**PROJECT REPORT**

**INSTITUTE NAME**

Department of School of Technology

The Apollo University

Chittoor

**NAME OF THE PROJECT**

“Student Report Card Management System”

A Mini Project Report Submitted to CodeXTAU committee

**BACHELOR OF TECHNOLOGY**

1st year AIML-B

**SUBMITTED BY**

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**Problem Statement**

**Title**: Student Report Card Management System using C

In Educational institutions, managing student academic records manually is time-consuming, error-prone, and inefficient – especially when calculating grades and Semester Grade Point Average (SGPA) across multiple subjects. Teachers and administrators require a reliable system to store, compute, and retrieve student performance data accurately and quickly.

This project aims to develop a console-based Student Report Card Management System in the C programming language that allows user to:

* Enter and manage student information
* Record subject-wise marks and credits
* Automatically calculate grades and SGPA based on marks.
* Store and retrieve student data using file handling
* Search for student records using roll numbers

The system will use structured programming, data structures(like arrays, and structs), and file I/O operations to provide an efficient and reusable academic record management tool.

**OBJECTIVES**

* **Automate Student Record Management**
* To eliminate manual record-keeping by providing a digital system to store, manage, and retrieve student academic details.
* **Grade and SGPA Calculation**
* To automatically assign letter grades and calculate SGPA based on marks and credit values using a standardized grading system.
* **Efficient Data Storage and Retrieval**
* To save student data to a file and reload it later, allowing long-term storage and access without data loss.
* **Support for Multiple Students and Subjects**
* To allow management of records for many students, each having multiple subjects, ensuring scalability.
* **Enable Search Functionality**
* To provide quick access to individual student records through roll number-based searching.
* **Encourage Practical Programming Skills**
* To help students understand real-world use of:
* Structures
* Arrays
* Functions
* File Handling
* Menu-driven programming in C

**METHODOLOGY**

The development of the Student Report Card Management System followed a structured, modular programming approach using the C language. The project was divided into different phase:

1. **Problem** **Analysis**

Identify the need to manage student academic records digitally.

Understand grading systems and SGPA calculation methods.

Define input (student details, marks, credits) and desired output (grades, SGPA, saved records).

2. **System** **Design**

The system is designed using a modular structure with the following components:

* Data Structures:

Subject struct to store individual subject info (marks, credit, grade, grade point).

Student struct to store student info (name, roll no, subjects [], SGPA).

* Functional Modules:

Each function performs a specific task:

Function Name Purpose

calculateGrade() Converts marks to grade and grade point

inputStudent() Takes user input for student and subjects

displayStudent() Displays student report in readable format

saveToFile() Saves all student data to a file

loadFromFile() Loads data from file back into memory

searchByRoll() Searches and displays a student by roll number

3. **Implementation**

Written using C programming language.

File Handling (fopen, fprintf, fscanf, fgets) is used for persistent storage.

A menu-driven interface (while loop with choices) guides user interaction.

4. **Testing** **and** **Validation**

Program is tested with various student data to check:

Correct grade assignment

Accurate SGPA computation

File save/load reliability

Search functionality

Edge cases (e.g., failing grades, max subjects) are tested.

5. **Output** **Generation**

For each student, the program prints:

Subject-wise marks, credits, grade, grade point

Overall SGPA

Confirmation messages for file saving/loading are displayed.

**Outcomes of the Project**

Successfully implemented a working Student Report Card Management System using C.

Demonstrated the practical use of data structures (structs) to manage real-world academic records.

Built a menu-driven system that supports multiple students and subjects with search and file handling capabilities.

Accurately calculated grades and SGPA using a well-defined logic.

Achieved persistent storage by implementing file save/load features.

Improved team collaboration, debugging skills, and coding practices through structured modular programming.

**Approach to Minimize Code Complexity**

**To reduce code length and complexity:**

Modular functions were used for individual tasks (input, display, grade calculation, file I/O).

Structures (struct) simplified the representation of students and subjects.

Loops and arrays minimized code repetition for multiple subjects and students.

Standard file I/O functions (fscanf, fprintf, fopen) avoided third-party libraries.

A simple menu loop ensured the interface remained under one main() block for clarity.

**Strategies Used**

**Divide** **and** **conquer**: Broke the program into logical components — input, processing, storage, search, output.

**Code** **reusability**: Used functions like calculateGrade() to avoid rewriting grade logic.

**Edge** **case** **handling**: Incorporated tests for failed subjects and maximum subject limits.

**Scalability**: Allowed up to 100 students and 10 subjects per student with easy future expansion.

**Minimal** **UI** **complexity**: Chose a console-based interface to focus on logic rather than design.

**Menu** **Options**:

**Option** **Function**

1 Add new student (inputStudent())

2 Display all student records

3 Save to file

4 Load from file

5 Search by roll number

6 Exit program

**Flow** **Summary**:

User -> Menu -> Choose Option ->

[1] Add Student -> Compute Grades -> SGPA

[2] Display All

[3] Save File

[4] Load File

[5] Search Roll

[6] Exit

**Tools and Technologies Used**

**Language**: C

**Compiler**: Turbo C

**CONCLUSION**

The Student Report Card Management System successfully demonstrates the application of C programming concepts to solve real-world problems in academic data management. This project efficiently automates the process of recording, processing, and retrieving student academic records.

By using structures, functions, and file handling, the system ensures:

* Accurate grade and SGPA calculation,
* Organized storage of student information,
* Easy access to records through search functionality, and
* Persistent data storage via file operations.

Overall, this project helped strengthen understanding of core C programming techniques and demonstrated their practical use in a meaningful, real-world application.