NATIONAL UNIVERSITY OF MODERN LANGUAGES

MIRPUR AZAD KASHMIR CAMPUS

FACULTY OF ENGINEERING AND COMPUTER SCIENCE

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Course: Software Construction and Development

Student Management System (SMS)

Overview

A Student Management System (SMS), it helps schools and colleges manage student information easily. It keeps track of student admissions, attendance, grades, and performance. The system also handles fees, schedules, and communication between students, teachers, and parents. It stores all data in one place, making it simple to access and use. SMS can connect with other tools to provide useful reports and insights. By automating tasks, it saves time and reduces errors. This makes managing schools more efficient and convenient for everyone.

Key Functions of an SMS:

1. Student Data Management.
2. Academic Administration.
3. Attendance Tracking.
4. Fee & Financial Management.
5. Communication & Collaboration.
6. Reporting & Analytics.

Benefits:

1. **Efficiency**: Automates manual processes saving time and reducing errors.

2. **Data Centralization**: All student information in one secure location.

3. **Improved Communication**: Better connection between administration, teachers, students, and parents.

4. **Reporting**: Comprehensive reporting capabilities for decision making.

5. **Compliance**: Helps maintain records for regulatory requirements.

Importance:

1. Centralized Data Management.

2. Improved Administrative Efficiency.

3. Enhanced Communication & Transparency.

4. Accurate Academic Monitoring.

5. Financial Management & Accountability.

6. Data-Driven Decision Making.

7. Scalability & Future-Readiness.
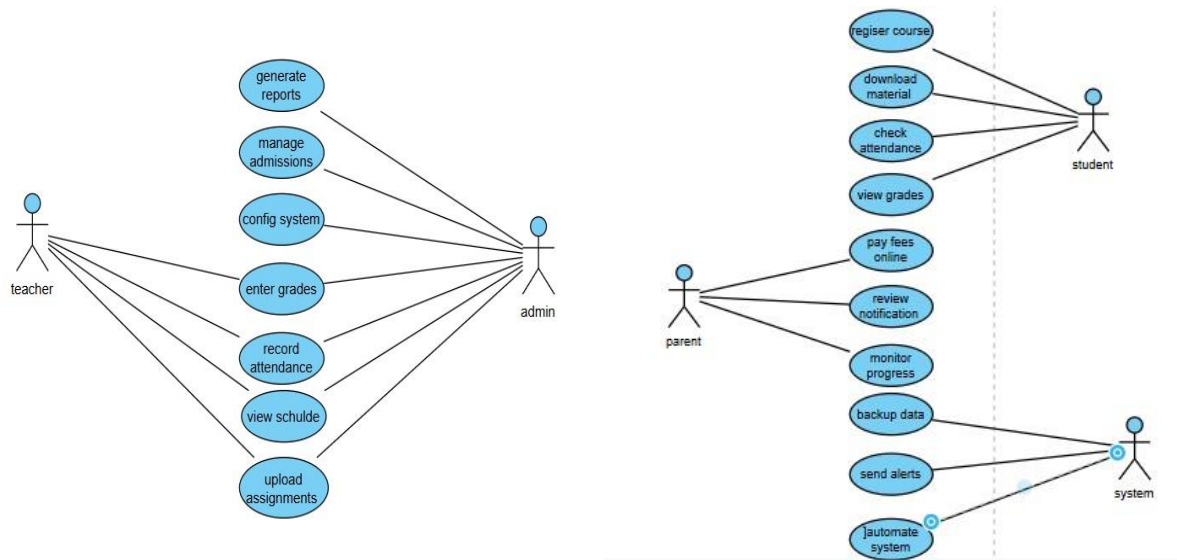
Data stream:

1. Data Input: Entry points where raw student/system data enters the SMS.

2. Processing: Core modules that transform input data into usable information.

3. Storage: Secure repositories for organized short/long-term data retention.

4. Output: Interfaces delivering processed information to end-users/systems.

5. Integrations: Connections enabling data exchange with external platforms.

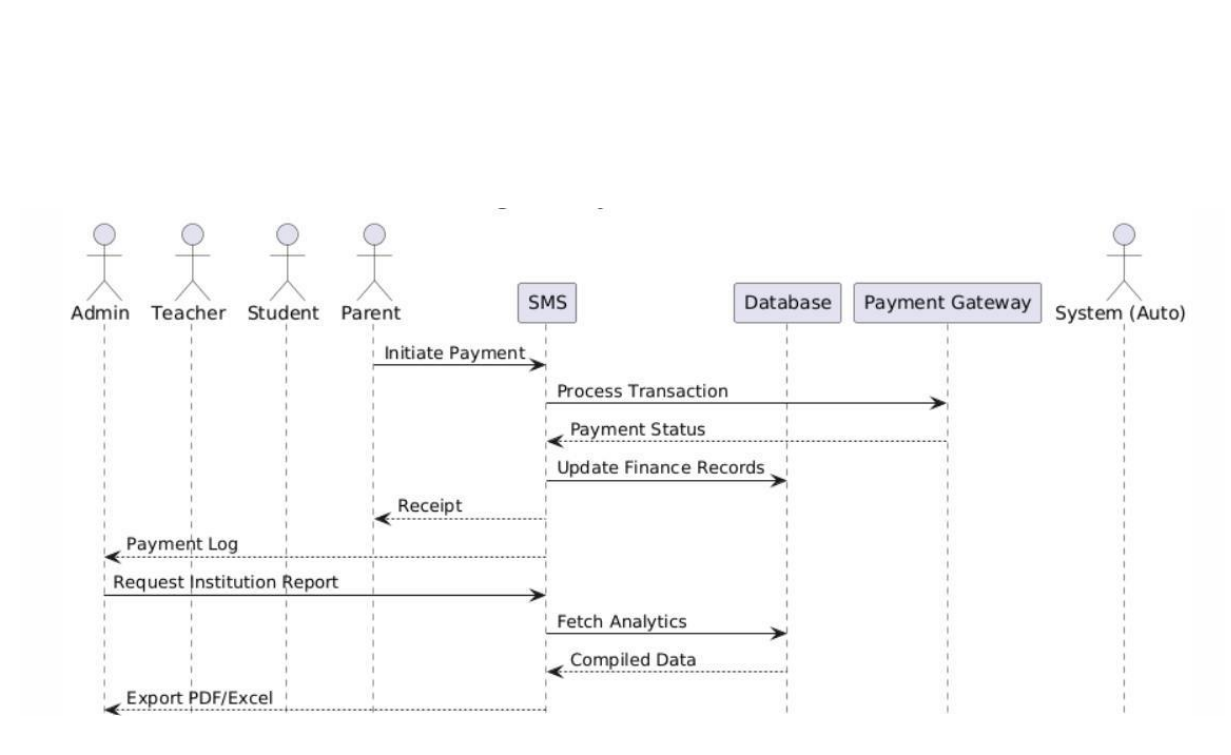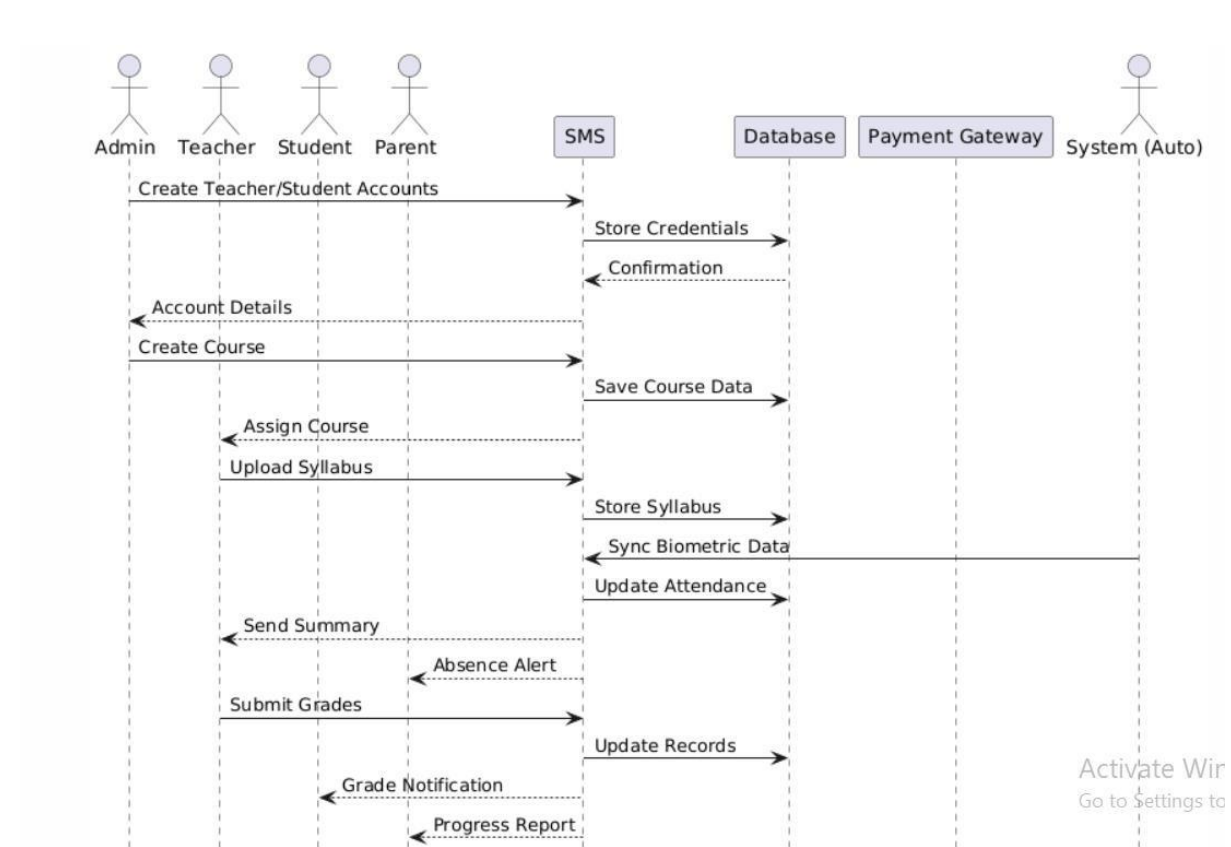6. Security: Measures protecting data integrity, access, and compliance.

Use-Case:

Actors:

1. Admin
2. Teacher
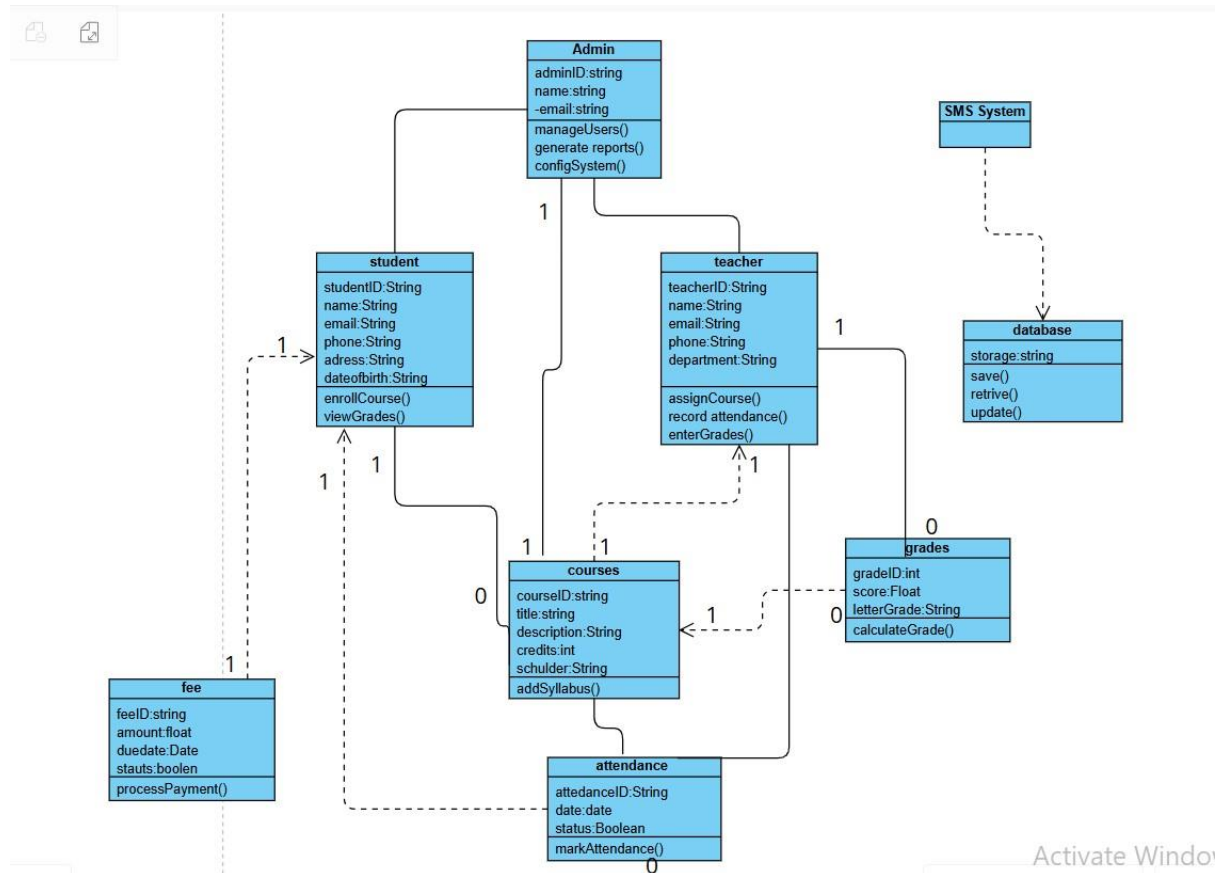3. Student
4. Parent
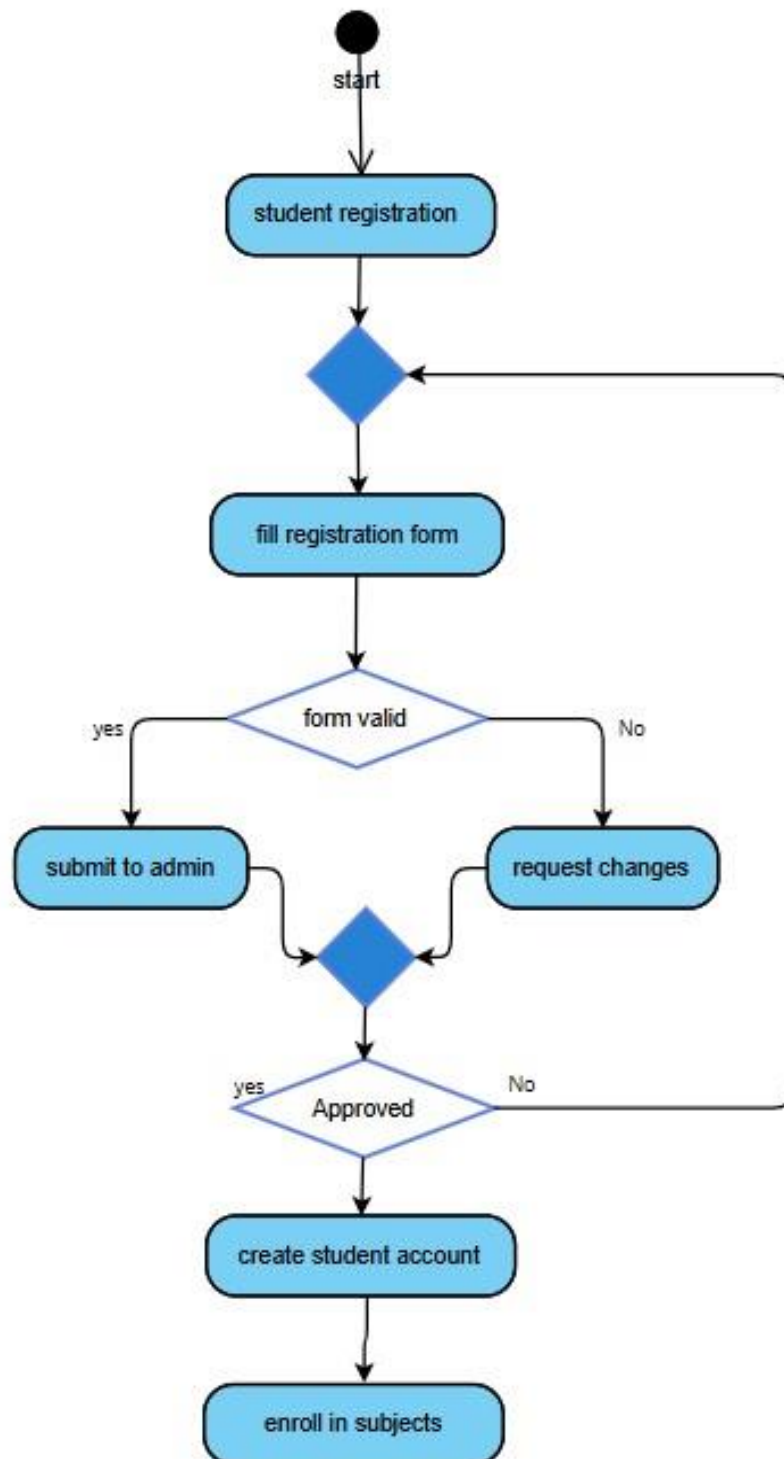5. System (Automated processes)

Diagram:

Sequence diagram:

Class diagram:

Activity Diagram:
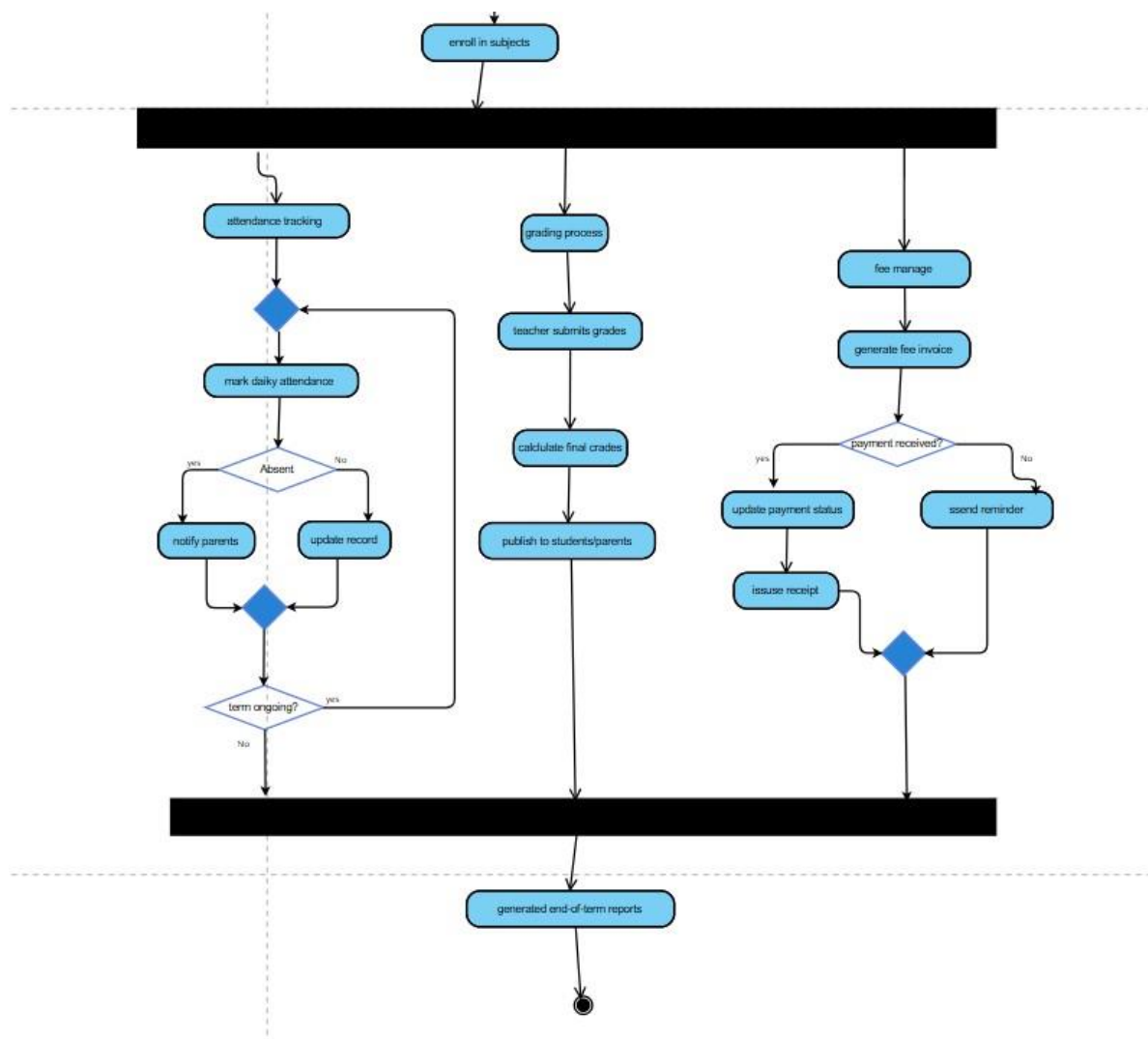
Component Diagram:

Object diagram:

admin1:Admin
adminId = "A100"
name = "Dr. Smith"
email = "smith@sms.edu"

▼ manages

smsDB:Database
storageType = "PostgreSQL"
version = "14.5"

▶ stores

◀ stores

student1:Student
studentId = "S2023001"
name = "Alice Johnson"
email = "alice@sms.edu"
enrolledCourses = ["CSC101", "MATH201"]

student2:Student
studentId = "S2023002"
name = "Bob Lee"
email = "bob@sms.edu"
enrolledCourses = ["CSC101"]

teacher1:Teacher
teacherId = "T501"
name = "Prof. Chen"
department = "Computer Science"

enrolls

enrolls

enrolls

teaches

math201:Course
courseId = "MATH201"
title = "Calculus II"
schedule = "Tue/Thu 14:00-15:30"

csc101:Course
courseId = "CSC101"
title = "Intro to Programming"
schedule = "Mon/Wed 10:00-11:30"

▶ has

◀ includes

attendance1:Attendance
date = "2023-09-20"
status = "Present"

grade1:Grade
score = 87.5
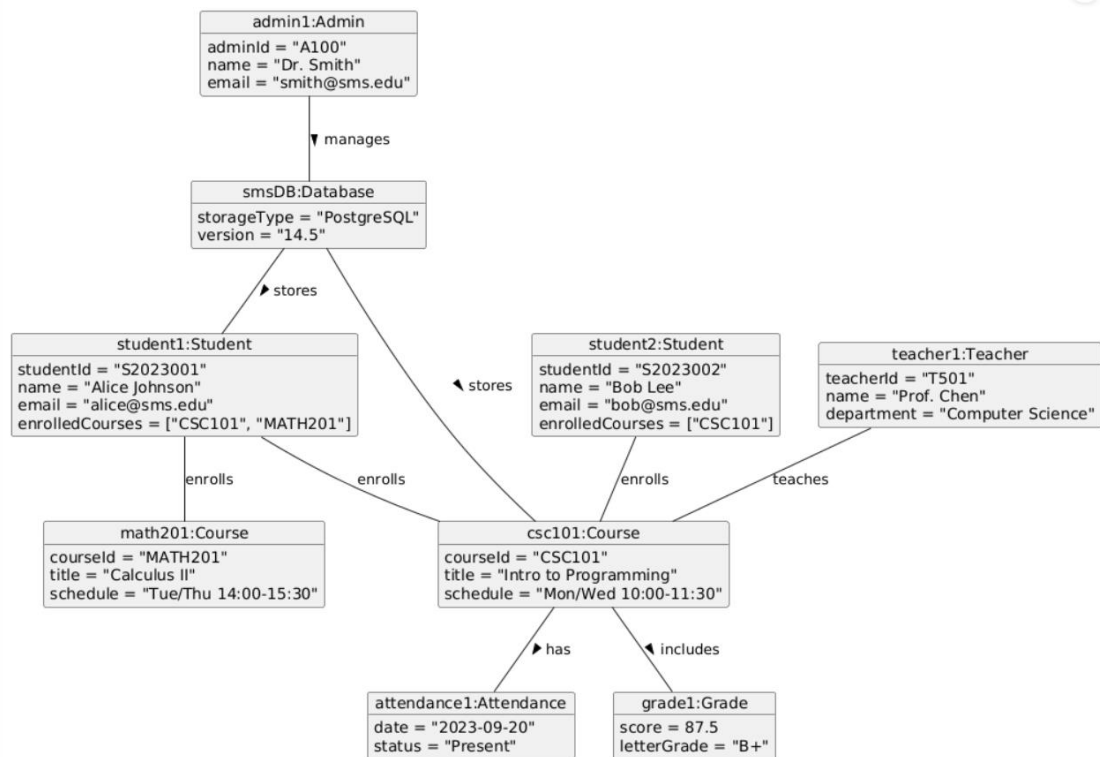letterGrade = "B+"

Code cleaning and refactoring:

Unrefactored (Messy) Code:

```html
1   <!DOCTYPE html>
2   <html>
3   <head>
4   <title>SMS</title>
5   <style>
6   body{font-family:Arial;margin:0;padding:0;background:#f0f0f0;}
7   .header{background:#333;color:white;padding:10px;text-align:center;}
8   .nav{background:#444;overflow:hidden;}
9   .nav a{float:left;color:white;text-align:center;padding:14px 16px;text-decoration:none;}
10  .nav a:hover{background:#ddd;color:black;}
11  .main{padding:20px;}
12  .card{background:white;padding:20px;margin-top:20px;border-radius:5px;box-shadow:0 2px 5px rgba(0,0,0,0.1);}
13  table{width:100%;border-collapse:collapse;}
14  th,td{padding:12px;text-align:left;border-bottom:1px solid #ddd;}
15  th{background:#333;color:white;}
16  tr:hover{background:#f5f5f5;}
17  .btn{padding:10px 15px;background:#4CAF50;color:white;border:none;border-radius:4px;cursor:pointer;}
18  .btn:hover{background:#45a049;}
19  .form-group{margin-bottom:15px;}
20  .form-group label{display:block;margin-bottom:5px;}
21  .form-group input{width:100%;padding:8px;border:1px solid #ddd;border-radius:4px;}
22  </style>
23  </head>
24  <body>
25  <div class="header"><h1>Student Management System</h1></div>
26  <div class="nav"><a href="#students">Students</a><a href="#teachers">Teachers</a><a href="#courses">Courses</a><a href="#attendance">Attendance</a><
27  <div class="main">
28  <div class="card"><h2>Student Records</h2>
29  <table><tr><th>ID</th><th>Name</th><th>Email</th><th>Actions</th></tr>
30  <tr><td>S001</td><td>John Doe</td><td>john@example.com</td><td><button class="btn">Edit</button> <button class="btn" style="background:#f44336;">D
31  <tr><td>S002</td><td>Jane Smith</td><td>jane@example.com</td><td><button class="btn">Edit</button> <button class="btn" style="background:#f44336;"
32  </table>
33  </div>
34  <div class="card"><h2>Add New Student</h2>
35  <div class="form-group"><label>Student ID</label><input type="text"></div>
36  <div class="form-group"><label>Full Name</label><input type="text"></div>
37  <div class="form-group"><label>Email</label><input type="email"></div>
38  <button class="btn">Add Student</button>
39  </div>
```

Cleaning code and refactored:

```html
yyy.html > html
1   <!DOCTYPE html>
2   <html lang="en">
3   <head>
4       <meta charset="UTF-8">
5       <meta name="viewport" content="width=device-width, initial-scale=1.0">
6       <title>Student Management System</title>
7       <style>
8           /* === GLOBAL STYLES === */
9           :root {
10              --primary-color: #2c3e50;
11              --secondary-color: #34495e;
12              --accent-color: #3498db;
13              --danger-color: #e74c3c;
14              --success-color: #2ecc71;
15              --text-light: #ecf0f1;
16              --text-dark: #2c3e50;
17              --card-shadow: 0 2px 10px rgba(0, 0, 0, 0.1);
18          }
19
20          body {
21              font-family: 'Segoe UI', Tahoma, Geneva, Verdana, sans-serif;
22              margin: 0;
23              padding: 0;
24              background-color: #f8f9fa;
25              color: var(--text-dark);
26          }
27
28          /* === HEADER STYLES === */
29          .header {
30              background-color: var(--primary-color);
31              color: var(--text-light);
32              padding: 1.5rem;
33              text-align: center;
34              box-shadow: 0 2px 5px rgba(0, 0, 0, 0.2);
35          }
36
37          .header__title {
38              margin: 0;
39              font-size: 2rem;
40          }
41
42          /* === NAVIGATION STYLES === */
43          .nav {
44              background-color: var(--secondary-color);
45              display: flex;
46              justify-content: flex-start;
47              padding: 0;
48              box-shadow: 0 2px 5px rgba(0, 0, 0, 0.1);
49          }
50
51          .nav__link {
52              color: var(--text-light);
53              padding: 1rem 1.5rem;
54              text-decoration: none;
55              transition: all 0.3s ease;
56          }
57
58          .nav__link:hover {
59              background-color: var(--accent-color);
60              color: white;
61          }
62
63          /* === MAIN CONTENT STYLES === */
64          .main {
65              padding: 2rem;
66              max-width: 1200px;
67              margin: 0 auto;
68          }
69
70          /* === CARD COMPONENT === */
71          .card {
72              background: white;
73              padding: 1.5rem;
74              margin-bottom: 2rem;
75              border-radius: 8px;
76              box-shadow: var(--card-shadow);
77          }
78
79          .card__title {
80              margin-top: 0;
81              color: var(--primary-color);
82              border-bottom: 2px solid var(--accent-color);
83              padding-bottom: 0.5rem;
84          }
85
```

```html
<style>
    /* === TABLE STYLES === */
    .data-table {
        width: 100%;
        border-collapse: collapse;
        margin: 1rem 0;
    }

    .data-table th {
        background-color: var(--primary-color);
        color: var(--text-light);
        padding: 1rem;
        text-align: left;
    }

    .data-table td {
        padding: 1rem;
        border-bottom: 1px solid #eee;
    }

    .data-table tr:hover {
        background-color: #f5f5f5;
    }

    /* === BUTTON STYLES === */
    .btn {
        padding: 0.6rem 1.2rem;
        border: none;
        border-radius: 4px;
        cursor: pointer;
        font-weight: 500;
        transition: all 0.3s ease;
    }

    .btn--primary {
        background-color: var(--accent-color);
        color: white;
    }

    .btn--danger {
        background-color: var(--danger-color);
        color: white;
    }

    .btn--success {
        background-color: var(--success-color);
        color: white;
    }

    .btn:hover {
        opacity: 0.9;
        transform: translateY(-1px);
    }

    /* === FORM STYLES === */
    .form-group {
        margin-bottom: 1.2rem;
    }

    .form-label {
        display: block;
        margin-bottom: 0.5rem;
        font-weight: 500;
    }

    .form-input {
        width: 100%;
        padding: 0.8rem;
        border: 1px solid #ddd;
        border-radius: 4px;
        font-size: 1rem;
        transition: border 0.3s ease;
    }

    .form-input:focus {
        border-color: var(--accent-color);
        outline: none;
        box-shadow: 0 0 0 2px rgba(52, 152, 219, 0.2);
    }
</style>
</head>
<body>
    <!-- Header Section -->
    <header class="header">
```

```html
<body>
    <!-- Header Section -->
    <header class="header">
        <h1 class="header__title">Student Management System</h1>
    </header>

    <!-- Navigation -->
    <nav class="nav">
        <a href="#students" class="nav__link">Students</a>
        <a href="#teachers" class="nav__link">Teachers</a>
        <a href="#courses" class="nav__link">Courses</a>
        <a href="#attendance" class="nav__link">Attendance</a>
        <a href="#grades" class="nav__link">Grades</a>
    </nav>

    <!-- Main Content -->
    <main class="main">
        <!-- Student Records Card -->
        <section class="card">
            <h2 class="card__title">Student Records</h2>
            <table class="data-table">
                <thead>
                    <tr>
                        <th>Student ID</th>
                        <th>Full Name</th>
                        <th>Email</th>
                        <th>Enrolled Courses</th>
                        <th>Actions</th>
                    </tr>
                </thead>
                <tbody>
                    <tr>
                        <td>S2023001</td>
                        <td>John Doe</td>
                        <td>john.doe@example.edu</td>
                        <td>CSC101, MATH201</td>
                        <td>
                            <button class="btn btn--primary">Edit</button>
                            <button class="btn btn--danger">Delete</button>
                        </td>
                    </tr>
                    <tr>
                        <td>S2023002</td>
                        <td>Jane Smith</td>
                        <td>jane.smith@example.edu</td>
                        <td>CSC101, ENG102</td>
                        <td>
                            <button class="btn btn--primary">Edit</button>
                            <button class="btn btn--danger">Delete</button>
                        </td>
                    </tr>
                </tbody>
            </table>
        </section>

        <!-- Add Student Form -->
        <section class="card">
            <h2 class="card__title">Add New Student</h2>
            <form id="addStudentForm">
                <div class="form-group">
                    <label for="studentId" class="form-label">Student ID</label>
                    <input type="text" id="studentId" class="form-input" required>
                </div>
                <div class="form-group">
                    <label for="fullName" class="form-label">Full Name</label>
                    <input type="text" id="fullName" class="form-input" required>
                </div>
                <div class="form-group">
                    <label for="email" class="form-label">Email</label>
                    <input type="email" id="email" class="form-input" required>
                </div>
                <button type="submit" class="btn btn--success">Add Student</button>
            </form>
        </section>
    </main>
</body>
</html>
```

Key Improvements in Refactored Code:

1. **Clean Structure**
   - Organized HTML with proper sections (`<header>`, `<nav>`, `<main>`).
   - CSS split into logical groups (globals, headers, forms, etc.)

2. **Consistent Styling**
   - Uses CSS variables (like `--primary-color`) for easy theme changes.
   - Standardized spacing (using `rem` units) and colors.

3. **Better Naming**
   - Clear class names (e.g., `btn--danger` for red buttons).
   - Follows BEM convention (`block__element--modifier`).

4. **Reusable Components**
   - Cards, buttons, and forms styled uniformly.
   - Avoids duplicate code (e.g., one button style with color variants).

5. **Improved Readability**
   o Comments label each CSS section.

6. **Accessibility**
   - Proper form labels (`<label for="id">`).
   - Focus states for interactive elements.

7. **Scalability**
   - Easy to add new components without breaking existing styles.
   - Variables allow quick design changes (e.g., dark mode).

Before vs. After:

- **Messy Code**: Hard to edit, inconsistent, repetitive.
- **Refactored**: Clean, modular, and maintainable.

Output:

Student Management System

Students   Teachers   Courses   Attendance   Grades

Student Records

Student ID	Full Name	Email	Enrolled Courses	Actions
S2023001	John Doe	john.doe@example.edu	CSC101, MATH201	Edit Delete
S2023002	Jane Smith	jane.smith@example.edu	CSC101, ENG102	Edit Delete

Add New Student

Student ID

Full Name

Email

Add Student