

# **MID TERM PROJECT**

## **DataBase System**



**Submitted By :**

**Amna Imran**

**2021-CS-96**

**Submitted To :**

**Sir Nazeef Ul Haq**

**UNIVERSITY OF ENGINEERING AND TECHNOLOGY**  
**COMPUTER SCIENCE DEPARTMENT**

## **ACKNOWLEDGEMENT**

I am grateful to Allah Almighty for giving me the strength, ability, and motivation to work on this project and complete it on time.

Along with that, I am thankful to Sir Nazeef Ul Haq for his guidance and supervision during the project.

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## **ABSTRACT**

The objective of this initiative is to optimize the assessment procedure within a university's Computer Science department through the creation of a desktop software application that automates the evaluation process and furnishes meaningful data on student achievements. The application will feature a user-friendly graphical interface for faculty members to handle student data, Course Learning Objectives (CLOs), assessment criteria, and grading levels, conduct evaluations on individual students, and generate reports in Portable Document Format (PDF) for record-keeping purposes.

# 1 INTRODUCTION

## 1.1 DESCRIPTION

This endeavor entails developing a Windows Form Application with C# programming language to manage the evaluation process in UET's Computer Science Department. The desktop application will enable teachers to manage students, Course Learning Objectives (CLOs), rubrics, assessments, and rubric levels, mark evaluations for each student and generate reports in PDF format. The project will follow the Outcome-Based Education approach where each subject will have multiple CLOs mapped with rubrics, which are further aligned with Rubric Levels. Students' evaluations will be based on rubrics in each assessment, and the marks will be automatically calculated using a pre-defined formula based on the rubric level.

The main features of the application include:

**Student Management:** The desktop application will enable teachers to add, edit, and delete student records, view student details, and assign assessments to students.

**CLO Management:** The application will allow teachers to add, edit, and delete CLOs, view CLO details, and associate CLOs with rubrics.

**Rubric Management:** Teachers can add, edit, and delete rubrics, view rubric details, and associate rubrics with CLOs using the application.

**Assessment Management:** Teachers can add, edit, and delete assessments, view assessment details, and assign rubrics to assessments.

**Rubric Level Management:** The desktop application will allow teachers to define rubric levels for each rubric and assign marks for each level.

**Evaluation Marking:** Teachers can mark evaluations against each student using the application and calculate marks based on the rubric level.

**Report Generation:** The application will allow teachers to generate reports in PDF format, such as CLO-wise class results and assessment-wise class results.

The software will have a secure and user-friendly interface for teachers to manage the evaluation process and access relevant information. The project aims to improve the accuracy and consistency of student evaluations, standardize rubrics and assessment criteria, and provide useful insights into student performance. The project will adhere to industry-standard software development practices, including requirement gathering, design, implementation, testing, and documentation.



## **1.2 PURPOSE AND MOTIVATION**

The aim of this project is to optimize the evaluation procedure of students against rubrics in the Department of Computer Science at the University of Engineering and Technology (UET) Lahore. The existing method is manually executed, which can be prone to errors and can consume a considerable amount of time. To address this, a desktop application will be developed that automates the process and provides a centralized platform for managing student evaluations, Course Learning Objectives (CLOs), rubrics, assessments, and rubric levels.

The motivation for this project is driven by the need to enhance the efficacy and precision of the evaluation process, which will lead to an improvement in the quality of education and learning outcomes. The desktop application will aid teachers in managing data in a centralized location, reducing the workload of manual evaluation, and creating reports that can assist in evaluating student performance. Additionally, it will enable the department to monitor the progress of students and identify areas of weakness that require attention. In general, the project will contribute to the enhancement of the academic system in the Department of Computer Science at the University of Engineering and Technology (UET) Lahore.

## **1.3 OBJECTIVES**

The objectives of this project can include:

To implement automation of the manual process of managing student evaluations against multiple rubrics associated with each CLO and assessment.

To establish a centralized platform for managing students, CLOs, rubrics, assessments, and rubric levels.

To standardize rubrics and assessment criteria to improve the accuracy and consistency of student evaluations.

To generate CLO wise class result and assessment wise class result in PDF format to provide useful insights into student performance.

To reduce errors in the evaluation process by automating calculations and minimizing manual data entry, thus increasing efficiency.

To facilitate collaboration and communication among teachers, students, and other stakeholders by providing access to the evaluation data and reports.

To develop a secure and user-friendly interface for teachers to manage the evaluation process and access relevant information.

Overall, the project aims to improve the evaluation process in the Computer Science de-

partment at UET Lahore by automating manual tasks, standardizing rubrics and assessment criteria, and providing useful insights into student performance.

## **2 PROJECT SCOPE**

### **2.1 FEATURES AND FUNCTIONALITIES**

#### **1. Manage Students:**

Add, edit and delete students' information.

Assign unique IDs to each student.

View students' information in a table format.

Search for students by name, ID, or any other relevant attribute.

#### **2. Manage CLOs:**

Add, edit and delete CLOs.

Assign unique IDs to each CLO.

View CLOs information in a table format.

Search for CLOs by name, ID, or any other relevant attribute.

#### **3. Manage Rubrics:**

Add, edit and delete rubrics for each CLO.

Assign unique IDs to each rubric.

View rubrics information in a table format.

Search for rubrics by name, ID, or any other relevant attribute.

#### **4. Manage Assessments:**

Add, edit and delete assessments.

Assign unique IDs to each assessment.

View assessments information in a table format.

Search for assessments by name, ID, or any other relevant attribute.

#### **5. Manage Rubric Levels:**

Add, edit and delete rubric levels for each rubric.

Assign unique IDs to each rubric level.

View rubric levels information in a table format.

Search for rubric levels by name, ID, or any other relevant attribute.

#### **6. Mark Evaluations Against a Student:**

The teacher can mark evaluations against a student for each assessment and component.

The application will automatically calculate the obtained marks for each rubric level based on the rubric mapping.

The application will also automatically calculate the final marks for each component and assessment based on the obtained rubric levels.

7. Generate Reports:

CLO wise class result report: This report will show the performance of the whole class against each CLO.

Assessment wise class result report: This report will show the performance of the whole class against each assessment.

Any other reports that can help the teacher or committee streamline the evaluation process are also be added such as Student Attendance Report.

8. Backup:

The application will have a backup feature to ensure the data's safety and security.

## 3 IMPLEMENTATION

### 3.1 Programming Languages, Frameworks and Libraries

Table 1: System Requirements

<b>Language</b>	C# (3.11.0)
<b>IDEs</b>	Microsoft Visual Studio Community 2019 (16.11.21)
	using System.Windows.Forms;
	using System;
	using System.Collections.Generic;
	using System.ComponentModel;
	using System.Data;
	using System.Drawing;
	using System.Linq;
	using System.Text;
	using System.Data.SqlClient;
	.NET Framework;
	Guna.UI2
	using iTextSharp.text.pdf;
	using iTextSharp.text;
	using System.IO;
	Latex

## **4 SYSTEM DESIGN**

### **4.1 Project Users**

#### **4.1.1 Project Actors**

The actors in this project are:

1. Teacher/Instructor(Primary): They will be the primary user of the desktop application and will use it to manage student data, CLOs, rubrics, assessments, rubric levels, and evaluate students based on the rubrics.
2. Students(Secondary): They will be evaluated based on the rubrics and their marks will be recorded in the system.
3. Administrative Staff(Secondary): They may be responsible for maintaining the system, managing data backups, and ensuring the system is running smoothly.
4. Committee Members(Secondary): They may use the reports generated by the system to analyze the performance of the class, evaluate the effectiveness of the rubrics, and make decisions about changes that need to be made to improve student outcomes.

## 4.2 Interfaces and Use Cases:

Table 2: MainMenu Interface

<b>Interface ID</b>	I01
<b>Name</b>	Main Menu
<b>Linked Use Case</b>	Accessing every linked Page of the Project
<b>Validations</b>	None
<b>Path</b>	Main Menu

### 4.2.1 Main Menu

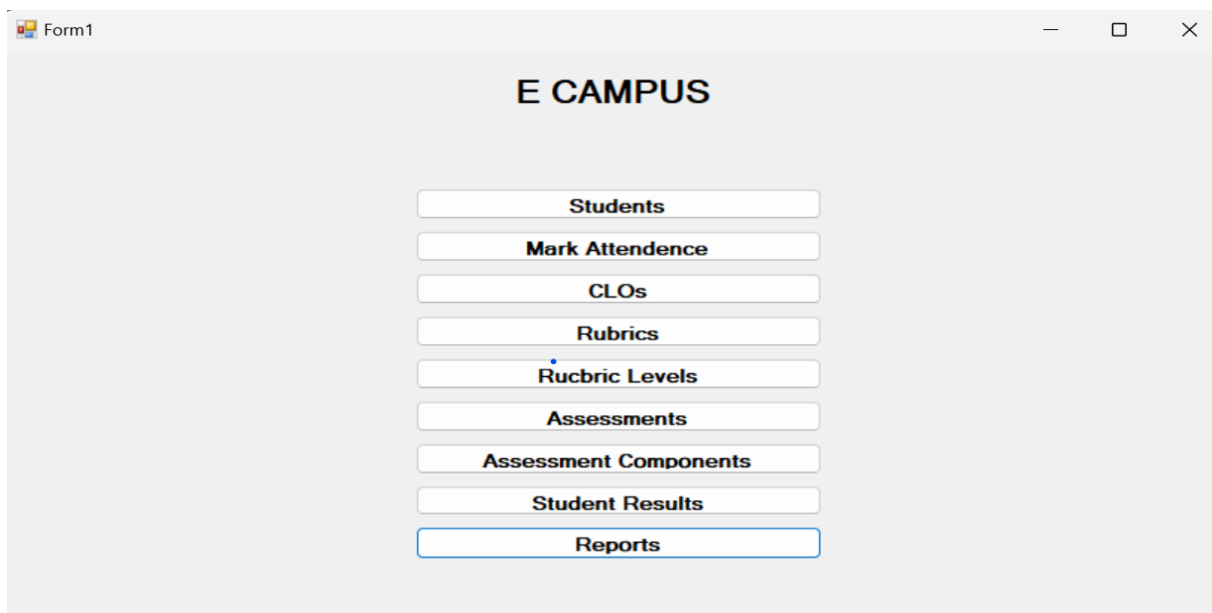


Figure 1: Main Menu UI

Table 3: Students UI

<b>Interface ID</b>	I02
<b>Name</b>	Students UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Students
<b>Validations</b>	1. FirstName and LastName: Only string characters 2. Contact: Strictly 11 digits 3. Email: Contain @, gmail, .com 4. Registration Number: Unique for all records
<b>Path</b>	MainMenu >Manage Students

#### 4.2.2 Students UI

**STUDENTS**

First Name  Last Name

Registration Number  Status

Email  Contact

**Add** **Edit** **Show** **Search** **Clear**

	Id	FirstName	LastName	Contact	Email	RegistrationNumber	Status
▶	1	Amna	Imran	03234367885	amna@gmail.com	2021-CS-96	5
	2	Mehak	Aftab	03234360634	mehak@gmail.com	2021-CS-92	6
	3	Mahnoor	Ijaz	03234389390	mahnoor@gmail....	2021-CS-95	5
*							

Figure 2: Students UI

Table 4: CLOs UI

<b>Interface ID</b>	I03
<b>Name</b>	CLOs UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete CLOs
<b>Validations</b>	1. CLOName: Only string characters and should be unique for all records 2. DateCreated: While updating any CLO the Date Created remains the same 3. DateUpdated: It can be modified in any case but it cannot be less than DateCreated
<b>Path</b>	MainMenu >Manage CLOs

### 4.2.3 CLOs UI

The screenshot shows a web application interface for managing CLOs. At the top, there's a title 'CLOs'. Below it, there are input fields for 'Clo Name' and 'Date Created' (which includes a date picker set to Thursday, 9 March 2023). Underneath, there's a 'Date Updated' field with a date picker set to Thursday, 9 March 2023. A row of five buttons follows: 'Add', 'Edit', 'Show', 'Search', and 'Clear'. Below the buttons is a table with four columns: 'Id', 'Name', 'DateCreated', and 'DateUpdated'. The first row of the table is highlighted in blue and contains the data: '1', 'Clo 1', '06/03/2023', and '06/03/2023'. Below the table is a large, empty grey rectangular area, likely a placeholder for more data or a detailed view.

Figure 3: CLOs UI

Table 5: Rubrics UI

<b>Interface ID</b>	I04
<b>Name</b>	Rubrics Screen
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Rubrics
<b>Validations</b>	1. Details: Only string characters 2. Details and Clold: They should be unique for all records
<b>Path</b>	MainMenu >Manage Rubrics

#### 4.2.4 Rubrics UI

Rubric

### RUBRICS

Details  Clo ID

ID

	Id	Details	Clold
▶	1	Design	1
	2	Execution	1
	3	Testing	1
*			

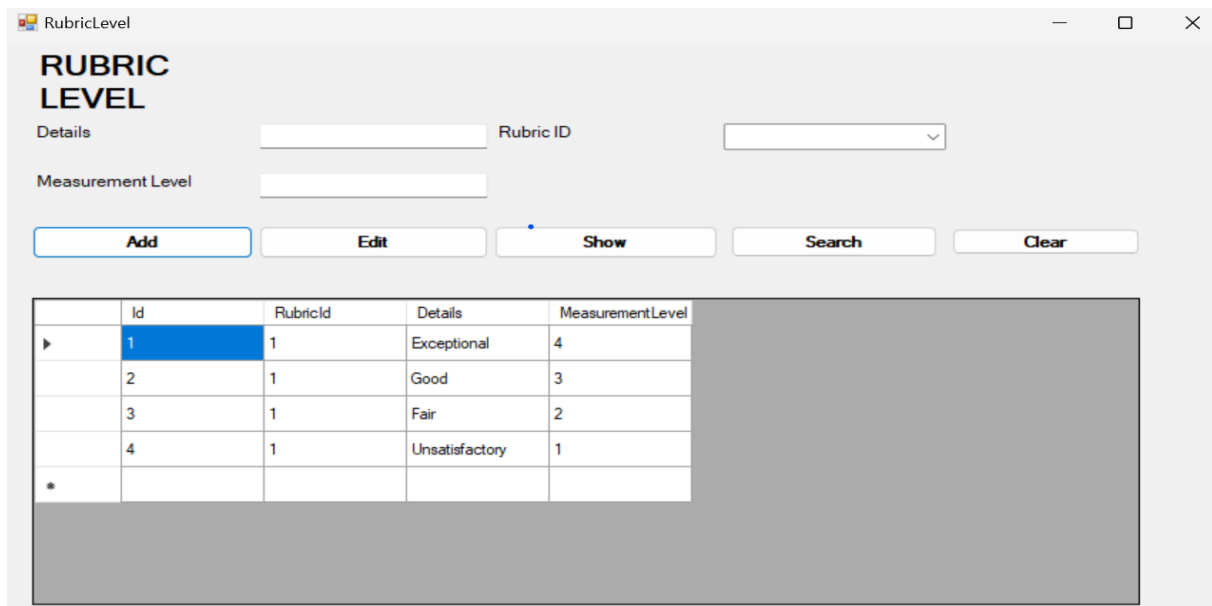
Figure 4: Rubrics UI



Table 6: Rubric Levels UI

<b>Interface ID</b>	I05
<b>Name</b>	Rubric Levels UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Rubric Levels
<b>Validations</b>	1. Details: Only string characters 2. MeasurementLevel: Only digits 3. Details, RubricId, MeasurementLevel: They should be unique for all records
<b>Path</b>	MainMenu >Manage Rubric Levels

#### 4.2.5 Rubric Levels UI



The screenshot shows a window titled "RubricLevel" with standard Windows window controls (minimize, maximize, close). The window contains a form with the following elements:

- RUBRIC LEVEL** (Section Header)
- Details** (Label) next to a text input field.
- Rubric ID** (Label) next to a dropdown menu.
- Measurement Level** (Label) next to a text input field.
- Four buttons: **Add**, **Edit**, **Show**, and **Search**.
- A **Clear** button.
- A table with the following columns: **Id**, **RubricId**, **Details**, and **MeasurementLevel**.

The table contains the following data:

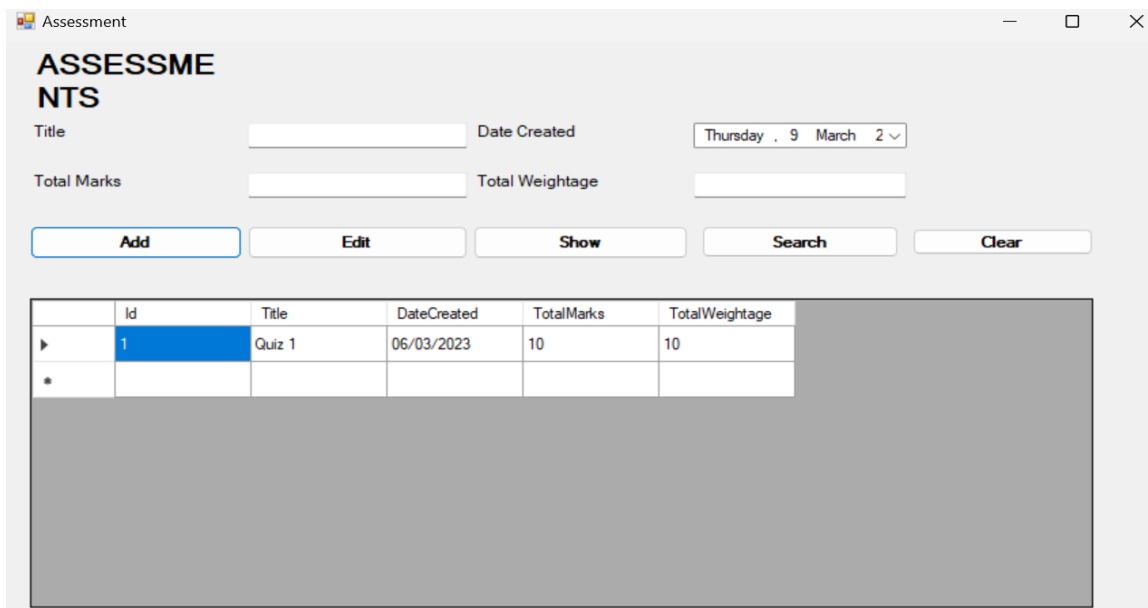
	Id	RubricId	Details	MeasurementLevel
▶	1	1	Exceptional	4
	2	1	Good	3
	3	1	Fair	2
	4	1	Unsatisfactory	1
*				

Figure 5: Rubric Levels UI

Table 7: Assessment UI

<b>Interface ID</b>	I06
<b>Name</b>	Assessment UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Assessments
<b>Validations</b>	1. Title: Only string characters and should be unique for all records 2. TotalMarks and TotalWeightage: Only digits
<b>Path</b>	MainMenu >Manage Assessments

#### 4.2.6 Assessments UI



The screenshot shows a web application window titled "Assessment". The main heading is "ASSESSMENTS". Below the heading, there are form fields for "Title", "Date Created" (with a date picker showing "Thursday, 9 March 2"), "Total Marks", and "Total Weightage". Below these fields are five buttons: "Add", "Edit", "Show", "Search", and "Clear". Below the buttons is a table with the following data:

	Id	Title	DateCreated	TotalMarks	TotalWeightage
▶	1	Quiz 1	06/03/2023	10	10
*					

Figure 6: Assessments UI

Table 8: Assessment Components UI

<b>Interface ID</b>	I07
<b>Name</b>	Assessment Components UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Assessment Components
<b>Validations</b>	1. Name: Only string characters and should be unique for same AssessmentId 2. TotalMarks: Only digits 3. Date Created: it cannot be modified 4. DateUpdated: It can be modified in any case but it cannot be less than DateCreated
<b>Path</b>	MainMenu >Manage Assessment Components

## Assessment Components UI

**ASSESSMENT COMPONENTS**

Assessment Component Name  Total Marks

Date Updated  Date Created

Rubric ID  Assessment ID

	Id	Name	RubricId	TotalMarks	DateCreated	DateUpdated	AssessmentId
▶	1	Question 1	1	10	06/03/2023	06/03/2023	1
*							

Figure 7: Assessment Components UI

Table 9: Attendance UI

<b>Interface ID</b>	I08
<b>Name</b>	Attendance UI
<b>Linked Use Case</b>	Mark Attendance for a particular date
<b>Validations</b>	Date: Attendance Date cannot be repeated
<b>Path</b>	MainMenu >Manage Attendance

#### 4.2.7 Attendance UI

The screenshot shows a window titled "MarkAttendance" with standard Windows window controls. The main heading is "ATTENDANCE". Below the heading is a "Date" label followed by a date picker showing "Thursday , 9 March 2023". Below the date picker is a table with the following columns: Status, Id, RegistrationNumber, and StudentName. The table contains three rows of data. The first row shows a status of "▶", Id "1", RegistrationNumber "2021-CS-96", and StudentName "Amna Imran". The second row shows a status of "▼", Id "3", RegistrationNumber "2021-CS-95", and StudentName "Mahnoor Ijaz". The third row shows a status of "\*", Id "", RegistrationNumber "", and StudentName "". Below the table is a large grey rectangular area. At the bottom right of the window is a button labeled "Confirm Attendance".

Status	Id	RegistrationNumber	StudentName
▶	1	2021-CS-96	Amna Imran
▼	3	2021-CS-95	Mahnoor Ijaz
*			

Figure 8: Attendance UI

Table 10: Student Result UI

<b>Interface ID</b>	I09
<b>Name</b>	Student Result UI
<b>Linked Use Case</b>	Insert, Update, Search, Show, Delete Student Results
<b>Validations</b>	None
<b>Path</b>	MainMenu >Manage Student Results

#### 4.2.8 Student Result UI

The screenshot shows a web application window titled "StudentResult". The main heading is "STUDENT RESULT". Below the heading, there are four dropdown menus for "Student ID", "Assessment ID", "Rubric Maseasurement", and "Assessment Component ID". There is also a date picker for "Evaluation Date" set to "Thursday, 9 March 2023". Below these fields are five buttons: "Add", "Edit", "Show", "Search", and "Clear". The "Show" button is highlighted with a blue border. Below the buttons is a table with the following columns: "StudentId", "AssessmentCompor", "RubricMeasuremen", and "EvaluationDate". The first row of the table is highlighted in blue and contains the values "1", "1", "4", and "06/03/2023". The table is followed by a large grey rectangular area.

StudentId	AssessmentCompor	RubricMeasuremen	EvaluationDate
1	1	4	06/03/2023

Figure 9: Student Result UI

Table 11: Pdf Reports UI

<b>Interface ID</b>	I10
<b>Name</b>	Pdf Reports UI
<b>Linked Use Case</b>	Show Reports
<b>Validations</b>	None
<b>Path</b>	MainMenu >Manage Pdf Reports

#### 4.2.9 Pdf Reports UI

The screenshot displays a web application window titled "Reports". Inside, there is a section labeled "REPORTS". Below this, a "Report Type" dropdown menu is set to "Active Students Report". There are three buttons: "Show", "Generate PDF", and "Clear". Below the buttons is a table with the following data:

	FirstName	LastName	Contact	Email	Id	RegistrationNumber	Status
▶	Amna	Imran	03234367885	amna@gmail.com	1	2021-CS-96	5
	Mahnoor	Ijaz	03234389390	mahnoor@gmail....	3	2021-CS-95	5

Below the table is a large grey rectangular area, likely a placeholder for a PDF report or additional data.

Figure 10: Pdf Reports UI

## 4.3 DataBase Design Diagram and Data Schemas

### Database Design:

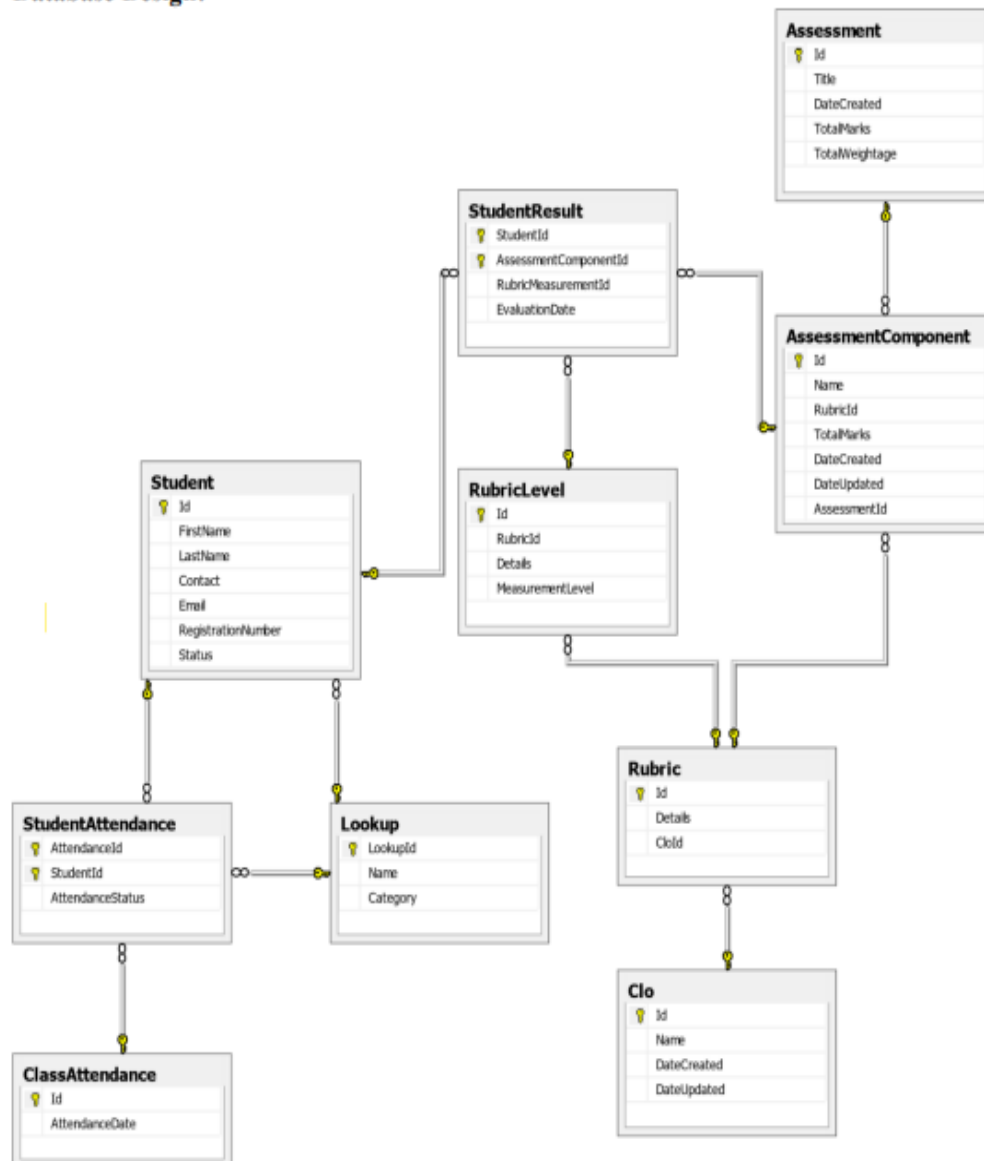


Figure 11: DataBase Design Diagram and Data Schemas

## 4.4 Data Base Schemas

### 4.4.1 Students

Here is a brief description of the columns in the "Student" table:

Id: A unique identifier for each student in the table.

FirstName: The first name of the student.

LastName: The last name of the student.

Contact: The contact number of the student.

Email: The email address of the student.

RegistrationNumber: The registration number assigned to the student.

Status: The status of the student, such as active or inactive.

#### **4.4.2 LookUp**

Here is a brief description of the columns in the "LookUp" table:

Name: This column contains the values such as: present, absent, leave, and late etc.

Category: This column contains the category such as Student Status or Attendance Status.

#### **4.4.3 Student Attendance**

Here is a brief description of the columns in the "StudentAttendance" table:

AttendanceId: This is the primary key column of the table, containing a unique identifier for each attendance record.

StudentId: This column probably contains the unique identifier of the student who is associated with the attendance record.

AttendanceStatus: This column likely stores the status of the student's attendance, such as "present", "absent", or "late".

#### **4.4.4 Class Attendance**

Here is a brief description of the columns in the "ClassAttendance" table:

Id: This is the primary key column of the table, containing a unique identifier for each attendance record.

AttendanceDate: This column stores the date of the attendance record.

#### **4.4.5 Clo**

Here is a brief description of the columns in the "Clo" table:

Id: This is the primary key column of the table, containing a unique identifier for each record in the table.

Name: This column stores the name or description of the CLO (Course Learning Outcome) that is being tracked.

DateCreated: This column stores the date and time when the CLO record was created.

DateUpdated: This column stores the date and time when the CLO record was last updated.

#### **4.4.6 Rubric**

Here is a brief description of the columns in the "Rubric" table:

Id: This is the primary key column of the table, containing a unique identifier for each rubric.

Details: This column contains the detailed description for the rubric.

CloId: This column stores the identifier of the CLO (Course Learning Outcome) to which



this rubric is associated.

#### **4.4.7 Rubric Level**

Here is a brief description of the columns in the "Rubric Level" table:

Id: This is the primary key column of the table, containing a unique identifier for each rubric level.

RubricId: This column stores the identifier of the rubric to which this level is associated.

Details: This column contains the detailed description or instructions for this specific rubric level.

MeasurementLevel: This column stores the measurement level for this rubric level, such as "Exceptional", "Good", or "Fair".

#### **4.4.8 Assessment**

Here is a brief description of the columns in the "Assessment" table:

Id: This is the primary key column of the table, containing a unique identifier for each assessment.

Title: This column probably contains the title or name of the assessment.

DateCreated: This column stores the date and time when the assessment was created.

TotalMarks: This column stores the total marks that can be obtained in the assessment.

TotalWeightage: This column stores the total weightage or percentage that this assessment contributes to the overall course grade.

#### **4.4.9 Assessment Component**

Here is a brief description of the columns in the "Assessment Component" table:

Id: This is the primary key column of the table, containing a unique identifier for each assessment component.

Name: This column contains the name or title of the assessment component.

RubricId: This column stores the identifier of the rubric used to evaluate the assessment component.

TotalMarks: This column stores the total marks that can be obtained in the assessment component.

DateCreated: This column stores the date and time when the assessment component was created.

DateUpdated: This column stores the date and time when the assessment component was last updated.

AssessmentId: This column stores the identifier of the assessment to which this assessment component belongs.

#### 4.4.10 Student Result

Here is a brief description of the columns in the "Student Result" table:

StudentId: This column stores the identifier of the student for whom the assessment result is recorded.

AssessmentComponentId: This column stores the identifier of the assessment component for which the result is recorded.

RubricMeasurementId: This column stores the identifier of the rubric measurement used to evaluate the student's performance in the assessment component.

EvaluationDate: This column stores the date and time when the assessment result was evaluated.

### 4.5 Queries

#### 4.5.1 Mark Attendance Query

```
SELECT Id
FROM ClassAttendance
WHERE YEAR(AttendanceDate) = @Year1
AND MONTH(AttendanceDate) = @Month
AND Day(AttendanceDate) = @Day;
```

#### 4.5.2 Attendance Report Query

```
SELECT s.FirstName,s.LastName, s.Contact,s.Email,sa.AttendanceStatus
,ca.AttendanceDate
FROM StudentAttendance sa
JOIN ClassAttendance ca
ON sa.AttendanceId = ca.Id
JOIN Student s
ON sa.StudentId = s.Id
ORDER BY sa.AttendanceId ASC;
```

FirstName	LastName	Contact	Email	AttendanceStatus	AttendanceDate
Amna	Imran	03234367885	amna@gmail.com	1	01/03/2023 3:22:14 pm
Mehak	Aftab	03214010291	mehak@gmail.com	1	01/03/2023 3:22:14 pm
Amna	Imran	03234367885	amna@gmail.com	2	02/03/2023 8:11:11 pm
Mehak	Aftab	03214010291	mehak@gmail.com	1	02/03/2023 8:11:11 pm
Amna	Imran	03234367885	amna@gmail.com	1	04/03/2023 2:41:49 pm
Mehak	Aftab	03214010291	mehak@gmail.com	1	04/03/2023 2:41:49 pm
Mahnoor	Ijaz	03214567885	mahnoor@gmail.com	1	04/03/2023 2:41:49 pm
Aliza	Zaidi	03225674523	aliza@gmail.com	2	04/03/2023 2:41:49 pm
Rukmah	Amir	03224333221	rukmah@gmail.com	2	04/03/2023 2:41:49 pm
Alaina	Khan	03214365588	alaina@gmail.com	2	04/03/2023 2:41:49 pm

Figure 12: Attendance Report

#### 4.5.3 Rubric Report Query

```

SELECT c.Name,r.CloID,r.ID RubricID,r.Details RubricDetails,
rl.ID RubricLevelID,rl.Details RubricLevelDetails
FROM Clo c
JOIN Rubric r
ON c.Id=r.CloId
JOIN RubricLevel rl
ON rl.RubricId=r.Id;

```

Name	CloID	RubricID	RubricDetails	RubricLevelID	RubricLevelDetails
Clo2	1	1	Design	5	Exceptional
Clo2	1	1	Design	6	Good
Clo2	1	1	Design	7	Fair
Clo2	1	1	Design	8	Unsatisfactory

Figure 13: Rubric Report

#### 4.5.4 Active Students Report

```
SELECT c.Name,r.CloID,r.ID RubricID,r.Details RubricDetails,
rl.ID RubricLevelID,rl.Details RubricLevelDetails
FROM Clo c
JOIN Rubric r
ON c.Id=r.CloId
JOIN RubricLevel rl
ON rl.RubricId=r.Id;
```

Id	FirstName	LastName	Contact	Email	RegistrationNumber	Status
6	Amna	Imran	03234367885	amna@gmail.com	2021-CS-96	5
7	Mehak	Aftab	03214010291	mehak@gmail.com	2021-CS-92	5
8	Mahnoor	Ijaz	03214567885	mahnoor@gmail.com	2021-CS-95	5
11	Rukhmah	Amir	03224333221	rukhmah@gmail.com	2021-CS-90	5

Figure 14: Active Students Report

#### 4.5.5 Student Assessment Report

```

SELECT s.FirstName, s.LastName, ac.Name AS ComponentName, a.Title AS
AssessmentTitle, a.TotalMarks AS AssessmentTotalMarks, a.TotalWeightage
AS AssessmentTotalWeightage, sr.EvaluationDate, rl.Details
AS RubricDetails, rl.MeasurementLevel
AS RubricMeasurementLevel
FROM Student s
JOIN StudentResult sr
ON s.Id = sr.StudentId
JOIN AssessmentComponent ac
ON sr.AssessmentComponentId = ac.Id
JOIN Assessment a
ON ac.AssessmentId = a.Id
JOIN Rubric r
ON ac.RubricId = r.Id
JOIN RubricLevel rl
ON r.Id = rl.RubricId
ORDER BY s.LastName ASC, s.FirstName
ASC, a.Title ASC;

```

FirstName	LastName	ComponentName	AssessmentTitle	AssessmentTotalMarks	AssessmentTotalWeightage	EvaluationDate	RubricDetails	RubricMeasurementLevel
Amna	Imran	Question 1	Quiz 1	10	10	06/03/2023 12:00:00 am	Exceptional	4
Amna	Imran	Question 1	Quiz 1	10	10	06/03/2023 12:00:00 am	Good	3
Amna	Imran	Question 1	Quiz 1	10	10	06/03/2023 12:00:00 am	Fair	2
Amna	Imran	Question 1	Quiz 1	10	10	06/03/2023 12:00:00 am	Unsatisfactory	1

Figure 15: Assessment Report

#### 4.5.6 Student Result Report

```

SELECT Assessment.Id AS Assessment, AssessmentComponent.Id AS Components,
AssessmentComponent.TotalMarks, StudentResult.StudentId,
StudentResult.RubricMeasurementId
, RubricLevel.MeasurementLevel, StudentResult.EvaluationDate,
(CAST(2 AS decimal(10,2))/4 *AssessmentComponent.TotalMarks)
AS ObtainedMarks
FROM Assessment
Join AssessmentComponent
ON Assessment.Id
= AssessmentComponent.AssessmentId
JOIN StudentResult
ON AssessmentComponent.Id = StudentResult.AssessmentComponentId
JOIN RubricLevel
ON StudentResult.RubricMeasurementId = RubricLevel.Id;

```

Assessment	Components	TotalMarks	StudentId	RubricMeasure mentId	MeasurementLe vel	EvaluationDate	ObtainedMarks
1	1	10	1	4	1	06/03/2023 12:00:00 am	5.000000

Figure 16: Result Report

## 5 RESULTS AND EVALUATION

### 5.1 USABILITY OF SYSTEM

The intended system is a desktop application that automates the evaluation process for efficient management of student evaluations. Its user interface is intuitive, making it easy for teachers to navigate and manage evaluations with minimal effort. The application offers an easy-to-use data entry system that permits the input and management of various data, including CLOs, rubrics, assessments, and rubric levels.

The application's automated calculation system saves time and effort, automatically calculating the obtained marks based on the rubric level. With the application's report generation capability, teachers can generate reports in PDF format, making it convenient to access and share the relevant information.

Overall, the proposed system offers a dependable and efficient solution to manage student evaluations, providing an improved usability and efficiency of the evaluation process.

### 5.2 LIMITATIONS

The current application's lack of multi-user functionality poses a significant obstacle to efficient concurrent data management and access by multiple administrators, resulting in workflow inefficiencies.

The absence of a secure login system presents a potential security risk by allowing unauthorized users to access and manipulate data. To mitigate this risk, the implementation of a secure login system is recommended to enhance data confidentiality and integrity.

Incorporating user-friendly features such as auto-populated fields and drop-down menus into the data updating procedure could significantly streamline the data management process, resulting in improved efficiency.

Due to its lack of integration with the Learning Management System (LMS), the current application requires manual input of student data, leading to a duplication of effort and increased workload for administrators. Integration of the application with the LMS is advisable to optimize data management procedures.

The application's generated reports do not conform to the standard formats required by the department, decreasing the effectiveness and usefulness of the reports. Enhancing the report generation functionality to meet specific departmental requirements and formats would improve their quality.

Limited compatibility with only the Windows operating system restricts the application's usability for users who prefer alternative operating systems.

Finally, the current application's limited accessibility, restricted to the computer where it is installed, may present challenges for teachers requiring access from diverse locations and devices.

### **5.3 FUTURE WORKS**

**Multi-User Functionality:** The application can be updated to support multi-user functionality, allowing multiple admins to access and manage data concurrently. This can be achieved through the implementation of a database management system that allows multiple users to access and update data simultaneously.

**Secure Login System:** A secure login system can be implemented to prevent unauthorized access to the application. This can be achieved through the use of user authentication mechanisms, such as password-based authentication, two-factor authentication, or biometric authentication.

**User-Friendly Data Updating:** The data updating procedure can be enhanced by incorporat-



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ing more user-friendly features such as auto-populated fields and drop-down menus. This will make the data management process smoother and more efficient for the admins.

**Integration with LMS:** The application can be integrated with the Learning Management System (LMS) to streamline the data management process. This can be achieved by building an API that enables the LMS to interact with the application, allowing data to be automatically imported into the application.

**Standard Report Generation:** The report generation functionality can be improved to meet the specific requirements and formats of the department. This can be achieved by implementing customizable report templates that conform to the department's standards and formats.

**Increased Compatibility:** The desktop application can be made compatible with other operating systems, such as Mac OS or Linux. This can be achieved through the use of cross-platform development frameworks such as Electron, React Native, or Xamarin.

**Improved Accessibility:** To improve accessibility, the application can be hosted on a cloud server or web server, allowing admins to access the application from any device with an internet connection. This will ensure that the application is accessible to teachers who need to access it from different locations or devices.