



Grade Management System

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I. Introduction

A. Problem Statement

EKU's Registrar Office needs to update student course records after receiving student grades from the faculty at the end of each semester. Each faculty member provides the office with an Excel file that contains letter grades (A, B, C, D, or F) of the students who took course(s) with them. The office is asking you to develop a system to manage the data for them.

B. Proposal

We propose a software system that will allow Faculty and Staff to maintain student grades.

II. System Description

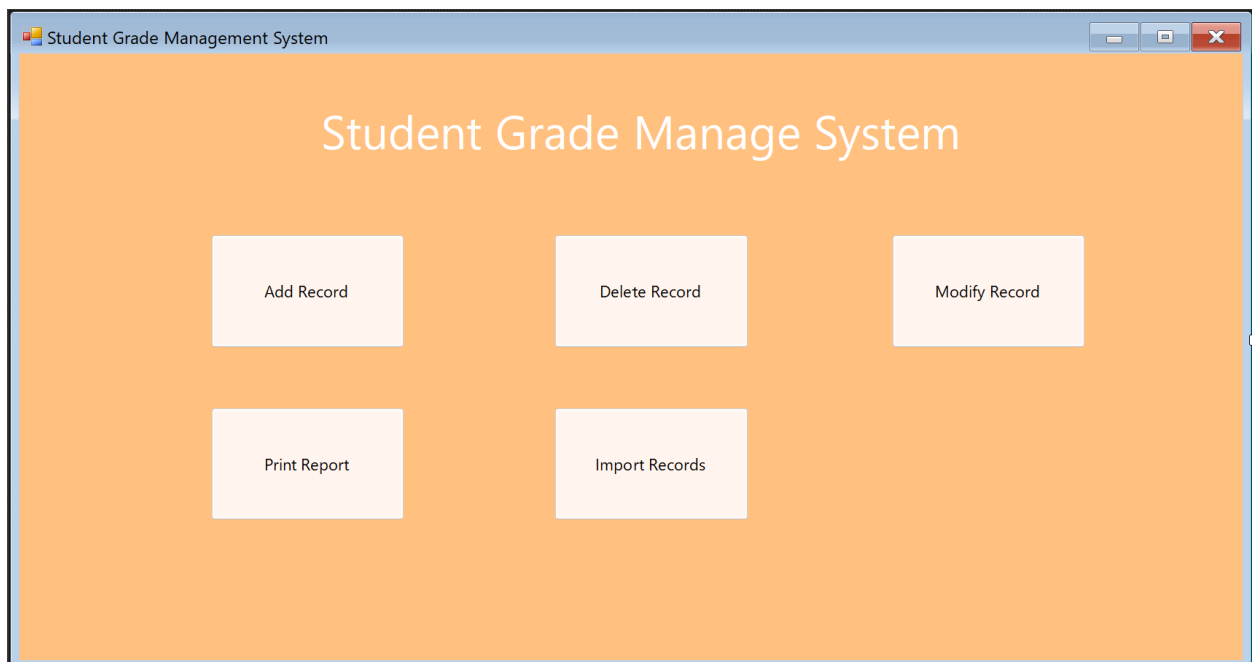
An interactive system designed to allow the Registrar Office to keep track of students' grades by importing, adding, editing, deleting, and printing the grades of any student.

III. System Requirements

A. Functional Requirements

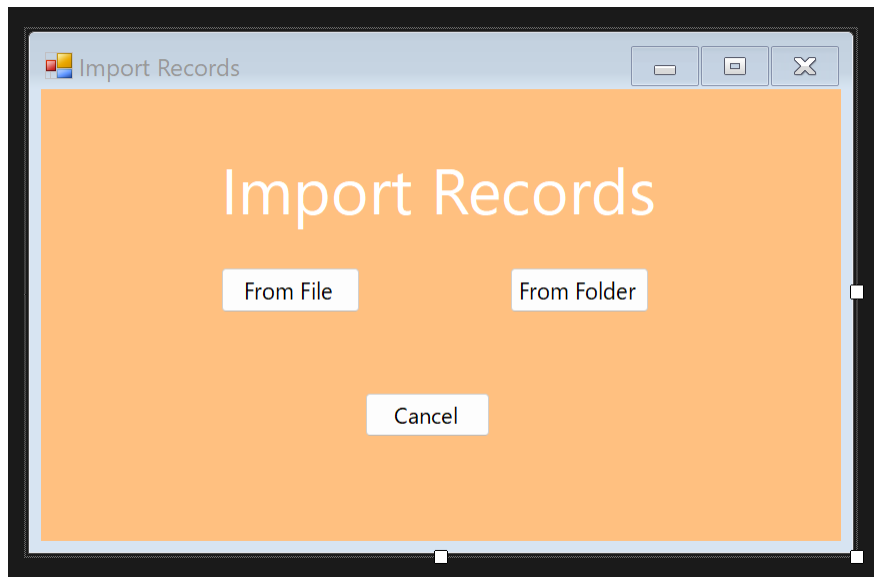
R1. The system shall allow the user to import a folder of Excel files and add all grades presented in the files to the database.

R1.1. The system shall display the Main Menu.



R1.2. The user shall press the "Import Records" button.

R1.3. The system shall display an Import Records form.



R1.4. The user shall choose to either import a file or import an entire folder by pressing the corresponding button.

R1.5. The systems shall validate that the file/folder is in the correct format.

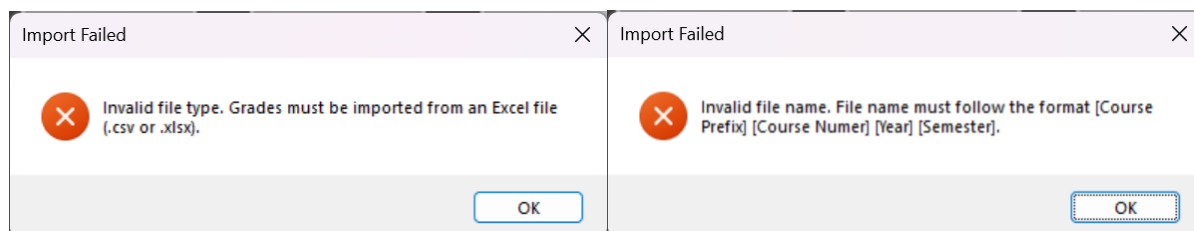
R1.5.1. The system shall ensure that the course prefix is exactly three characters long.

R1.5.2. The system shall ensure that the number is exactly three characters long.

R1.5.3. The system shall ensure that the year is exactly four characters long.

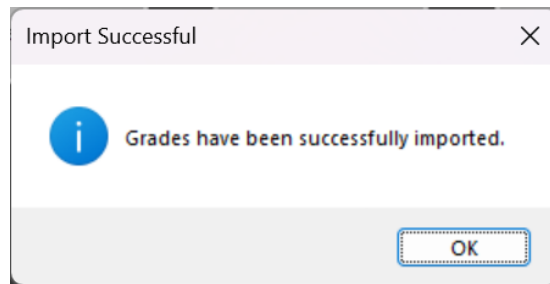
R1.5.4. The system shall ensure that the semester is a string.

R1.6. If any data is invalid, the system shall display an error message.



R1.7. The system shall parse the data from the file and add records to the database accordingly.

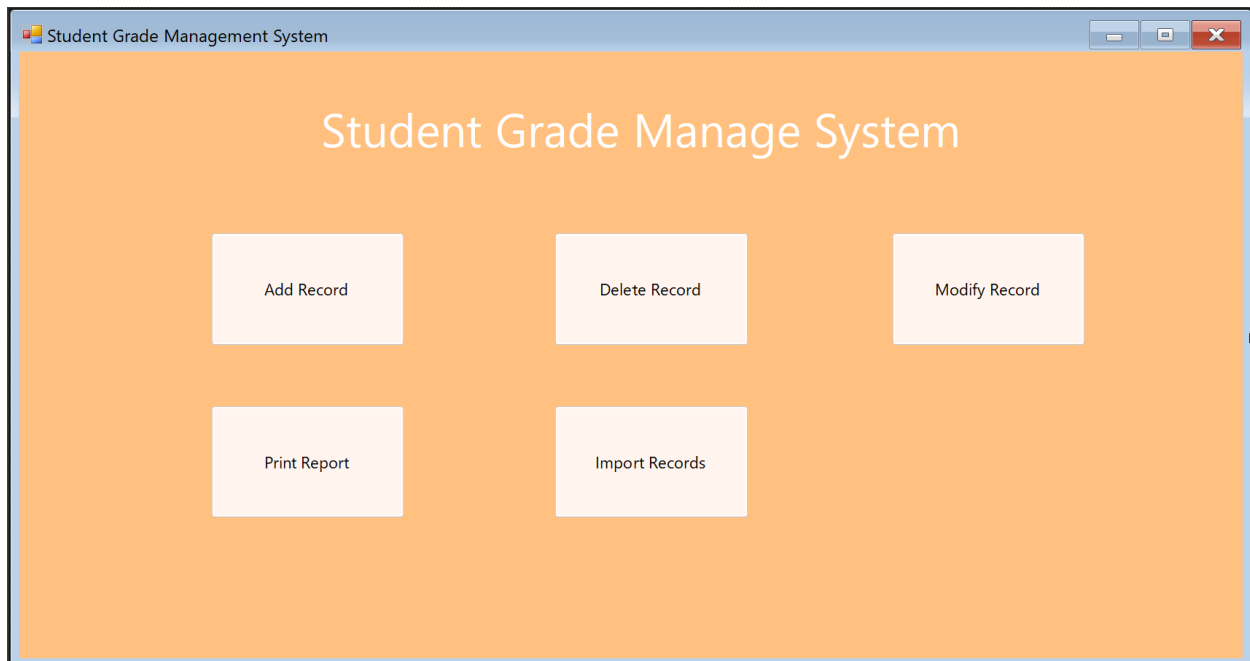
R1.8. The system shall display a confirmation message.



R1.9. The system shall display the Main Menu.

R2. The system shall allow the user to add a Student Grade Record to the database.

R2.1. The system shall display the Main Menu.



R2.2. The user shall press the “Add Record” button

R2.3. The system shall display an Add Record form.

The 'Add Record' dialog box has a light blue title bar with the text 'Add Record' and standard window controls. The main area has an orange background. It contains six input fields arranged in two columns: 'Student ID', 'Grade', 'Course Prefix', 'Year', 'Course Number', and 'Semester'. At the bottom, there are two buttons: 'Submit' and 'Cancel'.

R2.4. The user shall complete the form.

R2.4.1. The user shall enter the information of the grade they wish to add.

R2.4.1.1. The user shall enter the Student ID.

R2.4.1.2. The user shall enter the Course Prefix.

R2.4.1.3. The user shall enter the Course Number.

R2.4.1.4. The user shall enter the Grade.

R2.4.1.5. The user shall enter the Year.

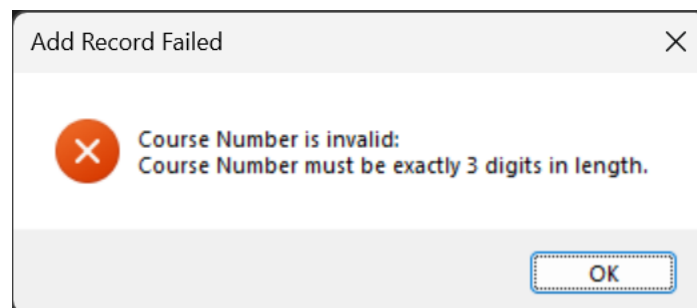
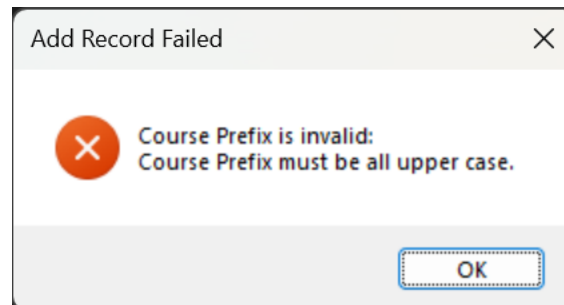
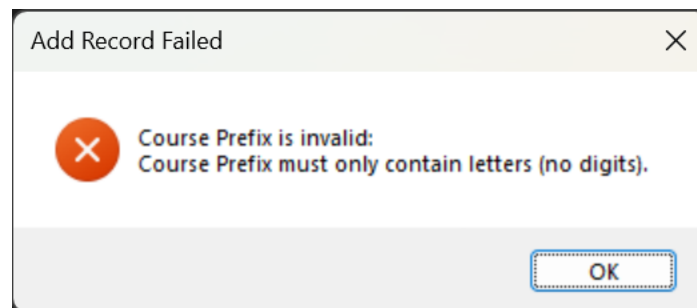
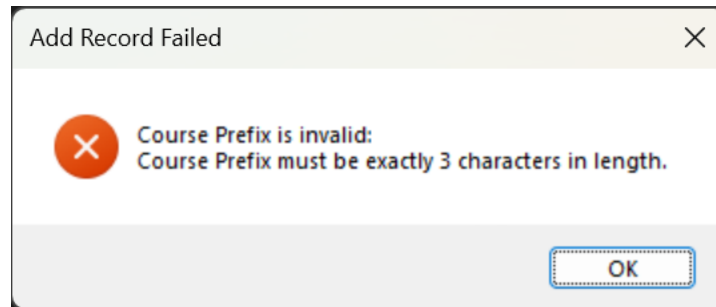
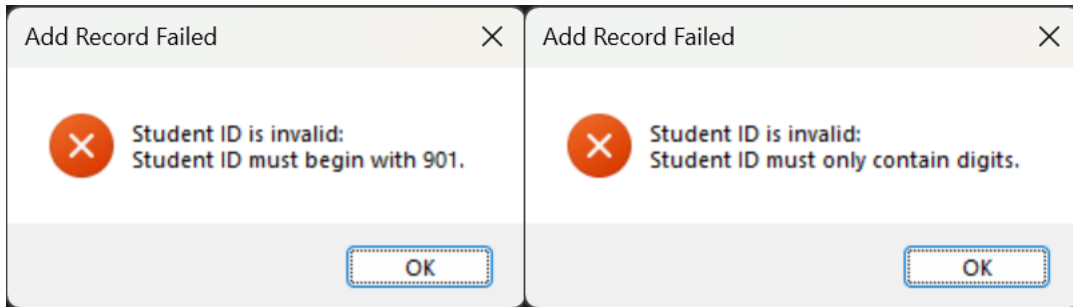
R2.4.1.6. The user shall enter the Semester.

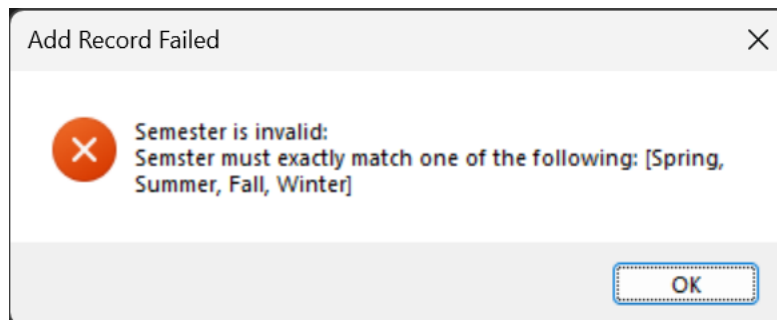
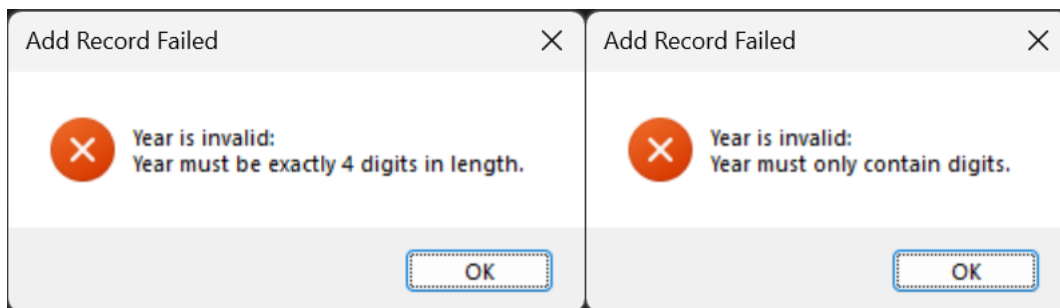
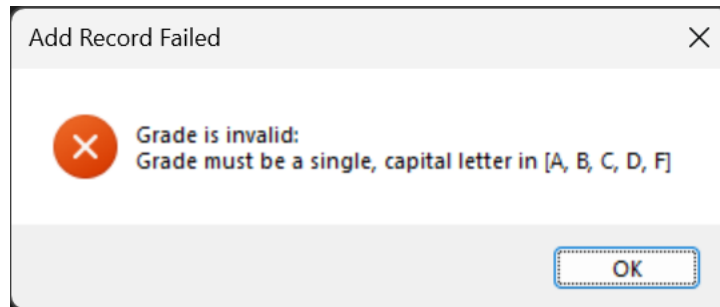
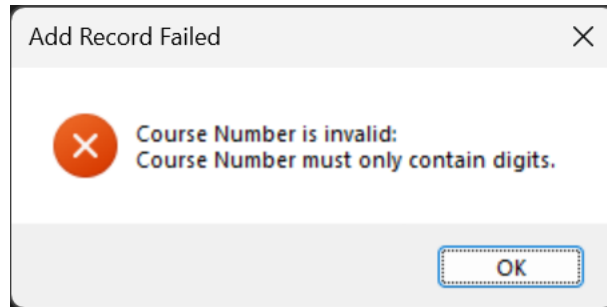
R2.4.2. The user shall press the “Submit” button

R2.4.3. The system shall validate that the form is complete.

R2.4.3.1. If any data is missing, the system shall display a message to the user and repeat Step 2.4

Two error message dialog boxes are shown side-by-side. Both have a title bar that says 'Add Record Failed' and a close button. The left dialog has a red circle with a white 'X' icon and the text 'One or more fields were left empty.' The right dialog has a red circle with a white 'X' icon and the text 'Student ID is invalid: Student ID must be exactly 9 digits in length.' Both dialogs have an 'OK' button at the bottom.



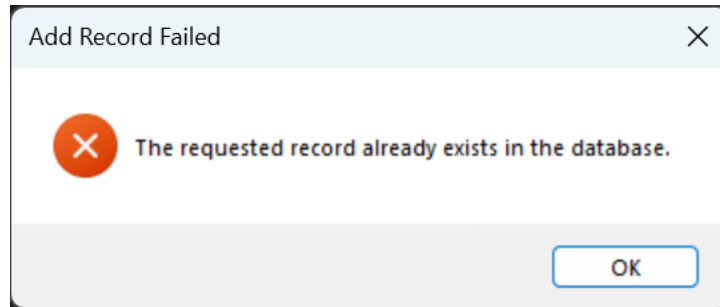


R2.4.3.2. If all data is valid, the system shall continue.

R2.5. The system shall verify if the record is already in the database.

R2.5.1. The system shall attempt to retrieve a record with the given data, excluding the "Grade".

R2.5.1.1. If a record is retrieved, the system shall display an error message to the user and cancel the add grade.

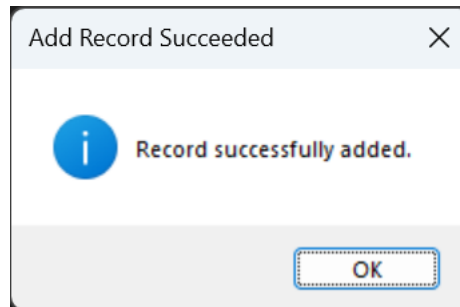


R2.5.2. If no record is retrieved, the system shall continue.

R2.6. The system shall add a new record to the database.

R2.7. The system shall recalculate the overall GPA for the student.

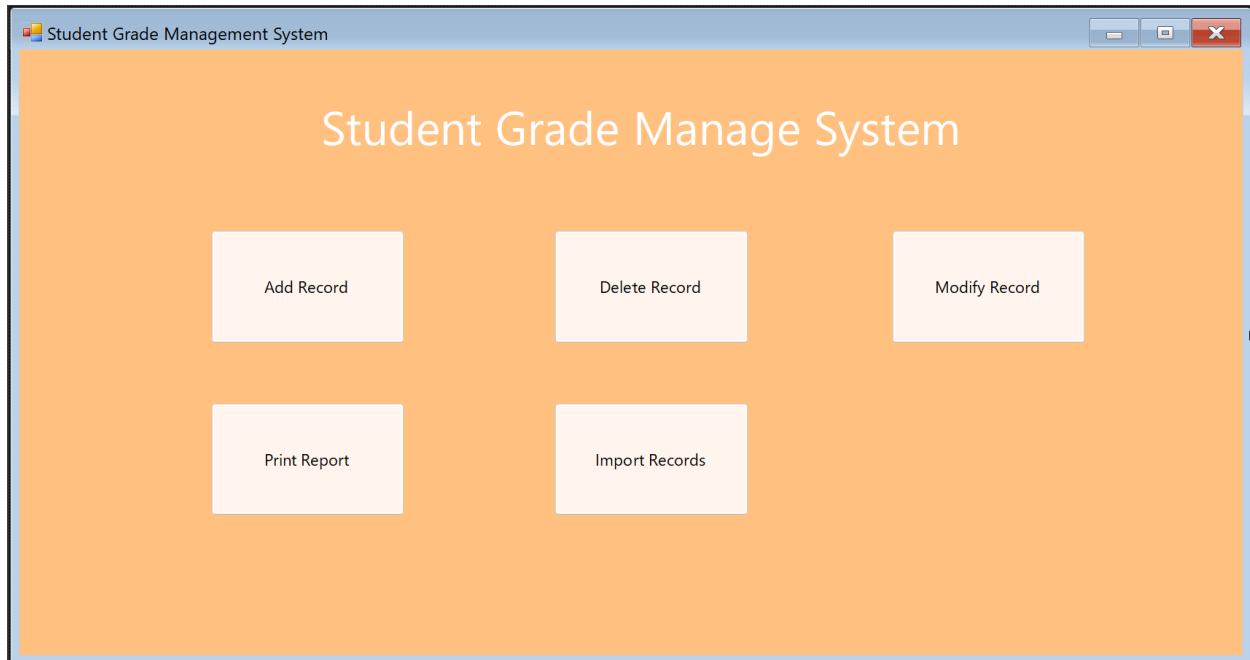
R2.8. The system shall display a confirmation message.



R2.9. The system shall display the Main Menu.

R3. The system shall allow the user to delete a grade from the database.

R3.1. The system shall display the Main Menu.



R3.2. The user shall press the “Delete Record” button.

R3.3. The system shall display a Delete Record form.

A screenshot of a software application window titled "Delete Record". The window has a grey title bar with standard Windows window controls (minimize, maximize, close). The main content area has an orange background. The form contains six input fields arranged in two columns. The left column has three labels: "Student ID", "Course Prefix", and "Course Number". The right column has three labels: "Grade", "Year", and "Semester". Each label is followed by a white rectangular input field. At the bottom center of the form, there are two buttons: "Submit" and "Cancel".

R3.4. The user shall complete the form.

R3.4.1. The user shall enter the information of the record they wish to delete.

R3.4.1.1. The user shall input the Student ID.

R3.4.1.2. The user shall input the Course Prefix.

R3.4.1.3. The user shall input the Course Number.

R3.4.1.4. The user shall input the Grade.

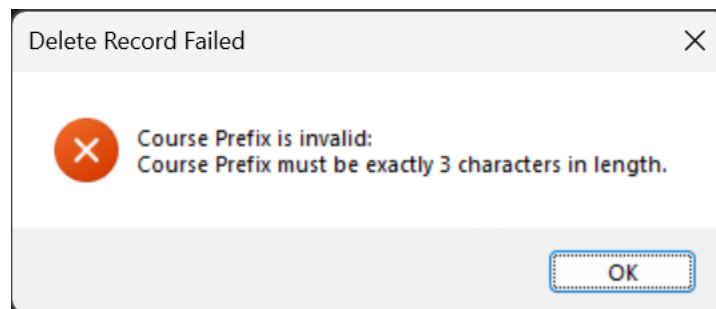
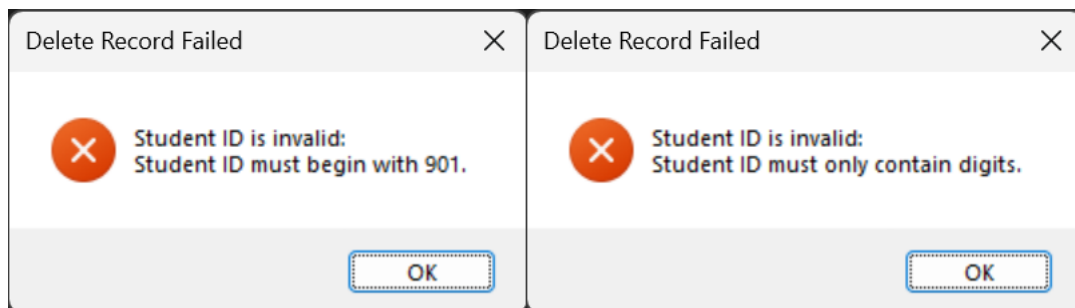
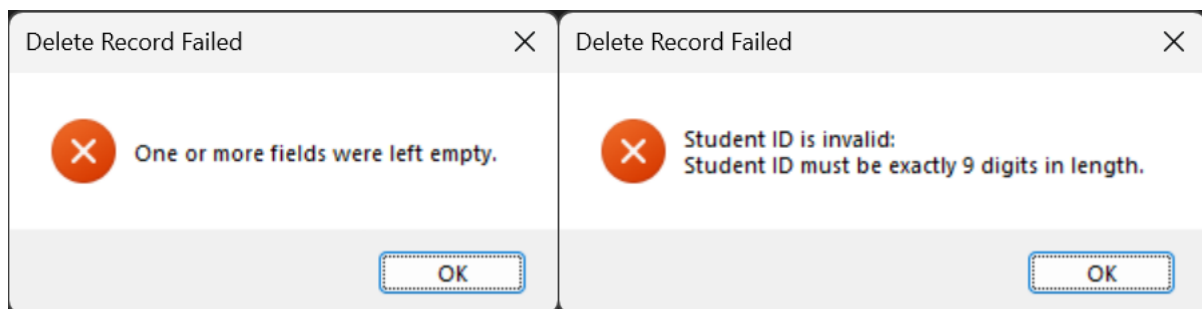
R3.4.1.5. The user shall input the Year.

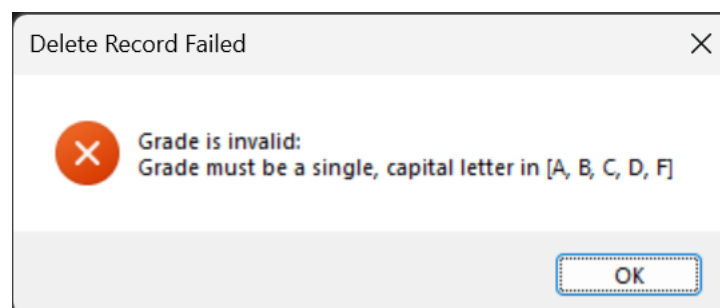
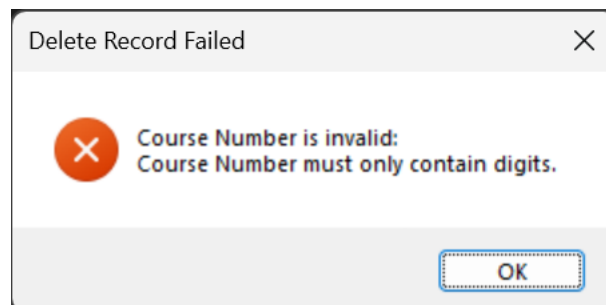
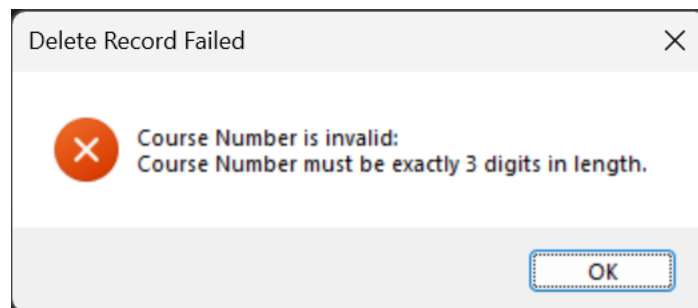
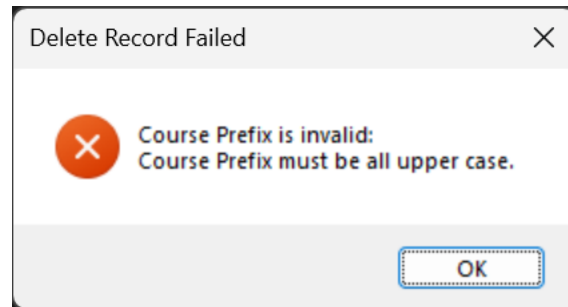
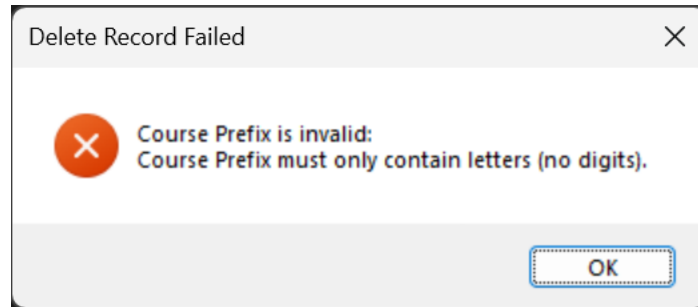
R3.4.1.6. The user shall input the Semester.

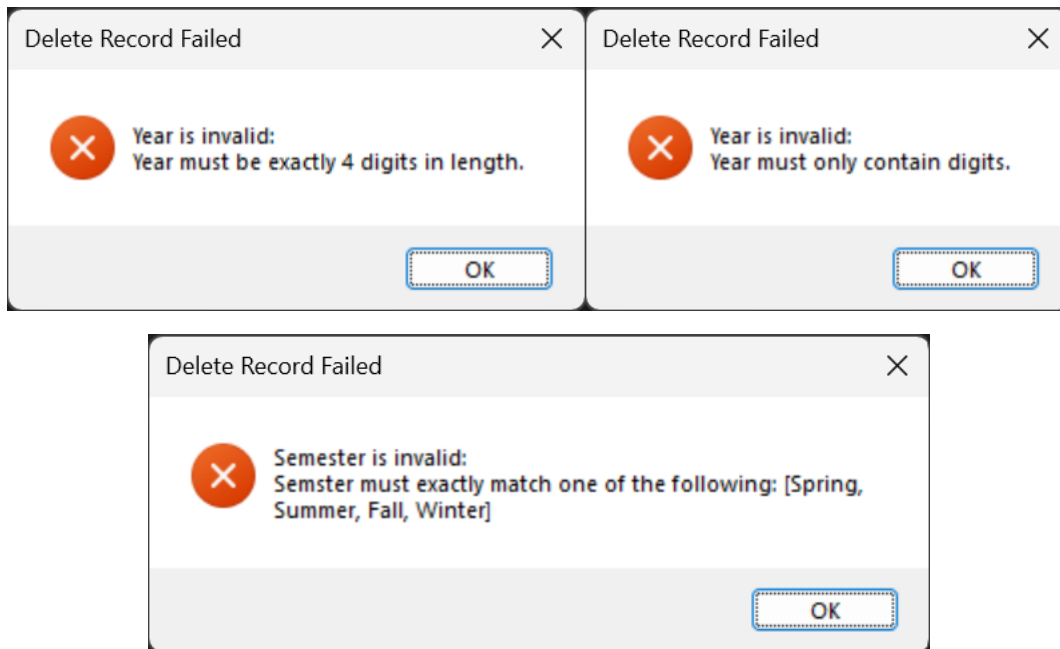
R3.4.2. The user shall press the submit button.

R3.4.3. The system shall validate the inputs and ensure every box has the appropriate data.

R3.4.3.1. If any data is missing, the system shall display a message to the user and repeat step 3.4







R3.4.3.2. If all data is present, then the system shall continue.

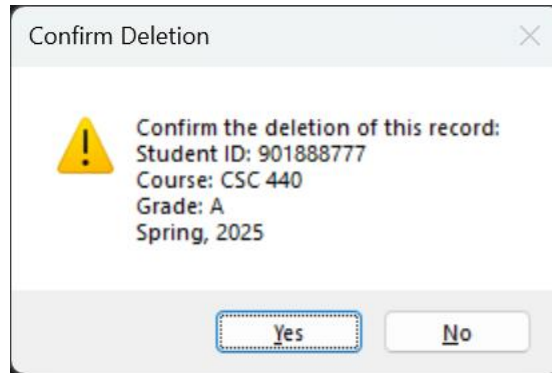
R3.4.4. The system shall verify that the record exists in the database.

R3.4.4.1. If the record does not exist in the database, the system shall display an error message.



R3.4.5. The system shall produce the matching record in the database.

R3.4.5.1. The system shall display the fetched record to the user.

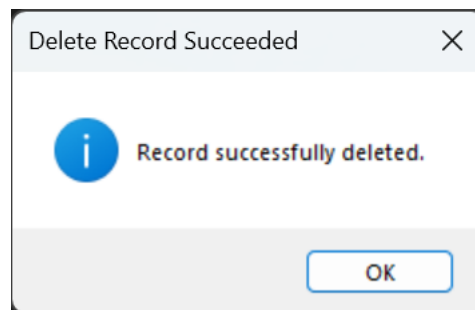


R3.4.5.2. If the record is what they want the user shall confirm that the system produced the correct record, the system will continue.

R3.4.5.3. If the record is NOT what the user wanted, then they shall cancel and repeat steps 3.4

R3.4.6. The system shall allow the user to delete record that was retrieved.

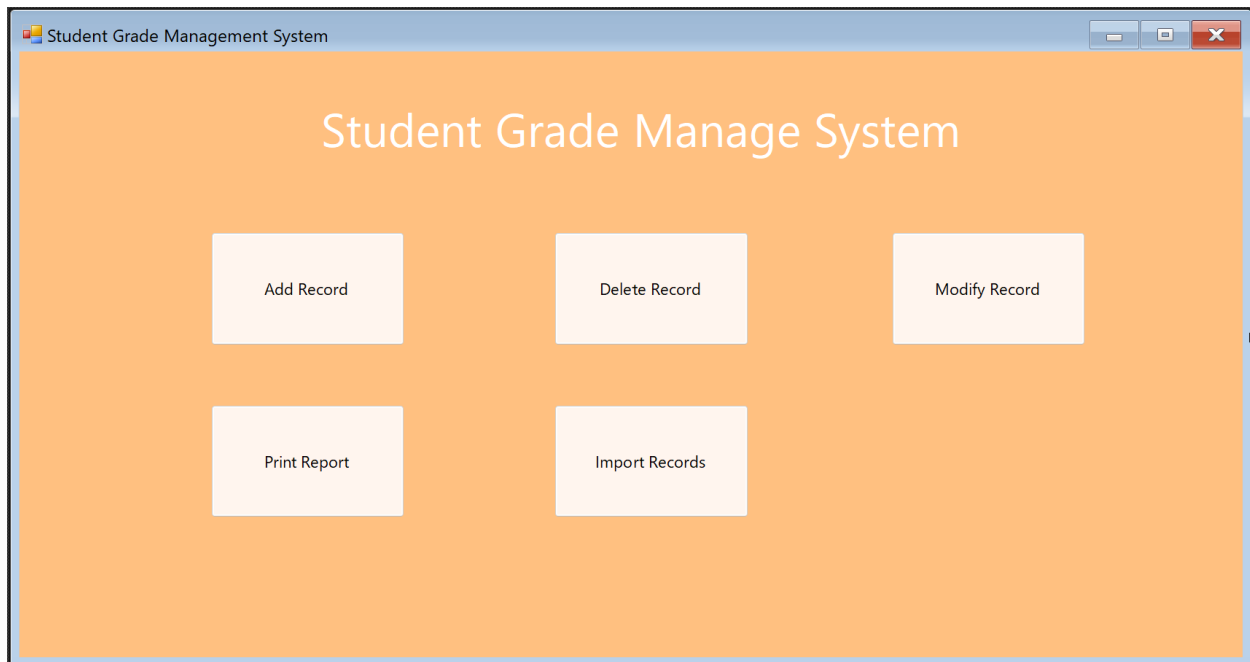
R3.4.7. The system shall display a confirmation message.



R3.4.8. The system shall display the Main Menu.

R4. The system shall allow the user to edit the grade of a course for a student.

R4.1. The system shall display the Main Menu.



R4.2. The user shall press the “Modify Record” button.

R4.3. The system shall display a Modify Record form.

A screenshot of a software application window titled "Modify Record". The window has a light blue title bar with standard Windows window controls (minimize, maximize, close). The main content area has an orange background. The form contains six input fields arranged in two columns. The left column has three fields: "Student ID", "Course Prefix", and "Course Number". The right column has three fields: "New Grade", "Year", and "Semester". Each field is a white rectangular box with a thin border. Below the input fields, there are two buttons: "Submit" and "Cancel", both with a light blue background and white text. A small mouse cursor is visible over the "Submit" button.

R4.4. The user shall complete the form.

R4.4.1. The user shall enter the information of the grade they wish to modify.

R4.4.1.1. The user shall enter the Student ID.

R4.4.1.2. The user shall enter the Course Prefix.

R4.4.1.3. The user shall enter the Course Number.

R4.4.1.4. The user shall enter the Grade.

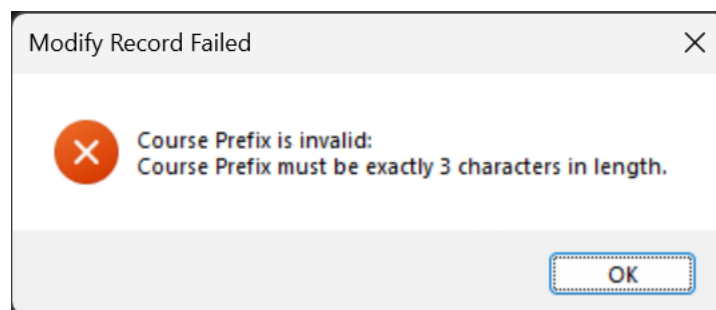
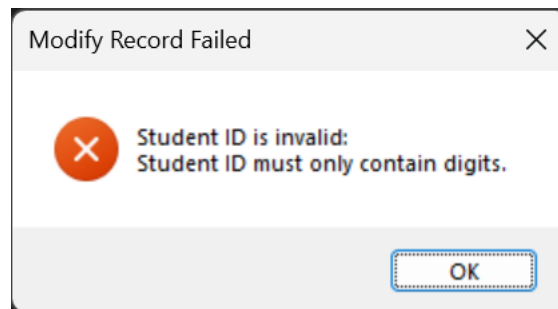
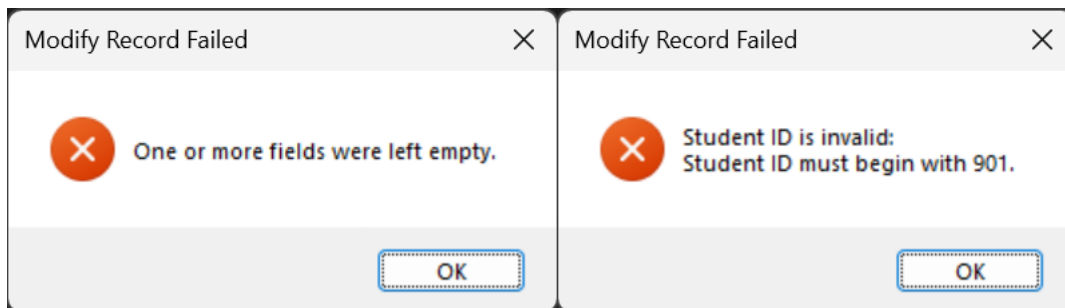
R4.4.1.5. The user shall enter the Year.

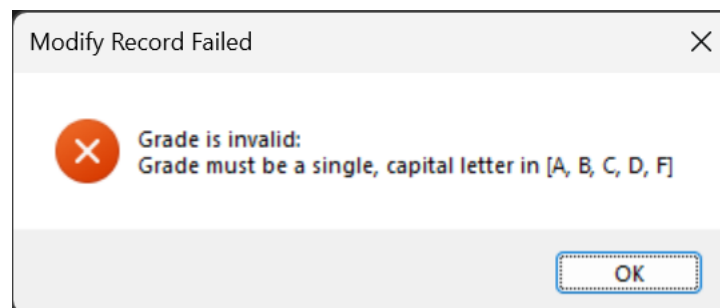
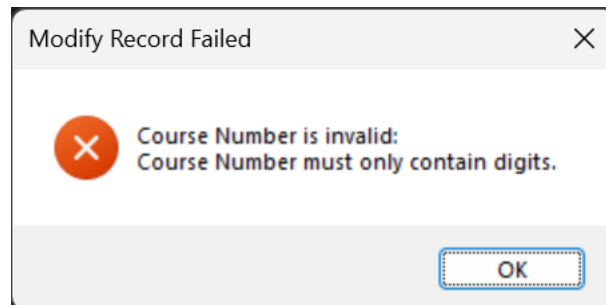
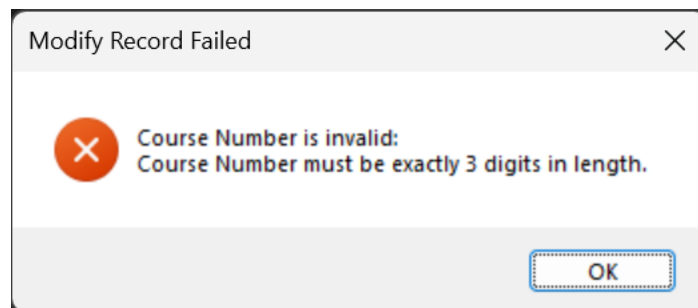
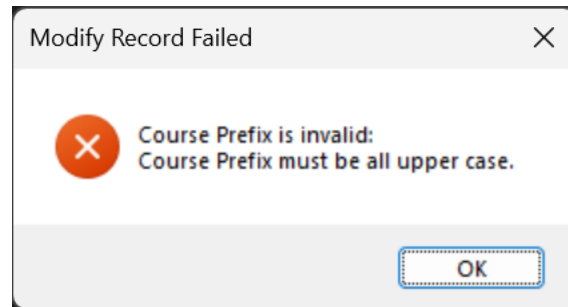
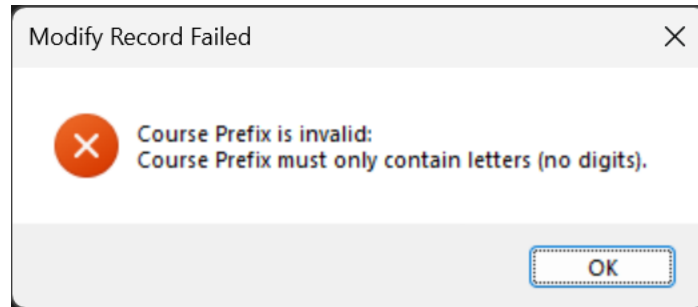
R4.4.1.6. The user shall enter the Semester.

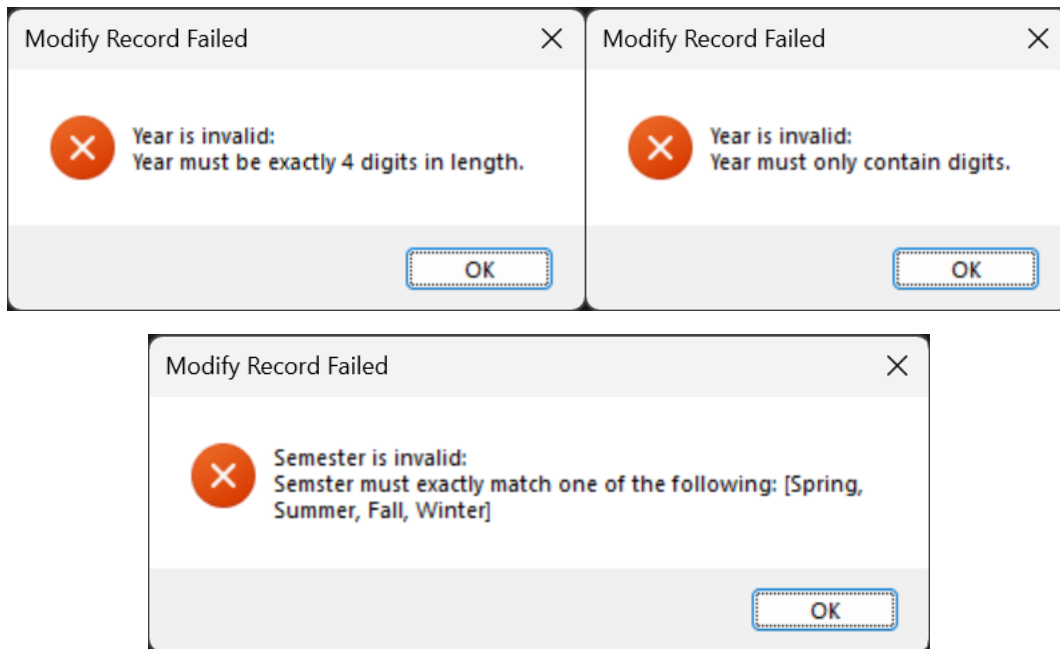
R4.4.2. The user shall press the “Submit” button.

R4.4.3. The system shall validate that the form is complete.

R4.4.3.1. If any data is missing, the system shall display a message to the user and repeat Step 4.4





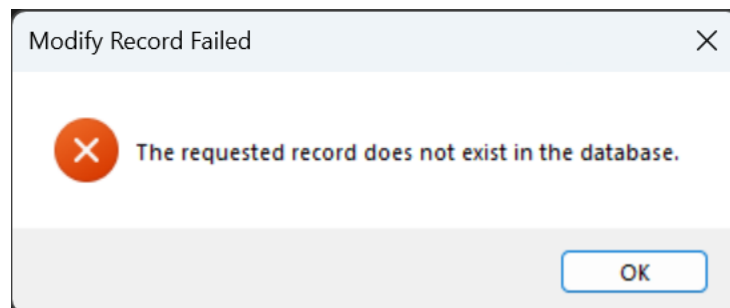


R4.4.3.2. If all data is valid, the system shall continue.

R4.5. The system shall verify that the record exists in the database.

R4.5.1. The system shall attempt to retrieve a record with the given data, excluding the "Grade".

R4.5.1.1. If a record is not retrieved, the system shall display an error message to the user and cancel the modified grade.



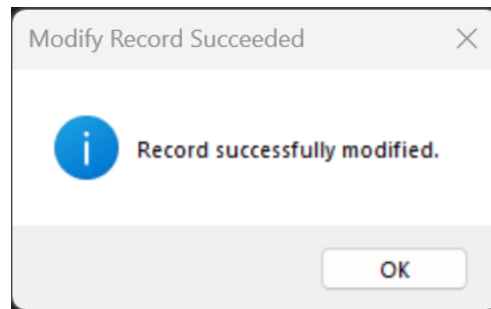
R4.5.1.2. If a record is retrieved, the system shall continue.

R4.5.2. The system shall update the new record in the database.

R4.5.3. The system shall recalculate the overall GPA for the student.

R4.5.4. The system shall update the overall GPA in the database for the student.

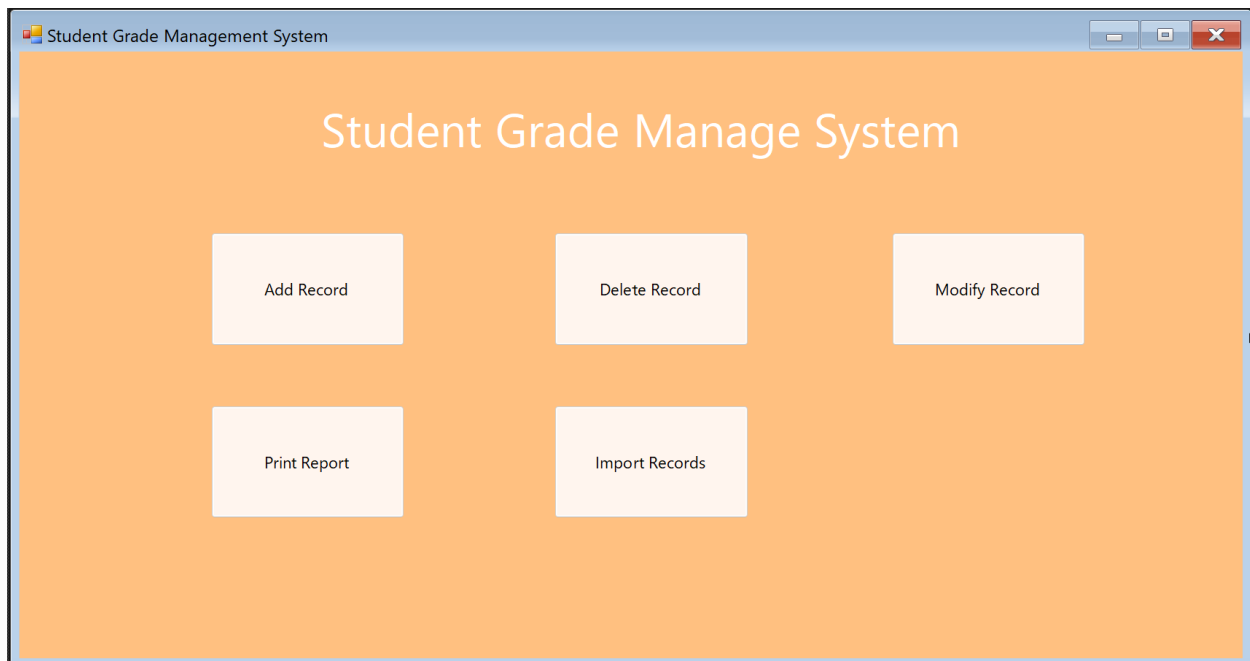
R4.5.5. The system shall display a confirmation message.



R4.5.6. The system shall display the Main Menu.

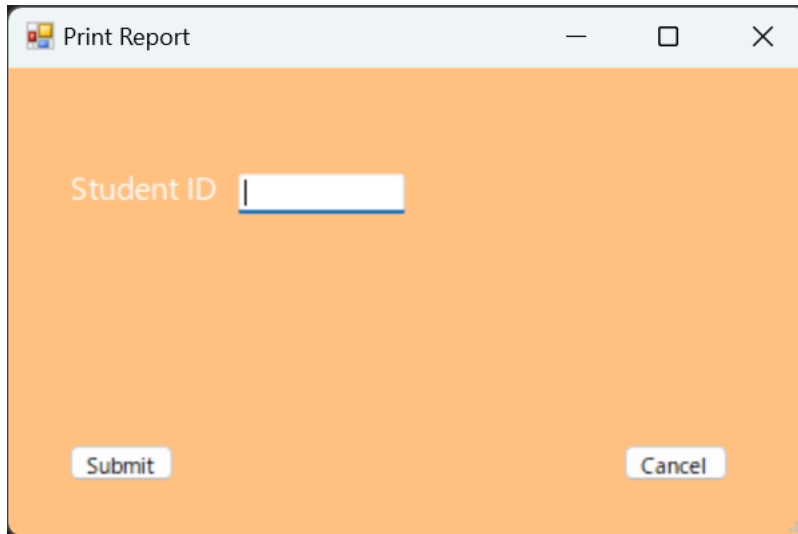
R5. The system shall allow the user to print a transcript for a student.

R5.1. The system shall display the Main Menu.



R5.2. The user shall press the "Print Report" button.

R5.3. The system shall display a Print Report form.

A screenshot of a 'Print Report' dialog box. The window has a title bar with a standard icon, a minus sign, a maximize button, and a close button. The main area has an orange background. It contains the text 'Student ID' followed by a text input field. At the bottom, there are two buttons: 'Submit' on the left and 'Cancel' on the right.

R5.4. The user shall complete the form.

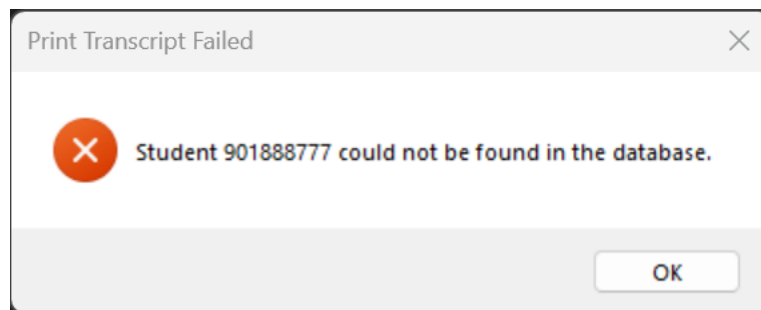
R5.4.1. The user shall enter information for the student they wish to print a transcript for.

R5.4.1.1. The user shall enter the Student ID.

R5.4.2. The user shall press the “Submit” button.

R5.5. The system shall query the database for a Student with a matching ID.

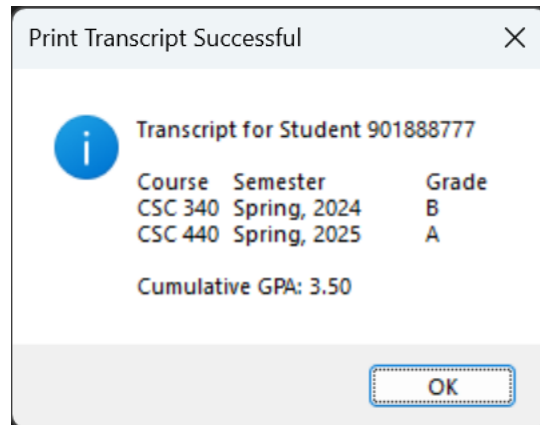
R5.5.1. If a record is not retrieved, the system shall display an error message and cancel the Print Report.



R5.5.2. If a record is retrieved, the system shall continue.

R5.6. The system shall display information about the selected student.

R5.6.1. The system shall display a list of courses, and grades for each course, that the student has completed, and the student’s GPA.



R5.7. The user shall press the “OK” button.

R5.8. The system shall display the Main Menu.

B. Non-Functional Requirements

NR1. The system shall be able to scale with the influx of faculty members submitting grades.

NR2. The system shall be secure, so that no private information of the students is released. It can use authentication, authorization and data encryption to complete this requirement.

NR3. The system should have a fast response time, so that it can react very quickly to the users' actions/requests.

IV. Use Case Diagram

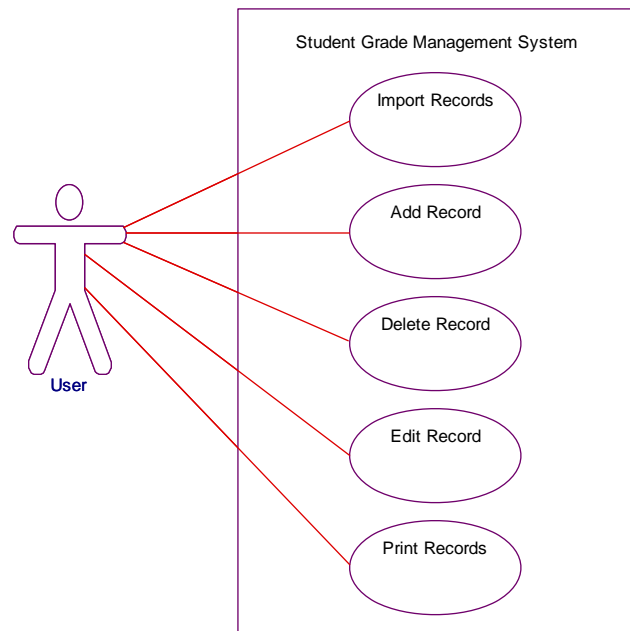


Figure 1 Use Case Diagram for Grade System

V. Class Diagram

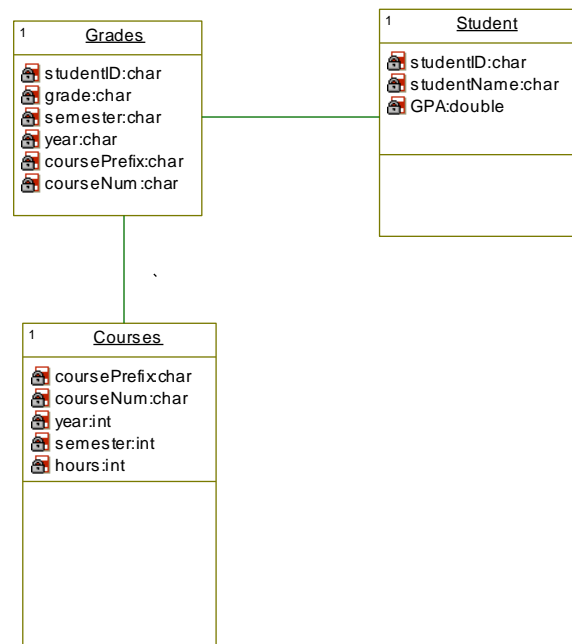


Figure 2 Class Diagram for Grade System

VI. Sequence Diagrams

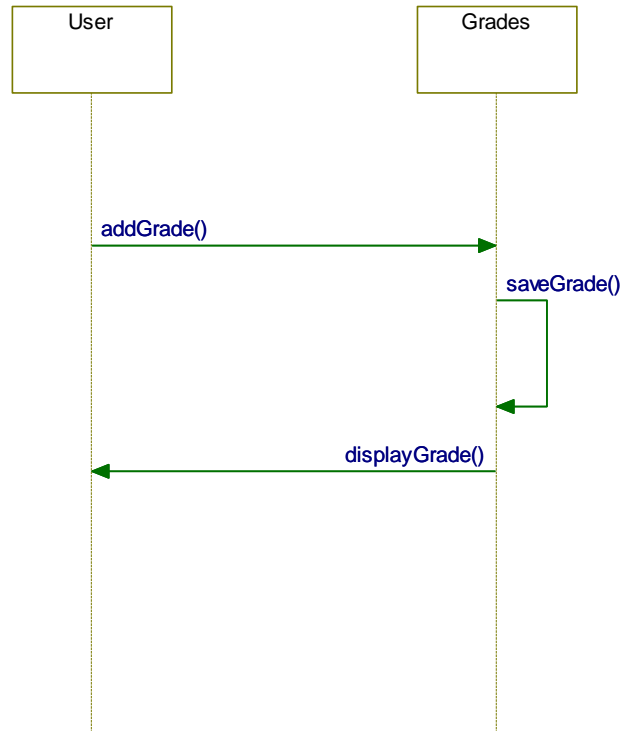


Figure 3 Sequence Diagram for Adding a Grade

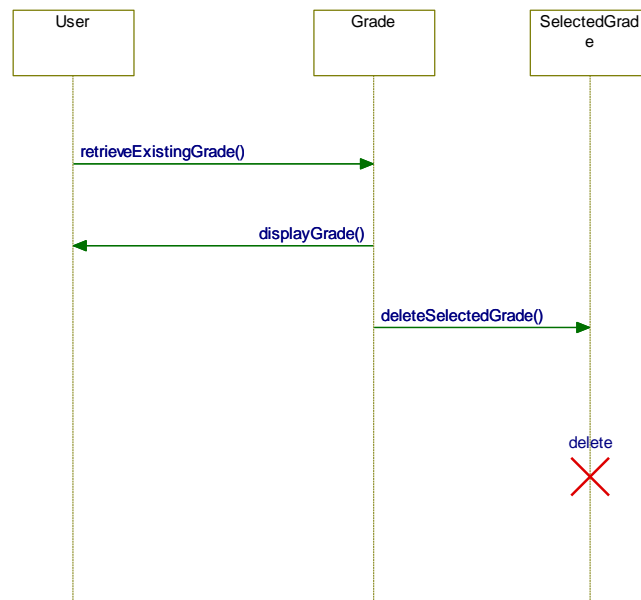


Figure 4 Sequence Diagram for Retrieve Existing Grade

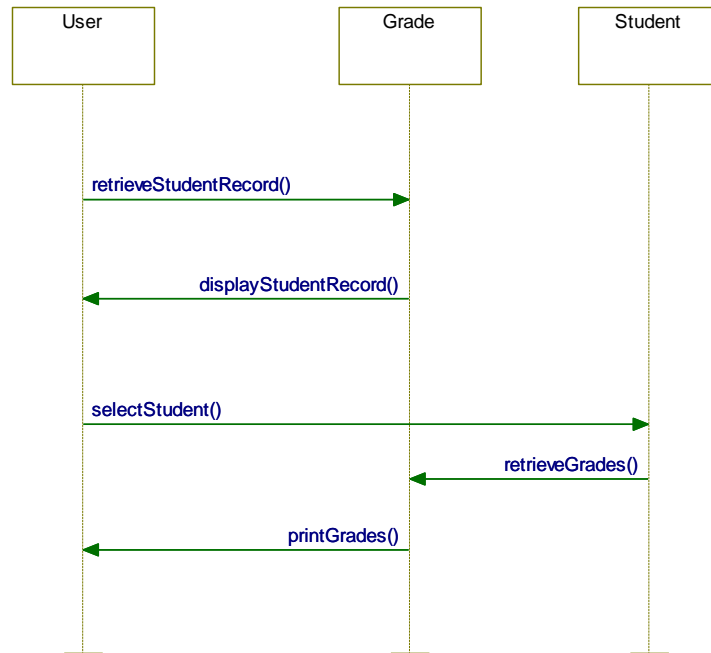


Figure 5 Sequence Diagram for Print Transcript

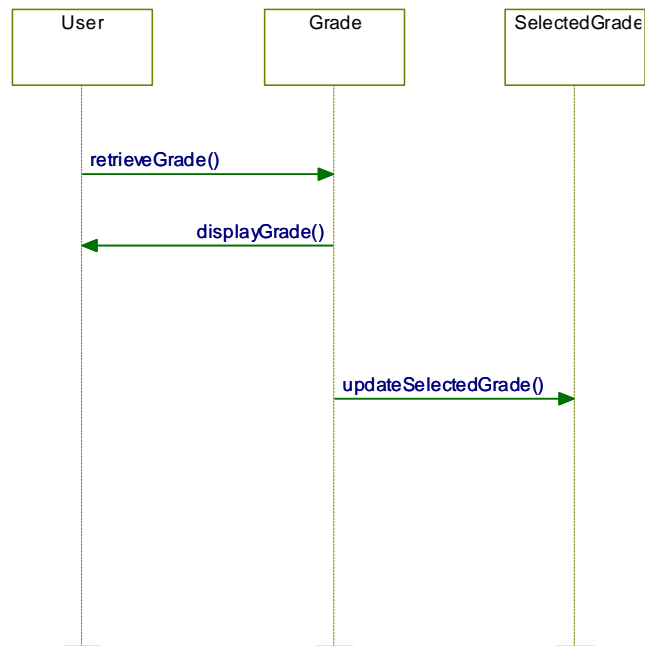


Figure 6 Sequence Diagram for Modify Grade

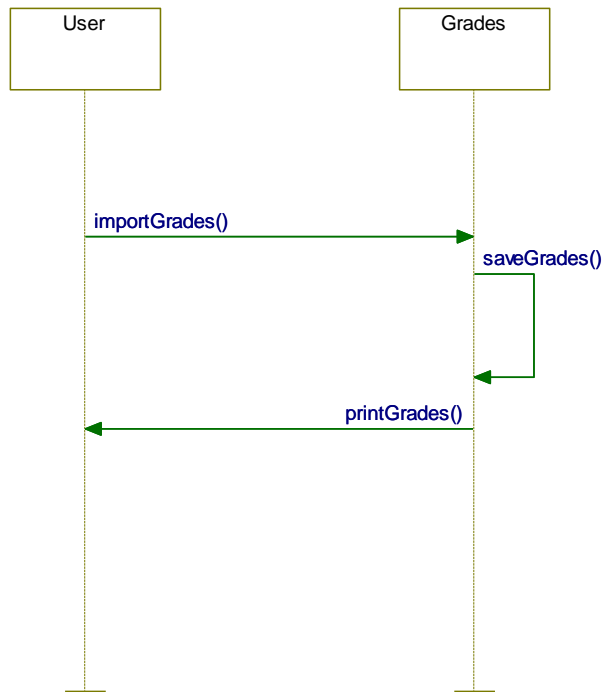


Figure 7 Sequence Diagram for Importing Grades

VII. State Diagram

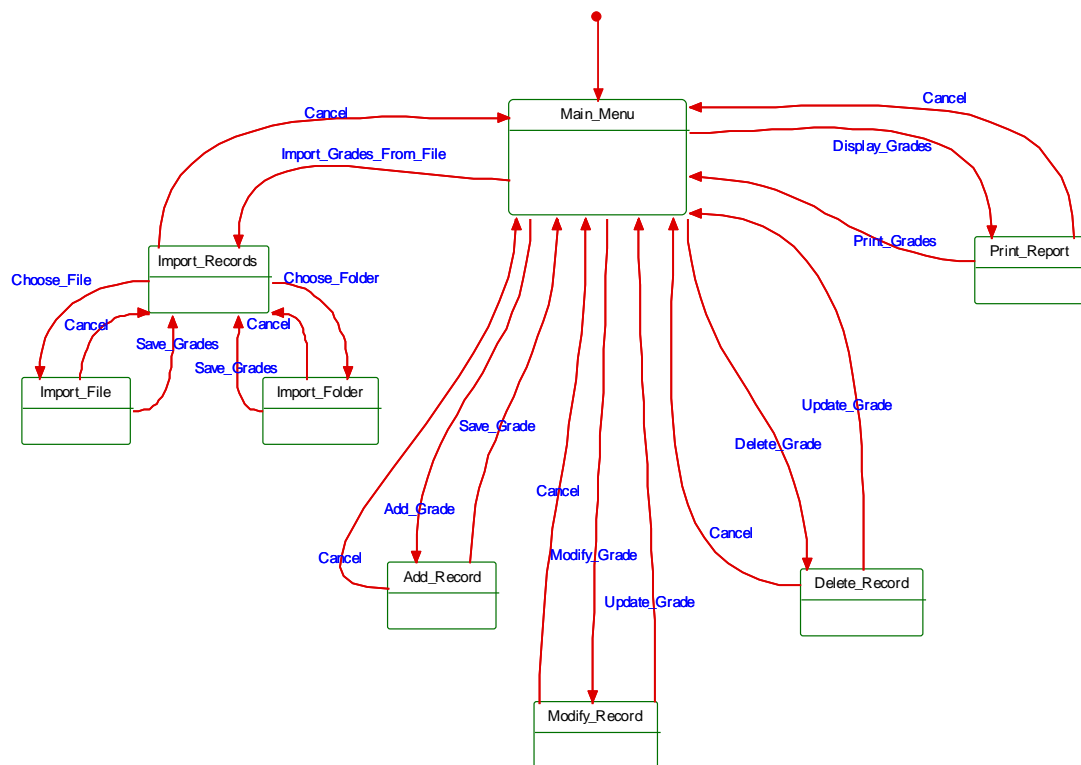


Figure 8 State Diagram for Grade System

VIII. Activity Diagrams

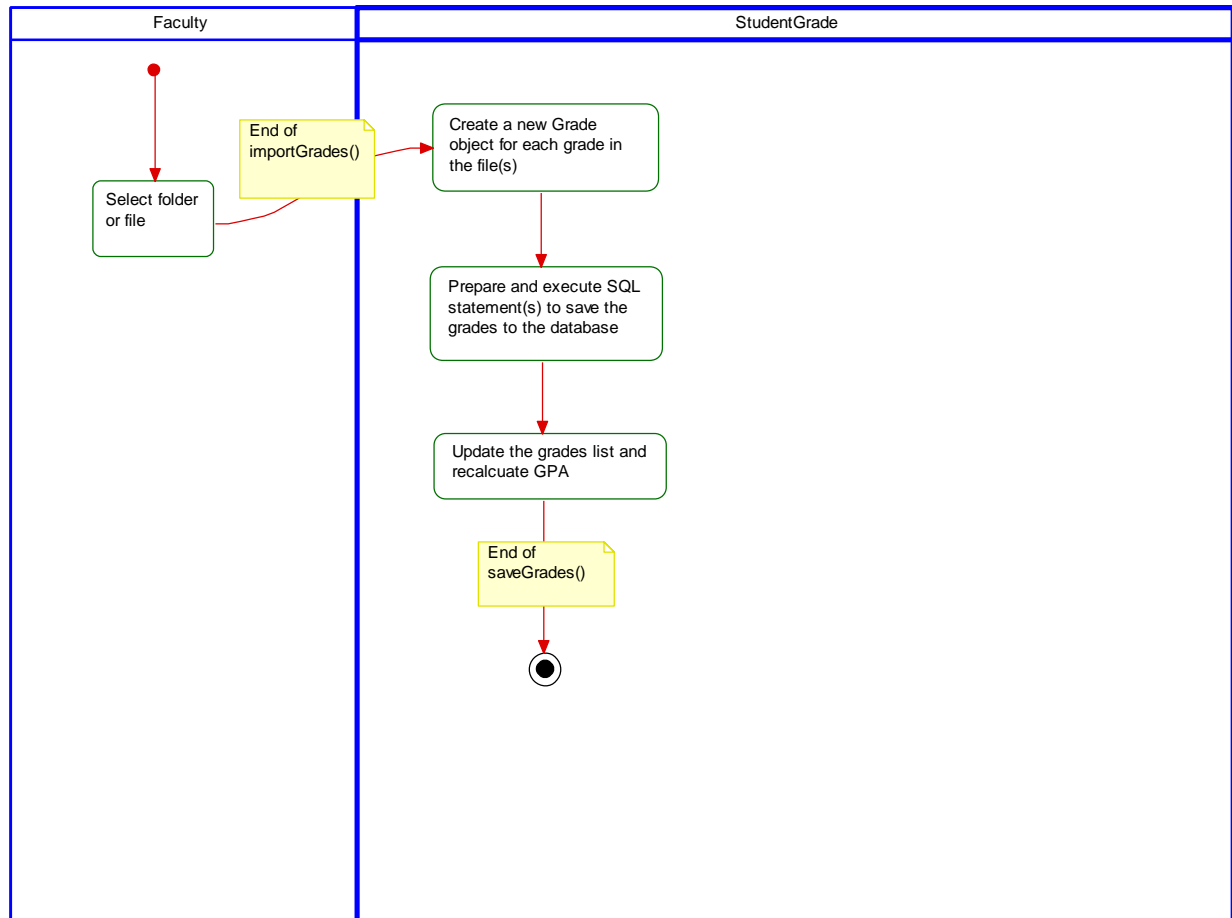


Figure 9 Activity Diagram for Import Grade

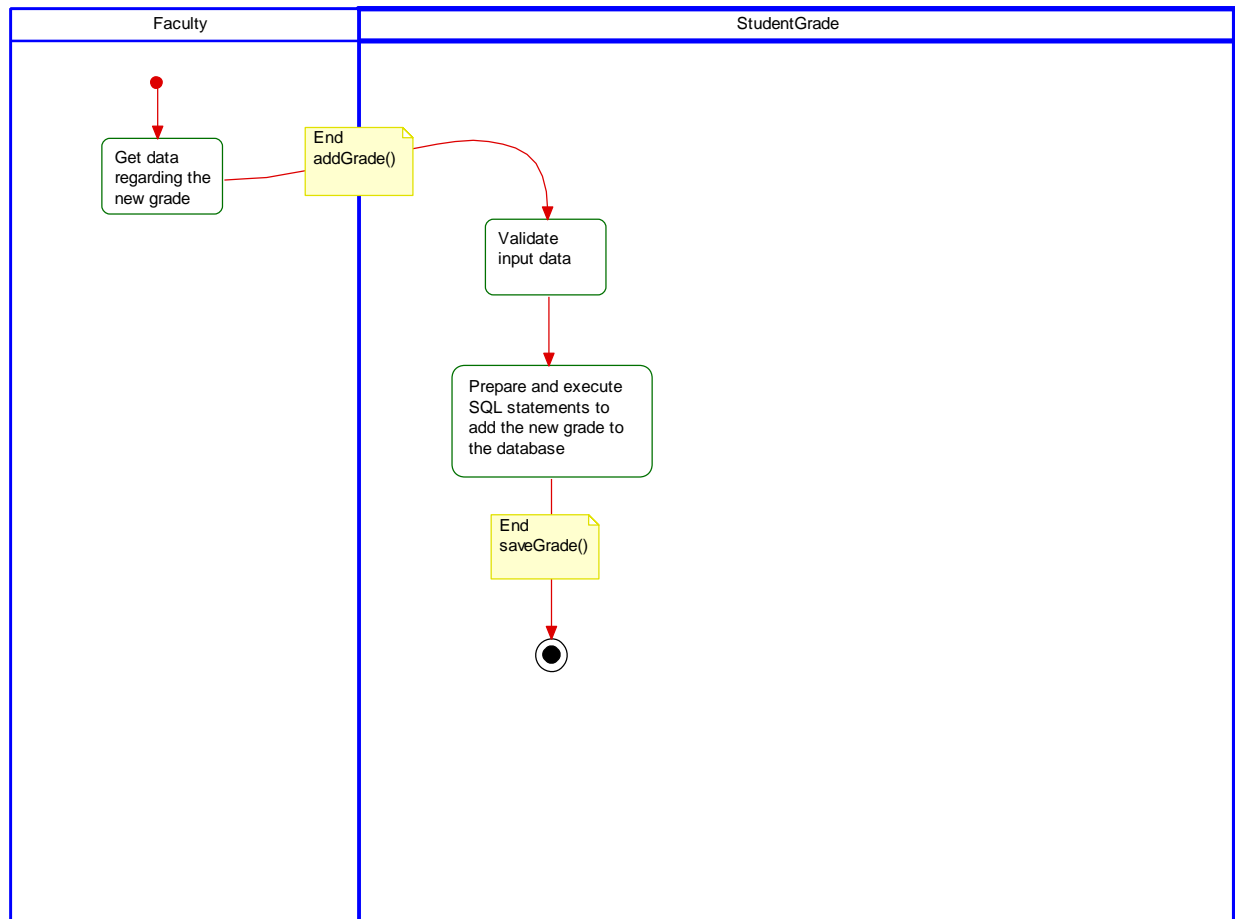


Figure 10 Activity Diagram for Manual Add Grade

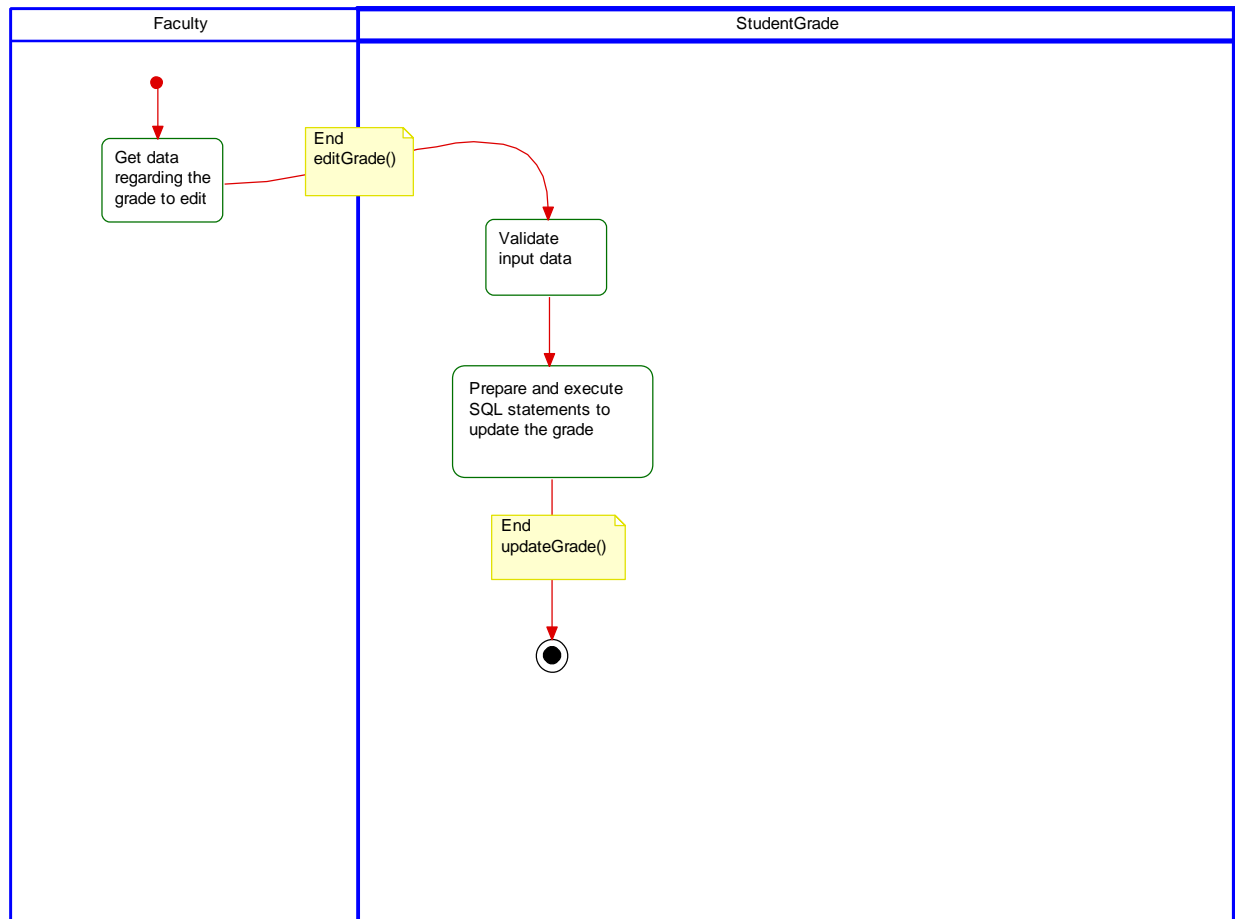


Figure 11 Activity Diagram for Edit Grade

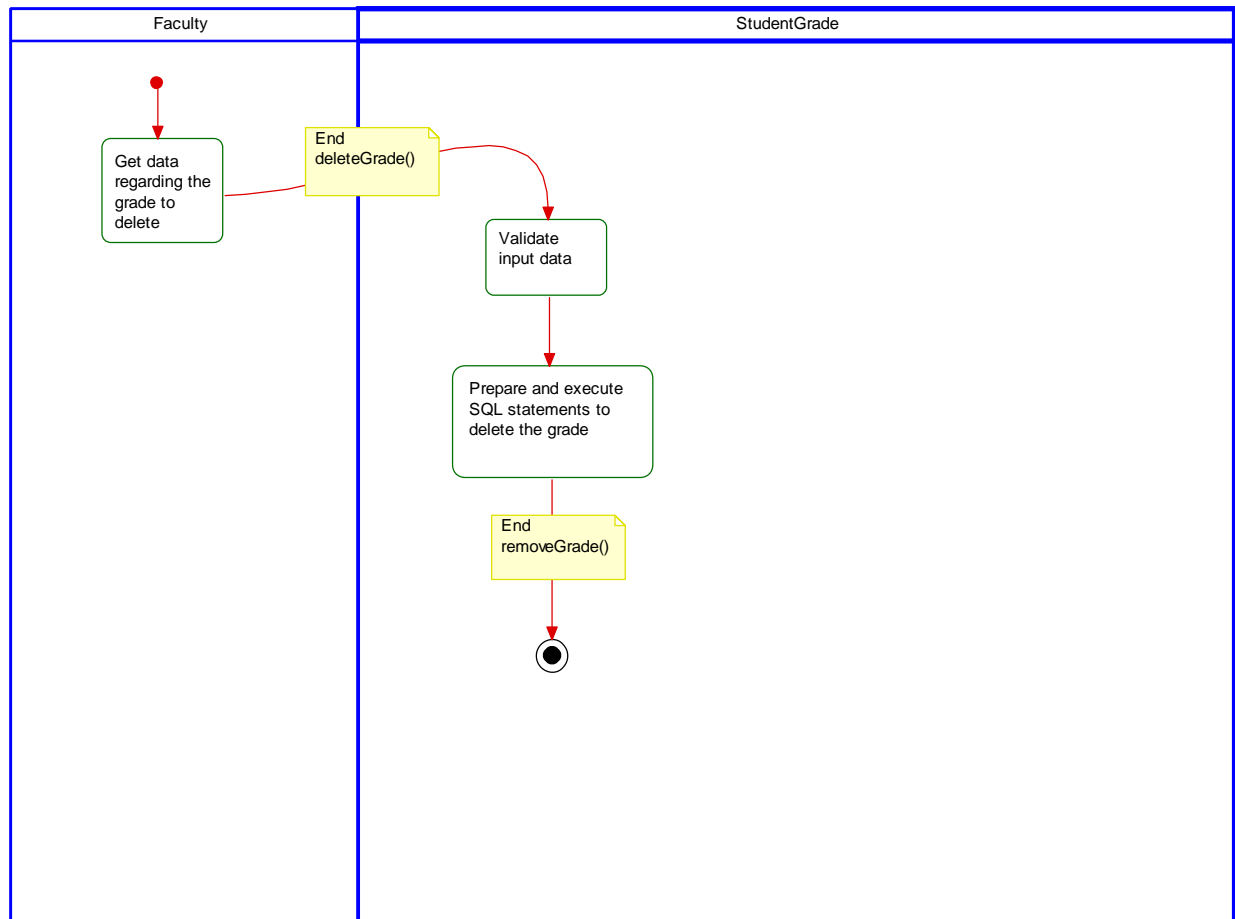


Figure 12 Activity Diagram for Delete Grade

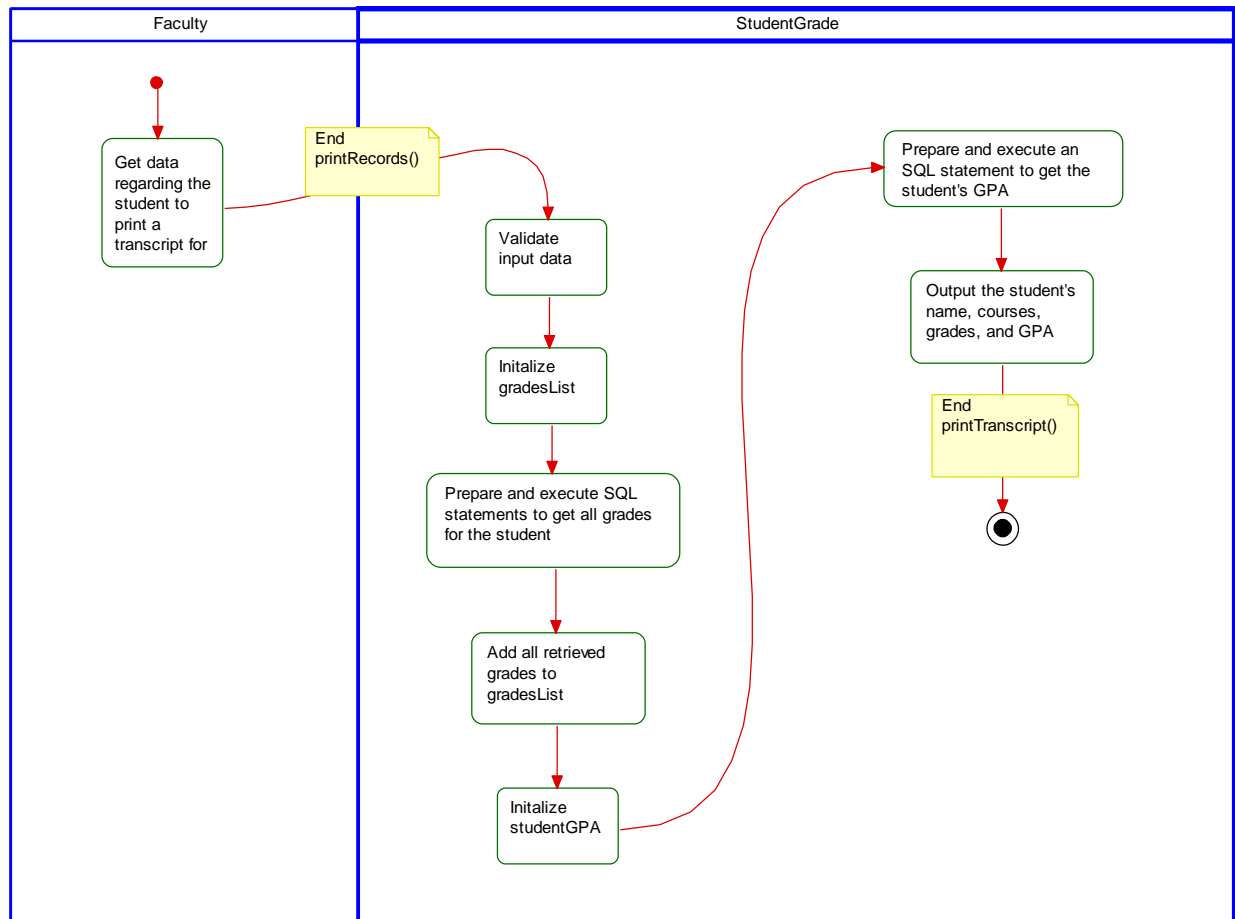


Figure 13 Activity Diagram for Print Records

IX. Database Design

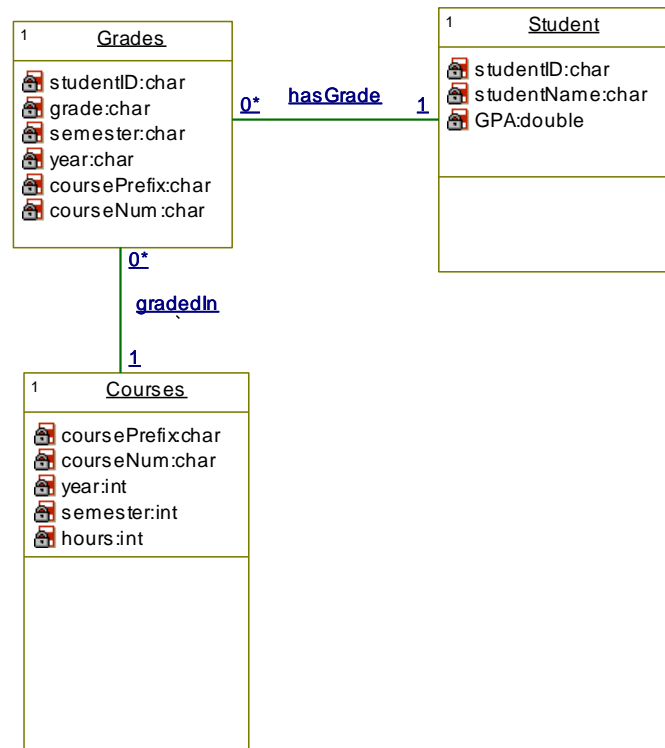


Figure 14 Relational Schema for Grade System

X. Conclusion

The system that we propose will fulfil the needs of the Registrar Office with improved database design.