

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

The screenshot shows a web browser window with the URL `localhost:5000/login.html` in the address bar. The main content is a login form titled "Login". It instructs the user to use one of the following credentials:

- Admin - `admin / admin123`
- Teacher - `teacher1 / t123` or `teacher2 / t123`
- Student - `rollNo / rollNo` (example: `23CSE1001`)

The form has fields for "Username" (containing `admin / teacher1 / rollNo`) and "Password" (containing `*****`). A blue "Login" button is at the bottom.

9.2 Add Student

The screenshot shows a web browser window with the URL `localhost:5000/index.html` in the address bar. The title bar says "Student Record Manager" and "Full Stack • Node.js + REST API + Vanilla JS". There are "Admin" and "Logout" buttons in the top right.

The main content area has tabs for "Students", "Attendance", "Marks", and "Timetable". The "Students" tab is active. It contains a form titled "Add / Edit Student" with instructions to fill details and click "Save Student". The form fields include:

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

At the bottom of the form are "Save Student" and "Clear Form" buttons.

Below the form is a section titled "Student Records" with a table:

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

At the bottom of the page are "Student Record Management System" and "Designed for College Project".

9.3 Student Profile

The screenshot shows the 'Student Record Manager' application interface. At the top, there is a logo with 'SR' and the text 'Student Record Manager' followed by 'Full Stack - Node.js + REST API + Vanilla JS'. On the right side of the header are 'Student' and 'Logout' buttons. Below the header, there are two tabs: 'Timetable' and 'Profile', with 'Profile' being the active tab. The main content area is titled 'Student Profile & Report Card' and contains the following information:

Student Details:
Bhaumik Hinunia
Roll No: 104
Department: CSE
Semester: 3
CGPA: 9.24
Phone: 987654321144404
Father Name: Sonish
Mother Name: Mamta
DOB: 2006-04-19

Attendance Summary:
Total Classes: 4
Present: 4
Absent: 0
Attendance %: 100.0%

Marks Summary:
Subject: DAA
Exam: Final Exam
Marks: 100

Overall Grade: O

Update Profile Photo:
Choose File: No file chosen
Upload

At the bottom of the profile card is a blue button labeled 'Print Report Card'.

At the very bottom of the page, there are footer links: 'Student Record Management System' and 'Designed for College Project'.

9.4 Admin Add Marks

The screenshot shows the 'Student Record Manager' application interface. The browser address bar indicates the URL is 'localhost:5000/index.html'. The top navigation bar includes a back arrow, forward arrow, refresh icon, and a search icon. On the right side of the header are 'Admin' and 'Logout' buttons. Below the header, there are four tabs: 'Students', 'Attendance', 'Marks' (which is the active tab), and 'Timetable'. The main content area is titled 'Marks' and contains the following information:

Enter marks and view marks summary.
Add Marks
Enter subject, exam type and marks for each student, then click Save.
Export CSV

Roll No	Name	Subject	Exam	Marks	Action
101	Jane	e.g. Maths	e.g. Mid-1	Marks	Save

Marks Summary:
All marks recorded so far.

Roll No	Name	Subject	Exam	Marks
-	-	Maths	MID SEM	1
101	Jane	Maths	MID SEM	18

At the bottom of the marks summary table is a blue 'Save' button.

At the very bottom of the page, there are footer links: 'Student Record Management System' and 'Designed for College Project'.

9.5 Teacher Attendance Marking

The screenshot shows the 'Attendance' section of the Student Record Manager. At the top, there are tabs for Attendance, Marks, Timetable, and Profile. The Attendance tab is active. A sub-header says 'Attendance' and 'Mark attendance for students and view summary.' Below this is a 'Mark Today's Attendance' form with a date field set to '05-12-2025'. A table lists four students with their roll numbers, names, and status dropdowns all set to 'Present'. A 'Save Attendance' button is at the bottom of the form. To the right, an 'Attendance Summary' table provides an overall attendance stats per student. The bottom of the page includes a footer for 'Student Record Management System' and 'Designed for College Project'.

Roll No	Name	Total	Present	Absent	Percentage
101	Jane	4	3	1	75.0%
102	Aryanish Singh	4	4	0	100.0%
103	Mike Wheeler	4	3	1	75.0%
104	Bhaumik Hinunia	4	4	0	100.0%

9.6 Student Timetable

The screenshot shows the 'Timetable' section of the Student Record Manager. At the top, there are tabs for Timetable and Profile. The Timetable tab is active. A sub-header says 'Timetable & Classroom Schedule' and 'View and manage class timetable with subject, teacher and room details.' Below this is a table listing classes for Monday through Friday. The columns are Day, Time, Subject, Teacher, Room, and Section. The data is as follows:

Day	Time	Subject	Teacher	Room	Section
Monday	10:00 - 12:00	CSE202	Gavaskar S	S 312	C
Monday	12:00 - 13:00	CSE207	Dr. Mrutyunjaya	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

The bottom of the page includes a footer for '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

