

University Learning Management System



Session: 2021 – 2025

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2021-CS-8

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Acknowledgments

I am grateful to Allah Almighty for giving me the energy to finish this project on time.

I want to thank my supervisor, Mr. Nauman Babar, for his support, guidance, and helpful advice. He taught me how to manage my work better by planning ahead of time.

I would also like to express my appreciation to Mr. Samyan Qayyum Wahla and Mr. Nazeef Ul Haq for teaching me database concepts that made completing this project easier.

Contents

| | |
|---|-----------|
| Acknowledgments | i |
| List of Figures | iv |
| Abstract | v |
| 1 Introduction | 1 |
| 1.1 Description | 1 |
| 1.2 Motivation | 2 |
| 1.3 Target Audience | 2 |
| 2 Technology Stack | 2 |
| 3 Links | 2 |
| 4 Operational Details | 2 |
| 5 Database Design | 3 |
| 5.1 Lookup | 4 |
| 5.2 Student | 4 |
| 5.3 StudentAttendance | 4 |
| 5.4 ClassAttendance | 4 |
| 5.5 Clo | 4 |
| 5.6 Rubric | 4 |
| 5.7 RubricLevel | 4 |
| 5.8 Assessment | 4 |
| 5.9 AssessmentComponent | 4 |
| 5.10 StudentResult | 5 |
| 6 Activity Flow Diagram | 5 |
| 6.1 Manage Student | 5 |
| 6.2 Manage Clo | 6 |
| 6.3 Manage Rubric | 6 |
| 6.4 Manage Rubric Level | 7 |
| 6.5 Manage Assessment | 7 |
| 6.6 Manage Assessment Component | 8 |
| 7 UI | 8 |
| 7.1 Home Page | 8 |
| 7.2 Manage Student Page | 9 |
| 7.3 Mark Attendance Page | 9 |
| 7.4 Manage Clo Page | 10 |

| | | |
|-------|--|----|
| 7.5 | Manage Rubric Page | 11 |
| 7.6 | Manage Rubric Level Page | 11 |
| 7.7 | Manage Assessment page | 12 |
| 7.8 | Manage Assessment Component page | 12 |
| 7.9 | InActive Students Page | 13 |
| 7.10 | Evaluation Page | 13 |
| 7.11 | Reports(1,2,3) Page | 14 |
| 7.12 | Reports(4,5,6) Page | 14 |
| 8 | Generated PDF Reports | 15 |
| 8.1 | Assessment Wise Report | 15 |
| 8.1.1 | Query | 15 |
| 8.2 | CLO Wise Report | 16 |
| 8.2.1 | Query | 16 |
| 8.3 | Monthly Attendance Report | 17 |
| 8.3.1 | Query | 17 |
| 8.4 | Daily Attendance Report | 18 |
| 8.4.1 | Query | 18 |
| 8.5 | Student Wise Report | 18 |
| 8.5.1 | Query | 18 |
| 8.6 | Overall CLO Report | 19 |
| 8.6.1 | Query | 19 |
| 9 | Testing | 20 |
| 9.1 | Testing Phase 1 | 20 |
| 9.2 | Testing Phase 2 | 20 |
| 9.3 | Testing Phase 3 | 21 |
| 9.4 | Testing Phase 4 | 21 |
| 10 | Limitations | 21 |
| 11 | Future Work | 21 |
| 12 | Collaboration | 21 |
| 13 | Conclusion | 22 |

List of Figures

| | | |
|----|---|----|
| 1 | Database Diagram | 3 |
| 2 | Flow diagram of managing students | 5 |
| 3 | Flow diagram of managing clo | 6 |
| 4 | Flow diagram of managing rubric | 6 |
| 5 | Flow diagram of managing rubric levels | 7 |
| 6 | Flow diagram of managing Assessments | 7 |
| 7 | Flow diagram of managing Assessment Components | 8 |
| 8 | Manage(Add,View,Delete(InActive),Update Student | 8 |
| 9 | Manage(Add,View,Delete(InActive),Update Student | 9 |
| 10 | Mark, View and update Attendance | 10 |
| 11 | Add,View,Delete,Update Clo's | 10 |
| 12 | Add,view,Delete,Update Rubrics | 11 |
| 13 | Add,view,Delete,Update Rubric Levels | 11 |
| 14 | Add,view,Delete,Update Assessments | 12 |
| 15 | Add,view,Delete,Update Assessments Components | 12 |
| 16 | Make InActive Students Active | 13 |
| 17 | Add, Update evaluation of students | 13 |
| 18 | Daily Attendance,Assessment wise,CLo Wise Reports | 14 |
| 19 | Monthly Attendance,Overall Clo's,Student Wise Reports | 14 |
| 20 | Assessment Wise Reports | 15 |
| 21 | CLO Wise Reports | 16 |
| 22 | Monthly Attendance Reports | 17 |
| 23 | Daily Attendance Reports | 18 |
| 24 | Student Wise Reports | 19 |
| 25 | Overall Clo Report | 20 |

Abstract

This project aims to replace human labor using a desktop application. The current assessment of students is being done manually, which is a difficult for instructors. The system is designed to perform CRUD operations on a database schema consisting of 10 tables: Assessment, StudentResult, AssessmentComponent, Student, RubricLevel, StudentAttendance, Lookup, Rubric, ClassAttendance, and Clo. The Assessment table contains information about the assessments. The StudentResult table stores the results of the students' assessments. The Student table stores the students' personal information. The RubricLevel table defines the rubric levels. The StudentAttendance table tracks the attendance of the students. The ClassAttendance table tracks the attendance of the classes. The system also generates PDF reports that provide useful information to the instructors. Overall, this project aims to demonstrate the use and benefits of databases in real-world problems, such as managing large amounts of data efficiently and securely.

1 Introduction

1.1 Description

The project Learning Management System is designed to manage assessments, student results, rubrics, attendance, and student information. The system has a set of Assessments that consists of one or more AssessmentComponents. Rubrics are used to measure student performance. RubricLevels are used to define a set of criteria that are used to measure a student's performance on a rubric. The system keeps track of student attendance via a StudentAttendance table, which has a unique AttendanceID. Finally, the system keeps track of class attendance through a ClassAttendance table. Lookup is used to categorize the different types of information stored in the system, such as attendance and student status.

The Home page represents the summary of the whole project. I have applied 8 figures with labels and this page shows the count of students(active or inactive), clo's, rubrics, rubric levels, assessments, assessment components and reports.

Admin can add, view, delete(inactive) and update students in the student page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. Admin can also make students active in the assessment components page. There is one button for making students active. When you click the grid, then button becomes enabled and you can make students active. In maximum pages Sorting and searching is applied on data and all the attributes in the system are required except student's LastName and Contact.

Attendance page shows the attendance status (present, absent, leave, late) of all students. This page have two grid. One grid shows students name and registration number so that admin can mark attendance of students. I have used four check boxes in grid for marking status of students. Other grid shows the status of all the students. First date is selected from datetimepicker and attendance is viewed in grid.

Admin can add, view, delete and update clo's in the student page. There are three buttons for adding, deleting and updating data. When you click the grid, then clo name goes to respective textbox. Admin can add, view, delete and update rubrics in the rubric page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. Admin can add, view, delete and update rubric levels in the rubric level page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes.

Admin can add, view, delete and update students in the assessment page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. Admin can add, view, delete and update students in the assessment components page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes.

Admin can download six reports in reports page that are Assessment wise Report, Clo Wise Report, Student wise Report, Overall Clo's Report, Monthly Attendance Report and Daily Attendance Report. I have also used three grids that shows the data of reports side by side by generating reports.

1.2 Motivation

The main motivation of this project is to practice sql queries. This project is completed using simple and complex queries. My motivation is to get data from relation by using sql queries. I have used Csharp and Transact Structured Query Language in my project and applied Complex queries to generate PDF Reports using pdfSharp library.

1.3 Target Audience

The target audience for the University Learning Management System are the teachers that were evaluating the students manually. This will help instructors to manage students, clo's, rubric's, rubric level's, assessment's, assessment components's data. The system will be able to generate result of students. The pdf reports are generated and it becomes easy for instructors to see the obtained marks of students. He will be able to see assessment wise, clo wise report. This system makes comfortable for instructors that he can view data of specific student by generating report. Proper attendance system is managed in the project. Instructor can be able to mark attendance of students. He will also be able to set leave and late status of student along with present and absent status.

2 Technology Stack

| | |
|---------------|--------------------------------------|
| Language | T-SQL and C# |
| IDEs | Visual Studio 2019 Community Edition |
| UserInterface | Winform (MaterialSkin) |
| PDF | PdfSharp |

3 Links

| | |
|---------------------|----------------------------|
| Gitlab Repository | Click Here |
| Latex Editable Link | Click Here |

4 Operational Details

University Learning Management system is single user i.e instructor or admin. It has following operational details:

1. The admin will be able to add students data. He is able to view, update and delete students. In Deletion procedure admin changes the status of student i.e. InActive.

2. The admin will be able to add CLO's. He is able to view, update and delete Clo's.
3. The admin will be able to add rubrics. He is able to view, update and delete rubrics.
4. The admin will be able to add rubric levels. He is able to view, update and delete rubric levels. He will give measurement level to rubrics.
5. The admin will be able to add Assessments. He is able to view, update and delete Assessments.
6. The admin will be able to add Assessment Components data. He is able to view, update and delete assessment Components.
7. The admin will be able to evaluate students. He will be able to view, update evaluation.
8. The admin will be able to mark attendance of students. He will also be able to view and update students.
9. The admin will be able to generate pdf reports.

5 Database Design

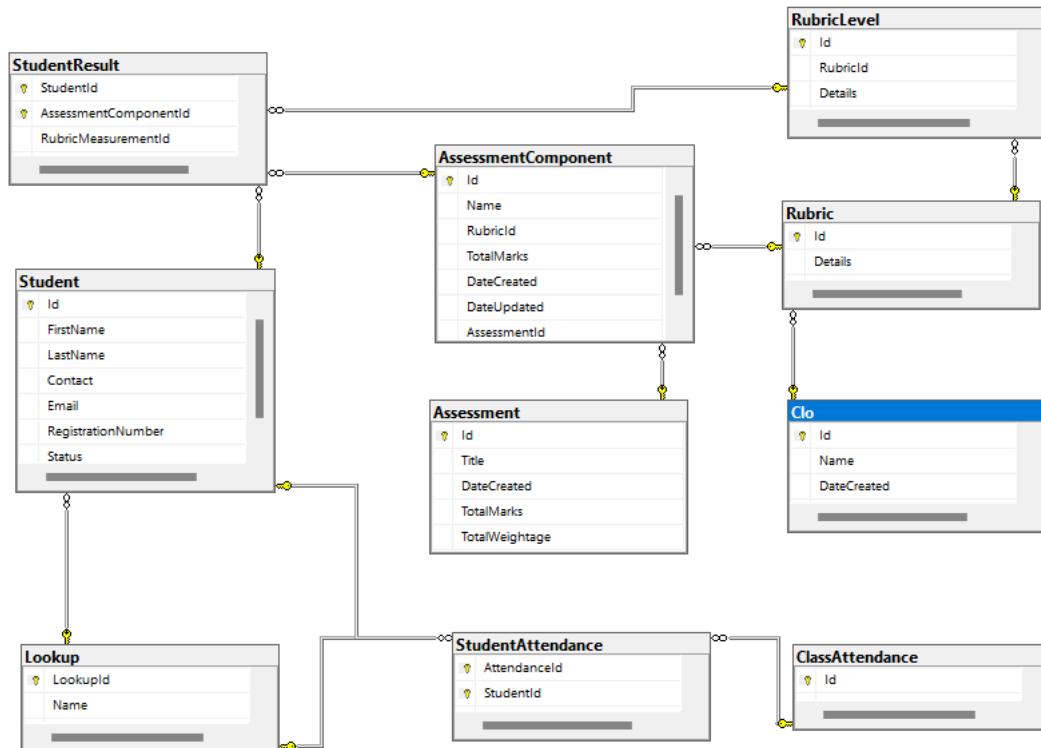


FIGURE 1: Database Diagram

5.1 Lookup

This relation consists of LookupId, Name and category. There are two types of categories i.e. 1)AttendanceStatus(Present=1, Absent=2, Leave=3, Late=4) 2)StudentStatus(Active=5, InActive=6)

5.2 Student

This relation has attributes i.e. Id, FirstName, LastName, Contact, Email, RegistrationNumber and Status. Here Id is a primary key and all values are required except Lastname and Contact.

5.3 StudentAttendance

This relation has three attributes i.e. AttendanceId, StudentId, AttendanceStatus. Attendance status may be present, absent, leave, late. Primary key is AttendanceId, StudentId and we determine other attributes basis on it.

5.4 ClassAttendance

This relation has two attributes i.e. Id, AttendanceDate. Here Id is a primary key and attendance of all student marked on specific date is stored in this relation.

5.5 Clo

This relation has four attributes i.e. Id, Name, DateCreated, DateUpdated. Here Id is a primary key due to which Rubric relation is connected with Clo relation. dateCreated and Dateupdated is dates of creation and updation respectively.

5.6 Rubric

This relation has three attributes i.e. Id, Details, CloId. Here Id is a primary key due to which Rubric relation is connected with RubricLevel and AssessmentComponent.

5.7 RubricLevel

This relation has four attributes i.e. Id, RubricId, Details, MeasurementLevel. Here Id is primary key and Rubric level is connected with Studentresult through it.

5.8 Assessment

This relation has five attributes i.e. Id, Title, Datecreated, TotalMarks, TotalWeightage. Here Assessment is a primary key due to which Assessment relation is connected with AssessmentComponent.

5.9 AssessmentComponent

This relation has seven attributes i.e. Id, Name, RubricId, TotalMarks, DateCreated, DateUpdated, AssessmentId. Here Id is a primary key and AssessmentComponent is connected with StudentResult and Rubric.

5.10 StudentResult

This relation has four attributes i.e. StudentId, AssessmentComponentId, RubricMeasurementId, EvaluationDate. Hence StudentId, AssessmentComponentId becomes primary key.

6 Activity Flow Diagram

6.1 Manage Student

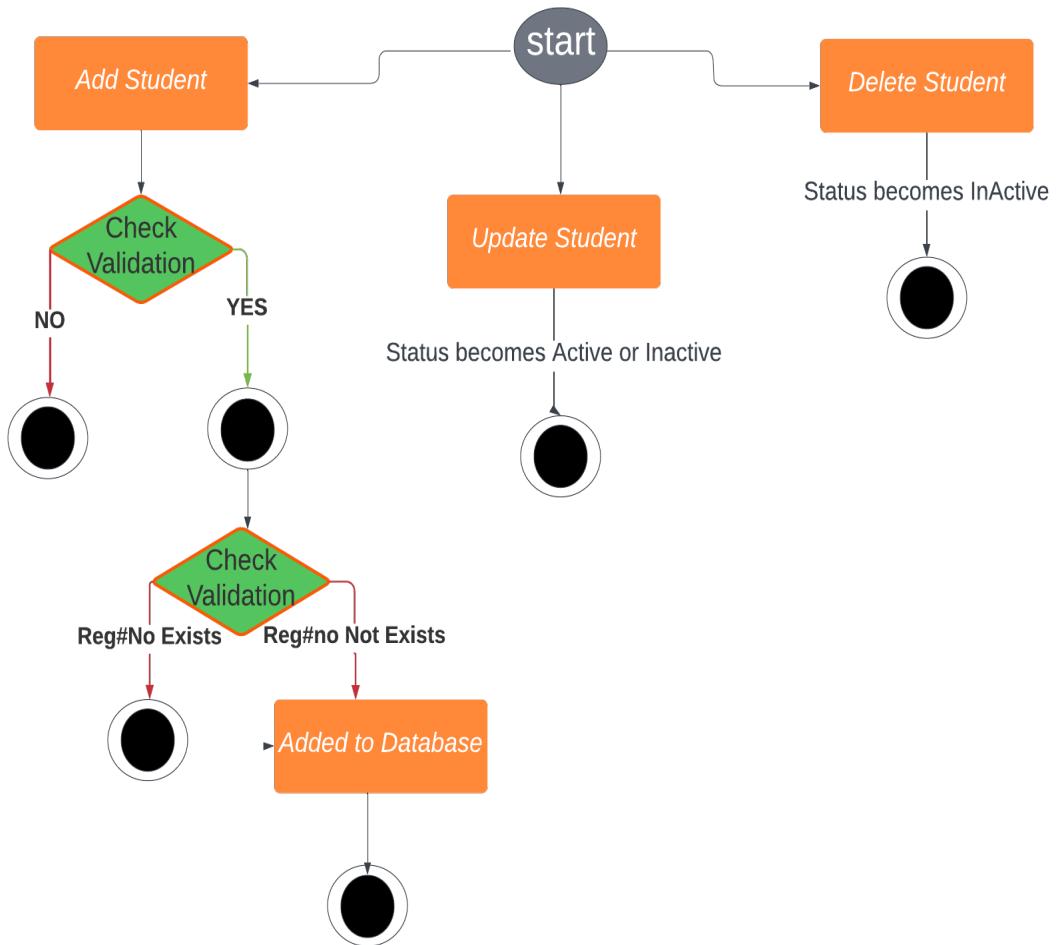


FIGURE 2: Flow diagram of managing students

6.2 Manage Clo

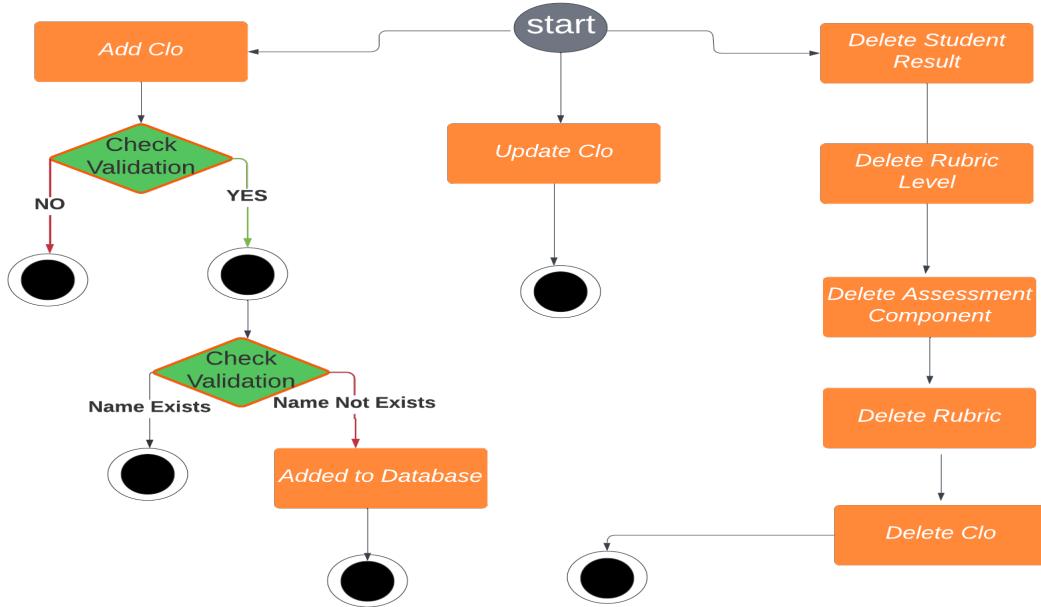


FIGURE 3: Flow diagram of managing clo

6.3 Manage Rubric

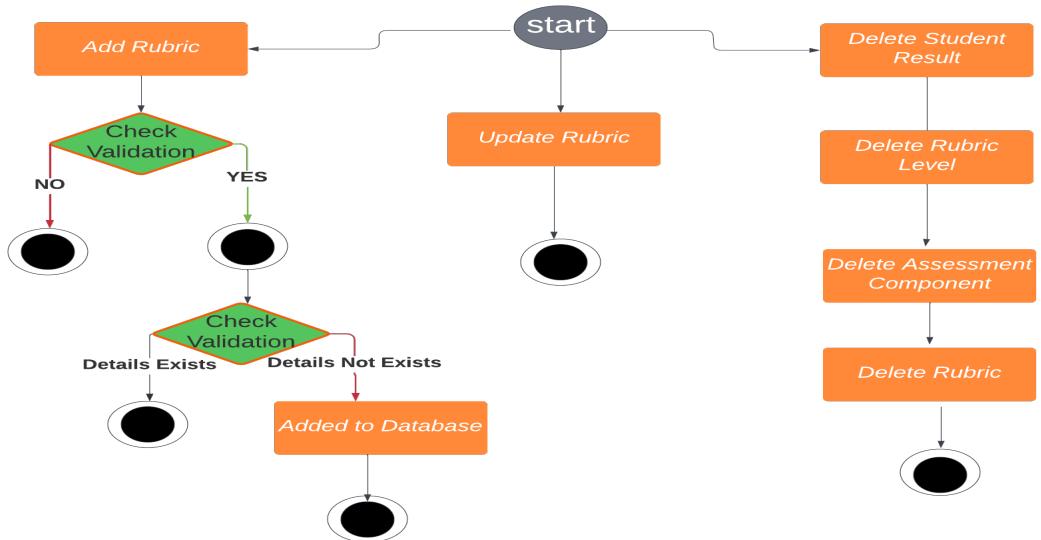


FIGURE 4: Flow diagram of managing rubric

6.4 Manage Rubric Level

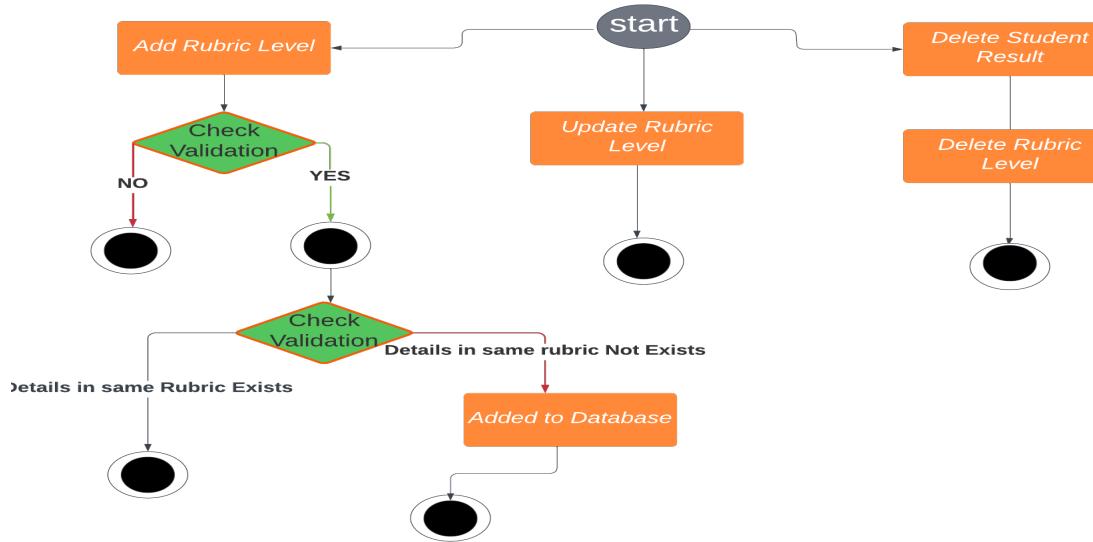


FIGURE 5: Flow diagram of managing rubric levels

6.5 Manage Assessment

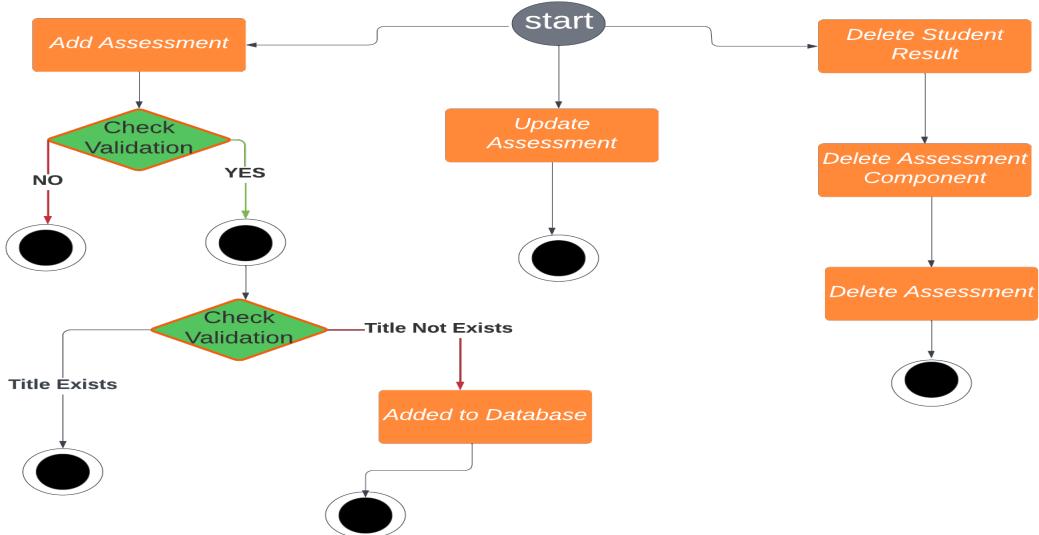


FIGURE 6: Flow diagram of managing Assessments

6.6 Manage Assessment Component

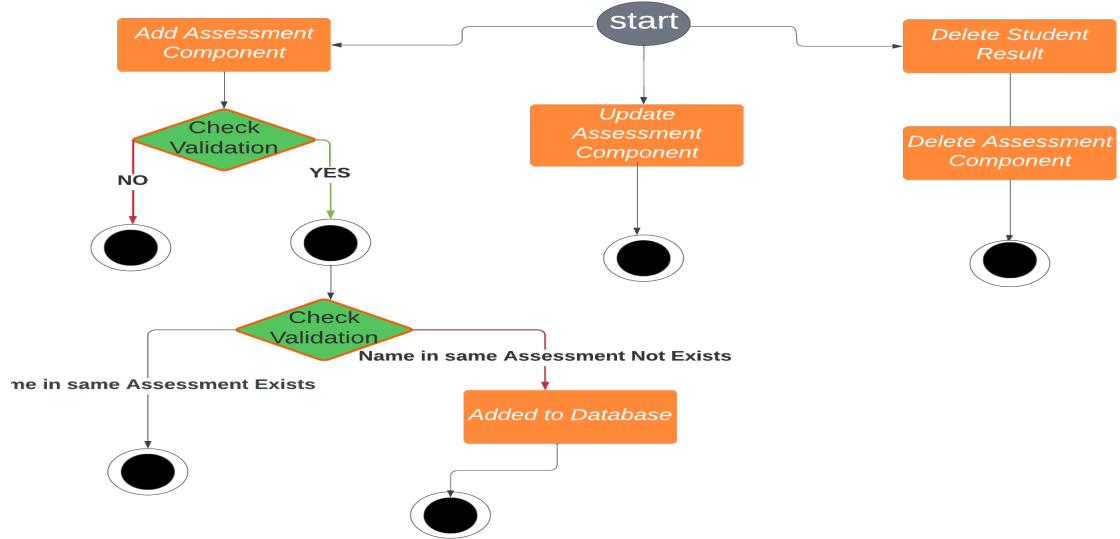


FIGURE 7: Flow diagram of managing Assessment Components

7 UI

7.1 Home Page

The home page represents the summary of the whole project. I have applied 8 figures with labels and this page shows the count of students(active or inactive),clo's, rubrics, rubric levels, assessments, assessment components and reports.

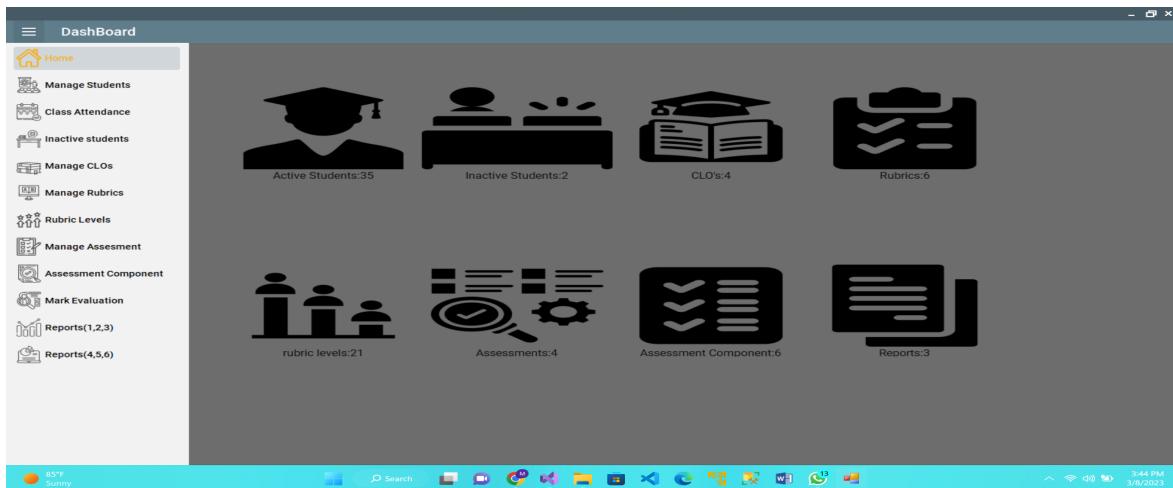


FIGURE 8: Manage/Add,View,Delete(InActive),Update Student

7.2 Manage Student Page

Admin can add, view, delete(inactive) and update students in the student page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. there are two comboboxes, one is used for searching of data and other is used for sorting of student's data.Three(FirstName, RegistrationNumber, Email attributes are required and two attributes(LastName,Contact) can be null.

| FirstName | LastName | Contact | Email | RegistrationNumber |
|------------------|----------|-------------------|-----------------------------|--------------------|
| Syed | Hashir | +92 3079066139 | syedhashir@gmail.com | 2021-CS-01 |
| Shazaib | Rafi | +92 3065454566 | shahzaibrafi@gmail.com | 2021-CS-02 |
| Kabir | Ahmed | +92 3018734675 | kabirahmed@gmail.com | 2021-CS-04 |
| Shazaib | Irfan | +92 3011 461 9252 | shazalbirfan@gmail.com | 2021-CS-07 |
| Muhammad | Nazir | +92 3456787655 | nazirashraf@gmail.com | 2021-CS-08 |
| Usama | Mehboob | +92 3455787655 | usamamehboob@gmail.com | 2021-CS-10 |
| Muhammad | Yahya | +92 3256787654 | muhammadyahaya@gmail.com | 2021-CS-11 |
| Afraz | Butt | +92 3256567655 | afrazbutt@gmail.com | 2021-CS-12 |
| Subhan | Anjum | +92 3056747655 | subhananjum@gmail.com | 2021-CS-13 |
| Fahad | Niazi | +92 3156457655 | fahadniazi@gmail.com | 2021-CS-14 |
| Muhammad Shahbaz | Rafique | +92 3079066139 | shahbazrafique@gmail.com | 2021-CS-16 |
| Muhammad | Uzair | +92 3255657655 | muhammaduzair@gmail.com | 2021-CS-17 |
| Ibrahim | Ali | +252 61 3456765 | ibrahimali@gmail.com | 2021-CS-18 |
| Saad | Munir | +92 3098976564 | saadmunir@gmail.com | 2021-CS-19 |
| Hammad | Younas | +92 3209876567 | hammadyounas@gmail.com | 2021-CS-20 |
| Muhammad | Talha | +92 3109476567 | muhammadtalha@gmail.com | 2021-CS-22 |
| Muhammad | Umar | +92 3149676567 | muhammadumar@gmail.com | 2021-CS-24 |
| Ammad | Irfan | +92 3189876565 | ammadirfan@gmail.com | 2021-CS-25 |
| Yasir | Hassan | +92 3339876534 | yasirhassan@gmail.com | 2021-CS-28 |
| Saleem | Malik | +92 3359856667 | saleemmalik@gmail.com | 2021-CS-32 |
| Hammad | Hassan | +92 3089867543 | hammadhassan@gmail.com | 2021-CS-33 |
| Muhammad | Tahir | +92 3198778654 | muhammadtahir@gmail.com | 2021-CS-34 |
| Subhan | Suleman | +92 3145678524 | shahbazrafique101@gmail.com | 2021-CS-35 |
| Bilal | Baig | +92 3295679256 | bilalbaig@gmail.com | 2021-CS-36 |

FIGURE 9: Manage/Add,View,Delete(InActive),Update Student

7.3 Mark Attendance Page

Attendance page shows the attendance status (present, absent, leave, late) of all students.This page have two grid. One grid shows students name and registration number so that admin can mark attendance of students. I have used four check boxes in grid for marking status of students. Other grid shows the status of all the students. First date is selected from datetimepicker and attendance is viewed in grid.

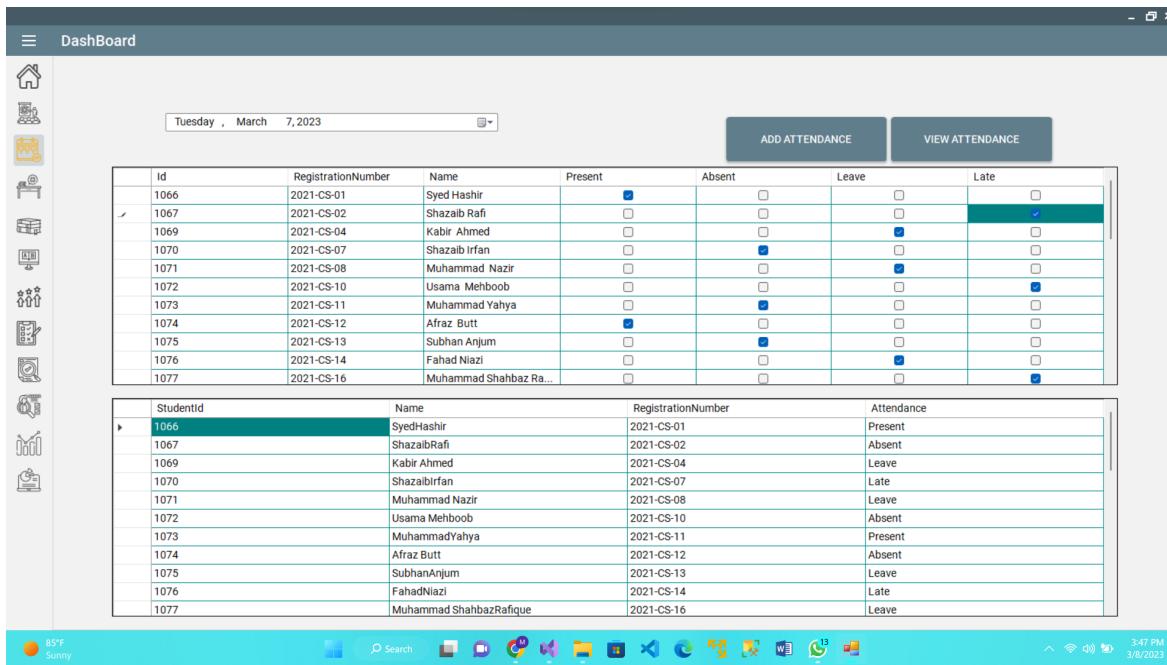


FIGURE 10: Mark, View and update Attendance

7.4 Manage Clo Page

Admin can add, view, delete and update clo's in the student page. There are three buttons for adding, deleting and updating data. When you click the grid, then clo name goes to respective textbox. There are two comboboxes, one is used for searching of data and other is used for sorting of clo's data. All the attributes are required.

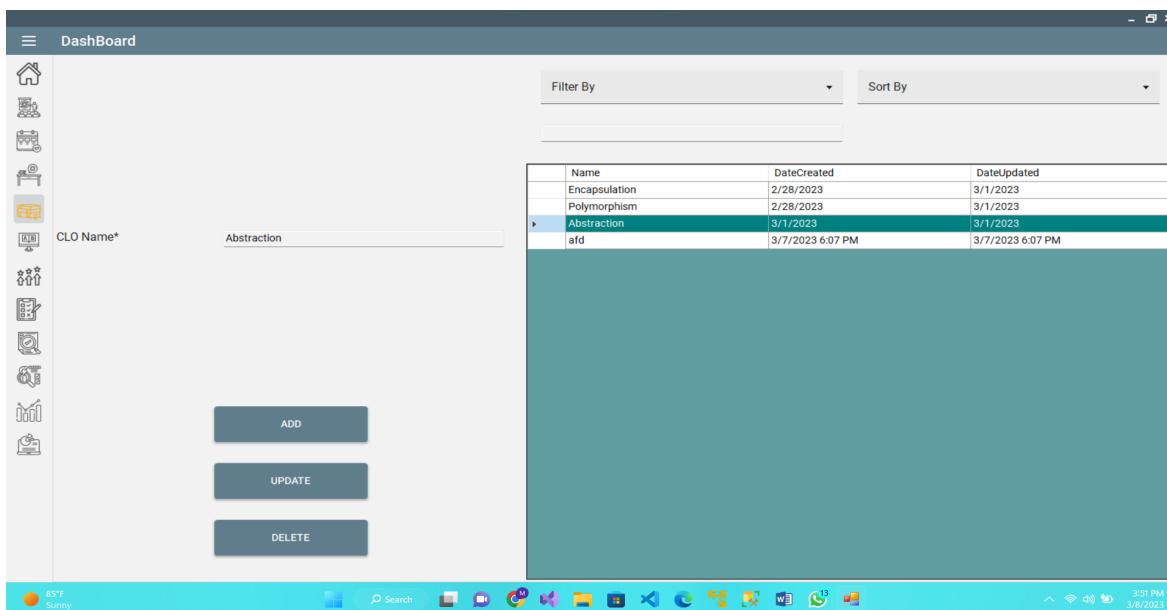


FIGURE 11: Add,View,Delete,Update Clo's

7.5 Manage Rubric Page

Admin can add, view, delete and update rubrics in the rubric page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. There are two comboboxes, one is used for searching of data and other is used for sorting of rubric's data. All the attributes are required.

The screenshot shows a Windows desktop environment with a taskbar at the bottom. The main window is titled 'Dashboard' and contains a sidebar with various icons. On the left, there is a form with fields for 'CLO Id*' (set to 21), 'Details*' (containing 'Rubric 3'), and three buttons: 'ADD', 'UPDATE', and 'DELETE'. On the right, there is a grid table with columns 'Details' and 'CId'. The data in the grid is:

| Details | CId |
|----------|-----|
| Rubric 1 | 20 |
| Rubric 2 | 20 |
| Rubric 3 | 20 |
| Rubric 1 | 21 |
| Rubric 2 | 21 |
| Rubric 3 | 21 |

FIGURE 12: Add,view,Delete,Update Rubrics

7.6 Manage Rubric Level Page

Admin can add, view, delete and update rubric levels in the rubric level page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. There are two comboboxes, one is used for searching of data and other is used for sorting of rubric level's data. All the attributes are required.

The screenshot shows a Windows desktop environment with a taskbar at the bottom. The main window is titled 'Dashboard' and contains a sidebar with various icons. On the left, there is a form with fields for 'Rubric ID*' (set to 2), 'Details*' (containing 'Measurelevel 4 rubric 2'), and 'Measurement Level*' (set to 4). Below these are three buttons: 'ADD', 'UPDATE', and 'DELETE'. On the right, there is a grid table with columns 'RubricId', 'Details', and 'MeasurementLevel'. The data in the grid is:

| RubricId | Details | MeasurementLevel |
|----------|--------------------------|------------------|
| 1 | measurelevel1 | 3 |
| 1 | measurelevel2 | 2 |
| 1 | rubric level4 | 4 |
| 2 | Measurelevel 2 rubric 2 | 2 |
| 2 | Measurelevel 3 rubic 2 | 3 |
| 2 | Measurelevel 4 rubric 2 | 4 |
| 3 | Measurelevel 2 rubric 1 | 3 |
| 3 | Measurelevel 4 rubric 1 | 4 |
| 4 | Measure level 1 Rubric 4 | 1 |
| 4 | Measure level 2 Rubric 4 | 2 |
| 4 | Measure level 3 Rubric 4 | 3 |
| 4 | Measure level 4 Rubric 4 | 4 |
| 5 | Measure level 1 Rubric 4 | 1 |
| 5 | Measure level 2 Rubric 5 | 2 |
| 5 | Measure level 3 Rubric 5 | 3 |
| 5 | Measure level 4 Rubric 5 | 4 |
| 6 | Measure level 1 Rubric 6 | 1 |
| 6 | Measure level 2 Rubric 6 | 2 |
| 6 | Measure level 3 Rubric 6 | 3 |
| 3 | Measurelevel 3 rubric 1 | 3 |

FIGURE 13: Add,view,Delete,Update Rubric Levels

7.7 Manage Assessment page

Admin can add, view and update students in the assessment page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. There are two comboboxes, one is used for searching of data and other is used for sorting of assessment's data. All the attributes are required.

The screenshot shows a Windows desktop environment with a taskbar at the bottom. The main window is titled 'Dashboard' and contains a sidebar with various icons. On the right, there is a table with columns: Title, DateCreated, TotalMarks, and TotalWeightage. The table has five rows with data. Below the table are three buttons: ADD, UPDATE, and DELETE. To the left of the table, there are input fields for 'Title*', 'Total Marks*', and 'Total Weightage*'. The taskbar includes icons for search, file explorer, and other system applications.

| Title | DateCreated | TotalMarks | TotalWeightage |
|-------------|------------------|------------|----------------|
| Mid Project | 3/3/2023 9:01 PM | 30 | 20 |
| Final | 3/4/2023 6:15 PM | 30 | 20 |
| afd | 3/7/2023 6:09 PM | 12 | 23 |
| nmnjhf | 3/7/2023 7:56 PM | 12 | 23 |

FIGURE 14: Add,view,Delete,Update Assessments

7.8 Manage Assessment Component page

Admin can add, view and update students in the assessment components page. There are three buttons for adding, deleting and updating data. When you click the grid, then data of specific row goes to corresponding textboxes. There are two comboboxes, one is used for searching of data and other is used for sorting of assessment component's data. All the attributes are required.

The screenshot shows a Windows desktop environment with a taskbar at the bottom. The main window is titled 'Dashboard' and contains a sidebar with various icons. On the right, there is a table with columns: Name, RubricId, TotalMarks, DateCreated, DateUpdated, and AssessmentId. The table has six rows with data. Below the table are three buttons: ADD, UPDATE, and DELETE. To the left of the table, there are input fields for 'Name*', 'Rubric ID*', 'Assessment ID*', and 'Total Marks*'. The taskbar includes icons for search, file explorer, and other system applications.

| Name | RubricId | TotalMarks | DateCreated | DateUpdated | AssessmentId |
|------------|----------|------------|------------------|------------------|--------------|
| Question 1 | 1 | 5 | 3/3/2023 9:07 PM | 3/3/2023 9:07 PM | 12 |
| Question#2 | 1 | 5 | 3/3/2023 9:08 PM | 3/3/2023 9:08 PM | 12 |
| Question 1 | 3 | 5 | 3/4/2023 6:15 PM | 3/4/2023 6:15 PM | 13 |
| Question1 | 3 | 5 | 3/7/2023 6:30 PM | 3/7/2023 6:30 PM | 14 |
| Question9 | 3 | 5 | 3/7/2023 6:31 PM | 3/7/2023 6:31 PM | 13 |
| Jhk | 6 | 2 | 3/7/2023 7:57 PM | 3/7/2023 7:57 PM | 15 |

FIGURE 15: Add,view,Delete,Update Assessments Components

7.9 InActive Students Page

Admin can make students active in the inactive student page. There is one button for making students active. When you click the grid, then button becomes enabled and you can make students active.

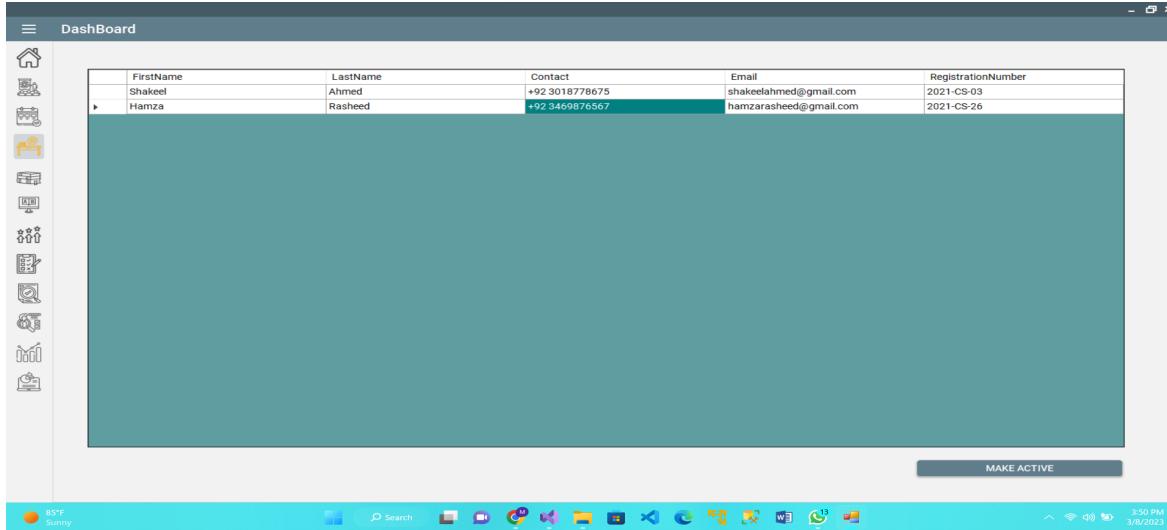


FIGURE 16: Make InActive Students Active

7.10 Evaluation Page

Admin can evaluate active students in the evaluation page. There are two buttons for marking and updating evaluation. there are two grids and two comboboxes. the assessment component's result is shown in grid.

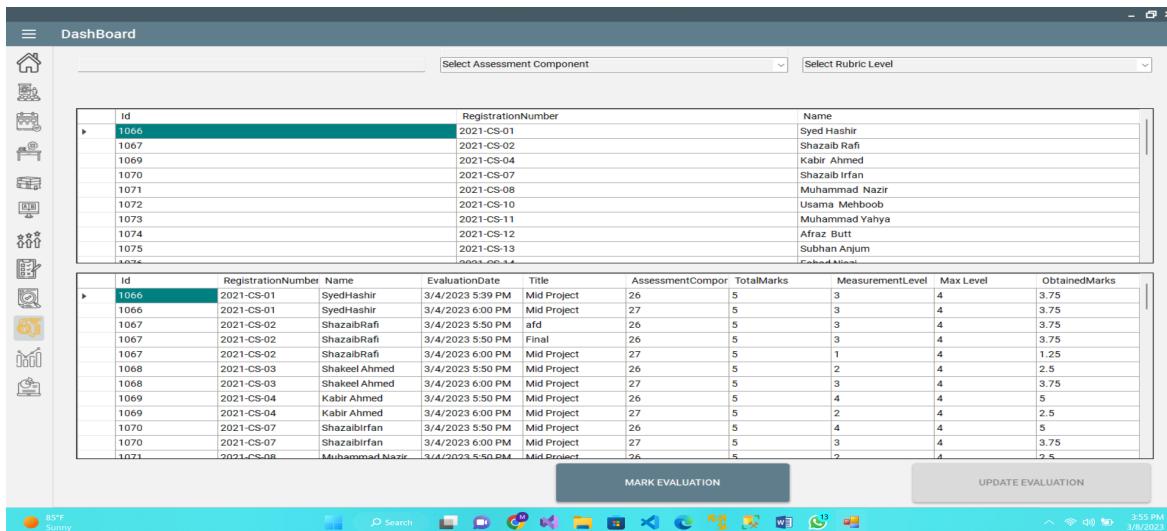


FIGURE 17: Add, Update evaluation of students

7.11 Reports(1,2,3) Page

Admin can download three types of reports in this page that are Assessment wise Report, Clo wise Report and Daily attendance report. I have also used three grids that shows the data of reports side by side by generating reports.

| StudentId | Name | RegistrationNo | Attendance |
|-----------|----------------|----------------|------------|
| 1066 | Syed Hashir | 2021-CS-01 | Present |
| 1067 | Shazabil Rafi | 2021-CS-02 | Leave |
| 1069 | Kabir Ahmed | 2021-CS-04 | Leave |
| 1070 | Shazabil Irfan | 2021-CS-07 | Absent |
| 1071 | Muhammad... | 2021-CS-08 | Leave |
| 1072 | Usama Meh... | 2021-CS-10 | Late |
| 1073 | Muhammad... | 2021-CS-11 | Absent |
| 1074 | Afraz Butt | 2021-CS-12 | Present |
| 1075 | Subhan Anjum | 2021-CS-13 | Absent |
| 1076 | Fahad Niazi | 2021-CS-14 | Leave |
| 1077 | Muhammad... | 2021-CS-16 | Late |
| 1078 | Muhammad... | 2021-CS-17 | Absent |
| 1079 | Ibrahim Ali | 2021-CS-18 | Present |
| 1080 | Saad Munir | 2021-CS-19 | Absent |
| 1081 | Hammad Yo... | 2021-CS-20 | Leave |
| 1082 | Muhammad... | 2021-CS-22 | Late |
| 1083 | Muhammad... | 2021-CS-24 | Leave |
| 1084 | Ammad Irfan | 2021-CS-25 | Absent |
| 1086 | Yasir Hassan | 2021-CS-28 | Present |
| 1087 | Saleem Malik | 2021-CS-32 | Absent |
| 1088 | Hammad Ha... | 2021-CS-33 | Leave |

| RegistrationNo | Name | TotalMarks | ObtainedMarks |
|----------------|---------------|------------|---------------|
| 2021-CS-01 | SyedHashir | 30 | 3.75 |
| 2021-CS-02 | Shazabilrafi | 30 | 1.25 |
| 2021-CS-03 | Shakeel Ah... | 30 | 6.25 |
| 2021-CS-04 | Kabir Ahmed | 30 | 7.5 |
| 2021-CS-07 | Shazalbirfan | 30 | 8.75 |
| 2021-CS-08 | Muhammad... | 30 | 7.5 |
| 2021-CS-10 | Usama Meh... | 30 | 8.75 |
| 2021-CS-11 | Muhammad... | 30 | 3.75 |

| RegistrationNo | Name | TotalMarks | ObtainedMarks |
|----------------|---------------|------------|---------------|
| 2021-CS-01 | Syed Hashir | 10 | 7.5 |
| 2021-CS-02 | Shazabil Rafi | 5 | 1.25 |
| 2021-CS-03 | Shakeel Ah... | 10 | 6.25 |
| 2021-CS-04 | Kabir Ahmed | 10 | 7.5 |
| 2021-CS-07 | Shazal Irfan | 10 | 8.75 |
| 2021-CS-08 | Muhammad... | 10 | 7.5 |
| 2021-CS-10 | Usama Meh... | 10 | 8.75 |
| 2021-CS-11 | Muhammad... | 5 | 3.75 |
| 2021-CS-12 | Afraz Butt | 10 | 5 |
| 2021-CS-13 | Subhan Anjum | 10 | 5 |
| 2021-CS-14 | Fahad Niazi | 10 | 6.25 |
| 2021-CS-16 | Muhammad... | 10 | 6.25 |
| 2021-CS-17 | Muhammad... | 10 | 10 |
| 2021-CS-18 | Ibrahim Ali | 10 | 5 |
| 2021-CS-19 | Saad Munir | 10 | 8.75 |
| 2021-CS-20 | Hammad Yo... | 10 | 6.25 |
| 2021-CS-21 | Abdul Manan | 10 | 8.75 |
| 2021-CS-22 | Muhammad... | 10 | 5 |
| 2021-CS-24 | Muhammad... | 10 | 8.75 |
| 2021-CS-25 | Ammad Irfan | 10 | 6.25 |
| 2021-CS-26 | HamzaRash... | 10 | 6.25 |

Insertion Confirmation

Clo Wise Report saved successfully

OK

DOWNLOAD DAILY ATTENDANCE REPORT DOWNLOAD ASSESSMENT WISE REPORT DOWNLOAD CLO WISE REPORT

85°F Sunny 3:56 PM 3/6/2023

FIGURE 18: Daily Attendance,Assessment wise,Clo Wise Reports

7.12 Reports(4,5,6) Page

Admin can download three types of reports in this page that are Student wise Report, Overall Clo's Report and Monthly attendance report. I have also used three grids that shows the data of reports side by side by generating reports.

| RegistrationNo | Name | TotalClasses | TotalPresent |
|----------------|----------------|--------------|--------------|
| 2021-CS-219 | Abdul Manan | 3 | 1 |
| 2021-CS-44 | Abdul Rehman | 3 | 1 |
| 2021-CS-12 | Afraz Butt | 3 | 2 |
| 2021-CS-37 | Ahsan Imtiaz | 3 | 2 |
| 2021-CS-38 | All Haider | 3 | 1 |
| 2021-CS-25 | Ammad Irfan | 3 | 1 |
| 2021-CS-2000 | Ayesha Ahm... | 3 | 0 |
| 2021-CS-36 | Bilal Baig | 3 | 1 |
| 2021-CS-55 | Bilal Bisharat | 3 | 1 |
| 2021-CS-14 | Fahad Niazi | 3 | 1 |
| 2021-CS-39 | Ghulam Mus... | 3 | 1 |
| 2021-CS-33 | Hammad Ha... | 3 | 1 |
| 2021-CS-20 | Hammad Yo... | 3 | 1 |
| 2021-CS-26 | Hamza Ras... | 3 | 1 |
| 2021-CS-18 | Ibrahim Ali | 3 | 2 |
| 2021-CS-04 | Kabir Ahmed | 3 | 1 |
| 2021-CS-08 | Muhammad... | 3 | 1 |
| 2021-CS-22 | Muhammad... | 3 | 1 |
| 2021-CS-41 | Muhammad... | 3 | 1 |
| 2021-CS-53 | Muhammad... | 3 | 1 |

| RegistrationNo | Title | TotalMarks | ObtainedMarks |
|----------------|-------------|------------|---------------|
| 2021-CS-22 | afd | 12 | 5 |
| 2021-CS-22 | Final | 30 | 10 |
| 2021-CS-22 | Mid Project | 30 | 12.5 |

| CLO Name | Rubric | Assessment | AssessmentM |
|---------------|----------|-------------|-------------|
| Encapsulation | Rubric 1 | Mid Project | 30 |
| Encapsulation | Rubric 3 | afd | 12 |
| Encapsulation | Rubric 3 | Final | 30 |
| Polymorphism | Rubric 3 | nmjchf | 12 |

Insertion Confirmation

Overall Clo Report saved successfully

OK

DOWNLOAD MONTHLY ATTENDANCE REPORT DOWNLOAD STUDENT WISE REPORT DOWNLOAD OVERALL CLO REPORT

85°F Sunny 3:59 PM 3/6/2023

FIGURE 19: Monthly Attendance,Overall Clo's,Student Wise Reports

8 Generated PDF Reports

8.1 Assessment Wise Report

8.1.1 Query

```

WITH NewTable AS
    (SELECT DISTINCT
        S.RegistrationNumber,
        S.FirstName+ ''+S.LastName AS Name,
        A.Title,A.TotalMarks,
        A.TotalWeightage,
        (CONVERT(FLOAT,RL.MeasurementLevel) / MAX(RL.MeasurementLevel)
        OVER() * AC.TotalMarks) AS ObtainedMarks,
        ((CONVERT(FLOAT,RL.MeasurementLevel) / MAX(RL.MeasurementLevel) OVER()
        * AC.TotalMarks)/A.TotalMarks * A.TotalWeightage) AS ObtainedWeightage
    FROM
        Student S
    JOIN StudentResult SR ON S.Id=SR.StudentId
    JOIN RubricLevel RL ON SR.RubricMeasurementId=RL.Id
    JOIN Rubric R ON RL.RubricId=R.Id
    JOIN AssessmentComponent AC ON R.Id=AC.RubricId
    JOIN Assessment A ON AC.AssessmentId=A.Id
    WHERE SR.StudentId = [StudentId] AND AC.Id = [AssessmentComponentId]
    AND A.Title ='" + AssessmentReport_comboBox1.Text+ "'")
    SELECT
        NewTable.RegistrationNumber,
        NewTable.Name, NewTable.TotalMarks,
        SUM(NewTable.ObtainedMarks) AS ObtainedMarks,
        NewTable.TotalWeightage, SUM(NewTable.ObtainedWeightage) AS ObtainedWeightage
    FROM NewTable GROUP BY
        NewTable.RegistrationNumber, NewTable.Name,
        NewTable.TotalMarks, NewTable.TotalWeightage

```

LISTING 1: Calculates the obtained marks and weightage for a specific assessment component of a student

| Mid Project Result | | | |
|----------------------------|----------------|--------------------|-----------------------|
| Registration Number | Name | Total Marks | Obtained Marks |
| 2021-CS-01 | SyedHashir | 30 | 3.75 |
| 2021-CS-02 | ShazaibRafi | 30 | 1.25 |
| 2021-CS-03 | Shakeel Ahmed | 30 | 6.25 |
| 2021-CS-04 | Kabir Ahmed | 30 | 7.5 |
| 2021-CS-07 | ShazaibIrfan | 30 | 8.75 |
| 2021-CS-08 | Muhammad Nazir | 30 | 7.5 |
| 2021-CS-10 | Usama Mehboob | 30 | 8.75 |
| 2021-CS-11 | MuhammadYahya | 30 | 3.75 |
| 2021-CS-12 | Afraz Butt | 30 | 5 |
| 2021-CS-13 | SubhanAnjum | 30 | 2.5 |
| 2021-CS-14 | FahadNiazi | 30 | 6.25 |
| 2021-CS-16 | Muhammad | 30 | 6.25 |
| 2021-CS-17 | MuhammadUzair | 30 | 5 |

FIGURE 20: Assessment Wise Reports

8.2 CLO Wise Report

8.2.1 Query

```

WITH NewTable AS
(
    SELECT S.RegistrationNumber,
    S.FirstName + ' ' + S.LastName AS Name,
    Clo.Name AS [CLO Name], Clo.Id, A.Title,
    AC.Name AS [Assessment Component Name],
    AC.TotalMarks AS TotalMarks, A.TotalWeightage,
    (convert(float, RL.MeasurementLevel) / MAX(RL.MeasurementLevel)
    OVER() * AC.TotalMarks) AS ObtainedMarks,
    ((convert(float, RL.MeasurementLevel) / MAX(RL.MeasurementLevel)
    OVER() * AC.TotalMarks) / A.TotalMarks * A.TotalWeightage) AS ObtainedWeightage
)
FROM
Student S
JOIN StudentResult SR ON S.Id=SR.StudentId
INNER JOIN RubricLevel RL ON SR.RubricMeasurementId=RL.Id
INNER JOIN Rubric R ON RL.RubricId=R.Id
INNER JOIN Clo ON R.CloId=Clo.id
INNER JOIN AssessmentComponent AC ON R.Id=AC.RubricId
INNER JOIN Assessment A ON AC.AssessmentId=A.Id
WHERE SR.StudentId = [StudentId] AND AC.Id = [AssessmentComponentId]
SELECT
NewTable.RegistrationNumber,
NewTable.Name, sum(NewTable.TotalMarks) AS TotalMarks,
Sum( NewTable.ObtainedMarks) AS ObtainedMarks
FROM NewTable where NewTable.Id=' " + CLO_report_comboBox2.Text + "'"
GROUP BY
NewTable.RegistrationNumber, NewTable.Name, NewTable.Title

```

LISTING 2: Filters the results based on a specific CLO ID.

| Encapsulation | | | |
|----------------------------|----------------|--------------------|-----------------------|
| Registration Number | Name | Total Marks | Obtained Marks |
| 2021-CS-01 | Syed Hashir | 10 | 7.5 |
| 2021-CS-02 | Shazaib Rafi | 5 | 1.25 |
| 2021-CS-03 | Shakeel Ahmed | 10 | 6.25 |
| 2021-CS-04 | Kabir Ahmed | 10 | 7.5 |
| 2021-CS-07 | Shazaib Irfan | 10 | 8.75 |
| 2021-CS-08 | Muhammad Nazir | 10 | 7.5 |
| 2021-CS-10 | Usama Mehbob | 10 | 8.75 |
| 2021-CS-11 | Muhammad | 5 | 3.75 |
| 2021-CS-12 | Afraz Butt | 10 | 5 |
| 2021-CS-13 | Subhan Anjum | 10 | 5 |
| 2021-CS-14 | Fahad Niazi | 10 | 6.25 |

FIGURE 21: CLO Wise Reports

8.3 Monthly Attendance Report

8.3.1 Query

```

"SELECT "
+"S.RegistrationNumber ,"
+"S.FirstName + ' ' +S.LastName As Name,"
+"COUNT(CA.Id) AS TotalClasses, "
+"COUNT(CASE SA.AttendanceStatus WHEN 1 THEN SA.AttendanceId END)
AS TotalPresent,"
+"COUNT(CASE SA.AttendanceStatus WHEN 2 THEN SA.AttendanceId END)
AS TotalAbsent,"
+"COUNT(CASE SA.AttendanceStatus WHEN 3 THEN SA.AttendanceId END)
AS TotalLeave,"
+"COUNT(CASE SA.AttendanceStatus WHEN 4 THEN SA.AttendanceId END)
AS TotalLate,"
+"CONVERT(DECIMAL(5,2), (COUNT(CASE SA.AttendanceStatus
WHEN 1 THEN SA.AttendanceId END) * 100.0) / COUNT(CA.Id))
AS AveragePresentRate"
+"FROM"
+"Student S"
+"LEFT JOIN ClassAttendance CA
ON MONTH(CA.AttendanceDate) = "+ MonthlyReport_dateTimePicker1.Value.ToString("MM")
+"LEFT JOIN StudentAttendance SA
ON CA.Id = SA.AttendanceId AND S.Id = SA.StudentId "
+"GROUP BY " + "S.RegistrationNumber,"+ "S.FirstName+' ' +S.LastName"

```

LISTING 3: Shows the monthly presence,absence,leave,late percentage of attendance

| Overall Attendance Report | | | | | | | |
|---------------------------|----------------|---------|---------|--------|-------|------|-----------------|
| Reg No | Name | Classes | Present | Absent | Leave | Late | AveragePresence |
| 2021-CS-219 | Abdul Manan | 3 | 1 | 1 | 0 | 0 | 33.33 |
| 2021-CS-44 | Abdul Rehman | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-12 | Afraz Butt | 3 | 2 | 0 | 0 | 0 | 66.67 |
| 2021-CS-37 | Ahsan Imtiaz | 3 | 2 | 0 | 0 | 0 | 66.67 |
| 2021-CS-38 | Ali Haider | 3 | 1 | 1 | 0 | 0 | 33.33 |
| 2021-CS-25 | Ammad Irfan | 3 | 1 | 1 | 0 | 0 | 33.33 |
| 2021-CS-2000 | Ayesha Ahmed | 3 | 0 | 0 | 0 | 1 | 0.00 |
| 2021-CS-36 | Bilal Baig | 3 | 1 | 1 | 0 | 0 | 33.33 |
| 2021-CS-55 | Bilal Bisharat | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-14 | Fahad Niazi | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-39 | Ghulam Mustafa | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-33 | Hammad Hassan | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-20 | Hammad Younas | 3 | 1 | 0 | 1 | 0 | 33.33 |
| 2021-CS-26 | Hamza Rasheed | 3 | 1 | 0 | 0 | 0 | 33.33 |

FIGURE 22: Monthly Attendance Reports

8.4 Daily Attendance Report

8.4.1 Query

```

SELECT
SA.StudentId,
S.FirstName + ' ' + S.LastName AS Name,
S.RegistrationNumber,
(SELECT Name FROM LookUp WHERE LookupId=SA.AttendanceStatus)
AS Attendance
FROM
Student S
JOIN StudentAttendance SA On S.Id=SA.StudentId
JOIN ClassAttendance on SA.AttendanceId=ClassAttendance.Id
WHERE ClassAttendance.AttendanceDate=@Date

```

LISTING 4: Shows the attendance status of all students on specific date

| Friday, March 3, 2023 Attendance Report | | | |
|--|----------------|----------------------------|-------------------|
| Student Id | Name | Registration Number | Attendance |
| 1035 | Shahzaib Rafi | 2021-CS-02 | Present |
| 1043 | Subhan Anjum | 2021-CS-13 | Leave |
| 1046 | Muhammad Uzair | 2021-CS-17 | Absent |
| 1047 | Saad Munir | 2021-CS-19 | Leave |

FIGURE 23: Daily Attendance Reports

8.5 Student Wise Report

8.5.1 Query

```

WITH NewTable AS
(SELECT S.RegistrationNumber,A.Title,A.TotalMarks, A.TotalWeightage,
(CONVERT(FLOAT, RL.MeasurementLevel) / MAX(RL.MeasurementLevel)
OVER() * AC.TotalMarks) AS ObtainedMarks,
Round(((CONVERT(FLOAT, RL.MeasurementLevel) / MAX(RL.MeasurementLevel) OVER()
* AC.TotalMarks) / A.TotalMarks * A.TotalWeightage),3) AS ObtainedWeightage
FROM
Student S
JOIN StudentResult SR ON S.Id = SR.StudentId

```

```

JOIN RubricLevel RL ON SR.RubricMeasurementId = RL.Id
JOIN Rubric R ON RL.RubricId = R.Id
JOIN AssessmentComponent AC ON R.Id = AC.RubricId
JOIN Assessment A ON AC.AssessmentId = A.Id
WHERE
S.RegistrationNumber ='"' + StudentWiseReport_comboBox1.Text + '"')
SELECT
NewTable.RegistrationNumber, NewTable.Title, NewTable.TotalMarks,
SUM(NewTable.ObtainedMarks) AS ObtainedMarks, NewTable.TotalWeightage,
SUM(NewTable.ObtainedWeightage) AS ObtainedWeightage
FROM
NewTable
GROUP BY
NewTable.RegistrationNumber, NewTable.TotalMarks,
NewTable.TotalWeightage, NewTable.Title

```

LISTING 5: Shows the performance of specific student in all assessments

| 2021-CS-22 Report | | | | | | |
|-------------------|-------------|-------|-----------|----------|--------------|--|
| RegNo | A-Title | Marks | weightage | ObtMarks | ObtWeightage | |
| 2021-CS-22 | afd | 12 | 23 | 5 | 9.583 | |
| 2021-CS-22 | Final | 30 | 20 | 10 | 6.666 | |
| 2021-CS-22 | Mid Project | 30 | 20 | 12.5 | 8.334 | |

FIGURE 24: Student Wise Reports

8.6 Overall CLO Report

8.6.1 Query

```

SELECT DISTINCT
C.Name As [CLO Name], R.Details As Rubric, A.Title AS Assessment,
A.TotalMarks As AssessmentMarks, COUNT(DISTINCT SR.StudentId)
AS [Student Attempted], COUNT(distinct AC.Id) AS CountofAssessmentComponent
FROM
Assessment A
JOIN AssessmentComponent AC ON A.Id = AC.AssessmentId
JOIN Rubric R ON AC.RubricId = R.Id
JOIN CLO C ON R.CloId = C.Id
LEFT JOIN StudentResult SR ON AC.Id = SR.AssessmentComponentId

```

```
GROUP BY A.Id, A.Title, A.DateCreated, A.TotalMarks, R.Details, C.Name;
```

LISTING 6: Shows the overall information of CLO's

| Overall CLO Report | | | | | | |
|--------------------|----------|-------------|-------|------------------|-------------|--|
| CLO | Rubric | Assessment | Marks | AttemptedStudent | AComponents | |
| Encapsulation | Rubric 1 | Mid Project | 30 | 35 | 2 | |
| Encapsulation | Rubric 3 | afd | 12 | 0 | 1 | |
| Encapsulation | Rubric 3 | Final | 30 | 3 | 2 | |
| Polymorphism | Rubric 3 | nmjkhf | 12 | 1 | 1 | |

FIGURE 25: Overall Clo Report

9 Testing

I have applied three testing phases for finding the errors in project.

9.1 Testing Phase 1

Problem: I have to face problems during the deletion of Clo, rubric,rubric levels, assessment because I have to face the error due to foreign key.

Solution: This error is resolved by deleting that components on which major component depends.

For Clo Deletion

First Delete StudentResult-> AssessmentComponent->RubricLevel->Rubric->Clo

For Rubric Deletion

First Delete StudentResult-> AssessmentComponent->RubricLevel->Rubric

For Rubric Level Deletion

First Delete StudentResult->RubricLevel

For Assessment Component Deletion

First Delete StudentResult->AssessmentComponent

9.2 Testing Phase 2

Problem: I have to face problems that duplicate data is adding in database.

Solution: This is resolved by writing an sql query that find the count of data. If count of existing data is zero then data can be added otherwise, it cannot be added.

9.3 Testing Phase 3

Problem: I have rechecked the complete project once again and find error in searching of assessment.

Solution: I have called the wrong event, when i change the event, error is resolved.

9.4 Testing Phase 4

Problem: In fourth phase I added the correct data in the project database and solved some small problems.

Solution: I have resolved the issue of spacing, report generating and many more.

10 Limitations

Following are the limitations of learning management system:

1. This application is for single user and has not signUp, SignIn functionality.
2. At this form the the application accepts only those phone numbers that are affiliated with Pakistan.
3. I have generated monthly attendance report tat shows the count but it is not up to the mark.
4. The concepts of Object Oriented programming is not used.

11 Future Work

The future work that can be done on this system are given below:

1. I will make signIn, signUp application in future so that the application can be used for many users.
2. I will change that the system accepts all formats of contact number no matter that the phone number is belongs to which country.
3. I will apply all the Object Oriented Programming Features.
4. I will make attendance report in such a way that we can see the status of students in a proper manner.

12 Collaboration

The project is successfully completed by discussing it with my session fellows and our supervisor, Mr. Nauman Babar. He helped us understand the case study and explained the database schema and relationships between different database tables. He also provided us with a database diagram to give us

a better understanding of the schema. Our main objective was to understand the schema well enough to understand the connections between the different tables. We were able to discuss any problems we had with the supervisor and he helped us to complete the project.

13 Conclusion

In conclusion, this project aims to address the difficulties faced by instructors in assessing student performance manually. The proposed solution involves the development of a desktop application that performs CRUD operations on a database schema. By automating the process of student assessment, the system aims to replace human labor and increase efficiency. Additionally, the system generates PDF reports that provide useful information to the instructors. Overall, this project highlights the benefits of databases in real-world problems by managing large amounts of data efficiently and securely.