

REPORT
ON
STUDENT RECORD MANAGEMENT SYSTEM (SRMS)

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ABSTRACT

This project implements a **Student Record Management System (SRMS)** using **HTML, CSS, JavaScript, Node.js, Express.js, and JSON-based storage.**

The system enables educational institutions to efficiently manage student information, attendance, marks, timetable, and student profiles through a unified web interface.

The project supports **role-based access** for Admin, Teacher, and Student, ensuring data security and functional separation. CRUD operations are implemented using REST APIs, and data is persisted using JSON files. The application provides a simple, scalable, and user-friendly solution suitable for college-level academic management.

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1. Introduction

Managing student data manually is time-consuming and inefficient. Educational institutions require systematic digital solutions to maintain student records, attendance, marks, and timetable details.

The **Student Record Management System** is a full-stack web application designed to handle academic data securely and efficiently. The system provides separate roles for Admin, Teacher, and Student, ensuring proper data access control. The frontend is developed using HTML, CSS, and JavaScript, while the backend is built using Node.js and Express. JSON files are used for lightweight data storage, enabling easy deployment and portability.

2. Objectives

The main objectives of this project are:

- To design a simple and interactive web-based system for managing student records.
- To implement role-based access control for Admin, Teacher, and Student.
- To automate processes such as attendance marking and marks entry.
- To create a centralised system for viewing student profiles and report cards.
- To use Node.js and REST APIs for backend communication.
- To store data in JSON format for easy access and modification.

3. SYSTEM OVERVIEW

The system consists of three primary user roles:

3.1 Admin

- Add, edit, delete student information
- Manage timetable
- View attendance and marks

3.2 Teacher

- Mark attendance
- Enter and update marks
- View student profiles
- Access timetable

3.3 Student

- View personal profile
- View attendance percentage
- View marks and grades
- View class timetable

The application runs on a local Node.js server and communicates using REST APIs.

4. TECHNOLOGIES USED

4.1 Frontend

- HTML5
- CSS3
- Vanilla JavaScript

4.2 Backend

- Node.js
- Express.js
- Multer (for photo upload)
- CORS

4.3 Storage

- JSON files
 - students.json
 - attendance.json
 - marks.json
 - timetable.json

4.4 Tools

- Visual Studio Code
- Git & GitHub
- Browser DevTools

5. SYSTEM ARCHITECTURE

Frontend (HTML/CSS/JS)



REST API (Fetch API)



Backend (Node.js + Express)



JSON Storage (Local Database)

- The frontend sends requests using the Fetch API.
- Express.js handles routes and processes data.
- Data is stored in JSON files acting as a lightweight database.

6. MODULES DESCRIPTION

6.1 Student Management Module

- Admin can create, update, and delete students.
- Fields include Roll No, Name, Dept, Semester, CGPA, Phone, Parents, DOB.
- Students' data displayed in a searchable table.

6.2 Attendance Module

- Teachers can mark Present/Absent for each student.
- Attendance records stored date-wise.
- Auto-calculates attendance percentage.

6.3 Marks Module

- Teachers add marks per subject.
- Students can view subject-wise marks and grades.
- Supports CSV export.

6.4 Timetable Module

- Admin/Teacher can manage class schedules.
- Students can view timetable anytime.

6.5 Student Profile & Report Card

- Displays personal details
- Attendance percentage
- Marks summary with grade
- Printable report card

7. IMPLEMENTATION DETAILS

7.1 Frontend

- Built using HTML for structure, CSS for styling, and JavaScript for dynamic behaviour.
- Tab-based navigation for easy access to modules.
- Input validation implemented for all forms.

7.2 Backend

- RESTful API built using Express.js.

- Routes for CRUD operations:

- /api/students
- /api/attendance
- /api/marks
- /api/timetable

- Multer used for image uploads.

7.3 Data Storage

Each dataset is stored in a separate JSON file:

- Student data → students.json
- Attendance records → attendance.json
- Marks → marks.json
- Timetable → timetable.json

7.4 Security

- Role-based data access (Admin / Teacher / Student).
- Input sanitization.
- Local JSON file access only through backend.

8. Code Snippets

This section provides a few representative code snippets from the project to demonstrate the structure and working of the Student Record Management System. Only the essential parts of the code are presented here. The full code is available in the project repository.

8.1 Backend – Express Server Setup (server.js)

```

const express = require("express");
const fs = require("fs");
const cors = require("cors");
const app = express();

app.use(cors());
app.use(express.json());
app.use(express.static("src"));

// Load students
function loadData(file) {
    return JSON.parse(fs.readFileSync(file, "utf8"));
}

// Save students
function saveData(file, data) {
    fs.writeFileSync(file, JSON.stringify(data, null, 2));
}

app.get("/api/students", (req, res) => {
    res.json(loadData("./backend/students.json"));
});

```

8.2 Frontend – Fetching Students (main.js)

```
async function loadStudents() {
    const res = await fetch("/api/students");
    const students = await res.json();

    const body = document.getElementById("studentsTableBody");
    body.innerHTML = students
        .map(
            (s) => `
                <tr>
                    <td>${s.rollNo}</td>
                    <td>${s.name}</td>
                    <td>${s.department}</td>
                    <td>${s.semester}</td>
                    <td>${s.cgpa}</td>
                    <td>${s.phone}</td>
                </tr>
            `
        )
        .join("");
}
```

8.3 Attendance Saving Logic (attendance.js)

```
document.getElementById("saveAttendanceBtn").addEventListener("click", async () => {
    const rows = [...document.querySelectorAll("tr[data-student-id]")];
    const date = document.getElementById("attDate").value;

    const records = rows.map((row) => ({
        studentId: parseInt(row.dataset.studentId),
        status: row.querySelector(".att-status").value,
        date
    }));

    for (const r of records) {
        await fetch("/api/attendance", {
            method: "POST",
            headers: { "Content-Type": "application/json" },
            body: JSON.stringify(r)
        });
    }

    alert("Attendance Saved Successfully!");
});
```

8.4 Marks Entry API Route (server.js)

```
app.post("/api/marks", (req, res) => {
    const marks = loadData("./backend/marks.json");
    const newRecord = { id: Date.now(), ...req.body };
    marks.push(newRecord);
    saveData("./backend/marks.json", marks);
    res.json({ success: true });
});
```

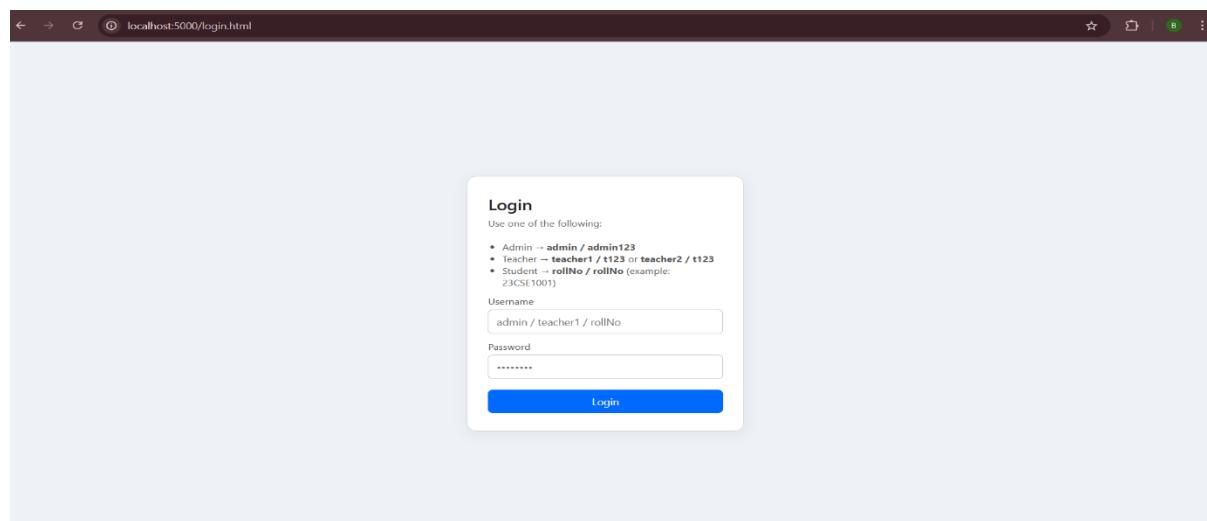
8.5 Timetable Rendering (timetable.js)

```
async function loadTimetable() {
    const res = await fetch("/api/timetable");
    const table = await res.json();

    document.getElementById("timetableContainer").innerHTML = table
        .map(
            (t) => `
                <div class="timetable-row">
                    <b>${t.day}</b> - ${t.subject} (${t.time}) in Room ${t.room}
                </div>
            `
        )
        .join("");
}
```

9. Output Images

9.1 Login Page



9.2 Add Student

The screenshot shows the 'Add / Edit Student' form in the Student Record Manager. The form fields include:

- Roll Number: e.g. 23CSE1001
- Name: e.g. Bhaumik Hinunia
- Department: e.g. CSE
- Semester: e.g. 2
- CGPA: e.g. 8.5
- Phone: e.g. 9876543210
- Father Name: e.g. Ramesh Kumar
- Mother Name: e.g. Sita Devi
- Date of Birth: dd-mm-yyyy

Buttons at the bottom include 'Save Student' and 'Clear Form'.

Student Records section below shows a table with one record:

Roll No	Name	Dept	Sem	CGPA	Phone	Actions
101	Jane	CSE	2	8.6	9521144404	Edit Delete

Page footer: Student Record Management System | Designed for College Project

9.3 Student Profile

The screenshot shows the 'Student Profile & Report Card' page for student Bhaumik Hinunia. The profile details are:

B	Bhaumik Hinunia	CGPA: 9.24
	Roll No: 104	Phone: 9521144404
	Department: CSE	Father Name: Suresh
	Semester: 3	Mother Name: Mamta
		DOB: 2006-04-19

Attendance Summary table:

Total Classes	Present	Absent	Attendance %
4	4	0	100.0%

Marks Summary table:

Subject	Exam	Marks
DAA	Final Exam	100

Overall Grade: O

Update Profile Photo: Choose File (No file chosen) Upload

Print Report Card

Page footer: Student Record Management System | Designed for College Project

9.4 Admin Add Marks

The screenshot shows the 'Marks' section of the Student Record Manager. At the top, there's a navigation bar with links for Students, Attendance, Marks, and Timetable. Below that is a sub-navigation bar with tabs for Admin (selected), Logout, and Export CSV. The main area has a heading 'Marks' with a sub-instruction 'Enter marks and view marks summary.' A table titled 'Add Marks' allows users to input student details (Roll No, Name, Subject, Exam, Marks) and click 'Save'. Below this is a 'Marks Summary' table showing recorded marks for student 101. The footer includes the system name 'Student Record Management System' and a note 'Designed for College Project'.

9.5 Teacher Attendance Marking

The screenshot shows the 'Attendance' section of the Student Record Manager. At the top, there's a navigation bar with links for Attendance, Marks, Timetable, and Profile. Below that is a sub-navigation bar with tabs for Teacher (selected), Logout, and Export CSV. The main area has a heading 'Attendance' with a sub-instruction 'Mark attendance for students and view summary.' A table titled 'Mark Today's Attendance' allows users to select a date (05-12-2025) and status (Present) for students 101, 102, 103, and 104. A 'Save Attendance' button is at the bottom. Below this is an 'Attendance Summary' table showing overall stats per student. The footer includes the system name 'Student Record Management System' and a note 'Designed for College Project'.

9.6 Student Timetable

The screenshot shows a web-based student record management system. At the top, there is a header bar with a back arrow, forward arrow, refresh icon, and a search bar containing 'localhost:5000/index.html'. To the right of the search bar are icons for a magnifying glass, a star, a folder, and a three-dot menu. Below the header is a navigation bar with a blue 'SR' logo and the text 'Student Record Manager' followed by 'Full Stack • Nodejs + REST API + Vanilla JS'. On the right side of the navigation bar are 'Student' and 'Logout' buttons. The main content area has tabs for 'Timetable' and 'Profile', with 'Timetable' currently selected. A sub-header 'Timetable & Classroom Schedule' with the sub-instruction 'View and manage class timetable with subject, teacher and room details.' is displayed. Below this is a table showing the class timetable:

Day	Time	Subject	Teacher	Room	Section
Monday	10:00 - 12:00	CSE202	Gavaskar S	S 312	C
Monday	12:00 - 13:00	CSE207	Dr. Mirutunjaya	S 312	C
Tuesday	10:00 - 12:00	CSE 201	Ravi Sir	C 202	C
Wednesday	10:00 - 11:00	AEC 108	Teacher	S 312	C
Thursday	09:00 - 11:00	CSE202	Gavaskar S	S 412	C
Friday	10:00 - 12:00	CSE 203	Fouzul Atik	S 312	C

At the bottom of the page, there is a footer with the text 'Student Record Management System' and 'Designed for College Project'.

10. TEST CASES

Test Case	Input	Expected Output	Result
Add Student	Valid details	Student added	Pass
Add Student	Missing name	Error message	Pass
Mark Attendance	Select P/A	Saved successfully	Pass
Add Marks	Valid marks	Marks saved	Pass
Student Login	Valid roll no	Profile loads	Pass

11. RESULTS

The developed system successfully provides:

- Accurate student data management
- Automated attendance and marks processing
- User-friendly dashboard for each role
- Working backend with complete CRUD operations
- Clean, responsive interface

All modules were tested and function as expected.

12. CONCLUSION

The Student Record Management System meets all project objectives and provides an efficient solution for managing academic records.

Using Node.js and JSON files made the system simple, portable, and suitable for college-level implementation.

The project enhanced our understanding of full-stack development, REST APIs, and modular design principles.

13. FUTURE ENHANCEMENTS

- Replace JSON storage with MySQL or MongoDB
 - Add authentication using JWT
 - Add analytics dashboards with charts
 - Introduce SMS/Email notifications
 - Cloud deployment using Render/Vercel
-

14. REFERENCES

- Node.js Official Documentation
- Express.js Guide
- MDN Web Docs (HTML, CSS, JS)
- Stack Overflow
- W3Schools Tutorial

