CSC 835 Project Management
Summer 2023
Cruz Macias
EKU Term Project

Student Grade Management System

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I. Introduction

A. Problem Statement

EKU needs a software system to manage students' grade in the database at the end of each semester. Currently they don't have such a system. They are seeking for our help to develop the system for them.

B. Proposal

We propose a software system to help EKU to manage the grade records of students.

II. System Description

EKU's Registrar Office needs to update student course records after receiving student grades from all of the faculty at the end of each semester. Each faculty member provides the office an Excel file with 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. They need you to develop a software system to do the following tasks:

1. Add new grades of courses for each student to a database: The office can gather all the Excel files from the faculty, and put them in a folder. The formats of the names for the folder and Excel files are:

   Folder name: "**Grades [Year] [Semester]**"
   (Ex., "**Grades 2021 Spring**", "**Grades 2023 Fall**")
   File name: "**[Course Prefix] [Number] [Year] [Semester]**"
   (Ex., "CSC 835 2021 Fall", "MAT 234 2027 Spring")

2. Edit a grade for a student: There might be some mistakes in the Excel files provided by the faculty. The system shall allow the office to edit the grade of a course for a student. Editing a grade means changing the grade, deleting the grade, and/or adding a grade to the database.

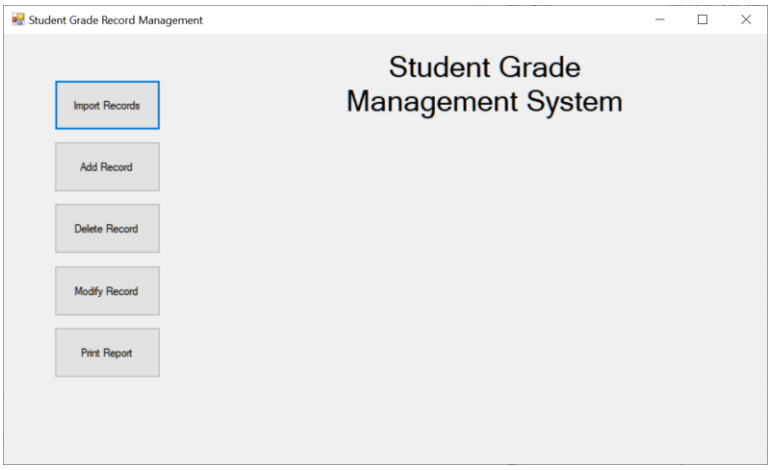
3. Print a report card (or transcript) for a student: The system shall let them print a report card (or transcript) for a selected student. The report card (or transcript) should list student's name, id, overall gpa, and a lists of courses with grades that he/she has taken before.

III. System Requirements

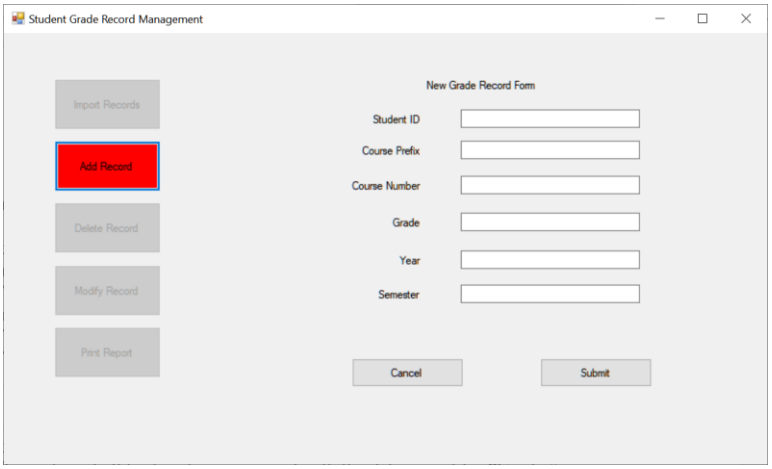
A. Functional Requirements

R1. The system shall allow a user to add a Student Grade record to database.

1.1. The system shall display a main menu to the user.



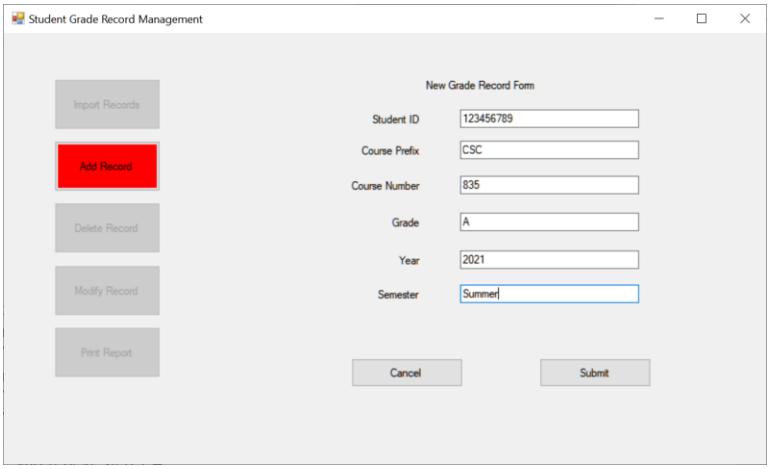
1.2. The user shall select “Add Record” button to add a new record.



1.3. The system shall display a New Grade Record form to the customer.

1.4. The user shall fill the form.

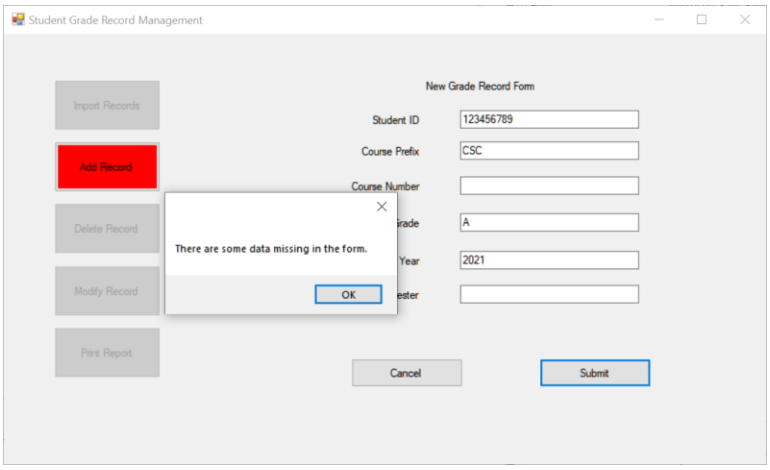
1.4.1. The user shall enter student id, course prefix, course number, grade, year and semester.



1.4.2. The user shall click “Submit” button after entering the data.

1.4.3. The system shall check if any of the data is missing.

1.4.3.1. If any of the data is missing, the system shall display a message to the user and repeat Step 1.4.

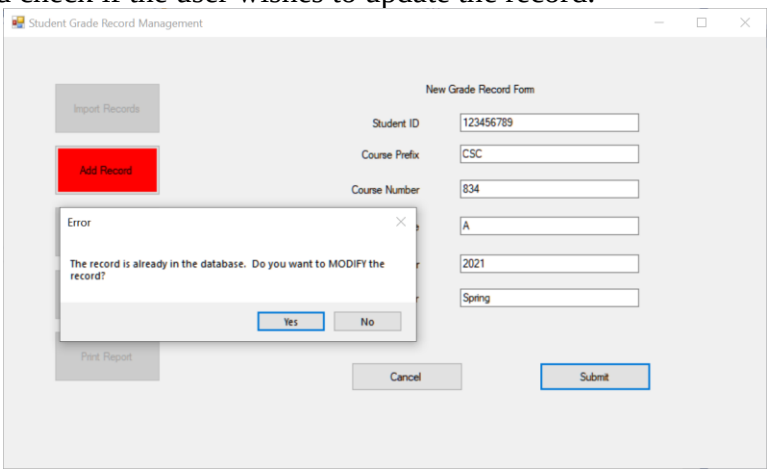


1.4.3.2. If all the data are correct, the system shall continue.

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

1.5.1. The system shall try to retrieve a record with the data except for "Grade."

1.5.1.1. If a record is retrieved, the system shall display an error message to the user, and check if the user wishes to update the record.



1.5.1.1.1. If the user wishes to update the record, the existing record will be updated. (Refer to R2.2.5)

1.5.1.1.2. If the user wishes not to go further, the system shall display a message to the user and return to main menu.

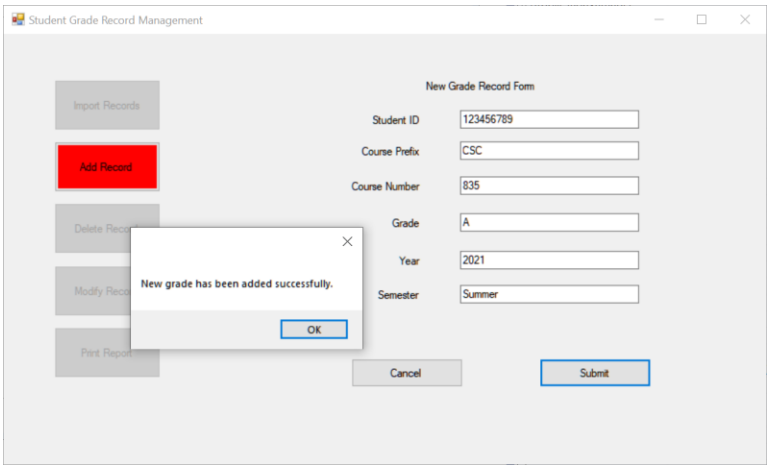
1.5.1.2. If no record is retrieved, the system shall continue.

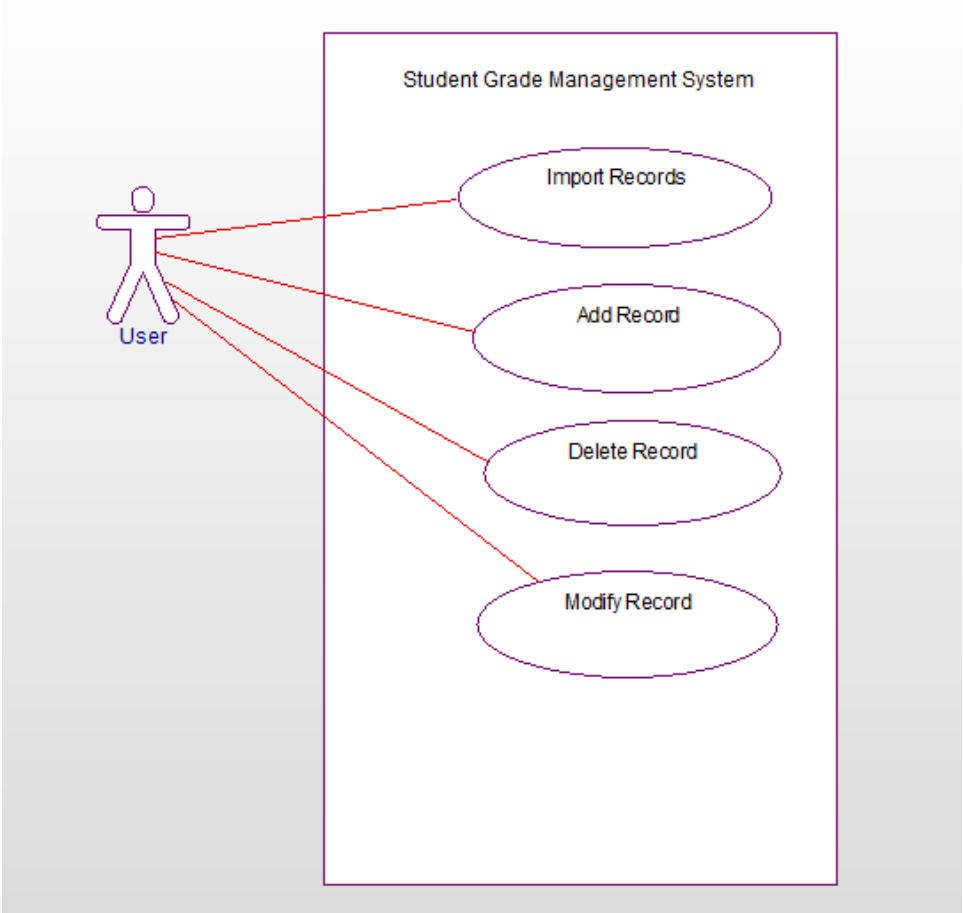
1.6. The system shall add the new record to the database.

1.7. The system shall recalculate the overall GPA for the student.

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

1.9. The system shall display a message and return to main menu.

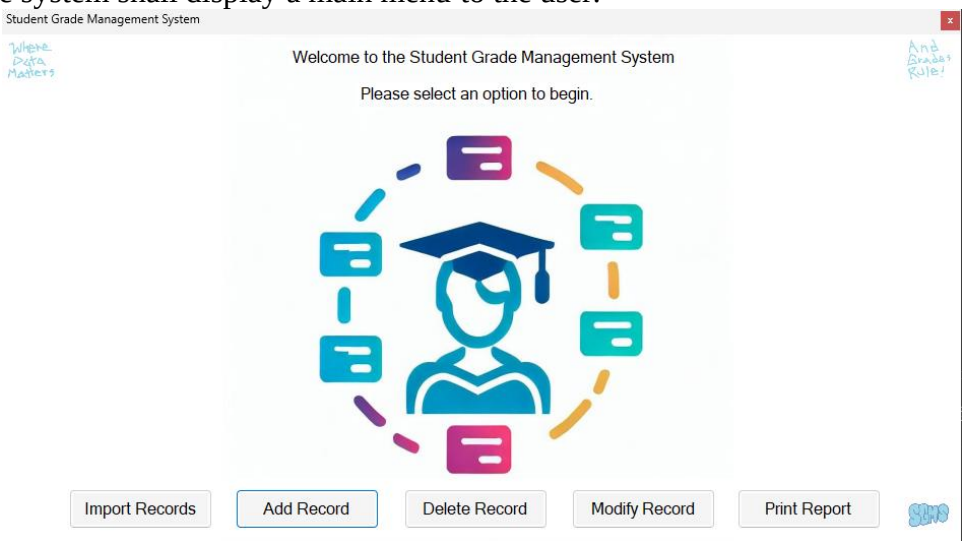




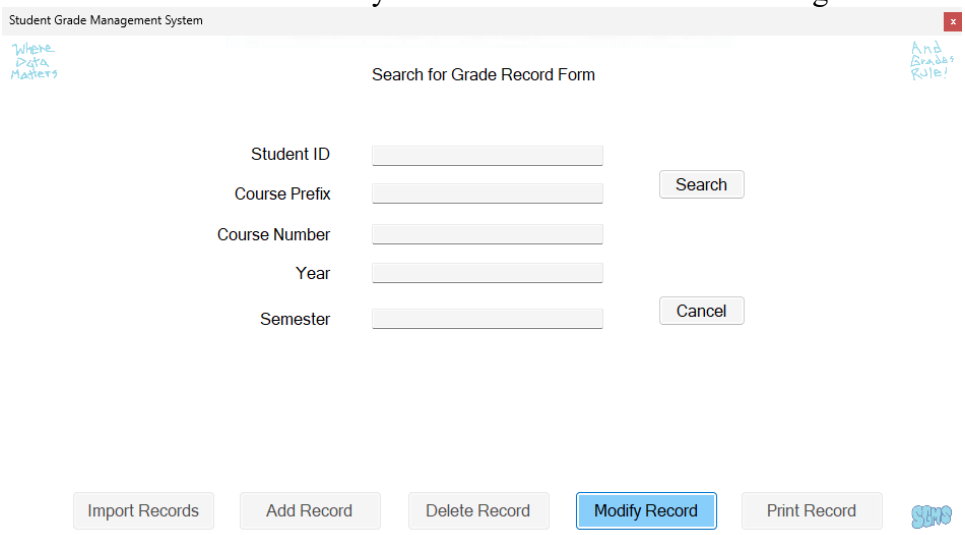
R2. The System shall allow a user to edit a Student Grade Record in the database which includes changing or deleting the value of the grade column for a Student Grade Record in the

database and/or adding the value of a grade column for a Student Grade Record in the database.

2.1. The system shall display a main menu to the user.



2.2. The user shall select the “Modify Record” button to edit an existing record.



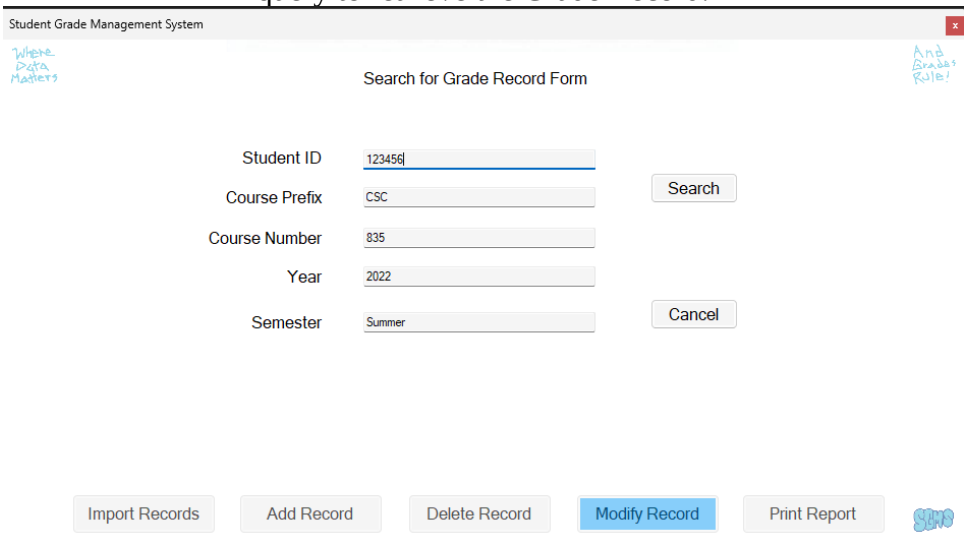
2.3. The system shall display a Search for Grade Record form to the customer.

2.4. The user shall fill the form.

2.4.1. The user shall search for an existing Student Grade Record to be edited.

2.4.1.1. The user shall enter the Student ID and Course Information (Course Prefix, Course Number, Year, and Semester) to be used as parameters in the selection

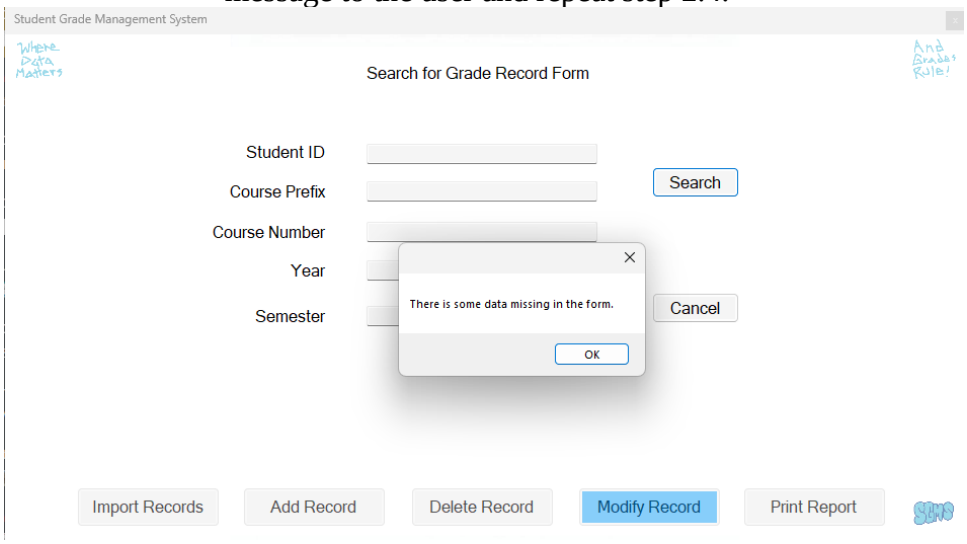
query to retrieve the Grade Record.



2.4.1.2. The user shall click the "Search" button to retrieve the Student Grade Record.

2.4.1.2.1. The system shall check that there isn't any missing data.

2.4.1.2.1.1. If any of the data is missing, the system shall display a message to the user and repeat step 2.4.



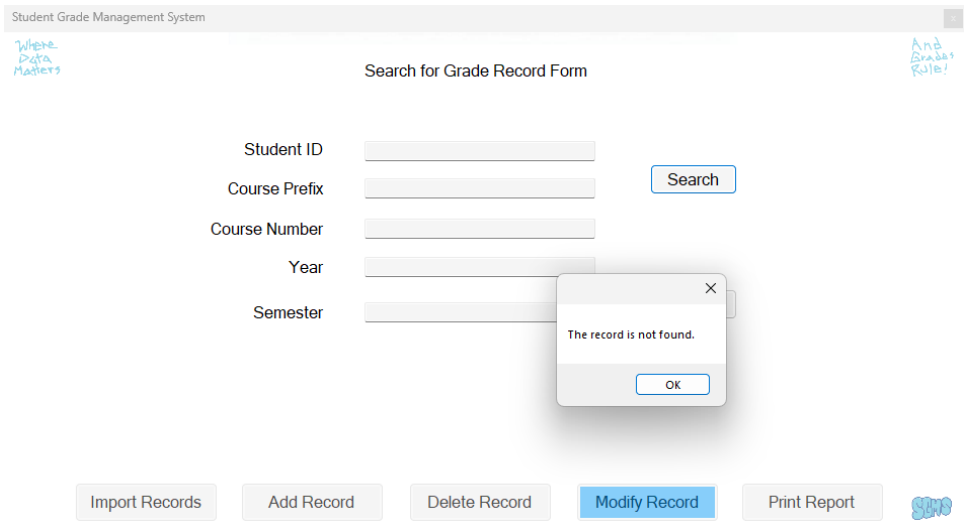
2.4.1.2.1.2. If all of the data is correct, the system shall continue.

2.4.1.3. The system shall verify that the Student Grade Record exists in the database.

2.4.1.3.1. The system shall attempt to retrieve the Student Grade Record from the Student Grades table in the database.

2.4.1.3.1.1. If the record is returned, the system shall continue.

2.4.1.3.1.2. If the record is not returned, the system shall display a message that the record is not found.



2.4.1.3.1.2.1. If the user wishes to add a new record to the database, the new record will be added (Refer to R1.1.3).

2.4.1.3.1.2.2. If the user wishes not to go further, the system shall display a message to the user and return to the main menu.

2.4.1.3.2. The system shall display the retrieved record to be edited by the user.

2.5. The system shall display a Modify Grade Record form to the user.

2.6. The user shall fill the form.

2.6.1. The user shall modify/update the value of the grade column for the retrieved Student Grade Record.

2.6.2. If the user wishes to modify/update any of the columns other than the grade column for the Student Grade Record, a new Student Grade Record will need to be added to the system (Refer to R1.1.3).

2.7. The user shall click the “Submit” button after the modifications/updates are completed.

2.8. The system shall validate modified grade value.

2.8.1. The system shall check if any of the required data is missing.

2.8.1.1. If any of the required data is missing, the system shall display an error message and repeat step 2.6.

2.8.1.2. If the required data is provided, the system shall continue.

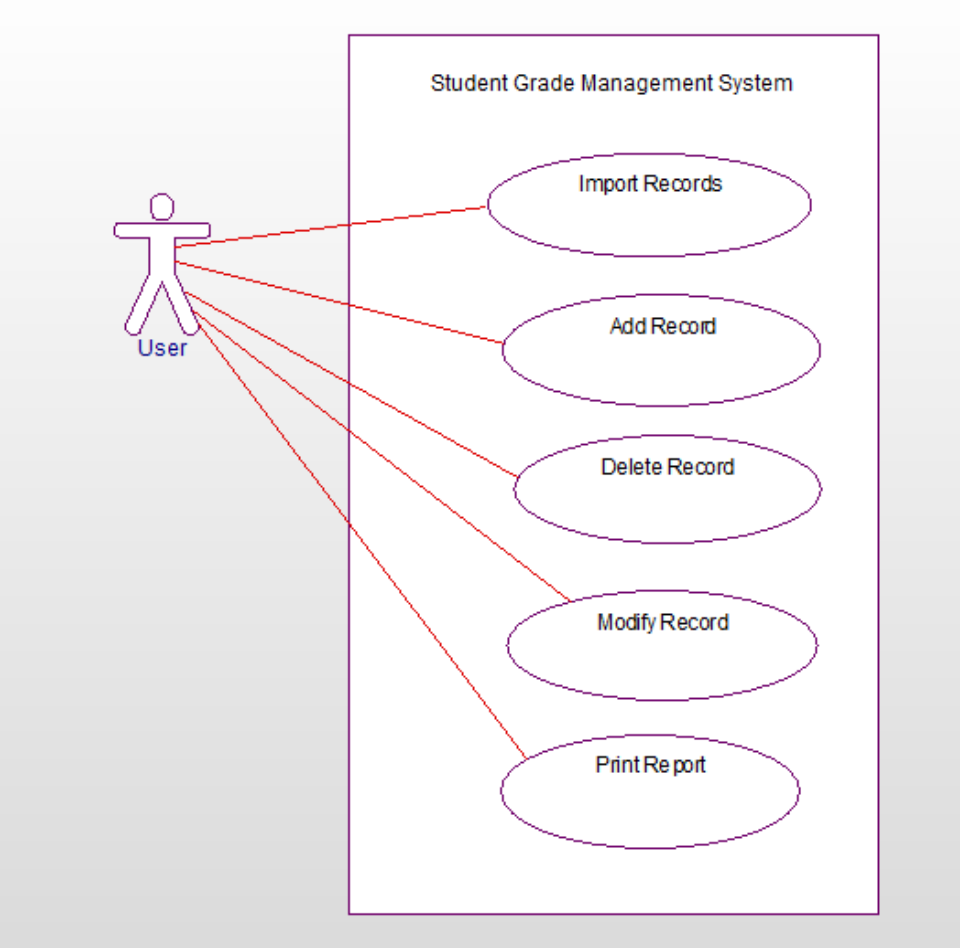
2.9. The system shall update the Student Grade Record with the edited grade information.

2.10. The system shall recalculate the overall GPA for the student the Student Grade Record is associated with.

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

2.12. The system shall display a confirmation message when the task is completed and return to the main menu.

2.13.



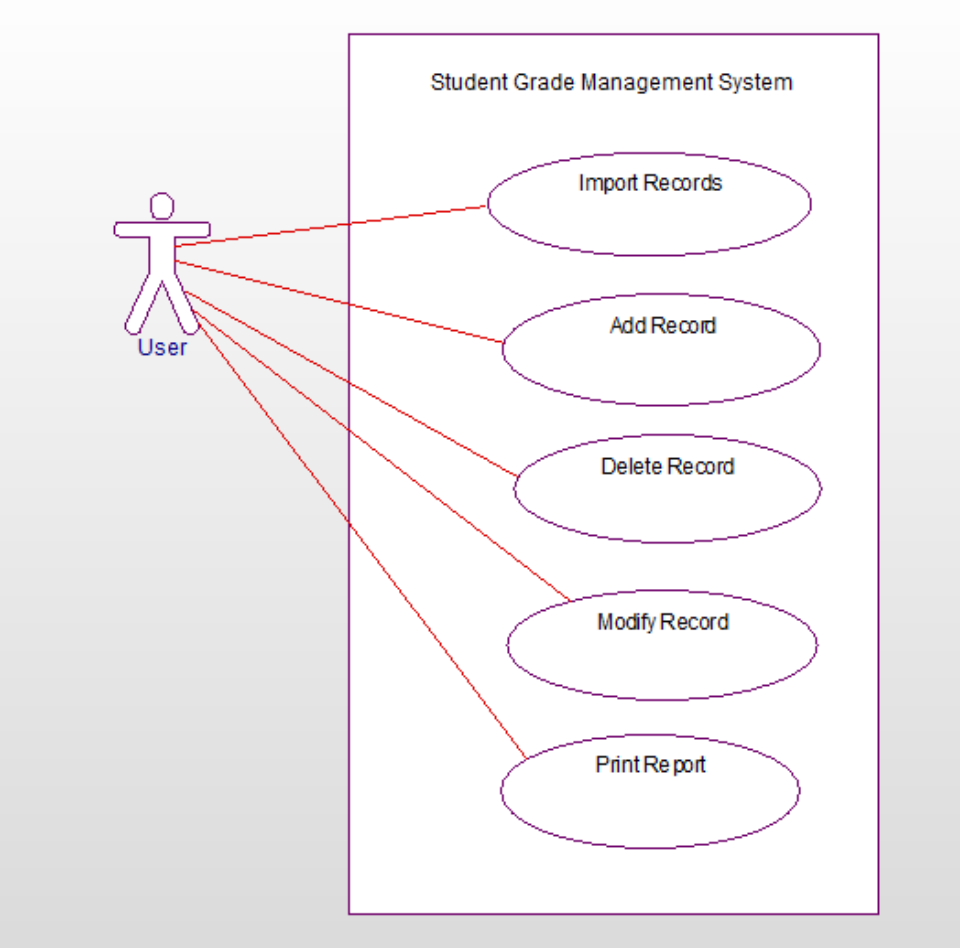
R3. The system shall enable a user to print a semester report card or complete transcript for a given student.
3.1. The system shall display a main menu to the user.
3.2. The user shall select the “Print Report” button to generate a report card or transcript.

3.3. The system shall display a Search for Student Record form to the user.
3.4. The user shall fill the form
3.4.1. The user shall enter the Student ID and for the student to generate a report card or transcript for.
3.4.1.1. The user shall enter the student ID in the designated field.
3.4.1.2. The user shall click the "Search" button to retrieve the student's information.
3.4.1.2.1. The system shall verify that there isn't any missing data
3.4.1.2.1.1. If there is any missing data, the system shall display a message to the user and repeat step 3.4.
3.4.1.2.1.2. If the data is correct, the system shall continue.
3.4.1.2.2. The system shall verify that a Student Record exists in the database for the student ID being searched for.
3.4.1.2.2.1. The system shall attempt to retrieve the Student Record from the Student Information table in the database
3.4.1.2.2.1.1. If the record is not returned, the system shall display a message to the user and repeat step 3.4.
3.4.1.2.2.1.2. If the record is returned, the system shall continue.
3.5. The system shall prompt the user to select "Print Transcript" or "Print Report Card".
3.5.1. If the user clicks on "Print Transcript", the system shall verify that Student Grade Records exist for that student.
3.5.1.1. The system shall attempt to retrieve all Student Grade Records from the Student Grades table in the database for the student ID provided by the user.
3.5.1.1.1. If no records are retrieved, the system shall display a message notifying the user that no records for that student exist and return to the main menu.
3.5.1.1.2. If records are retrieved, the system shall continue to step 3.6.
3.5.2. If the user clicks on "Print Report Card", the system will display a Select Semester and Year form to the user.
3.5.3. The user shall fill the form.
3.5.3.1. The user shall enter the year and semester to generate a report card for.
3.5.3.1.1. The user shall enter the semester and year in the designated field.
3.5.3.1.2. The user shall click the "Print" button to retrieve the information for that student, year, and semester.
3.5.3.1.2.1. The system shall verify that there isn't any missing data.
3.5.3.1.2.1.1. If there is any missing data, the system shall display a message to the user and repeat step 3.5.3.
3.5.3.1.2.1.2. If the data is correct, the system shall continue.
3.5.3.1.3. The system shall verify that Student Grade Records exist for that student, for that year, and for that semester provided by the user.
3.5.3.1.3.1. The system shall attempt to retrieve the Student Grade Records for that year and semester from the Student Grades table in the database.
3.5.3.1.3.1.1. If the records are not returned, the system shall display a message to the user and repeat step 3.5.3.
3.5.3.1.3.1.2. If the records are returned, the system shall continue to step 3.6.

3.6. The system shall generate a printable report containing the student's name, ID, overall GPA, and a list of courses and grades retrieved from steps 3.5.#.
3.7. The system shall display the report to the user for preview.
3.8. The user shall have the option to print the report card.
3.8.1. The user shall select the "Print" button to print the report or "Cancel" button to return to the main menu.
3.8.1.1. If the user clicks the "Cancel" button, the system shall return to the main menu.
3.8.1.2. If the user clicks the "Print" button, the system shall provide the option to save the report as a PDF file.
3.8.1.2.1. The user shall click the "Save as PDF" button to save the report.
3.8.1.2.1.1. The system shall produce a PDF file containing the contents of the report for the user to download.
3.9. The system shall display a confirmation message and return to the main menu.
R4. Import Records
R5. Delete Record

B. Non-functional Requirements - NA

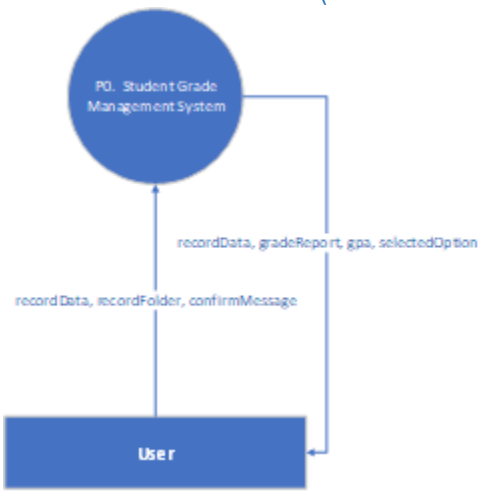
IV. [illegible]



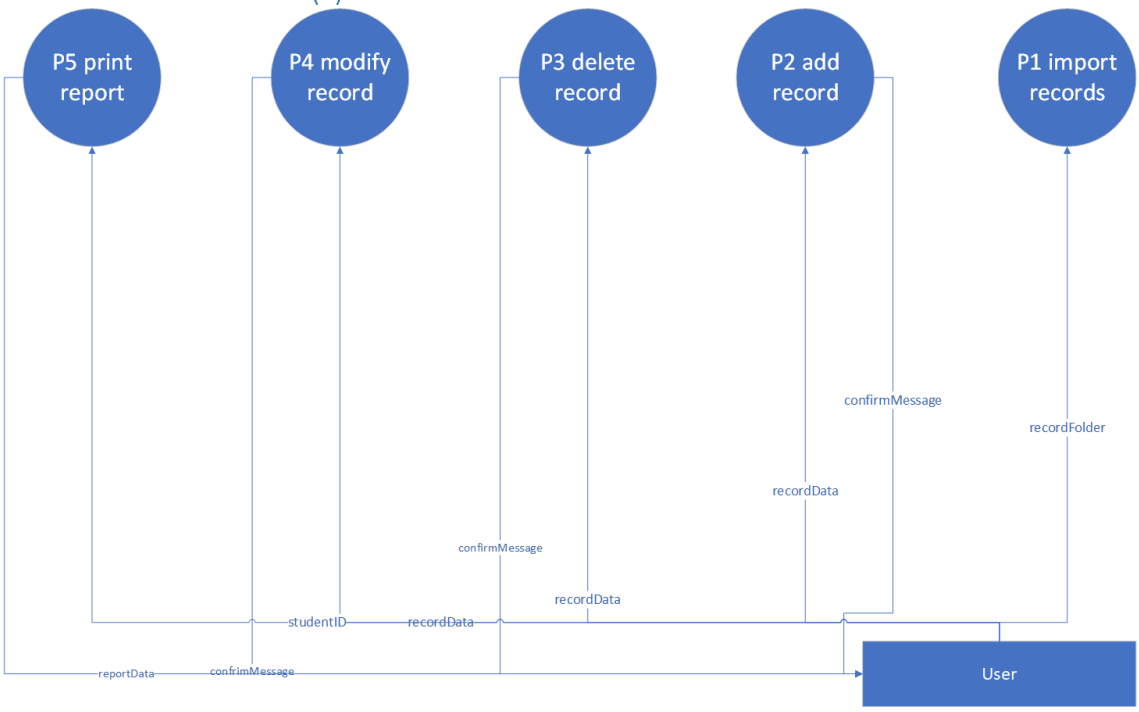
This use case diagrams show the services (use cases) of the system.

V. Data Flow Diagrams

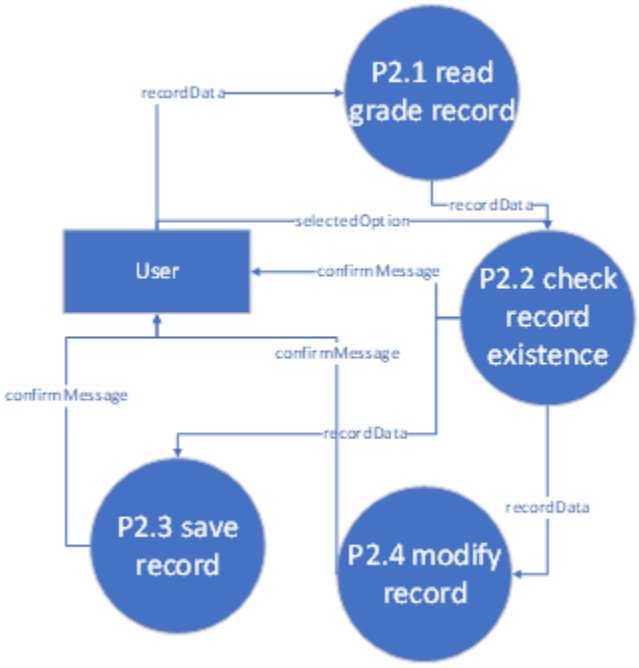
A. Level 0 DFD (Context Level)

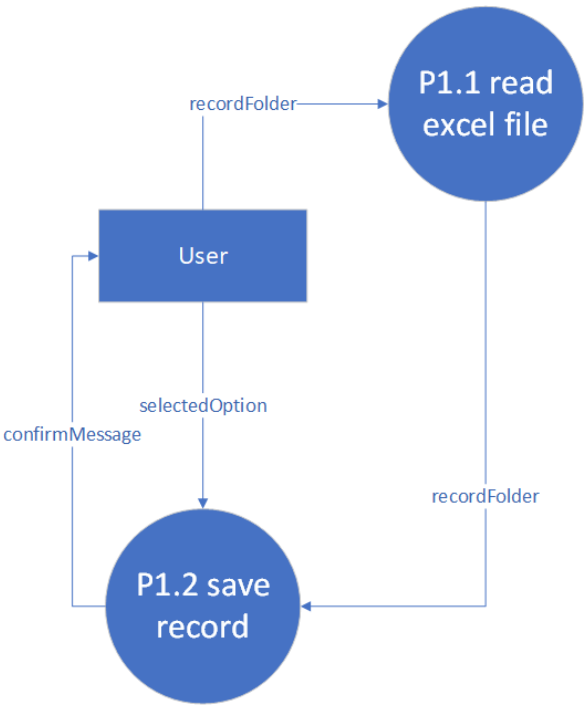


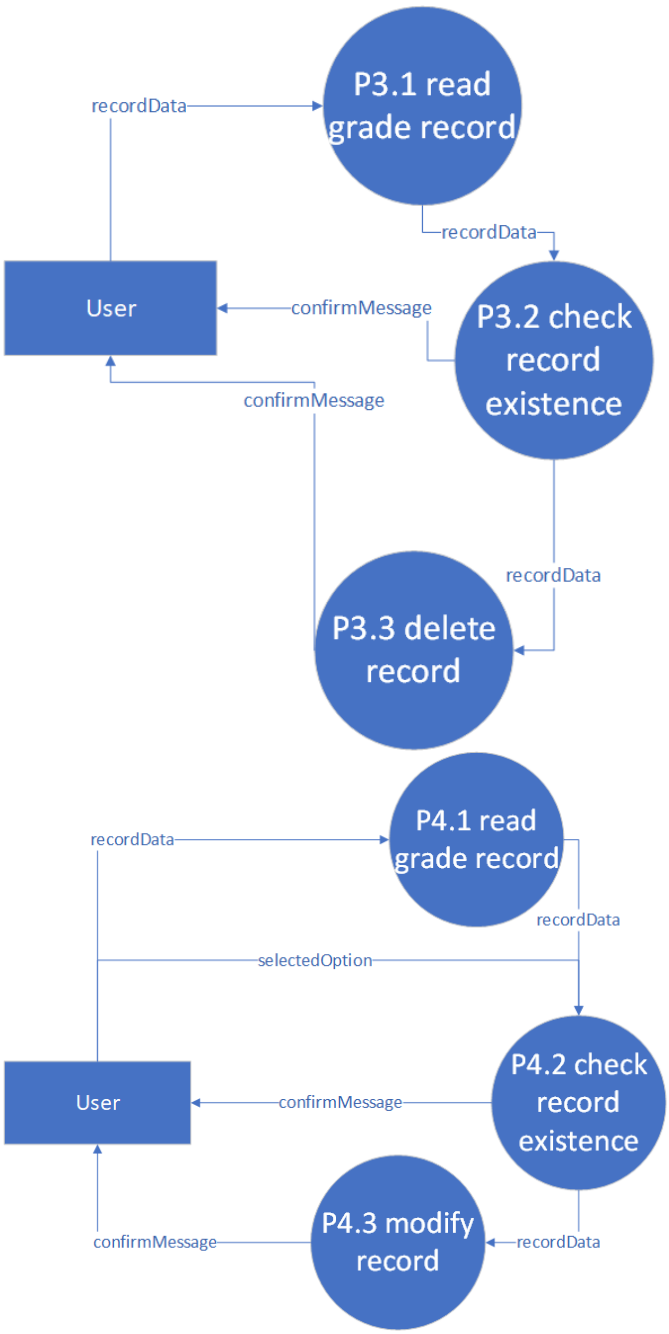
B. Level 1 DFD(s)

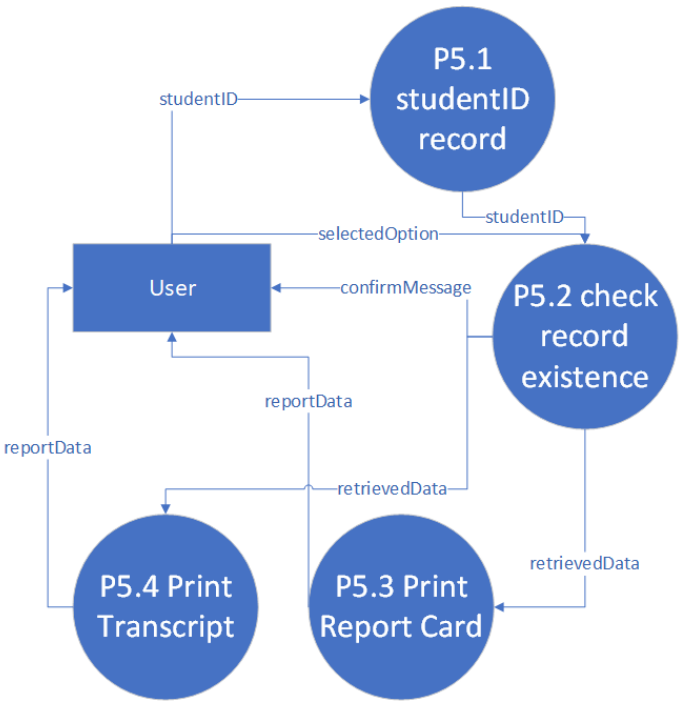


C. Level 2 DFD(s)

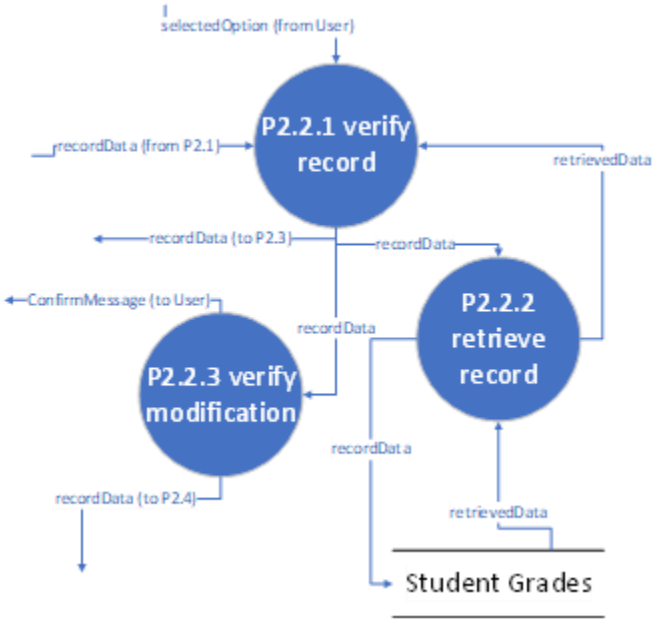


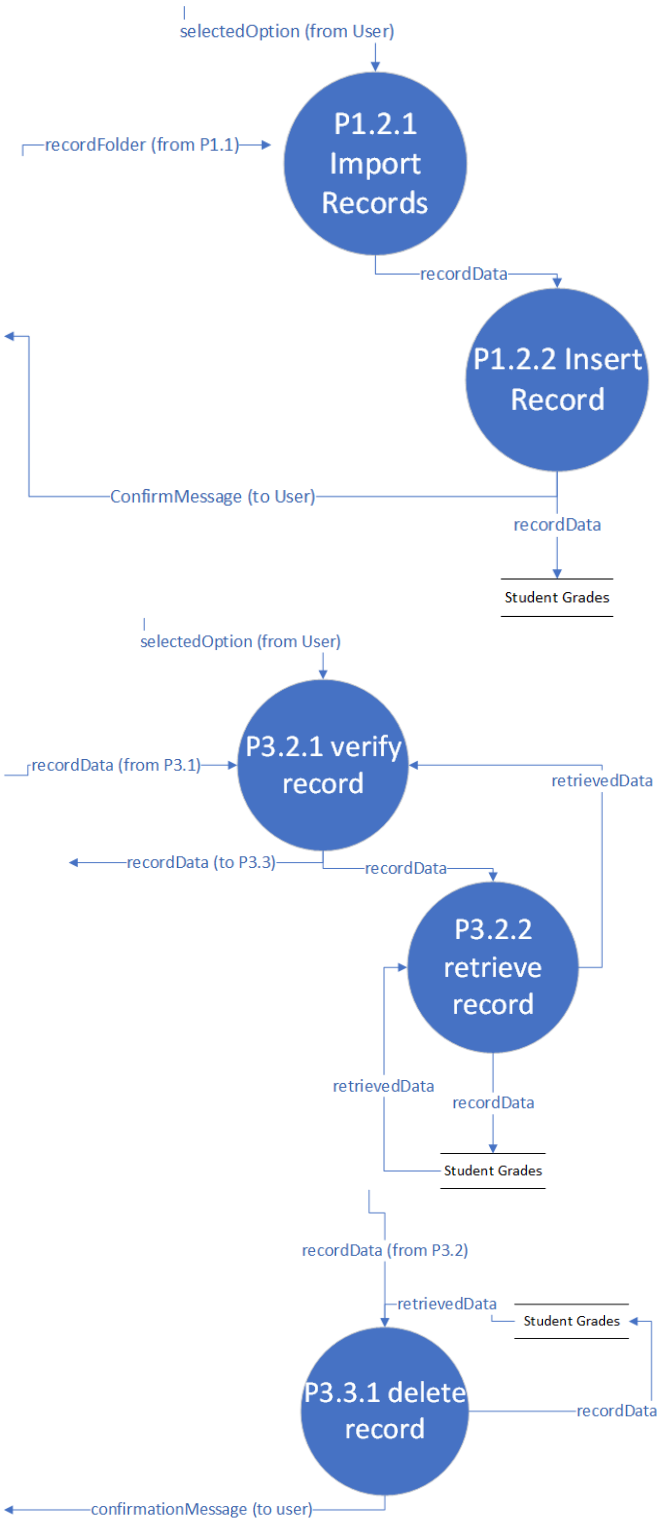

P1.1 read excel file
recordFolder
User
selectedOption
confirmMessage
recordFolder
P1.2 save record

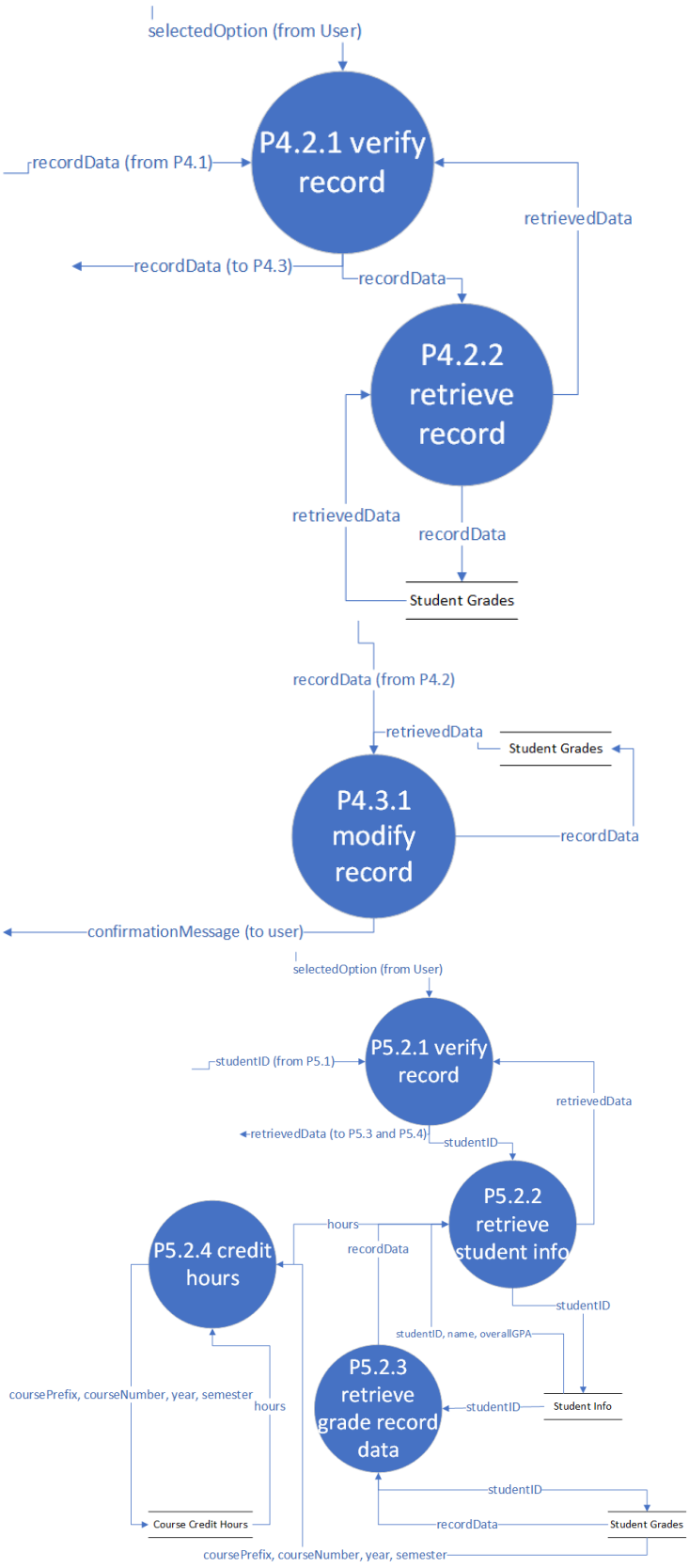

P3.1 read grade record
recordData
recordData
User
confirmMessage
P3.2 check record existence
confirmMessage
recordData
P3.3 delete record
P4.1 read grade record
recordData
recordData
selectedOption
User
confirmMessage
P4.2 check record existence
confirmMessage
P4.3 modify record
recordData



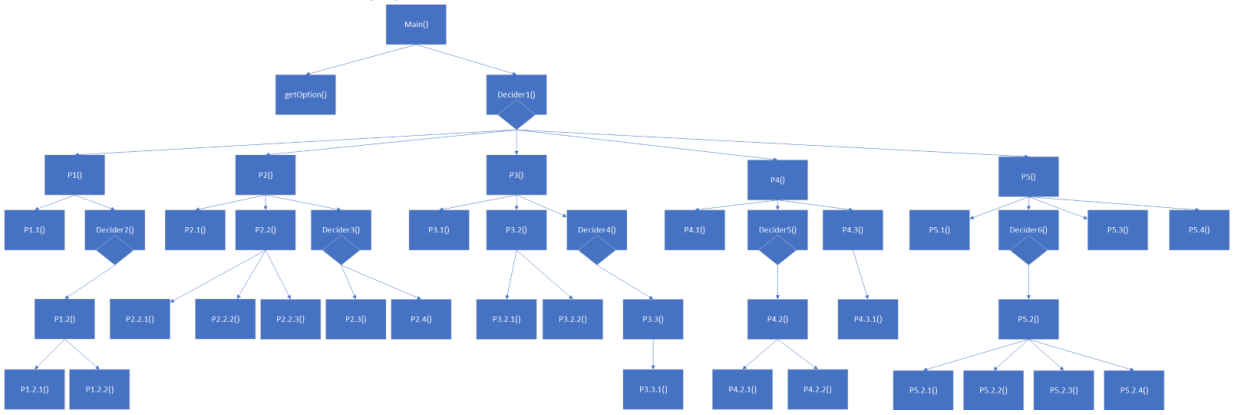
D. Level 3 DFD(s)




selectedOption (from User)
recordFolder (from P1.1)
P1.2.1 Import Records
recordData
P1.2.2 Insert Record
ConfirmMessage (to User)
recordData
Student Grades
selectedOption (from User)
recordData (from P3.1)
P3.2.1 verify record
retrievedData
recordData (to P3.3)
recordData
P3.2.2 retrieve record
retrievedData
recordData
Student Grades
recordData (from P3.2)
retrievedData
Student Grades
P3.3.1 delete record
recordData
confirmationMessage (to user)


selectedOption (from User)
P4.2.1 verify record
recordData (from P4.1)
retrievedData
recordData (to P4.3)
recordData
P4.2.2 retrieve record
retrievedData
recordData
Student Grades
recordData (from P4.2)
retrievedData
Student Grades
P4.3.1 modify record
recordData
confirmationMessage (to user)
selectedOption (from User)
P5.2.1 verify record
studentID (from P5.1)
retrievedData
retrievedData (to P5.3 and P5.4)
studentID
P5.2.2 retrieve student info
P5.2.4 credit hours
hours
recordData
studentID
studentID, name, overallGPA
P5.2.3 retrieve grade record data
coursePrefix, courseNumber, year, semester
hours
studentID
Student Info
studentID
Course Credit Hours
recordData
Student Grades
coursePrefix, courseNumber, year, semester

VI. Structure Chart(s)



VII. Data Store Design (Database Design)

Flow into Student Grades						
recordData (P1.2.2. - Student Grades)	recordData (P2.2.2. - Student Grades)	recordData (P3.2.2. - Student Grades)	recordData (P3.3.1. - Student Grades)	recordData (P4.2.2. - Student Grades)	recordData (P4.3.1. - Student Grades)	recordData(P5.2.3. - Student Grades)
StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID CoursePrefix CourseNumber Grade Year Semester

Flow into Student Grades

retrievedData (Student Grades - P2.2.2.)	retrievedData (Student Grades - P3.2.2.)	retrievedData (Student Grades - P3.3.2.)	retrievedData (Student Grades - P4.2.2.)	retrievedData (Student Grades - P4.3.2.)	StudentID (Student Grades - P5.2.3.)	CoursePrefix CourseNumber Year Semester (Student Grades - P5.2.4.)
Name OverallGPA RecordData StudentID CoursePrefix CourseNumber Grade Year Semester	Name OverallGPA RecordData StudentID CoursePrefix CourseNumber Grade Year Semester	Name OverallGPA RecordData StudentID CoursePrefix CourseNumber Grade Year Semester	Name OverallGPA RecordData StudentID CoursePrefix CourseNumber Grade Year Semester	Name OverallGPA RecordData StudentID CoursePrefix CourseNumber Grade Year Semester	StudentID	CoursePrefix CourseNumber Year Semester

Flow into Course Credit Hours

CoursePrefix CourseNumber Year Semester (P5.2.4. - Course Credit Hours)
CoursePrefix CourseNumber Year Semester

Flow out of Course Credit Hours
hours (Course Credit Hours - P5.2.4.)
hours

Flow into Student Info
StudentID (P5.2.2. - Course Credit Hours)
StudentID

Flow out of Student Info
StudentID, Name, OverallGPA (Course Credit Hours - P5.2.2.)
StudentID Name OverallGPA

Schemas

Student Info
StudentID
Name
OverallGPA

Student Grades
StudentID
CoursePrefix
CourseNumber
Grade
Year
Semester

Course Credit Hours
CoursePrefix
CourseNumber
Year
Semester
Hours

Student Info 3NF

StudentID	CoursePrefix	CourseNum	Grade	Year	Semester
189467	MAT	420	A	2021	Fall

Course Credit Hours 3NF

CoursePrefix	CourseNum	Year	Semester	Hours
MAT	420	2019	Fall	3

Student Info 3NF

StudentID	Name	OverallGPA
189467	Adam Cohen	3.1

VIII. Conclusion

The proposed software system offers a solution to address the grade management needs of EKU's Registrar Office. By addressing the challenges associated with collecting, editing, and presenting student grade records, this system aims to enhance accuracy and productivity within EKU's Registrar Office. The system's core features include the ability to add, edit, and print student grade records with an integrated ability to perform grade calculations and GPA updates. The utilization of data flow diagrams, structure charts, and data store designs enhances the system's transparency and scalability, promoting adaptability to potential future enhancements. Furthermore, the data dictionary and well-defined schemas provide a clear understanding of the underlying data structures. This not only facilitates smooth operations but also lays the foundation for potential expansion and integration with other institutional systems. As a result of this project, EKU's Registrar Office can anticipate improved accuracy in student grade records, streamlined administrative processes, and enhanced accessibility to crucial academic information. The proposed software system stands as a testament to effective project management, diligent system design, and the application of modern technological solutions to meet the evolving needs of educational institutions.

IX. Data Dictionary

1. confirmMessage: Text displayed with a message box.
2. recordData (data structure): Data in a student grade record, including studentID, coursePrefix, courseNumber, grade, year, and semester.
3. selectedOption (data element): a Boolean value to decide to modify a grade record.
4. studentID (data element): 6-digits varchar.
5. coursePrefix (data element): 3-chars varchar.
6. courseNumber (data element): 3-chars varchar.
7. grade (data element): 1-char varchar.
8. year (data element): 4-digit varchar.
9. semester (data element): varchar.
10. hours (data element): digits varchar
11. overallGPA (data element): double.
12. recordFolder (data structure): data in Excel spreadsheet (comma-separated value: csv) with course grades for each student of a given semester and year including name, studentID, and grade and recordData.
13. retrievedData (data structure): name, overallGPA, and recordData.
14. reportData (data structure): report that includes name, overallGPA, studentID, courseNumber, coursePrefix, grade, year, semester, and hours.