**Project Report**: Students Database Management System

Introduction

The Students Database Management System is a C program designed to efficiently manage student details using a circular queue data structure. This system enables users to perform various operations such as adding, searching, updating, and deleting student information. The program is structured into two main sections: The Student section, which defines the student details structure, and The FIFO section, which implements the circular queue data structure.

Implementation Details

**Student Section**

The student\_t structure encapsulates student details, including Name, Roll number, GPA, and course IDs. These attributes provide comprehensive information about each student enrolled in the system.

**FIFO Section**

The FIFO\_t structure manages the circular buffer, storing student details efficiently. It maintains essential information such as the base address of the buffer, the count of elements, and the allocated memory size.

Database APIs

The project offers a set of functions to interact with the database efficiently. These functions include:

1. Add Student Details Manually: Users can input student details interactively, providing essential information like Name, Roll number, GPA, and course IDs.

2. Add Student Details from Text File: Users can bulk-add student details by importing data from a text file.

3. Find Student Details by Roll Number: Allows users to search for student details using the Roll number as a unique identifier.

4. Find Student Details by First Name: Enables users to search for student details based on their First Name.

5. Find Student Details by Course ID: Users can search for students enrolled in a specific course by providing the course ID.

6. Find Total Number of Students: Displays the total count of students currently enrolled in the database.

7. Delete Student Details by Roll Number: Users can delete student records by specifying the Roll number.

8. Update Student Details by Roll Number: Allows users to modify student information using the Roll number as a reference.

9. Show All Information: Provides a comprehensive view of all enrolled students and their respective details.

Conclusion

The Students Database Management System offers a user-friendly interface to manage student information effectively. With features such as manual and file-based data entry, search, update, and deletion functionalities, it provides a robust solution for organizing student records. This project demonstrates the practical implementation of circular queue data structure in real-world scenarios, enhancing data management capabilities for educational institutions and similar organizations.