

STUDENT RECORD MANAGEMENT SYSTEM

A Project Report

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ABSTRACT

The Student Record Management System is a C++ based application designed to simplify and automate the process of managing student academic information. Traditional methods of maintaining records rely heavily on manual entry, which is time-consuming, prone to errors, and often difficult to update or retrieve efficiently. This project addresses these challenges by providing a digital solution that ensures accurate data handling, faster retrieval, and long-term storage of student records.

The system enables users to store, update, search, and display student details such as personal information, marks, attendance, CGPA, and remarks. Through the use of file handling techniques in C, the application ensures that all records are securely stored and easily accessible whenever required. The inclusion of multiple user roles—Admin, HOD, Professor, and Student—enhances data security by restricting access based on permissions, thereby preventing unauthorized modifications.

The project emphasizes modular programming, structured code design, and effective use of functions and file operations. Each module is built to handle a specific task, promoting clarity, maintainability, and scalability. By automating repetitive administrative tasks, the system helps reduce human errors and improves efficiency within academic environments.

Overall, the Student Record Management System demonstrates how fundamental programming concepts can be applied to solve real-world problems. It serves as a practical example of how digital solutions can significantly improve record management, enhance productivity, and support better decision-making in educational institutions. The project ultimately showcases the importance of systematic design, logical implementation, and reliable data management in software development.

INTRODUCTION

In the present digital era, information plays a vital role in the effective functioning of every organization, especially educational institutions. Colleges and universities handle a vast amount of student data related to admissions, academic performance, attendance, examinations, and personal details. Traditionally, this data has been managed using manual record-keeping methods such as registers, files, and spreadsheets. These traditional systems are time-consuming, inefficient, and highly prone to human errors. With the rapid growth of technology, educational institutions are now shifting towards automated systems for managing student records. The Student Record Management System (SRMS) is developed to serve this purpose by providing a reliable, accurate, and efficient digital solution.

The Student Record Management System is a software-based application designed to store, manage, and retrieve student-related information in a structured and organized manner. It acts as a centralized information system where authorized users can access and update student data according to their roles. The system provides different access levels for Admin, Head of Department (HOD), Professors, and Students, ensuring proper control and data security. By adopting a role-based access mechanism, the system prevents unauthorized modifications and ensures that only authenticated users can perform specific operations.

This project is developed using the C++ programming language with Object-Oriented Programming (OOP) concepts and File Handling techniques. OOP allows the system to be modular, reusable, and easy to maintain. File handling enables permanent data storage, ensuring that all records are safely stored and can be retrieved whenever required. The system uses binary files to maintain data securely and efficiently.

One of the major advantages of this system is its menu-driven interface, which makes it user-friendly and easy to operate even for users with basic computer knowledge. It allows quick addition of new student records, modification of existing records, and instant retrieval of required information. This significantly reduces the time and effort required for record maintenance when compared to the traditional manual system.

The project also introduces a Ticket Management System that allows students to report any incorrect data found in their records. These tickets are reviewed by the concerned authorities

such as Admin or HOD, ensuring transparency and a well-structured grievance redressal mechanism. This feature strengthens communication between students and staff and helps maintain data accuracy.

The Student Record Management System provides several benefits such as reduced paperwork, improved data accuracy, enhanced security, faster processing, and easy accessibility. It improves the overall efficiency of the institution and simplifies administrative tasks. Moreover, the system is scalable and can be enhanced in the future by integrating it with databases, web applications, and mobile platforms.

In conclusion, the Student Record Management System is a powerful tool that modernizes traditional record-keeping methods. It offers a secure, transparent, and efficient platform for managing student information and supports the digital transformation of educational institutions.

PROBLEM STATEMENT

Educational institutions traditionally rely on manual methods such as paper registers, files, and spreadsheets to maintain student records. While these methods have been used for many years, they suffer from several serious limitations that affect the efficiency, accuracy, and security of data management. As the number of students increases, handling records manually becomes more difficult and unreliable. This creates the need for a well-structured and automated Student Record Management System.

One of the major problems of the manual system is data redundancy and inconsistency. The same student information is often recorded in multiple registers across different departments. This leads to duplication of data and increases the chances of mismatch and inconsistency. If a student's information needs to be updated, it must be manually changed in several places, which is time-consuming and error-prone.

Another major limitation is the lack of proper security. Paper-based records can be easily accessed by unauthorized persons, leading to possible misuse, modification, or loss of sensitive information. There is no proper authentication or controlled access, and the risk of data theft or manipulation is high. In the case of fire, water damage, or misplacement, valuable records can be permanently lost.

The process of searching and retrieving information in a manual record system is also extremely slow. Finding a specific student's record among thousands of files consumes significant time and effort. This reduces the overall efficiency of administrative staff and affects the speed of institutional operations.

Manual data management also leads to a high probability of human errors such as incorrect data entry, miscalculations, missing records, and overwriting of important information. These errors can directly impact students' academic progress and create serious administrative issues.

Furthermore, the lack of transparency and proper grievance handling is another major drawback. Students have no organized platform to report incorrect data in their records. Corrections depend completely on manual communication, which often results in delays, misunderstandings, and unresolved complaints.

The system also suffers from limited accessibility. Records can only be accessed from the physical location where they are stored. This restricts flexibility and increases dependency on office hours and staff availability.

Due to these problems, the traditional system fails to meet the growing demands of modern educational institutions. Therefore, there is a strong requirement for an automated Student Record Management System that can overcome these limitations by providing secure access, fast processing, accurate data handling, and a structured ticket-based grievance system. The proposed system aims to solve these issues effectively and provide a reliable digital platform for managing student records.

OBJECTIVES & SCOPE OF THE PROJECT

Objectives of the Project

The main objective of the Student Record Management System is to develop a computerized system that efficiently manages student information in an educational institution. This system aims to replace the existing manual record-keeping process with a digital solution that is fast, reliable, and secure. The specific objectives of this project are as follows:

- To design and develop a user-friendly student record management system.
- To provide role-based access control for Admin, HOD, Professors, and Students.
- To allow easy addition, updating, and viewing of student records.
- To provide a ticket-based grievance system for students.
- To ensure data accuracy, integrity, and security.
- To store data permanently using C++ file handling concepts.
- To ensure that only authorized users can access or modify data.

Scope of the Project

The scope of the Student Record Management System is limited to academic record management within an educational institution. The system allows:

- Management of student personal and academic details
- Secure access for different users
- Handling of student complaints using a ticket system
- Digital storage and retrieval of records

The system does not include online payment, attendance automation, or biometric integration at present, but it can be upgraded in the future.

SYSTEM ANALYSIS

Existing System

The existing system used in many institutions is completely manual. Records are maintained in physical registers and files. This system suffers from:

- Data duplication
- Slow data retrieval
- Poor security
- High error rate
- Lack of backup
- No grievance tracking system

Proposed System

The proposed system is a computerized Student Record Management System using C++ and File Handling. It overcomes all drawbacks of the manual system.

Advantages:

- Fast data processing
- Secure access
- Easy record search
- Reduced errors
- Digital storage
- Transparency through tickets

SYSTEM DESIGN

Data Flow

The Data Flow represents the flow of data within the system.

Level 0

User → Student Record Management System → Student Database

Level 1

Admin → Add/View/Update → Database

Professor → Update → Database

Student → Raise Ticket → Ticket System

HOD → View Reports → System

UML Diagrams

The UML diagrams used in this system include:

Use Case Diagram – Represents interaction between users and system

Class Diagram – Shows structure of classes and relationships

Sequence Diagram – Shows process flow

MODULE DESCRIPTION

6.1 Admin Module

Add Student

View All Students

Update Student Records

View Tickets

6.2 HOD Module

View Student Records

View Raised Tickets

6.3 Professor Module

View Student Details

Update Academic Information

6.4 Student Module

View Personal Records

Raise Ticket for corrections

TOOLS & TECHNOLOGIES USED

7.1 Hardware Requirements

Processor: Intel i3 or above

RAM: Minimum 4GB

Storage: 100GB free space

7.2 Software Requirements

Operating System: Windows / Linux

Programming Language: C++

IDE: Dev C++ / CodeBlocks

File System: Binary Files

TESTING

The following tests were performed to ensure correct functioning:

Login Testing

Data Input Testing

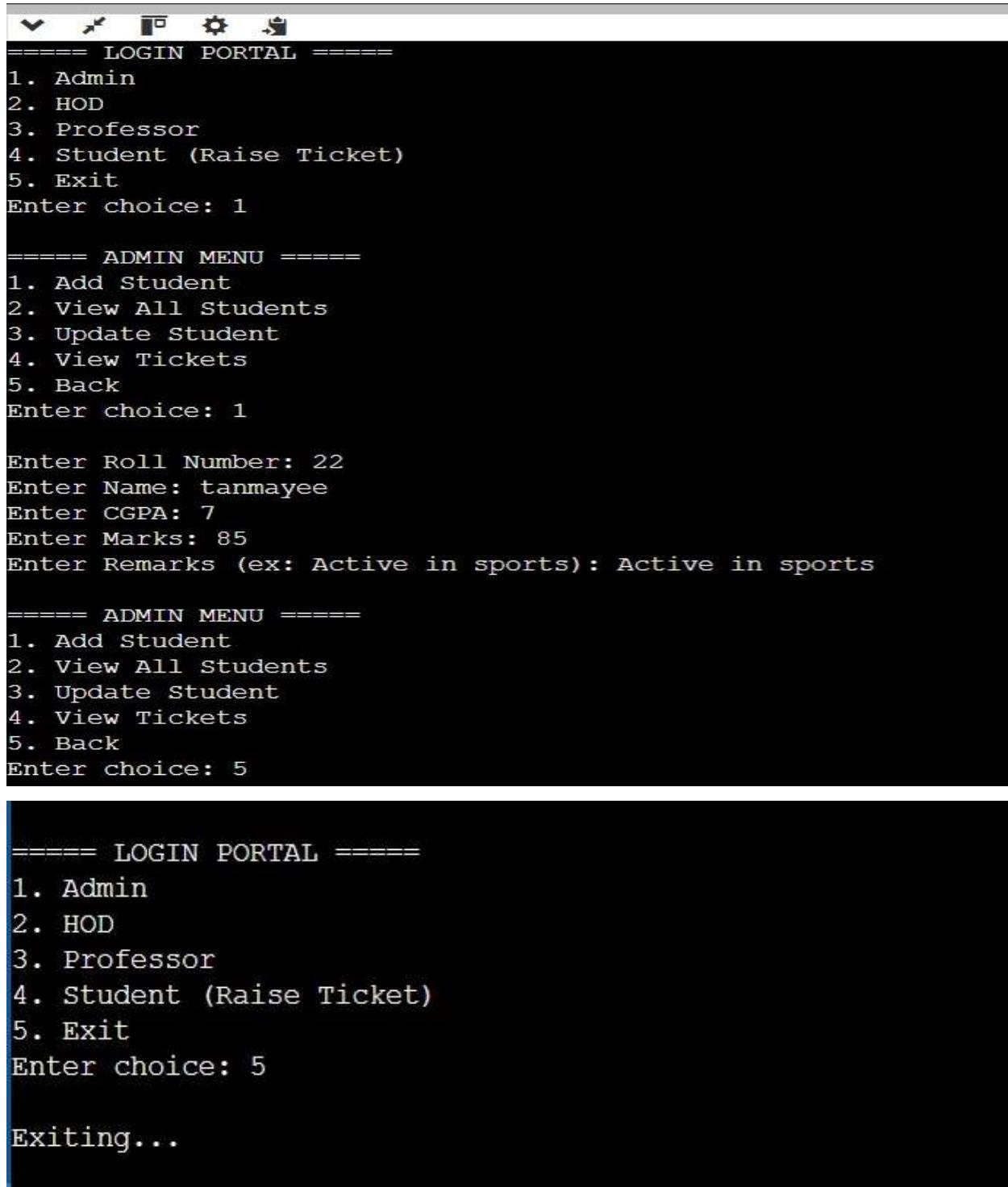
Data Retrieval Testing

Ticket System Testing

File Storage Testing

All tests were performed successfully and results were satisfactory.

OUTPUT SCREENSHOTS



```
===== LOGIN PORTAL =====
1. Admin
2. HOD
3. Professor
4. Student (Raise Ticket)
5. Exit
Enter choice: 1

===== ADMIN MENU =====
1. Add Student
2. View All Students
3. Update Student
4. View Tickets
5. Back
Enter choice: 1

Enter Roll Number: 22
Enter Name: tanmayee
Enter CGPA: 7
Enter Marks: 85
Enter Remarks (ex: Active in sports): Active in sports

===== ADMIN MENU =====
1. Add Student
2. View All Students
3. Update Student
4. View Tickets
5. Back
Enter choice: 5

===== LOGIN PORTAL =====
1. Admin
2. HOD
3. Professor
4. Student (Raise Ticket)
5. Exit
Enter choice: 5

Exiting...
```

FUTURE ENHANCEMENTS

Database integration using MySQL

Web-based application

Mobile app development

Biometric authentication

Email notifications

CONCLUSION

The Student Record Management System has been successfully designed and implemented as a complete software solution to digitally manage student information in an organized, secure, and efficient manner. The primary goal of this project was to replace the traditional manual record-keeping system with a computerized application that ensures accuracy, transparency, and ease of access. During the development of this project, we analyzed the existing manual system, identified its limitations, and designed a robust solution using C++ programming language, Object-Oriented Programming (OOP) concepts, and File Handling techniques. The system was structured into different modules such as Admin, HOD, Professor, and Student to maintain proper role-based access and data security.

In this project, we successfully implemented core functionalities such as adding new student records, viewing and updating academic details, secure role-based login, and a ticket-based grievance management system. The Admin module provides full control over the system, the Professors manage academic records, the HOD monitors both student performance and complaints, while Students are provided with the ability to raise tickets for correcting incorrect information. All data is securely stored using binary file handling, ensuring that records remain persistent and safe even after the application is closed. Proper testing was conducted on all modules to verify correctness, reliability, and smooth system operation.

What makes this Student Record Management System unique is the integration of a ticket-based correction mechanism within a simple, menu-driven, console-based environment. Unlike many basic record-keeping systems that only focus on data storage, this project also emphasizes transparency and communication between students and administration. The inclusion of multiple user roles with specific access rights ensures strict data security and prevents unauthorized modifications. The system is lightweight, requires minimal hardware resources, and can function efficiently without internet connectivity, making it suitable even for institutions with limited digital infrastructure.

This system provides significant benefits to educational institutions, staff, and students. It reduces the burden of manual paperwork, minimizes human errors, and ensures fast retrieval of information. Administrative staff can perform operations more efficiently, professors can maintain academic data easily, and students gain confidence due to the transparency of the record correction process. The system also enhances data security, saves time, improves productivity, and supports better decision-making through accurate and well-organized student records.

Overall, the Student Record Management System proves to be a reliable, secure, and cost-effective solution for managing academic records in educational institutions. It bridges the gap between students and administrators through a digital platform that promotes accuracy, accountability, and efficiency. The successful implementation of this project demonstrates the practical application of programming concepts and software engineering principles, and it lays a strong foundation for future enhancements such as web-based access, database integration, and mobile application development.

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