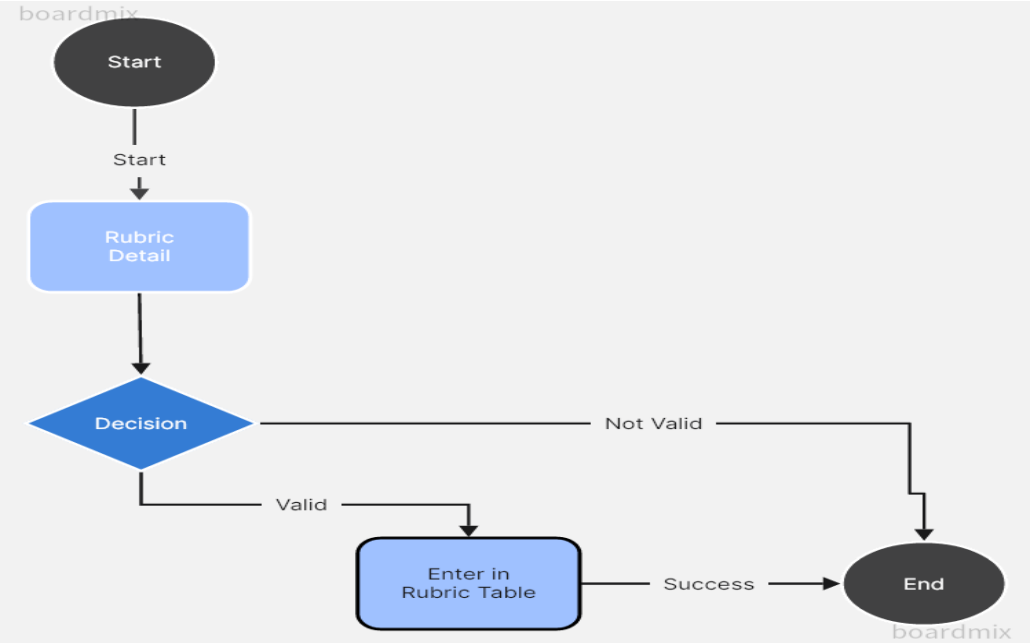

Figure 4: Data flow Diagram of Rubric management

3.4 Assessment Management

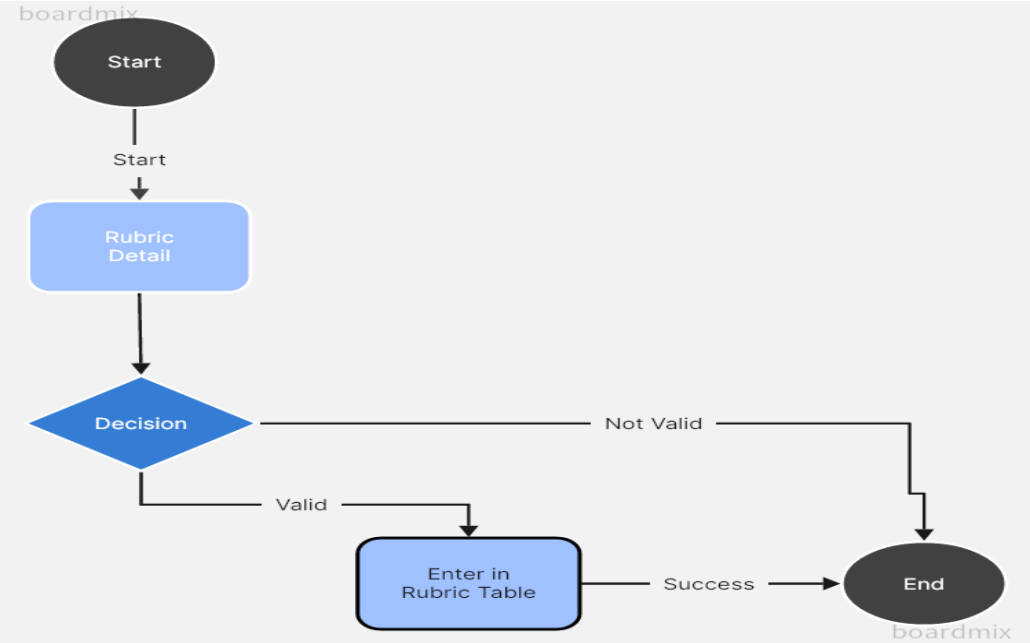

Figure 5: Data flow Diagram of Assessment management

3.5 Assessment Component Management

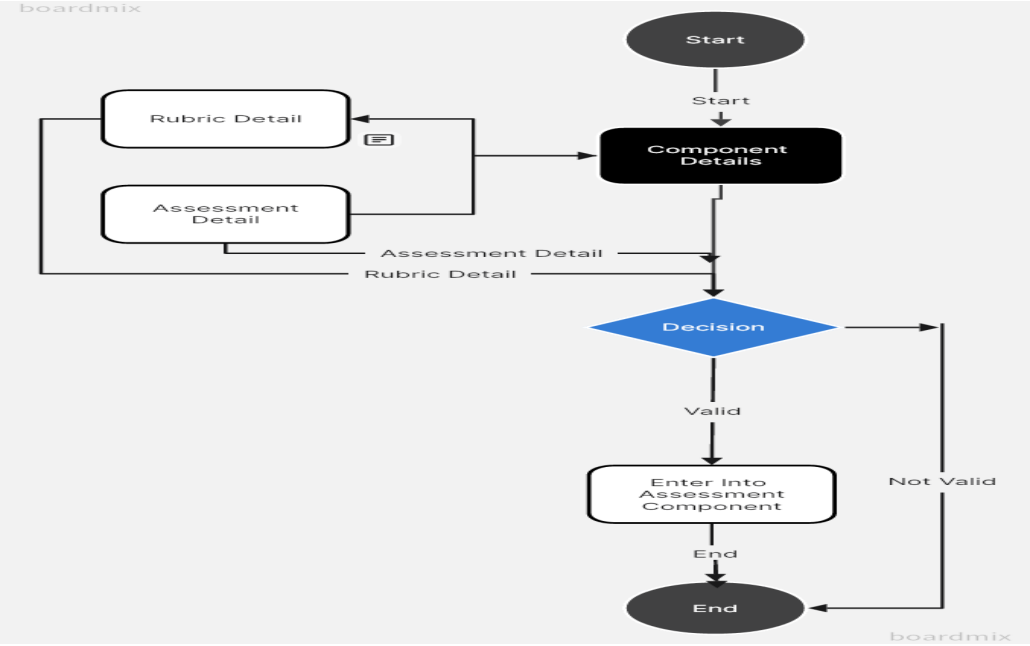

Figure 6: Data flow Diagram of Assessment Component management

3.6 Attendence Management

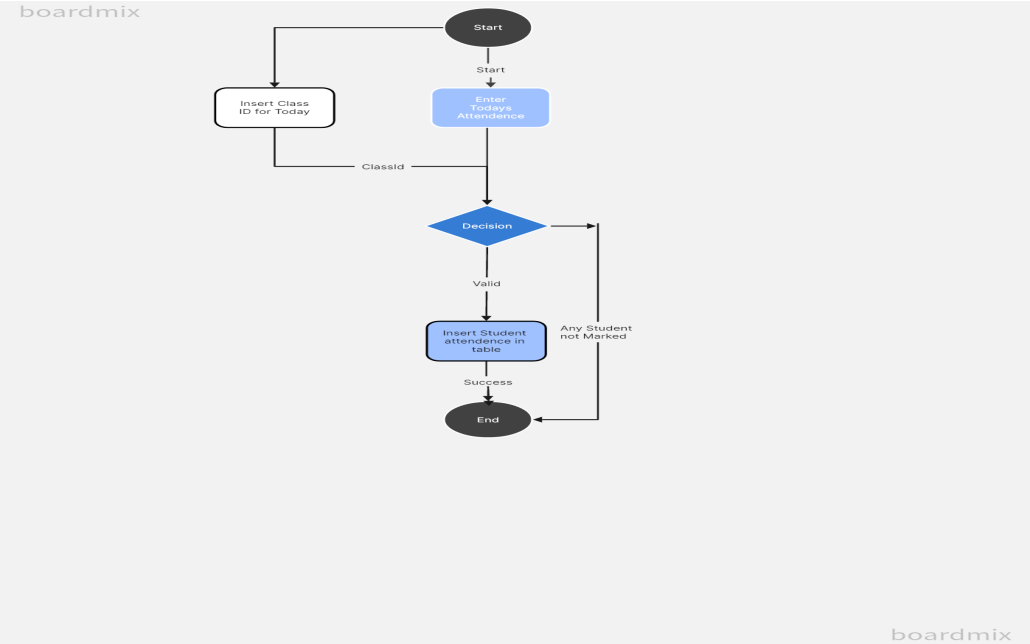

Figure 7: Data flow Diagram of attendence management

3.7 Result Management

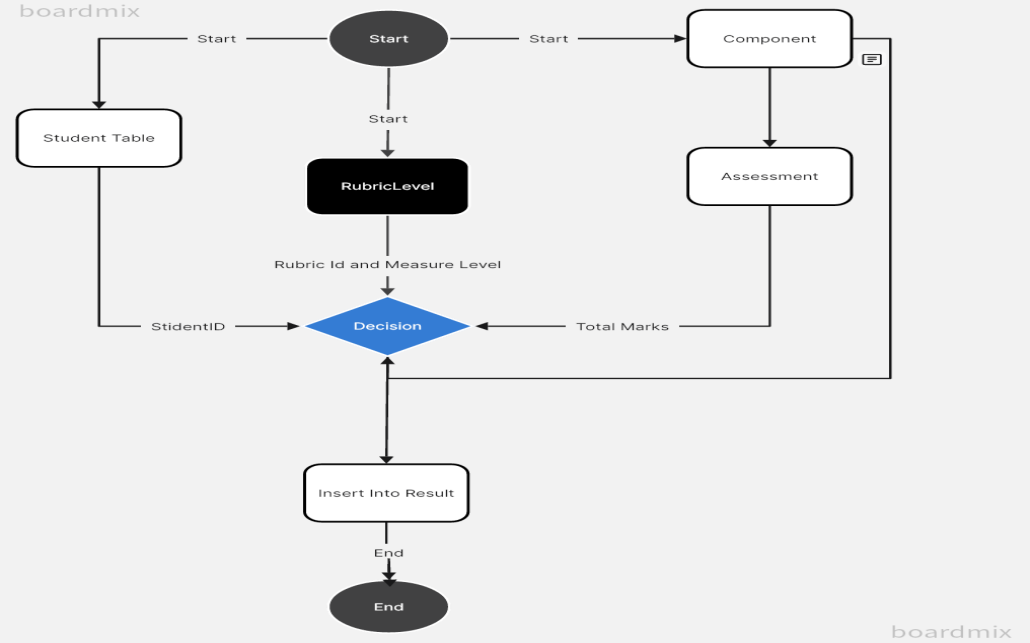

Figure 8: Data flow Diagram of result management

4 GUI of Project

4.1 Home

This first interface that appear when program is loaded.

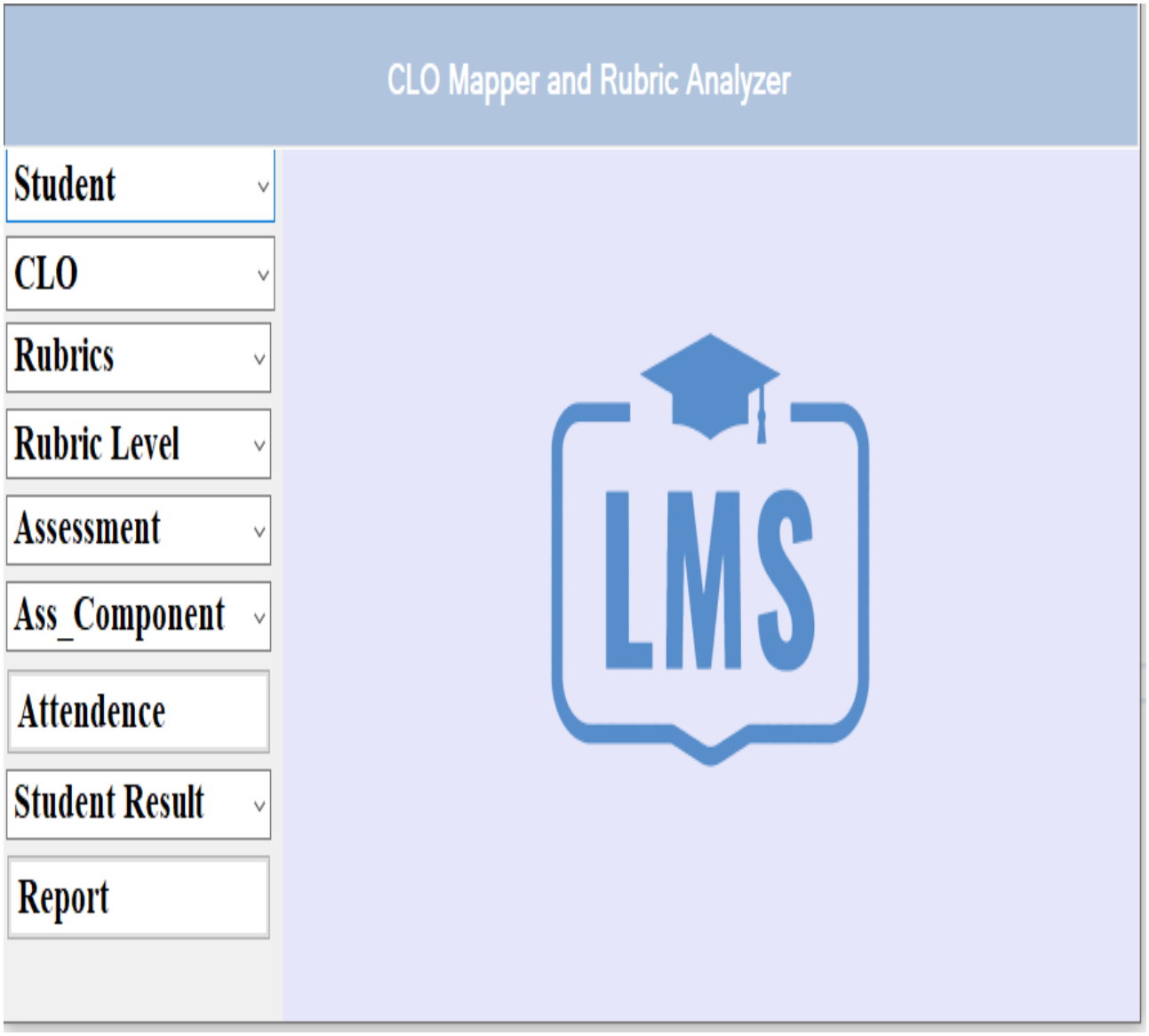

Figure 9: GUI of Home Page

4.2 Student

4.2.1 Student View

This interface appear when user click the combobox of student and the click on view student button. It has three button that show three different types of students.

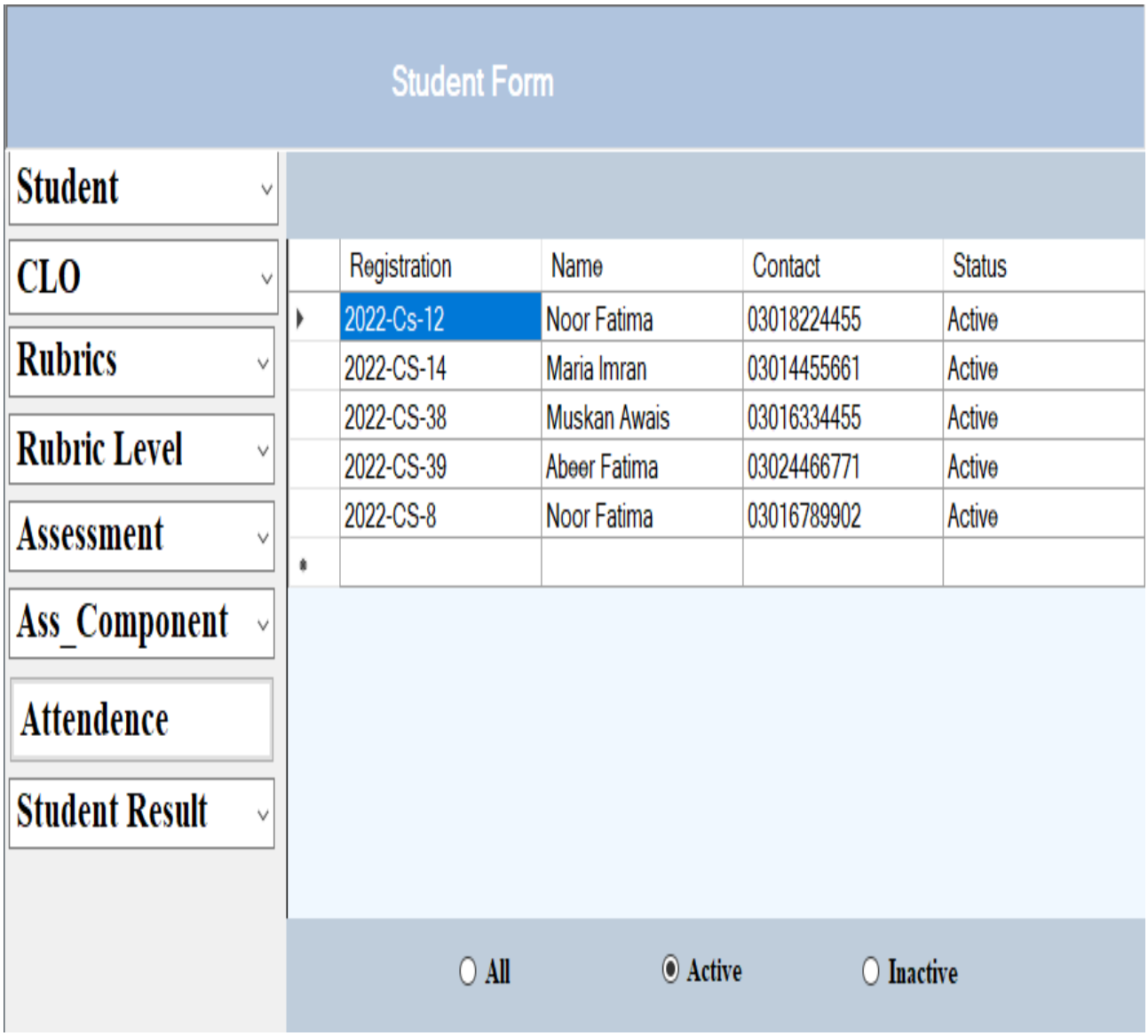

Figure 10: GUI of Student View

4.2.2 Student Delete

User can search any student whom he want to delete by using his or her registration number. user will select student Id from grid which he want to delete then press delete button.

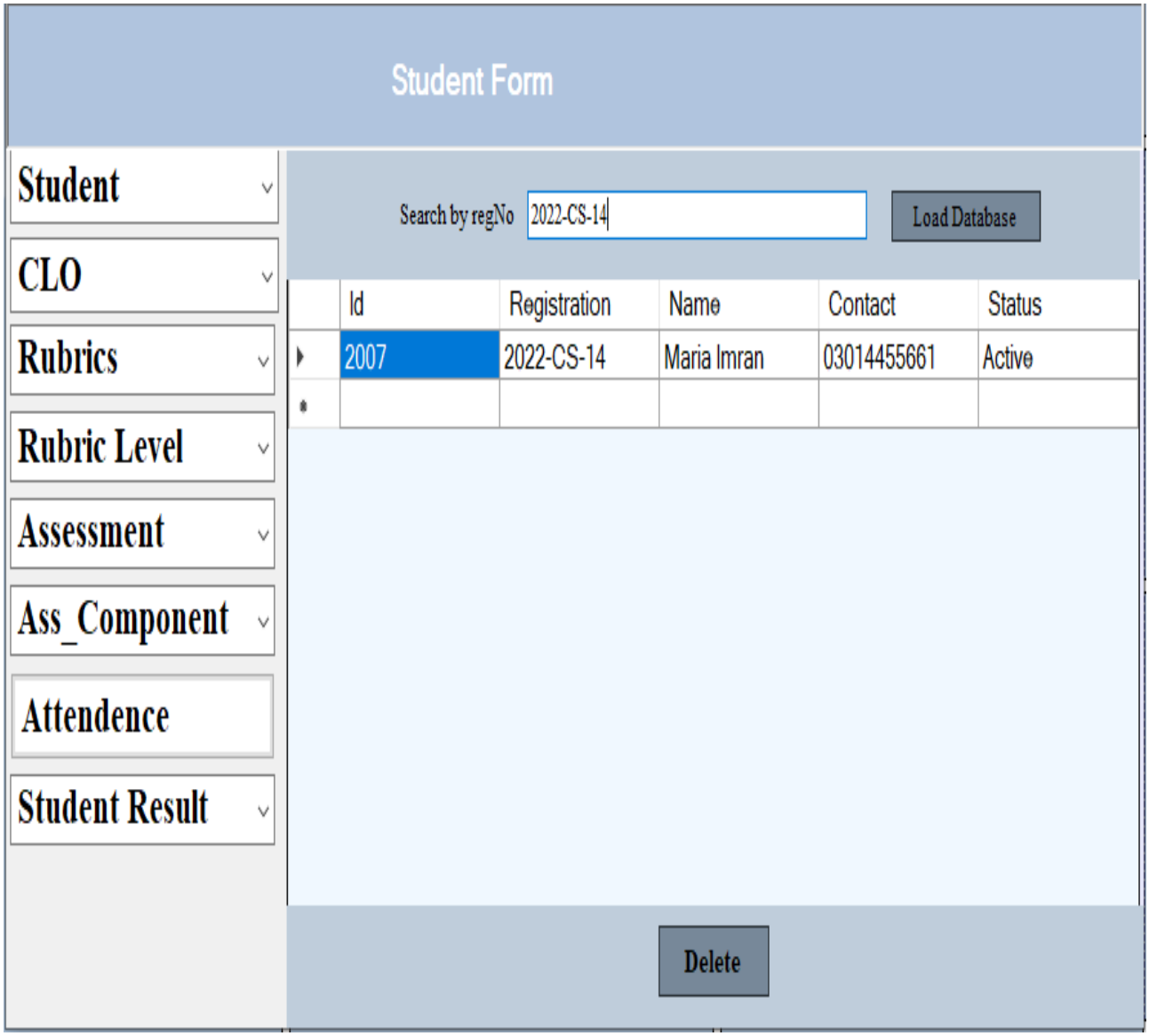

Figure 11: GUI of Student delete form

4.3 CLo

Users can add Clo by clicking on insert buttons. For updating, the user has first to select the row of the data grid view by clicking update button and then click the respective buttons.

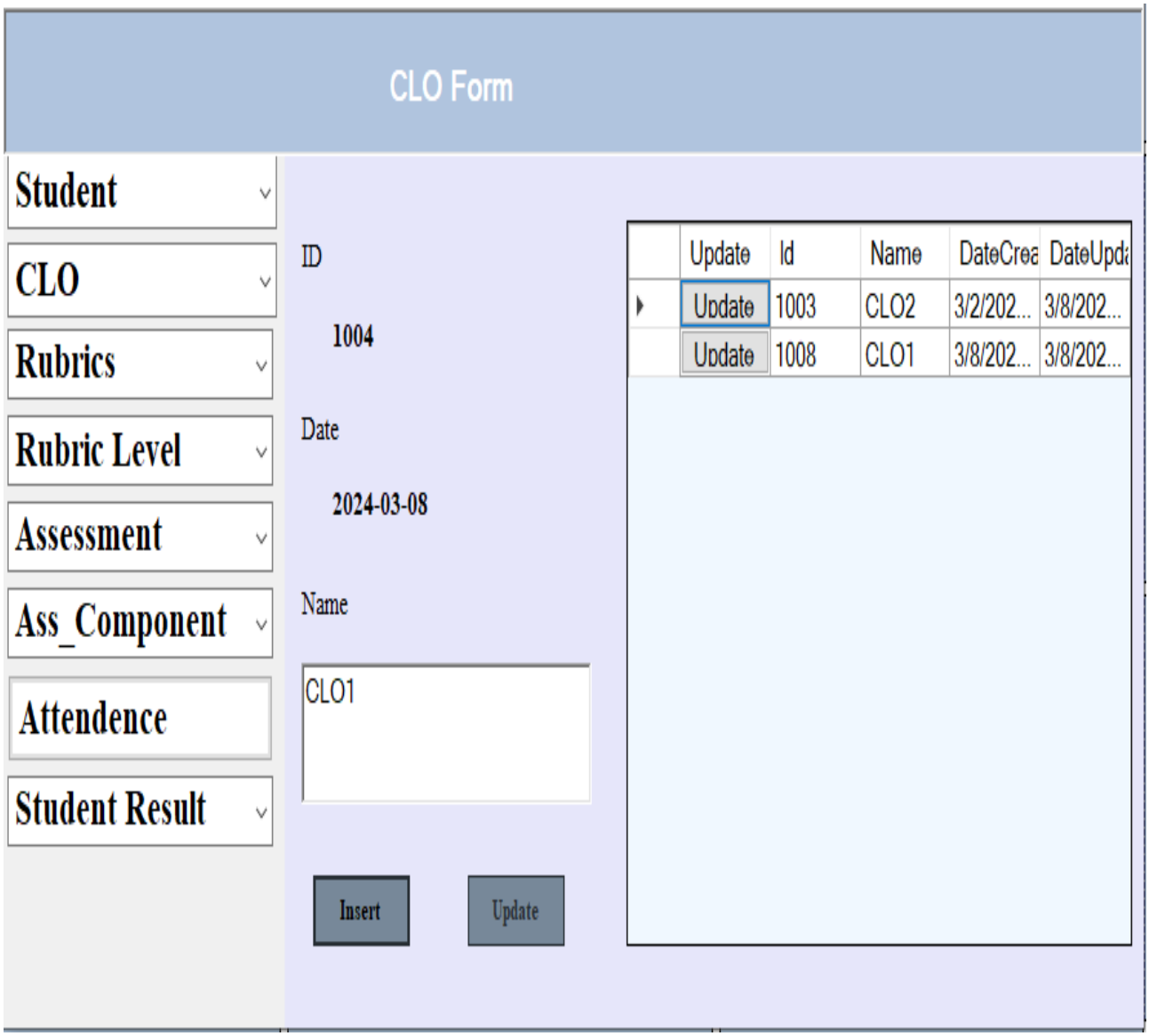

Figure 12: GUI of CLO

4.4 Attendence

Users will select require date from date picker. There will be four possibilty for a student status. user will select required status.

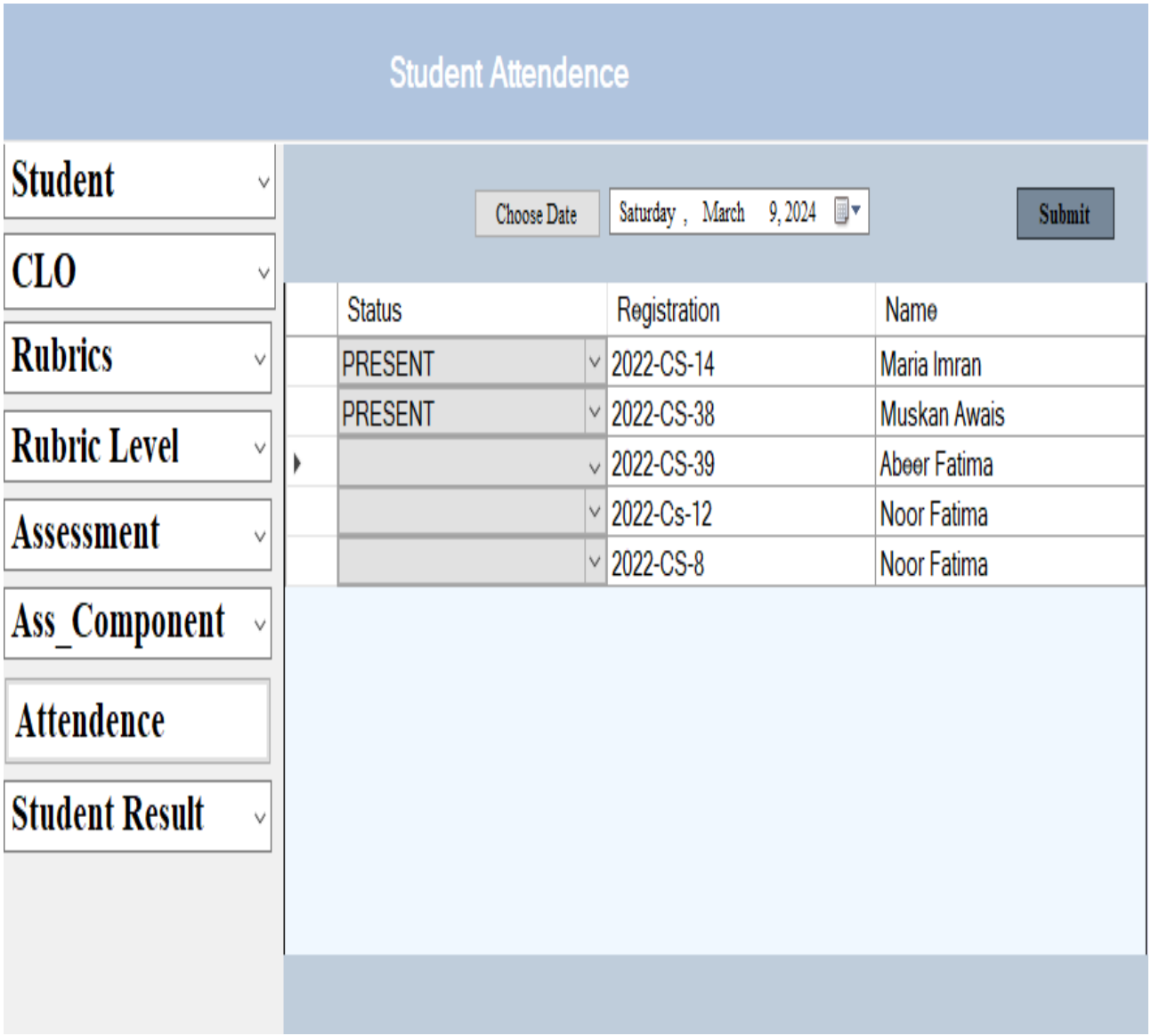

Figure 13: GUI of student Attendence Form

4.5 Student Result

In this form user edit delete and update student result according to available rubrics.

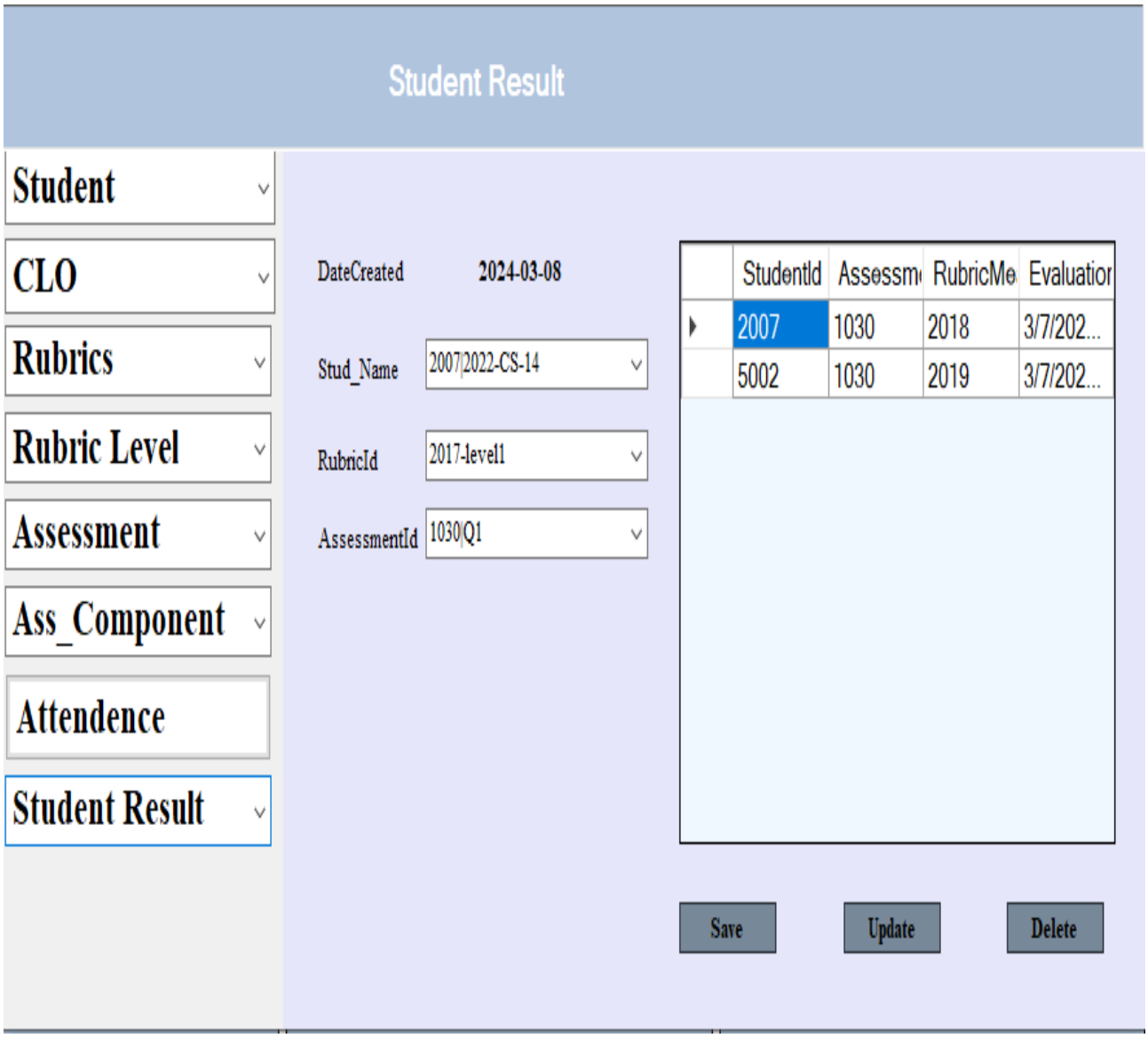

Figure 14: GUI of Student result form

4.6 Report

This is the report panel. User can generate following reports in PDF and can store at required place.

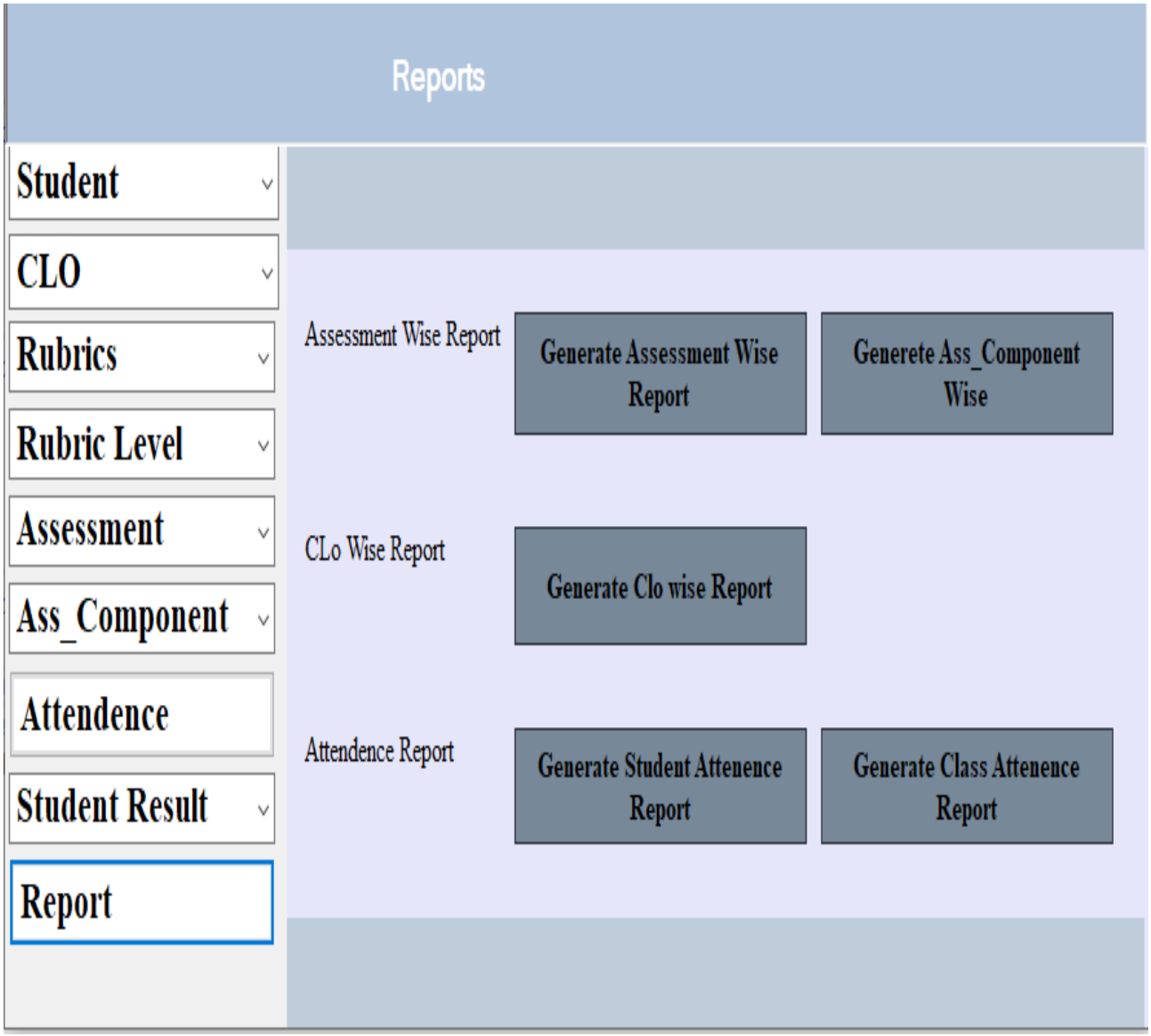

Figure 15: GUI of Report

5 PDF Reports

In this project user can generate five types of different Report. These reports include:

1. Assessment Wise Report
2. Assessment Component Wise Report
3. CLo Wise Report
4. Student Attendence Report
5. Class Attendence Report

5.1 Assessment Wise Report

The query output summarizes each student's assessment performance, featuring their name, assessment title, total obtained marks across all components, and weighted marks considering assessment weightage. This data help educators in understanding individual student progress, enabling informed decision-making and targeted support strategies.

ASSESSMENT WISE CLASS RESULT

Name	Assessment	Obtained	Weighted
Maria Imran	ProblemSet1	1.00	2.50
Muskan Awais	ProblemSet1	1.00	1.25
Noor Fatima	ProblemSet1	1.00	2.50

Figure 16: Assessment Wise Report

5.2 Assessment Component Wise Report

This PDF report aggregates assessment data, linking students to their performance metrics. It retrieves the student's name, CLO, evaluation date, and details about each assessment, such as the title, component details, total marks, and total obtain marks. The obtained marks are calculated based on the assessment's rubric and total marks, facilitating assessment analysis and student evaluation.

ASSESSMENT COMPONENT WISE CLASS RESULT

Name	CLO	Eval_Date	Assessment	Ass_Component	TotalMarks	TotalObtMarks	MaxMarks	ObtainedMarks
Maria Imran	1003-CLO2	3/7/2024 12:00:00 AM	ProblemSet1	Q1	2	5	10	1.00
Muskan Awais	1003-CLO2	3/7/2024 12:00:00 AM	ProblemSet1	Q1	2	3	10	0.60
Muskan Awais	1003-CLO2	3/9/2024 12:00:00 AM	ProblemSet1	Q2	2	2	10	0.40
Noor Fatima	1003-CLO2	3/9/2024 12:00:00 AM	ProblemSet1	Q2	2	5	10	1.00

Figure 17: Assessment Component Wise Report

5.3 CLO Wise Report

This report calculates the percentage achievement of students in each Course Learning Outcome (CLO) based on their assessment results. It aggregates data from assessment components and rubric levels, computes the maximum measurement level for each component, and then calculates the percentage based on students' achieved marks. This facilitates evaluating student performance across different CLOs.

CLO WISE CLASS RESULT

Student Name	Registration Number	CLO Name	Total Marks	Obtained Marks	Percentage
Maria Imran	2022-CS-14	CLO2	2	1	50
Muskan Awais	2022-CS-38	CLO2	4	1	25
Noor Fatima	2022-CS-8	CLO2	2	1	50

Figure 18: Clo Wise Report

5.4 Student Attendence Report

This report calculates the attendance statistics for each student, including their registration number, total presence, total classes entered, and percentage attendance. It achieves this by joining the StudentAttendance and Student tables, and then aggregating the data by student ID. The percentage attendance is computed by dividing the total presence by the total classes entered and multiplying by 100, providing insights into student attendance rates.

STUDENT WISE ATTENDENCE RESULT

Registration Number	Total Presents	Total Classes Entered	Attendance Percentage
2022-CS-14	14	25	56.00
2022-CS-38	1	25	4.00
2022-CS-39	1	25	4.00
2022-CS-8	9	25	36.00

Figure 19: Student Wise Attendence Report

5.5 Class Attendence Report

This report retrieves attendance statistics for each class, including the class ID, total number of students present, total classes entered, and attendance percentage. It achieves this by joining the ClassAttendance and StudentAttendance tables based on the attendance ID and then aggregates the data by class ID, providing insights into class attendance rates.

CLASS WISE ATTENDENCE RESULT

Class ID	Total Students Present	Total Classes Entered	Attendance Percentage
12	1	1	100.00
13	1	1	100.00
14	1	1	100.00
1002	3	3	100.00
1003	1	1	100.00
1004	2	2	100.00
1005	2	2	100.00
1006	2	2	100.00
1007	2	2	100.00
1008	2	2	100.00
1011	2	2	100.00
1012	2	2	100.00
1013	2	2	100.00
1014	2	2	100.00

Figure 20: Class Wise Attendence Report

6 Testing

Testing is really important for any project. It helps make sure everything works properly and finds and fixes any problems or mistakes before the project is finished. When a project involves lots of different parts that all connect to each other, testing becomes even more crucial. For this project, I tested all the queries in the SQL Server to make sure they gave the right results.

Once the queries worked properly, I put them into the graphical user interface (GUI) to make sure they worked well there too. But I had a hard time during testing because there weren't any specific results given by the queries. This meant I had to use my own understanding to figure out if the queries were giving the right answers or not.

7 Limitations

Following are some limitations of this project:

1. The project does not have any login functionality.
2. The project have limited purpose.
3. This project can be used by only one user.
4. GUI is not flexible for mobile application.
5. Students are required to add manually.

8 Future Implementation

1. Add SignIn and SignUp functionality.
2. Adding different subject to increase functionality.
3. Increasing GUI flexiblity for mobile application.
4. Installing student registration system into it.

9 Conclusion

In conclusion, this projects make significant improvements to how university handle evaluations and management. They use tools like rubric levels and databases to create centralized systems that track student progress, make evaluations easier, and give teachers helpful insights. Even though there were some challenges along the way, like getting different parts to work together and adjusting the system as needed, the teamwork of the developers and supervisors made sure the projects were successful. These projects not only make things more efficient and accurate, but they also show how what students learn in class connects to real-life situations. Overall, they're big steps forward in making education better for everyone involved.

Database Schema
http://bit.ly/ProjectBDb