মেট্রোপলিটন ইউনিভার্সিটি
Metropolitan
University

Department of Computer Science & Engineering

Project Report

Title : Student Management System

Course Name : Data Structure Lab

Course Code : CSE -134

Submitted to:

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- ✩ Lecturer
- ✩ Dept. of Computer Science & Engineering

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SCHOOL MANAGEMENT SYSTEM

❖ Introduction:

This School Management System is a beginner-friendly project aimed at creating a useful tool for managing student and teacher information in a school setting. This project uses fundamental C programming techniques to achieve several essential functions .This project has basic management function. It adds, modify, display, and delete records for students and teachers with details like names, roll numbers, and classes .It also tracks numbers of classes attended, calculates attendance percentages, and checks if a student is eligible for exams or not .It calculates GPAs and ranks students based on a simple grading system. The system also includes a search function that lets users look up students by roll number or class and easily retrieve teacher information. There is also a basic login system to control access. This project uses core C programming concepts like data structures, file handling, and user-defined functions demonstrating how these techniques can create a useful tool for educational management. It's a solid starting point with room for future enhancements.

❖ Background Study:

As it was our first project in C, we developed a basic School Management System by gathering ideas and learning from various online resources. This project marks our initial attempt at creating a School Management System using C programming, and we took inspiration from multiple sources to incorporate features such as managing students, teachers, and attendance.

The concept of ranking students based on their scores came from an article on FindNerd. The article, "How to calculate the ranking for students in a classroom using arrays only and sorting techniques", clearly explained how sorting algorithms can be used to rank students. We took inspiration and used this approach in our system to calculate rankings dynamically.[1]

For managing teacher information and the concept of adding both first and last names, we were inspired by the code shared on GitHub by Yasir Waseem in his project School Management System in C. This gave us a structure to handle basic teacher records, which we extended by adding more functionality to suit the needs of our system.[2]

For the login system, tracking attendance percentages, and modifying and displaying teacher and student information, we were influenced by Manan's work shared on GitHub for the Student Attendance Calculator. His code demonstrated how to create a login system, calculate attendance percentages, and manage records. We integrated these features into our project, adapting them to modify and display both student and teacher data efficiently.[3]

[1] https://findnerd.com/list/view/How-to-calculate-the-ranking-for-students-in-a-classroom-using-arrays-only-and-sorting-techniques/69809/

[2] https://github.com/YasirWaseem/School-Management-System-in-C/blob/main/school_management_system.c

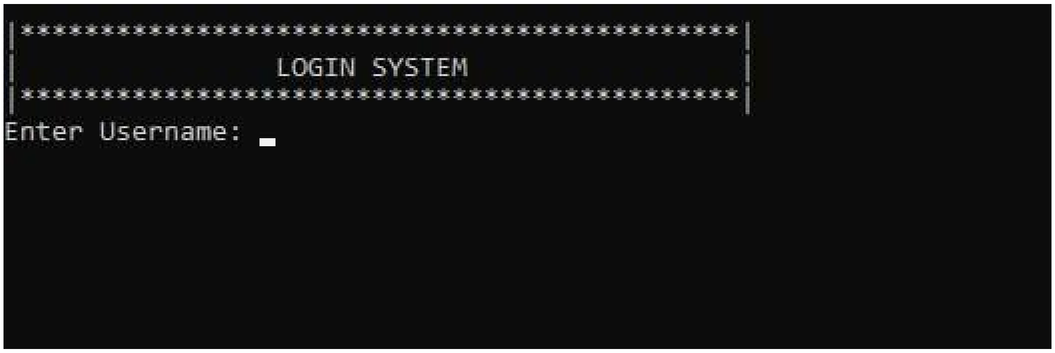
[3] https://github.com/manan307/Student-attendance-calculator/blob/main/Final.c

Lastly, for adding, deleting, and finding records of students and teachers we turned to a tutorial on Scaler. The article Student Record Management System in C helped us to implement various functions like adding new records and searching for existing ones.[4]

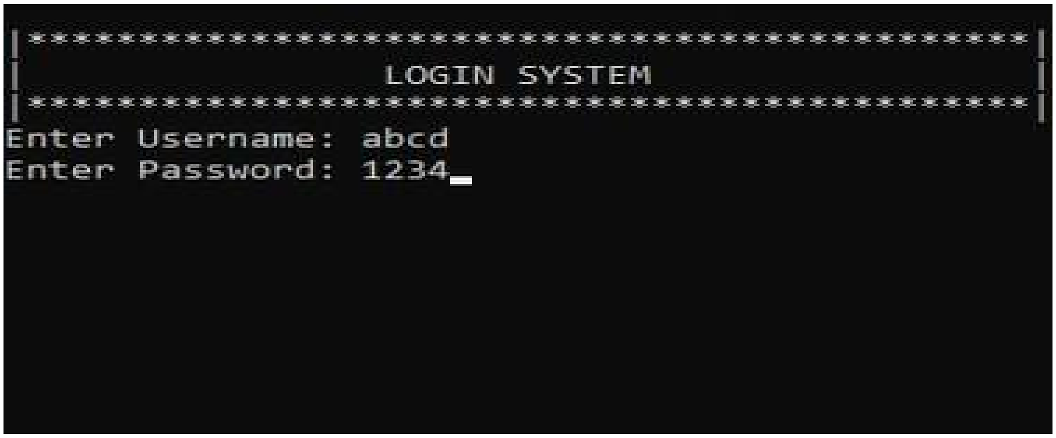
In summary, this project is a combination of the ideas and code we gathered from multiple sources. We were able to use these inspirations and adapt them with the knowledge of C programming we had acquired. Each of these resources was essential in helping us shape our School Management System.

- ### Feature:

Login System: The login system ensures that only authorized users can access the system. To gain access, users must enter a username and password. The system then verifies the credentials, allowing access if they match. If the credentials are incorrect, the user will not be able to use the system.



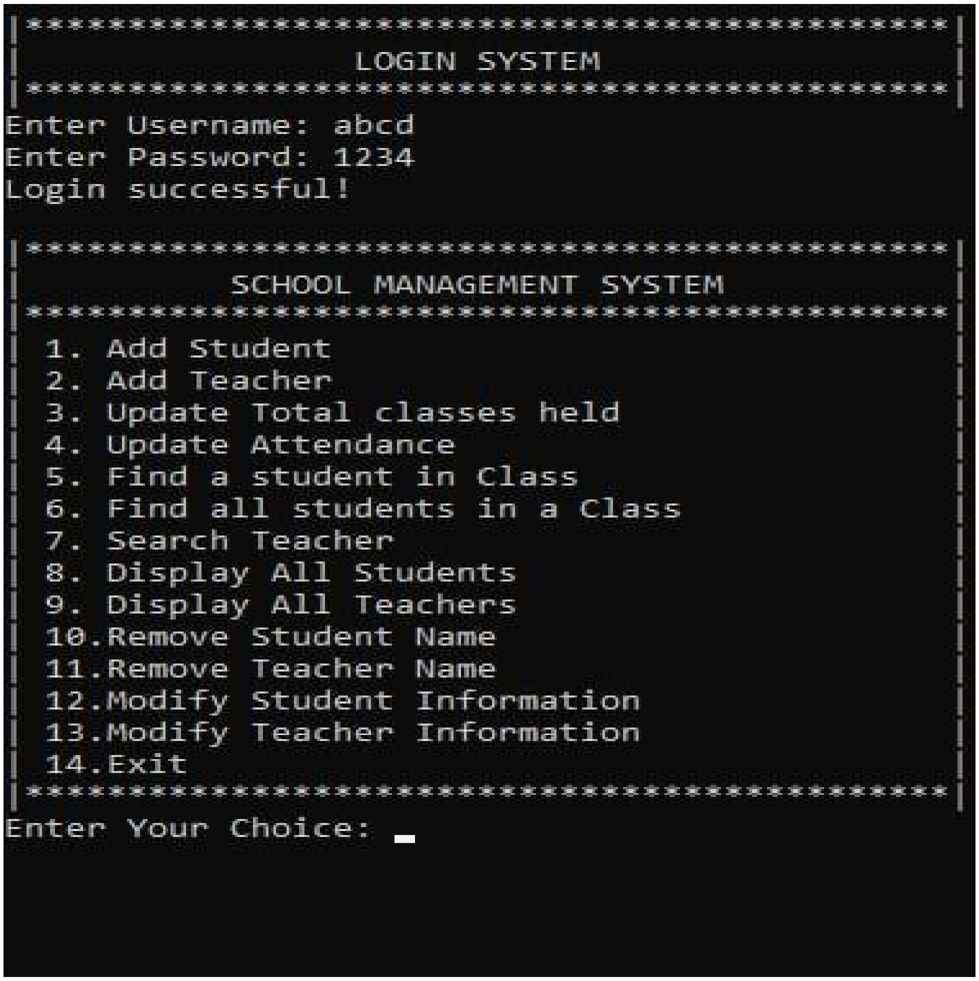
```
|*********************************************|
|                LOGIN SYSTEM                 |
|*********************************************|
Enter Username: _
```



```
|*********************************************|
|                LOGIN SYSTEM                 |
|*********************************************|
Enter Username: abcd
Enter Password: 1234_
```

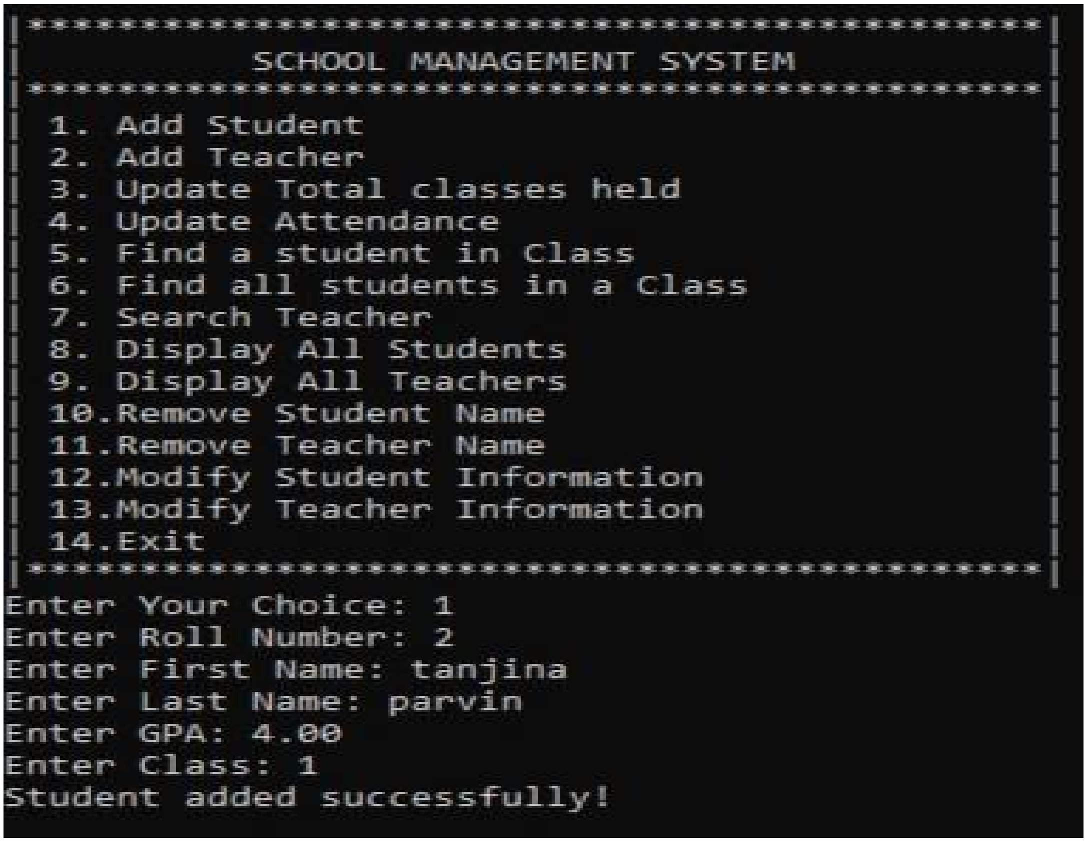
Main menu: After logging in, users are presented with a main menu that lists all available features. They can choose the option they wish to use.

[4] https://www.scaler.com/topics/student-record-management-system-c-project/



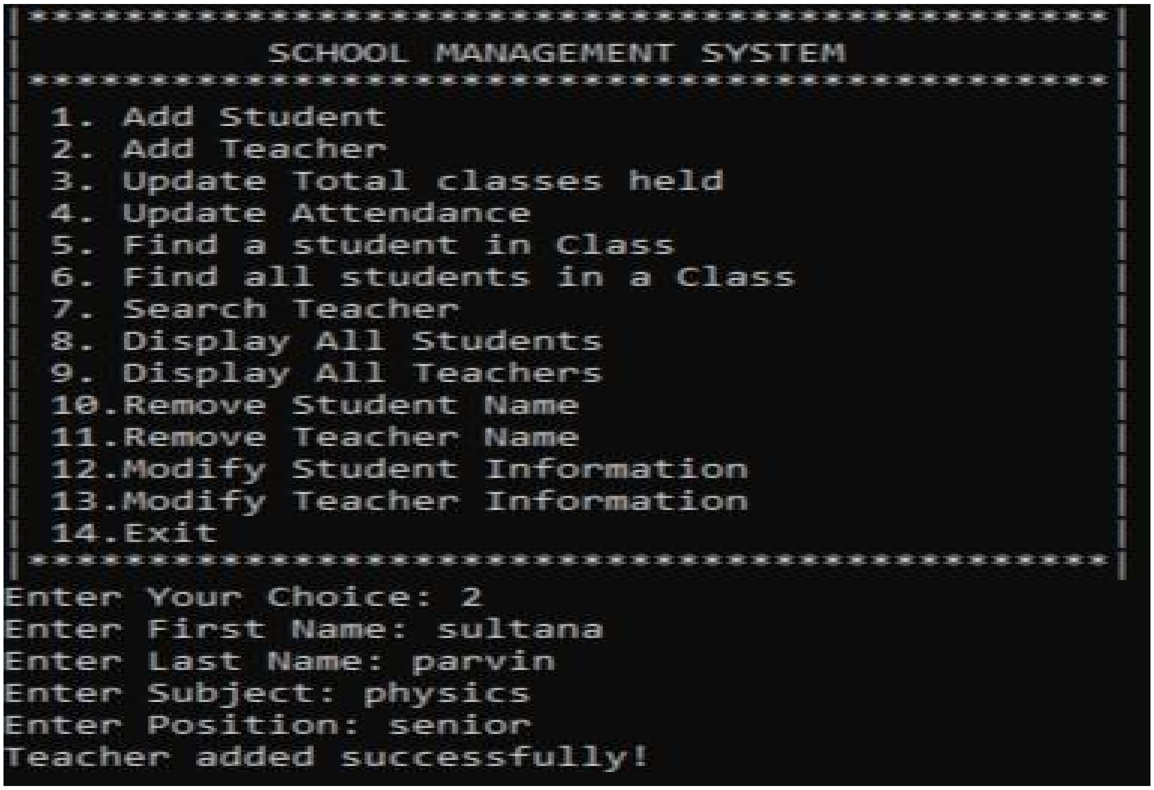
```
|*********************************************|
|                LOGIN SYSTEM                 |
|*********************************************|
Enter Username: abcd
Enter Password: 1234
Login successful!

|*********************************************|
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: _
```

Add student: This feature allows the addition of a new student to the system. The system will prompt the user for details like roll number, first name, last name, GPA, and class. Based on the GPA entered, the system automatically assigns a grade to the student**.**



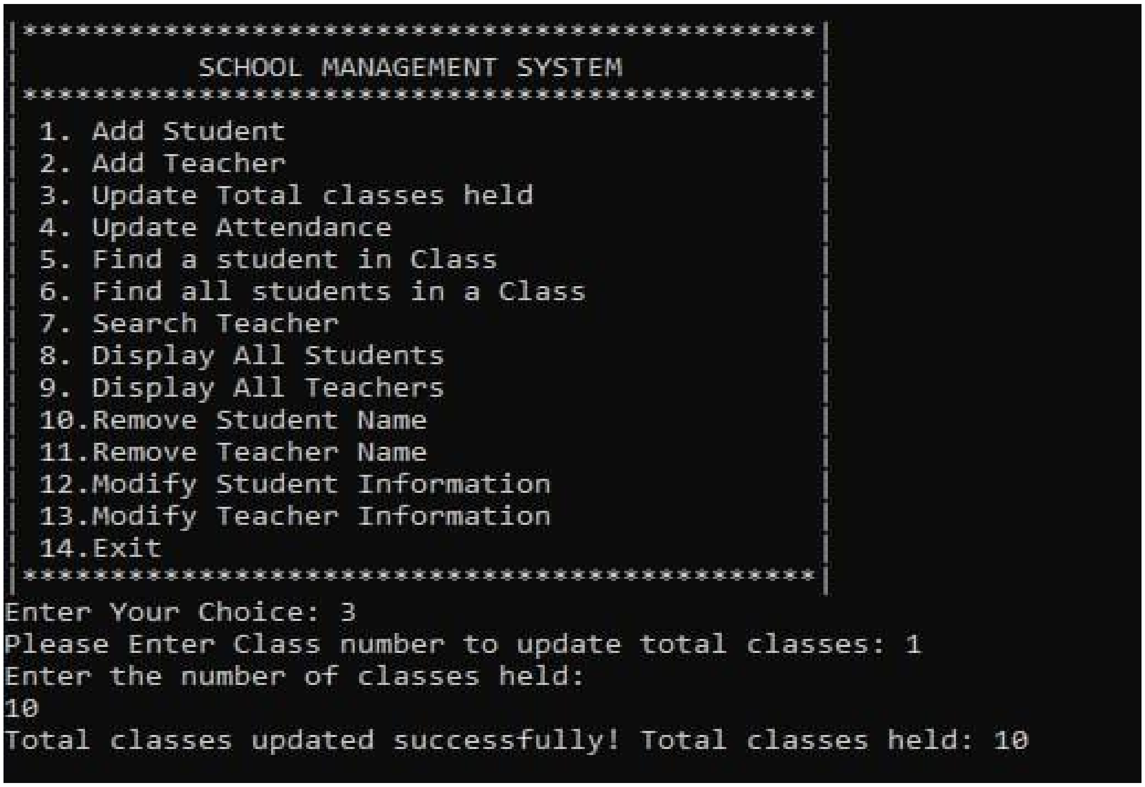
```
|**********************************************|
|             SCHOOL MANAGEMENT SYSTEM         |
|**********************************************|
| 1. Add Student                               |
| 2. Add Teacher                               |
| 3. Update Total classes held                 |
| 4. Update Attendance                         |
| 5. Find a student in Class                   |
| 6. Find all students in a Class              |
| 7. Search Teacher                            |
| 8. Display All Students                      |
| 9. Display All Teachers                      |
| 10.Remove Student Name                       |
| 11.Remove Teacher Name                       |
| 12.Modify Student Information                |
| 13.Modify Teacher Information                |
| 14.Exit                                      |
|**********************************************|
Enter Your Choice: 1
Enter Roll Number: 2
Enter First Name: tanjina
Enter Last Name: parvin
Enter GPA: 4.00
Enter Class: 1
Student added successfully!
```

Add teacher: This feature adds a new teacher to the system. The user has to input the teacher’s name, the subject they teach, and their position.



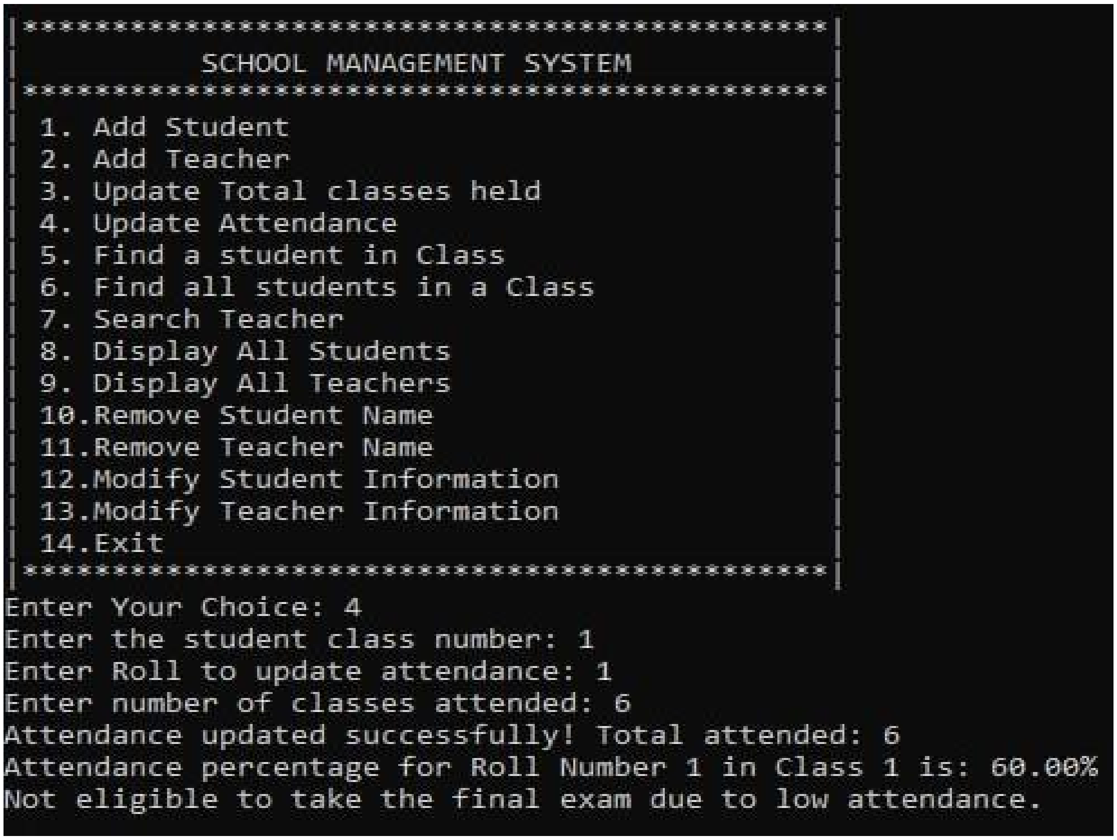
```
|**********************************************|
|            SCHOOL MANAGEMENT SYSTEM          |
|**********************************************|
|  1. Add Student                              |
|  2. Add Teacher                              |
|  3. Update Total classes held                |
|  4. Update Attendance                        |
|  5. Find a student in Class                  |
|  6. Find all students in a Class             |
|  7. Search Teacher                           |
|  8. Display All Students                     |
|  9. Display All Teachers                     |
|  10.Remove Student Name                      |
|  11.Remove Teacher Name                      |
|  12.Modify Student Information               |
|  13.Modify Teacher Information               |
|  14.Exit                                     |
|**********************************************|
Enter Your Choice: 2
Enter First Name: sultana
Enter Last Name: parvin
Enter Subject: physics
Enter Position: senior
Teacher added successfully!
```

Update total classes held: This feature allows the user to modify the total number of classes held for a specific class. The user can input the new total number of classes, which will impact attendance tracking.



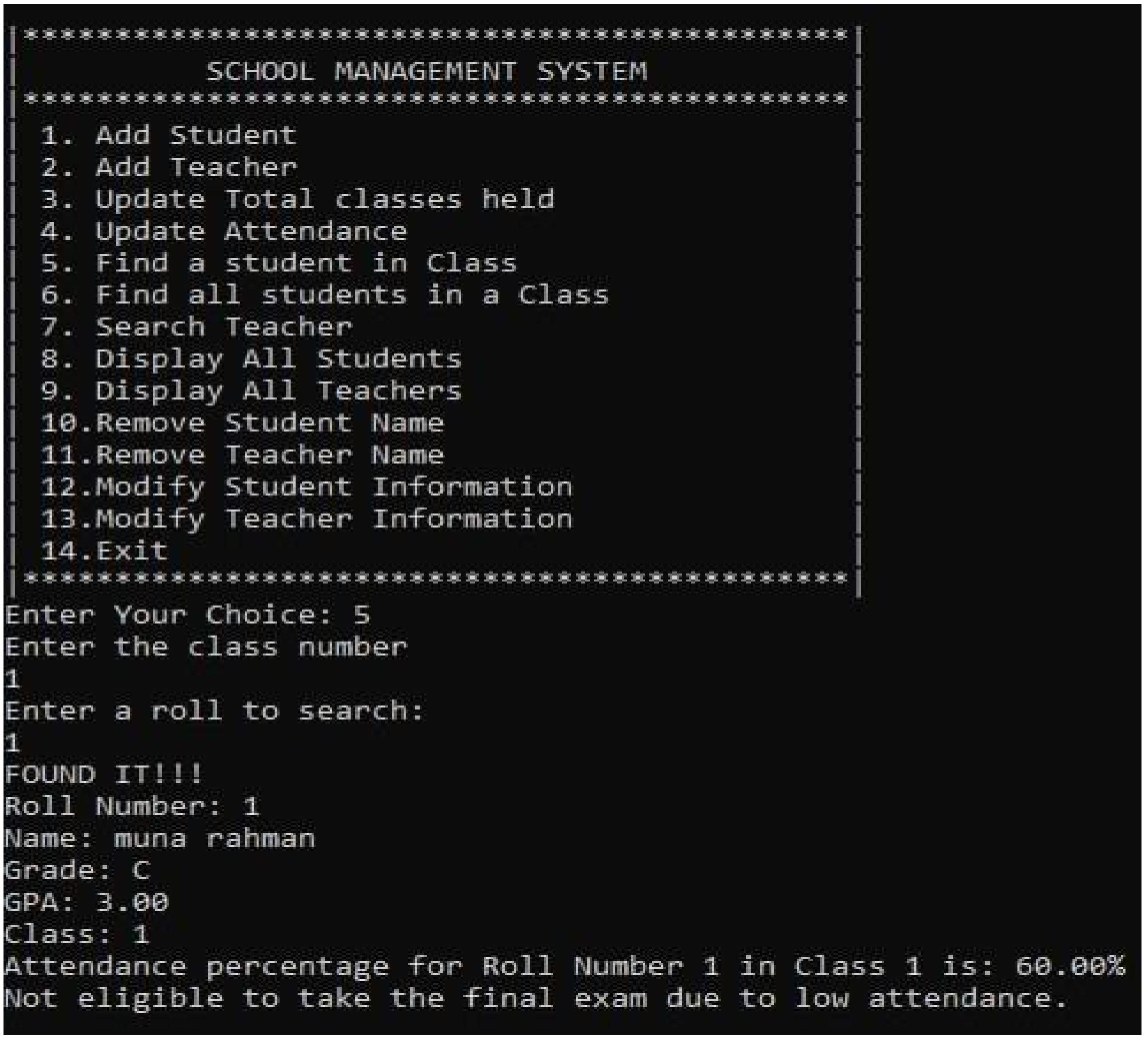
```
|*********************************************|
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 3
Please Enter Class number to update total classes: 1
Enter the number of classes held:
10
Total classes updated successfully! Total classes held: 10
```

Update attendance: This feature updates the attendance record for a specific student .The user can input the number of classes a student has attended, ensuring that it doesn’t exceed the total number of classes. This feature make sure if a student is eligible for taking the final exam or not.



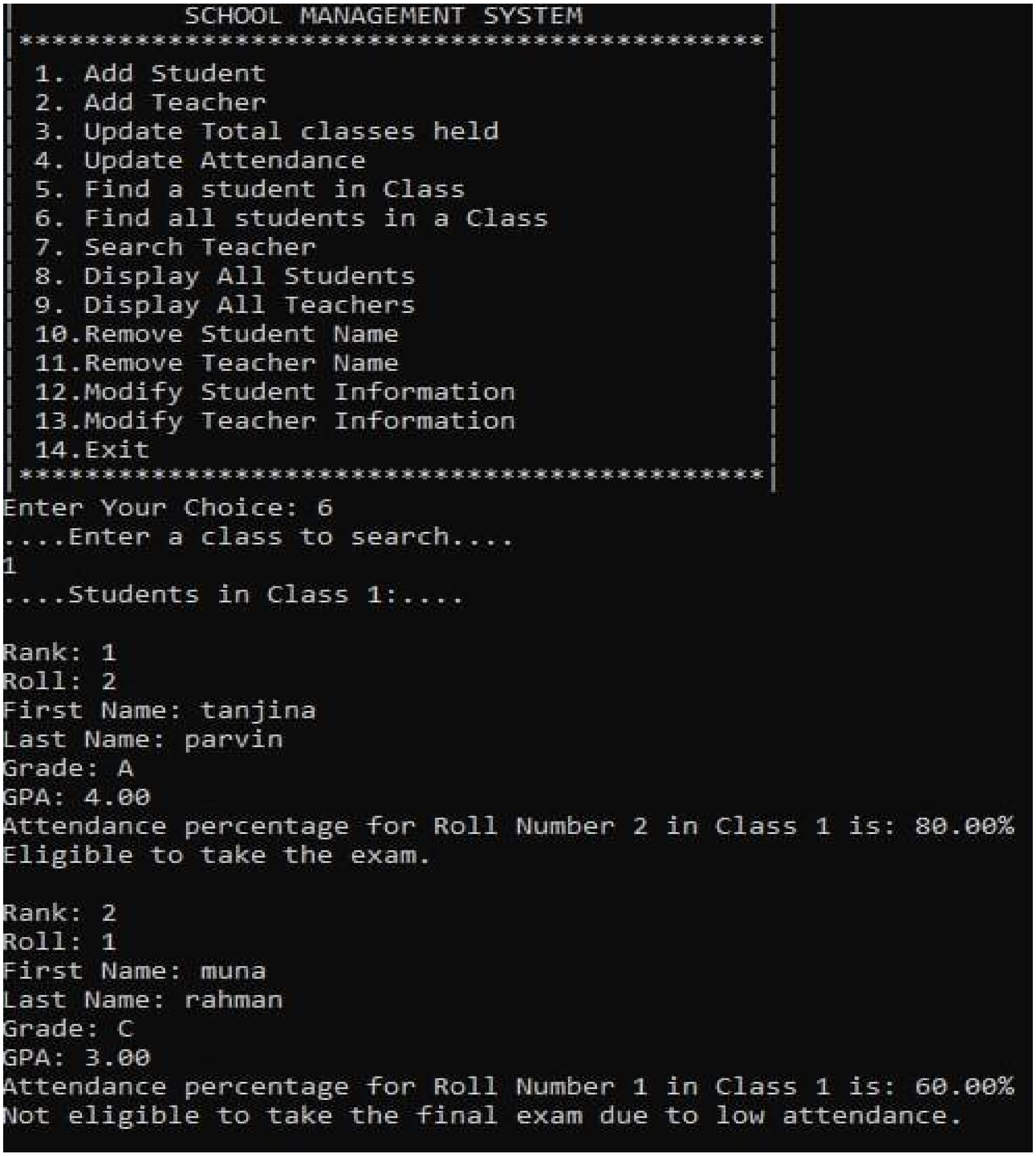
```
|*********************************************|
|           SCHOOL MANAGEMENT SYSTEM          |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 4
Enter the student class number: 1
Enter Roll to update attendance: 1
Enter number of classes attended: 6
Attendance updated successfully! Total attended: 6
Attendance percentage for Roll Number 1 in Class 1 is: 60.00%
Not eligible to take the final exam due to low attendance.
```

Find a student in a class: This feature allows the user to search for a specific student using their roll number and class. The user inputs the roll number and class to find a student’s detailed information.



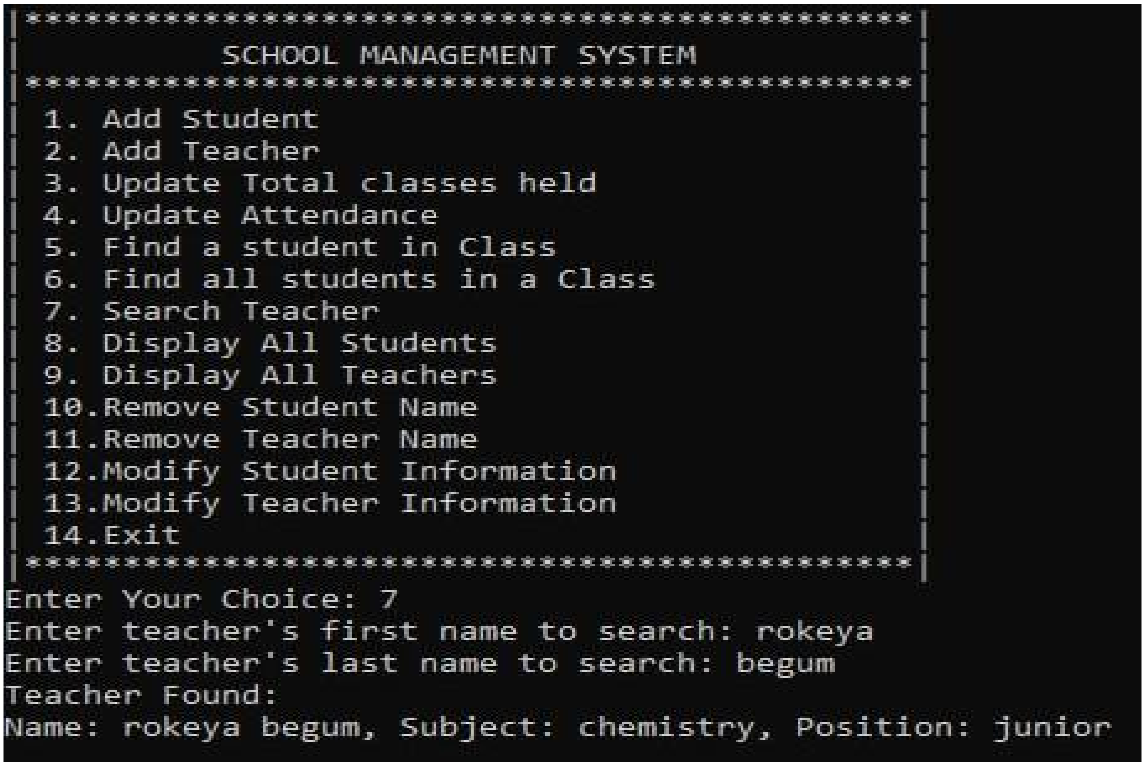
```
|*********************************************|
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 5
Enter the class number
1
Enter a roll to search:
1
FOUND IT!!!
Roll Number: 1
Name: muna rahman
Grade: C
GPA: 3.00
Class: 1
Attendance percentage for Roll Number 1 in Class 1 is: 60.00%
Not eligible to take the final exam due to low attendance.
```

Find all students in a class: This feature helps search for students in a specific class. The user can filter students by their class and sort them by GPA to get a sense of academic performance in that class.



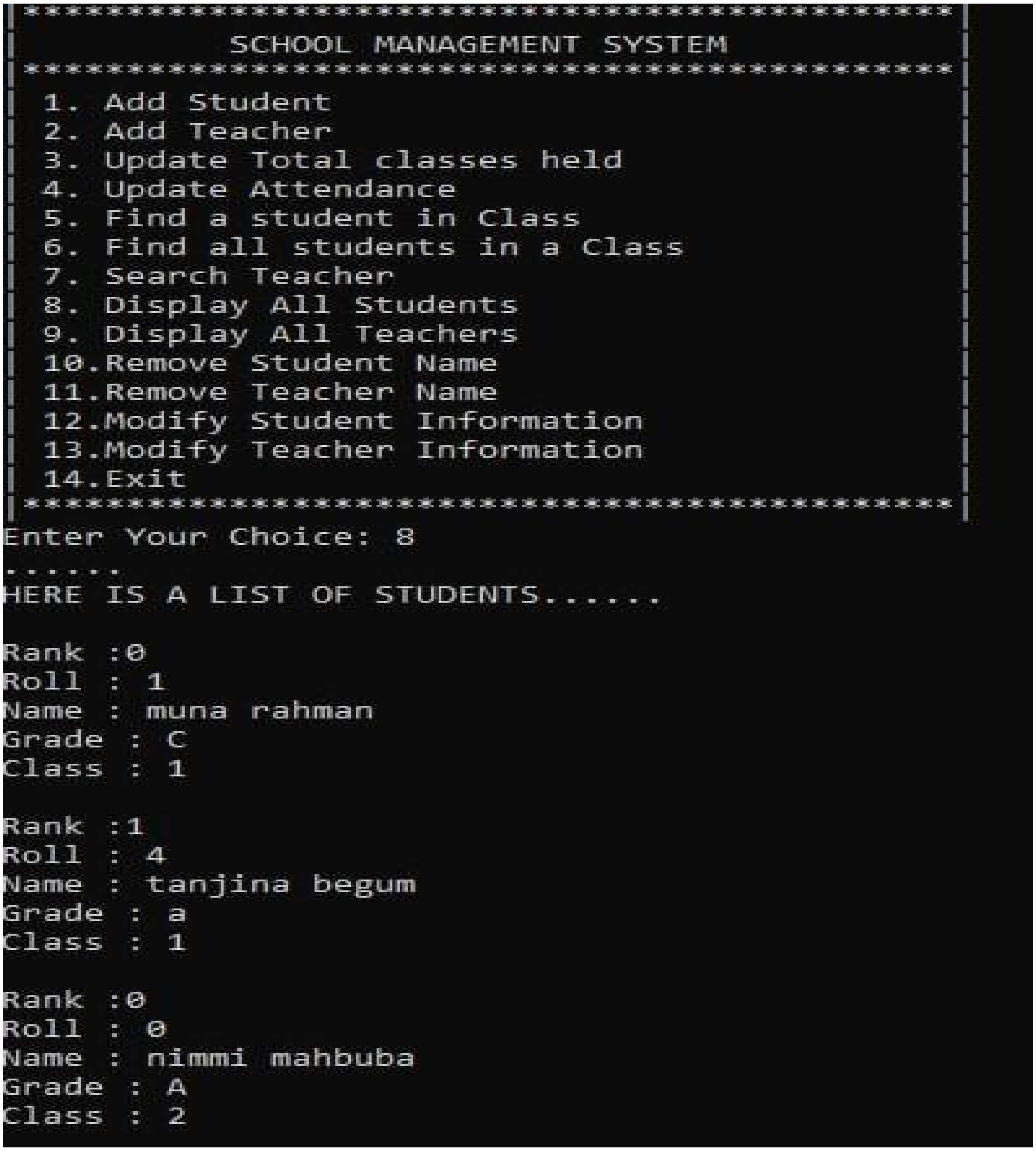
```
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 6
....Enter a class to search....
1
....Students in Class 1:....

Rank: 1
Roll: 2
First Name: tanjina
Last Name: parvin
Grade: A
GPA: 4.00
Attendance percentage for Roll Number 2 in Class 1 is: 80.00%
Eligible to take the exam.

Rank: 2
Roll: 1
First Name: muna
Last Name: rahman
Grade: C
GPA: 3.00
Attendance percentage for Roll Number 1 in Class 1 is: 60.00%
Not eligible to take the final exam due to low attendance.
```

Search teacher: This feature helps find a teacher by their first name and last name. The system searches teacher records based on the name provided and displays the corresponding details.



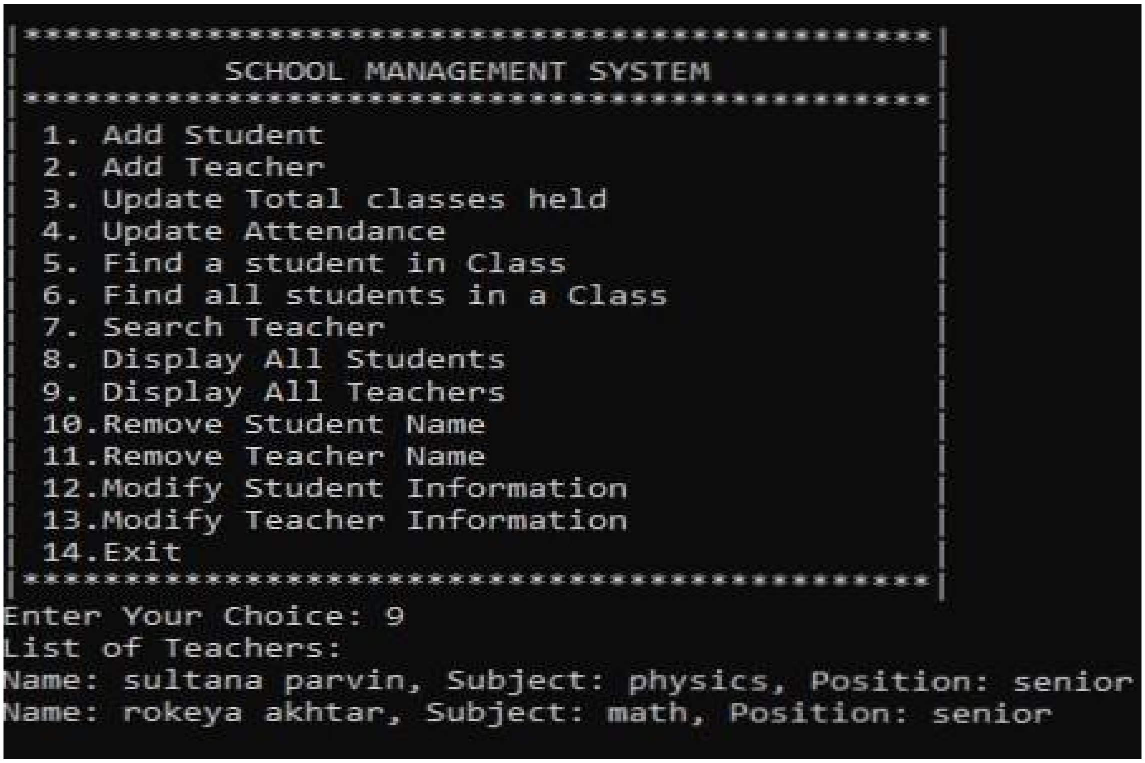
```
|*********************************************|
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 7
Enter teacher's first name to search: rokeya
Enter teacher's last name to search: begum
Teacher Found:
Name: rokeya begum, Subject: chemistry, Position: junior
```

Display all students: This feature allows the user to view all student records at once. The system lists students’ details, such as rank, roll number, name, grade and class.



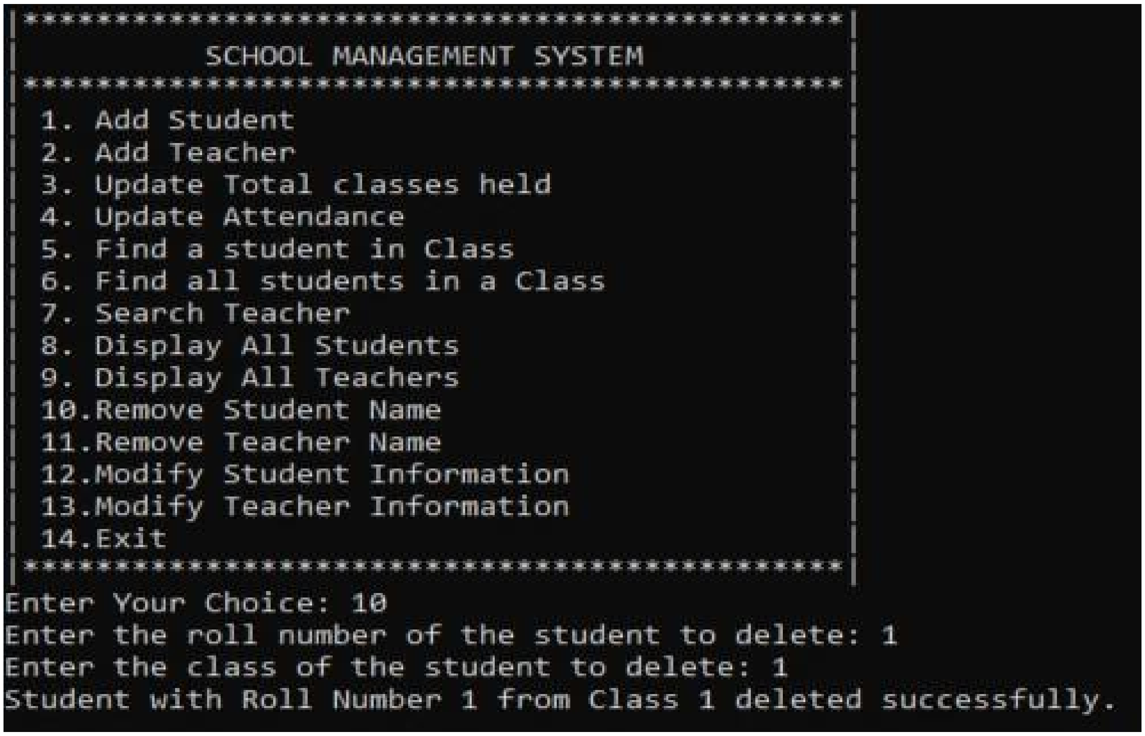
```
|*********************************************|
|            SCHOOL MANAGEMENT SYSTEM         |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 8
......
HERE IS A LIST OF STUDENTS......

Rank :0
Roll : 1
Name : muna rahman
Grade : C
Class : 1

Rank :1
Roll : 4
Name : tanjina begum
Grade : a
Class : 1

Rank :0
Roll : 0
Name : nimmi mahbuba
Grade : A
Class : 2
```

Display all teachers: This feature displays all teacher records. The system lists all teachers with details like their name, subject, and position (senior/junior).



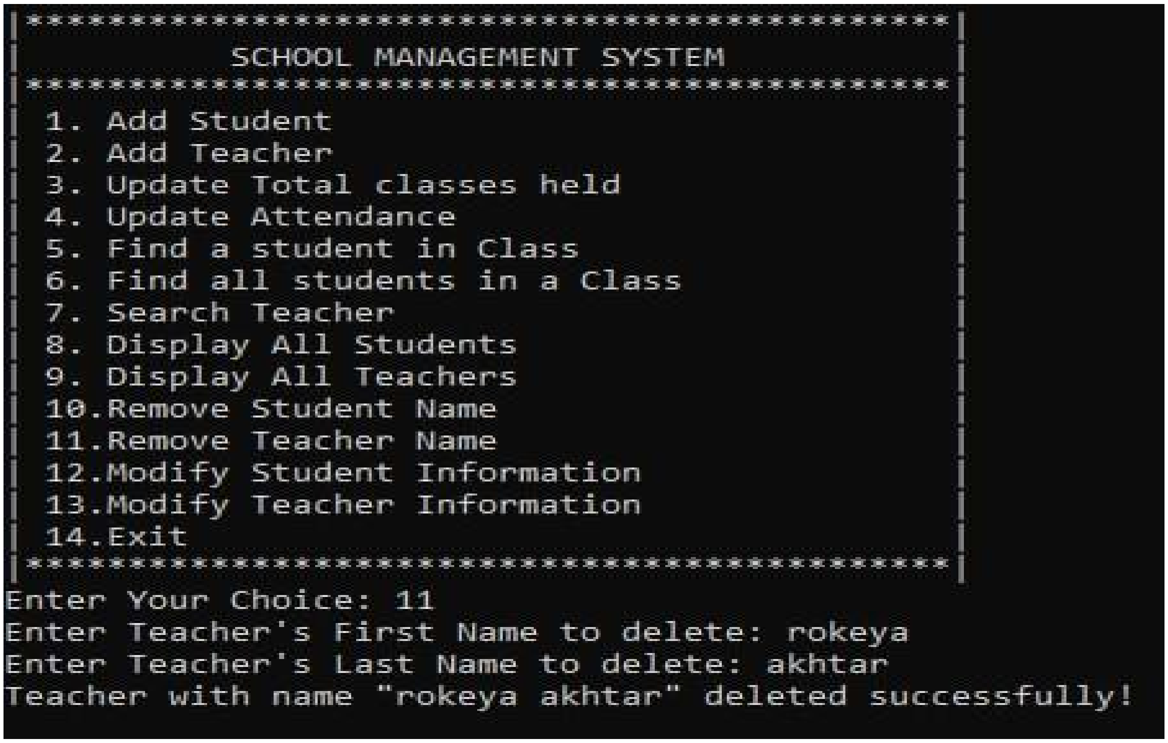
```
|********************************************|
|           SCHOOL MANAGEMENT SYSTEM         |
|********************************************|
| 1. Add Student                             |
| 2. Add Teacher                             |
| 3. Update Total classes held               |
| 4. Update Attendance                       |
| 5. Find a student in Class                 |
| 6. Find all students in a Class            |
| 7. Search Teacher                          |
| 8. Display All Students                    |
| 9. Display All Teachers                    |
| 10.Remove Student Name                     |
| 11.Remove Teacher Name                     |
| 12.Modify Student Information              |
| 13.Modify Teacher Information              |
| 14.Exit                                    |
|********************************************|
Enter Your Choice: 9
List of Teachers:
Name: sultana parvin, Subject: physics, Position: senior
Name: rokeya akhtar, Subject: math, Position: senior
```

Remove student name: This feature allows for the removal of a student from the system. The user can delete a student's record by entering their roll number and class.



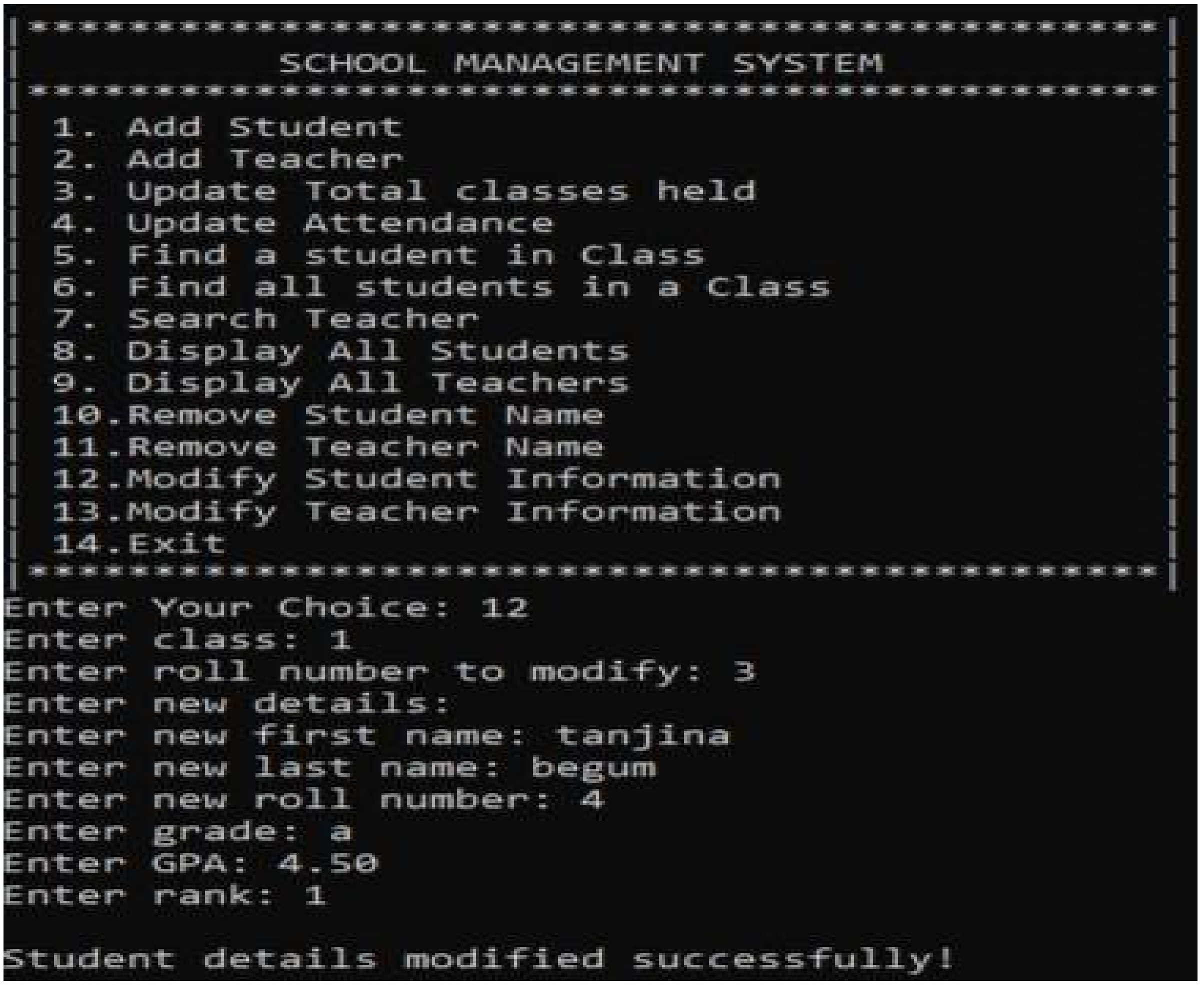
```
|********************************************|
|           SCHOOL MANAGEMENT SYSTEM         |
|********************************************|
| 1. Add Student                             |
| 2. Add Teacher                             |
| 3. Update Total classes held               |
| 4. Update Attendance                       |
| 5. Find a student in Class                 |
| 6. Find all students in a Class            |
| 7. Search Teacher                          |
| 8. Display All Students                    |
| 9. Display All Teachers                    |
| 10.Remove Student Name                     |
| 11.Remove Teacher Name                     |
| 12.Modify Student Information              |
| 13.Modify Teacher Information              |
| 14.Exit                                    |
|********************************************|
Enter Your Choice: 10
Enter the roll number of the student to delete: 1
Enter the class of the student to delete: 1
Student with Roll Number 1 from Class 1 deleted successfully.
```

Remove teacher name: This feature deletes a teacher record from the system. The user can remove a teacher by entering their name.



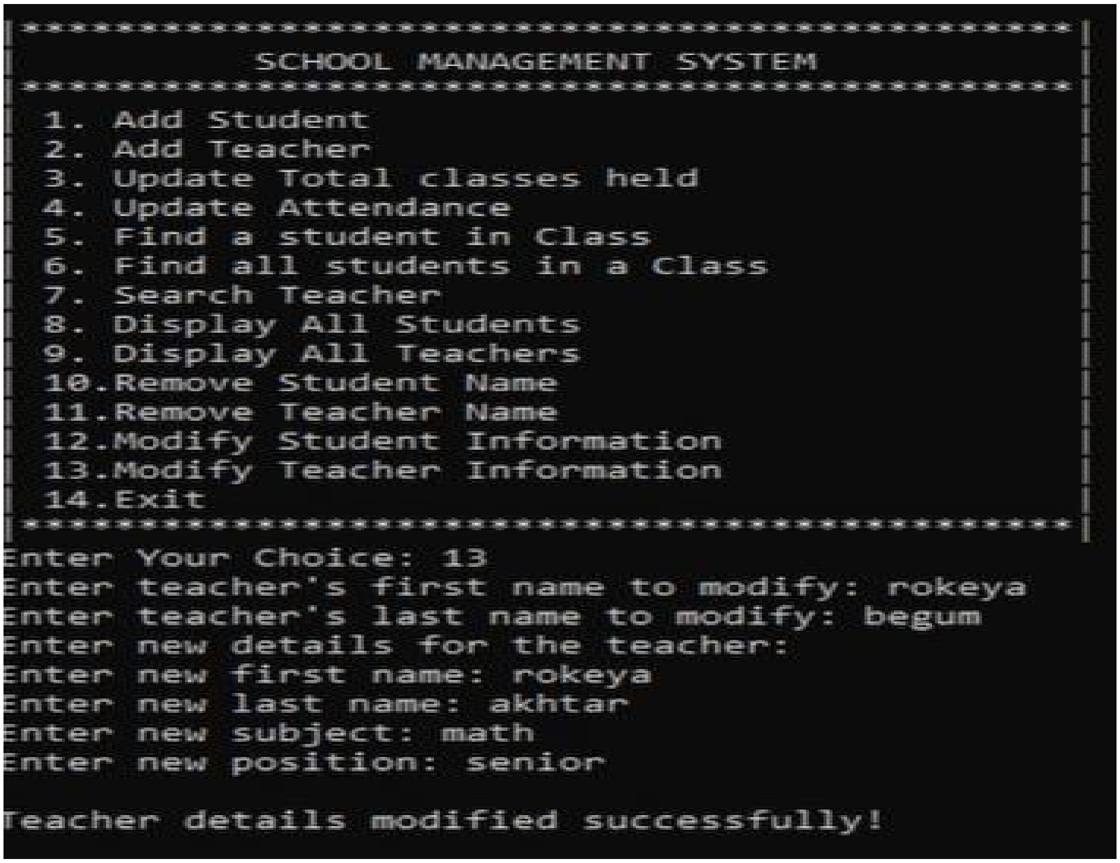
```
|**********************************************|
|          SCHOOL MANAGEMENT SYSTEM            |
|**********************************************|
| 1. Add Student                               |
| 2. Add Teacher                               |
| 3. Update Total classes held                 |
| 4. Update Attendance                         |
| 5. Find a student in Class                   |
| 6. Find all students in a Class              |
| 7. Search Teacher                            |
| 8. Display All Students                      |
| 9. Display All Teachers                      |
| 10.Remove Student Name                       |
| 11.Remove Teacher Name                       |
| 12.Modify Student Information                |
| 13.Modify Teacher Information                |
| 14.Exit                                      |
|**********************************************|
Enter Your Choice: 11
Enter Teacher's First Name to delete: rokeya
Enter Teacher's Last Name to delete: akhtar
Teacher with name "rokeya akhtar" deleted successfully!
```

Modify student information: This feature helps update a student’s information. The user can change details like name, GPA, roll number, rank ,grade or class.



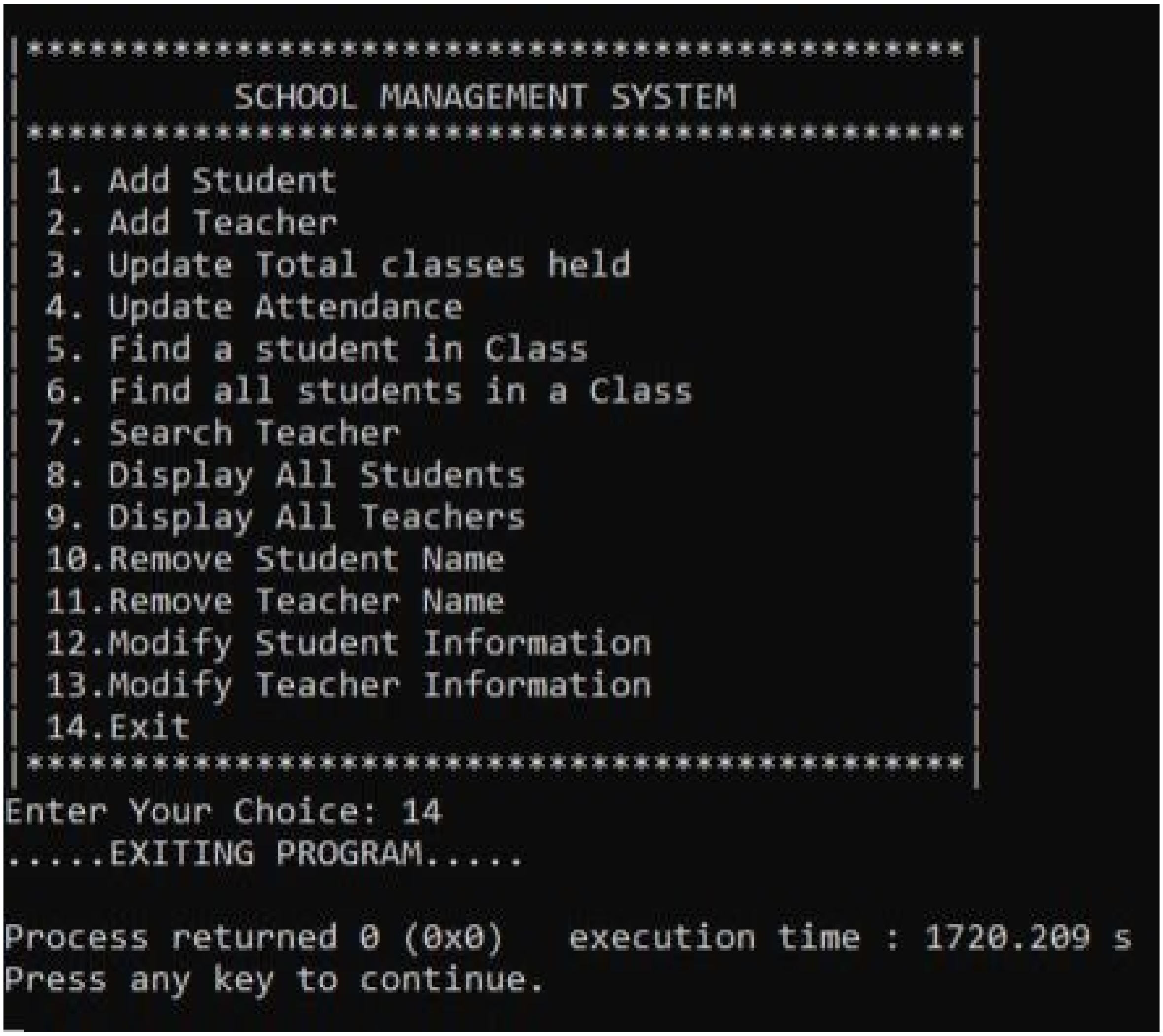
```
|**********************************************|
|            SCHOOL MANAGEMENT SYSTEM          |
|**********************************************|
| 1. Add Student                               |
| 2. Add Teacher                               |
| 3. Update Total classes held                 |
| 4. Update Attendance                         |
| 5. Find a student in Class                   |
| 6. Find all students in a Class              |
| 7. Search Teacher                            |
| 8. Display All Students                      |
| 9. Display All Teachers                      |
| 10.Remove Student Name                       |
| 11.Remove Teacher Name                       |
| 12.Modify Student Information                |
| 13.Modify Teacher Information                |
| 14.Exit                                      |
|**********************************************|
Enter Your Choice: 12
Enter class: 1
Enter roll number to modify: 3
Enter new details:
Enter new first name: tanjina
Enter new last name: begum
Enter new roll number: 4
Enter grade: a
Enter GPA: 4.50
Enter rank: 1

Student details modified successfully!
```

Modify teacher information: This feature updates a teacher details. The user can change a teacher’s name, subject, or position in the system.



```
|*********************************************|
|            SCHOOL MANAGEMENT SYSTEM         |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 13
Enter teacher's first name to modify: rokeya
Enter teacher's last name to modify: begum
Enter new details for the teacher:
Enter new first name: rokeya
Enter new last name: akhtar
Enter new subject: math
Enter new position: senior

Teacher details modified successfully!
```

Exit: This feature allows users to ends the session and close the application.



```
|*********************************************|
|          SCHOOL MANAGEMENT SYSTEM           |
|*********************************************|
| 1. Add Student                              |
| 2. Add Teacher                              |
| 3. Update Total classes held                |
| 4. Update Attendance                        |
| 5. Find a student in Class                  |
| 6. Find all students in a Class             |
| 7. Search Teacher                           |
| 8. Display All Students                     |
| 9. Display All Teachers                     |
| 10.Remove Student Name                      |
| 11.Remove Teacher Name                      |
| 12.Modify Student Information               |
| 13.Modify Teacher Information               |
| 14.Exit                                     |
|*********************************************|
Enter Your Choice: 14
.....EXITING PROGRAM.....

Process returned 0 (0x0)   execution time : 1720.209 s
Press any key to continue.
```

❖ Limitations:

While this School Management System is a great starting point, there are several limitations that need to be addressed to make it more reliable and user-friendly. Here are some key issues:

- **No Input Validation:**
  The program doesn't check if the user enters the right kind of data. For example, it won't stop you from entering a GPA that's too high or a roll number that's already taken. This could lead to errors or messy data over time.
- **No Data Saving:**
  All information—like student records and attendance—gets lost once the program is closed. In a real-world application, it's crucial for the data to be saved, so users don't lose any information after restarting the system.
- **Attendance Management Glitches:**
  There is a bug in how the program calculates attendance percentages, and it doesn't handle additional classes well. This could cause mistakes in attendance records, which is a problem in tracking students correctly.

- **Basic Teacher Management:**
  The teacher section only includes basic information and doesn’t allow assigning teachers to multiple subjects or tracking their attendance or schedules. In a real system, having more features to manage teachers in detail would be very useful.
- **No User Roles:**
  Everyone who uses the system has the same level of access, which means anyone could delete or change important information. A better approach would be to add different roles (like admin, teacher, and student) with specific permissions to control access.
- **Tracking Grades by Subject:**
  Currently, the system only shows an overall GPA instead of grades for each subject. This makes it hard to understand how a student is doing in individual subjects and limits the depth of academic tracking.

This project is a great starting point for learning programming, but there are areas where it can be improved. Fixing these issues could make the system more reliable and useful for managing school data.

❖ Future Scope:

This is our first project, so we tried to focus on the core functionalities to manage essential school information as much as possible. Despite being a basic version, there are plenty of opportunities for future enhancement that could make the system more functional and comprehensive. Some of the enhancement we could make is:

- **Fee Management**: We could add a module for handling fees, which would help keep track of tuition payments, payment histories, and any outstanding balances. This could also include features for sending automated reminders and creating receipts to make record-keeping simpler.
- **Staff Management**: The system currently doesn’t have any function to manage information for non-teaching staff. Expanding it to include all staff roles would add a lot of value. This would mean storing each staff member’s job details, tracking their attendance, and managing their salary information.

- **Course Management**: Another useful addition would be a course management feature, allowing for the creation and organization of various courses, subjects, and class schedules. This would make the system more flexible and functional for academic planning.
- **Examination and Result Processing**: Adding an exam scheduling and result processing feature could be very helpful. It would automatically calculate GPAs and rank students, making the academic performance system stronger. Also it will make it easier to create detailed student report cards.
- **Graphical User Interface (GUI)**: Adding a Graphical User Interface (GUI) would make the system easier to use and more visually attractive. Currently, the system works only with a command-line interface, which can be harder for some people to navigate. By

adding a GUI, users would have a simpler and more enjoyable experience. It would make the system easier to operate and more appealing, encouraging more people to use it.

- **Class and School Hours Management**: Currently, the system doesn't manage or show class schedules, making it hard to know when classes will happen. In the future, the system could be enhanced with a feature to manage and display class schedules, allowing users to easily view when each class is held. This would provide clear visibility for students, teachers, and administrators and improve the overall schedule management .Additionally, the system could track school hours, including start and end times, helping to better organize the school day. A timetable or calendar feature could be added to support this functionality, making the system more complete and useful for everyday school operations.

Though this project is a simple starting point, adding these features could turn it into a full-fledged school management solution. These future goals give us a clear direction to continue developing and improving this project.

In conclusion, this School Management System is a strong first project that combines essential C programming skills with useful features for managing student and teacher records, tracking attendance, and calculating rankings. While there is room for improvements like data saving and input validation, this project serves as a valuable foundation for more advanced systems in the future.