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FACULTY OF COMPUTER SCIENCE
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INFORMATION SYSTEM DESIGN TOOLS

STUDENT GRADE MANAGEMENT

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Class: DH21CS01C

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REVIEW



Contents

1 System Specification	8
1.1 Detailed Specification	8
1.2 Evaluation	10
2 Description of the current state of the system	10
2.1 System Features	10
2.1.1 Student Record Management	10
2.1.2 Grade Management	10
2.1.3 Conduct and Academic Classification Management	11
2.1.4 Award and Discipline Management	11
2.2 Highlights of the System	11
3 Determining System Flow	11
4 Use Case	13
4.1 Use case diagram	13
4.2 Decompose a use case	14
4.2.1 Employee information management function	14
4.2.2 Student and teacher information management function	14
4.2.3 Evaluation of academic results	15
4.2.4 Reward management function	15
4.3 Use case diagram description	15
4.3.1 Description of the System Functions	15
4.3.2 Description of User Interaction with the System	16
4.3.3 How the System is Used	17
5 Context diagram	18
5.1 Data Flow Diagram	18
5.2 Data Flow Diagram Description	18
6 Data Flow Diagram From Business Model	19
6.1 Data Flow Diagram	19
6.2 Data Flow Diagram Description	19
7 Data Flow Diagram Level 1	20
7.1 User Management	20
7.2 Score Management	21
7.3 Reward Management	22
8 Identify Entities And Attributes, Identify Relationships And Attributes	24
8.1 Entities And Attributes	24
8.2 Entities And Relationships	25
9 Analyze BPM	26
9.1 Business Process Model Describe	26
9.2 WORK FLOW	26
9.3 Business Process Model Diagram	27
10 Draw diagram and normalization	28
10.1 Diagram	28
10.2 Normalization	28
11 Sequence Diagram	30
11.1 Document Submission Process	30
11.2 Grade Management Process	30



12 The Data Model Relationship Diagram	31
13 ERD	32
13.1 Entities and Attributes	33
13.1.1 Student	33
13.1.2 Teacher	33
13.1.3 Subject	33
13.1.4 Class	34
13.1.5 Academic Year	34
13.1.6 Grade	34
13.1.7 Semester	34
13.1.8 Score	35
13.1.9 Score Type	35
13.1.10 Conduct	35
13.1.11 Result	35
13.2 Relationships	35
13.3 Detailed Relationships	36
14 CDM Analysis	36
14.1 Conceptual Data Model Diagram	36
14.2 CDM Description	36
15 Association between Entities:	36
16 Relationship between Entities:	37
17 LDM Analysis	37
17.1 Logical Data Model Diagram	37
17.2 LDM Description	37
17.2.1 Entities and Attributes:	38
17.2.2 Relationships:	40
17.2.3 Summary:	40
18 Physical Data Model (PDM) Analysis	41
18.1 Logical Data Model Diagram	41
18.2 PDM Description	41
18.2.1 Entity Descriptions	41
18.2.2 Relationship Descriptions	43
18.2.3 Summary	44
19 OOM Analysis	44
19.1 OOM Diagram	44
19.2 High School Student Score Management System OOM	44
19.2.1 Manage	44
19.2.2 SystemUser	44
19.2.2.a Attributes	44
19.2.2.b Function	45
19.3 Classes Related to Teachers	45
19.3.1 Teacher	45
19.3.1.a Attributes	45
19.3.1.b Function	45
19.3.2 Teaching	45
19.3.2.a Attributes	45
19.3.2.b Function	45
19.4 Classes Related to Students	45
19.4.1 Student	45
19.4.1.a Attributes	45



19.4.1.b Function	45
19.5 Classes Related to Semesters	46
19.5.1 Semester	46
19.5.1.a Attributes	46
19.5.1.b Function	46
19.6 Classes Related to Scores	46
19.6.1 Score	46
19.6.1.a Attributes	46
19.6.1.b Function	46
19.7 Classes Related to Subjects and Classes	46
19.7.1 Subject	46
19.7.1.a Attributes	46
19.7.1.b Function	46
19.7.2 Class	46
19.7.2.a Attributes	46
19.7.2.b Function	47
19.8 Relationships Between Classes	47
20 XML Analysis	47
20.1 XML Diagram	47
20.2 Main Entities	47
20.2.1 Score	47
20.2.1.a Attributes	47
20.2.1.b Function	48
20.2.2 Semester	48
20.2.2.a Attributes	48
20.2.2.b Function	48
20.2.3 Manage	48
20.2.3.a Attributes	48
20.2.3.b Function	48
20.2.4 Class	48
20.2.4.a Attributes	48
20.2.4.b Function	48
20.2.5 Student	48
20.2.5.a Attributes	48
20.2.5.b Function	49
20.2.6 Subject	49
20.2.6.a Attributes	49
20.2.6.b Function	49
20.2.7 SystemUser	49
20.2.7.a Attributes	49
20.2.7.b Function	49
20.2.8 Teacher	49
20.2.8.a Attributes	49
20.2.8.b Function	49
20.2.9 Teaching	49
20.2.9.a Attributes	49
20.2.9.b Function	49
20.3 Relationships Between Entities	50
21 User Interface	50
21.1 Log In As Teacher	50
21.2 School Principal	52
21.3 Clerical Staff	56
22 Project Resources	58



List of Figures

1	Use case diagram	13
2	Employee information management function	14
3	Student and teacher information management function	14
4	Evaluation of academic results	15
5	Reward management function	15
6	Data Flow Context Diagram	18
7	Data Flow Diagram	19
8	User Management Data Flow Diagram	20
9	Score Management Data Flow Diagram	21
10	Reward Management Data Flow Diagram	23
11	Business Process model	27
12	ERD Normalization	28
13	Sequence Diagram of the Student Management System	30
14	The Data Model Relationship Diagram	31
15	ERD DIAGRAM	32
16	High School Student Score Management System CDM	36
17	High School Student Score Management System LDM	37
18	High School Student Score Management System PDM	41
19	High School Student Score Management System OOM	44
20	High School Student Score Management System XML	47
21	Main Page	50
22	Login as Teacher	51
23	Subject Management	51
24	Teacher Assign Student Score	52
25	Principal Log In	52
26	Class Information Management	53
27	Student Information Management	53
28	Teacher Information Management	54
29	List of Teacher Teaching Subjects of Each Class	54
30	Subject Management Information	55
31	School Student Upgrade Rule	55
32	Upgrade Student To Next Class For New School Year	56
33	Report of Student Participate in Class	56
34	Report of Student Grade in Class	57
35	Report of Student Grade in Two Semester	57
36	Report of Class Average Grade	58



List of Tables

1	Entities and Attributes	24
2	Entities and Attributes	25
3	Normalization	29
4	Student Table Information	33
5	Teacher Table Information	33
6	Subject Table Information	33
7	Class Table Information	34
8	Academic Year Table Information	34
9	Grade Table Information	34
10	Semester Table Information	34
11	Score Table Information	35
12	Score Type Table Information	35
13	Conduct Table Information	35
14	Result Table Information	35



1 System Specification

1.1 Detailed Specification

1.1. Office Staff Interface

- **Login:**
 - Username: Employee ID.
 - Default password for a new account: Employee ID (If changed, must follow the password reset rules).
- **Enter Student Information:**
 - Office staff enters student information.
 - Mandatory fields: Full name, date of birth, place of birth, gender, ethnicity, parent's name, and phone number (if not available, enter guardian's name).
 - Optional fields: Religion, notes.
- **Enter Teacher Information:**
 - Office staff enters teacher information.
 - Mandatory fields: Teacher ID, full name, date of birth, homeroom class (if not applicable, leave empty), subject taught.
 - Optional fields: Notes.
- **Enter Grades:**
 - Office staff enters grades by following these steps:
 - * Select class.
 - * Select subject.
 - * Enter grade (must be a positive number not exceeding 10).
- **Manage Student and Teacher Information:**
 - Office staff can view and edit student and teacher information: select class to view the student list, select the Teacher section to view the teacher list.
- **Change Password:**
 - Office staff can change their login password.
 - Requirements for the new password:
 - * Match the old password entered.
 - * Password must be more than 8 characters.
 - * New password must not match the old password.
 - * Re-entered password must match the new password.
- **Logout:**
 - Office staff can log out of the system.

1.2. Teacher Interface

- **Login:**
 - Username: Teacher ID.
 - Default password for a new account: Teacher ID (If changed, must follow the password reset rules).
- **Update Grades:**
 - Teachers can edit grades entered by office staff in the system (grades must be positive numbers not exceeding 10).
- **View Grades and Academic Performance:**
 - Teachers can view students' grades and academic performance.
- **Semester Comments:**



- Teachers evaluate and classify students' conduct and academic performance based on school regulations, and these fields must not be left empty.
 - * Subject teachers provide feedback according to the subject taught.
 - * Homeroom teachers evaluate both behavior and academic performance.

- **Change Password:**

- Teachers can change their login password.
- Requirements for the new password:
 - * Match the old password entered.
 - * Password must be more than 8 characters.
 - * New password must not match the old password.
 - * Re-entered password must match the new password.

- **Logout:**

- Teachers can log out of the system.

1.3. Admin (School Management) Interface

- **Login:**

- Username: Teacher ID.
- Default password for a new account: Teacher ID (If changed, must follow the password reset rules).

- **Manage Student and Teacher Information:**

- School management has the authority to view and edit student and teacher information.

- **Announce Academic Results:**

- The school administration approves the report cards:
 - * Provides general comments on academic performance
 - * Approves the academic results and sends notifications to students
 - * Compiles the results and sends them to office staff to prepare for awards

- **Create Office Staff Accounts:**

- School management creates accounts for office staff.
- Mandatory fields: Employee ID, full name, date of birth, gender, place of birth.
- Optional fields: Notes.

- **Account Permissions:**

- School management assigns permissions to accounts from highest to lowest to perform specific functions.

- **Change Password:**

- Admin can change their login password.
- Requirements for the new password:
 - * Match the old password entered.
 - * Password must be more than 8 characters.
 - * New password must not match the old password.
 - * Re-entered password must match the new password.

- **Logout:**

- Admin can log out of the system.



1.2 Evaluation

- The system provides a clear and structured user interface for different roles (students, office staff, teachers, and admin).
- It ensures secure access to sensitive data through role-based access control and password management rules.
- The functionalities align with the educational institution's needs for managing academic data, including grade entry, student and teacher information, and performance evaluation.
- The system facilitates communication of academic results between students and the school management, ensuring transparency.

2 Description of the current state of the system

Summary: The High School Student Grade Management System is designed to enhance the efficiency of managing and administering educational tasks within the school. The system reduces the workload and manpower required to process and store student information, ensuring accuracy, security, and speed in updating and retrieving data. Additionally, the system supports efficient management of student grades, conduct, and rewards.

2.1 System Features

The High School Student Record & Grade Management System includes the following key features:

2.1.1 Student Record Management

Description: When a student enrolls, their records are reviewed and entered into the system. If the records are incomplete, the submitter is required to provide additional information. A student's personal information can be regularly updated, and student IDs are issued based on this information.

Constraints:

- Student information must include mandatory fields such as full name, date of birth, gender, address, and parent/guardian contact details.
- This information must be verified and confirmed for accuracy before being stored in the system.
- Each student is assigned a unique ID that applies for all three years of study.

2.1.2 Grade Management

Description: Subject teachers enter the grades from tests into the system. Administrative staff will verify the grade information and enter it into the system. The system automatically calculates the semester and annual GPA based on the grade calculation formula approved by the school board.

Constraints:

- Grades must be entered according to specified fields such as oral grades, 15-minute tests, one-period tests, and semester exams.
- Grades must be entered within a designated time frame and cannot be altered after finalization.
- The system must verify and ensure that the entered grades are within the range of 0 to 10.
- The correct grade calculation formula must be applied.



2.1.3 Conduct and Academic Classification Management

Description: Homeroom teachers will enter comments and evaluate student conduct into the system. Based on the grades and teachers' comments, the system automatically classifies the academic performance of the students. After evaluation results are obtained, the system will compile lists and reports to send to the school board.

Constraints:

- Conduct evaluations must adhere to prescribed assessment criteria and be entered into specific fields such as Excellent, Good, Average, or Poor.
- Academic classification must be based on the GPA of all subjects and determined according to the regulations of the Ministry of Education and Training.

2.1.4 Award and Discipline Management

Description: The school board provides the regulations for awards and discipline. The system reports on student academic performance and conduct, enabling the school board to make decisions on awards and discipline based on the system's reports.

Constraints:

- Information regarding awards and discipline must be stored in detail, including the reason, form, and date of execution.
- Decisions on awards and discipline must be based on the data entered into the system and confirmed by the relevant parties.

2.2 Highlights of the System

The High School Student Record & Grade Management System has the following highlights:

Accuracy and Security: The system ensures that information is accurately updated and securely stored.

Convenience: Information can be accessed and updated quickly from anywhere.

Efficiency: It reduces the workload and manpower required, saving time and effort.

Flexibility: The system can be easily adjusted and expanded to meet new requirements.

3 Determining System Flow

Detailed System Flow

1. Login and Account Management

Description: This process allows users (teachers, administrative staff, principals) to log in to the student management system. The system authenticates users and grants access based on their login information.

Actors:

- Users (teachers, administrative staff, principals)

Workflow:

1. **User Opens Login Page:** Access the system via browser or app. Login interface prompts the user for credentials.
2. **User Enters Login Information:** Input username and password. Click "Login" to submit.
3. **System Processes Login Request:** Validate the format of username and password. Display error message if invalid (e.g., "Invalid username or password").
4. **Authentication:** System sends credentials to the database for verification. Database returns authentication result.
5. **Handle Authentication Result:** If valid, determine user role (teacher, admin, principal) and redirect to the appropriate dashboard. If invalid, display error and prompt to re-enter credentials.



6. Account Management: Users can change passwords or update personal information after successful login. System requires current password confirmation for changes.

Outcome: User gains access with appropriate permissions or is prompted to log in again if unsuccessful.

2. Student Information Management

Description: This process allows users (teachers, administrative staff) to manage student personal information, including adding, editing, or deleting records.

Actors:

- Teachers, administrative staff

Workflow:

- Select "Student Management":** After login, navigate to "Student Management" from the main menu.
- Display Student List:** System queries the database and displays the current student list.
- Add New Student:** Click "Add New" and fill in required fields (e.g., name, birthdate, class). Validate and save the information to the database.
- Edit Student Information:** Select a student to edit, update information, and save changes.
- Delete Student:** Select a student to delete, confirm, and update the list accordingly.

Outcome: The student list is accurately updated based on user actions.

3. Enter and Store Grades

Description: This process allows teachers to enter and store student grades by subject and class. The grades are stored in the database for future reports.

Actors:

- Teachers

Workflow:

- Select "Enter Grades":** After login, select "Enter Grades" from the menu.
- Select Class and Subject:** Choose the class and subject for grade entry.
- Display Student List:** System shows the student list for the selected class.
- Enter Grades:** Teachers enter grades for each student.
- Save Grades:** Validate and save the grades to the database.
- Edit Grades (Optional):** Teachers can revise grades by selecting a student and updating the information.

Outcome: Student grades are accurately stored and available for reports.

4. Create Reports and Statistics

Description: This process allows users (administrative staff, principals) to generate summary reports of grades by term, academic year, or class. Reports can be exported as PDF or Excel files.

Actors:

- Administrative staff, principals

Workflow:

- Select "Create Report":** After login, choose "Create Report" from the menu.
- Select Term and Class:** Choose the term and class for the report.
- System Aggregates Grades:** The system calculates and generates the report with necessary information (e.g., average grades, ranking).
- Display and Export Report:** View the report and export it as PDF or Excel. Optionally save or print the report.
- Store Report:** Reports can be stored for future reference and accessed via "View Reports".

Outcome: Summary reports are successfully generated and exported for educational assessment.

5. Student Grade Comments

Description: This process allows teachers to add comments on students' grades, providing feedback on their performance.

Actors:

- Teachers

Workflow:

1. **Select "Grade Comments":** After entering grades, teachers choose the "Grade Comments" function from the main menu.
2. **Select Student and Subject:** The system displays students and subjects for the teacher to select.
3. **Enter Comments:** Teachers input comments related to the student's performance.
4. **Save Comments:** After entering, teachers click "Save." The system validates and stores the comments in the database.

Outcome: The teacher's comments are saved and displayed with the student's grades.

6. Reward Management

Description: This process allows staff to manage rewards for students based on their academic performance.

Actors:

- Administrative staff, School management

Workflow:

1. **Select "Reward Management":** After logging in, users choose "Reward Management" from the main menu.
2. **Select Student for Reward:** The system shows a list of students and their achievements for selection.
3. **Choose Reward Type:** Users select the type of reward (certificate, prize, etc.) or enter a new one.
4. **Record Reward:** The system records the reward in the student's profile and allows for printing or saving the reward information.

Outcome: Rewards are recorded and managed within the system for future reference.

4 Use Cage

4.1 Use case diagram

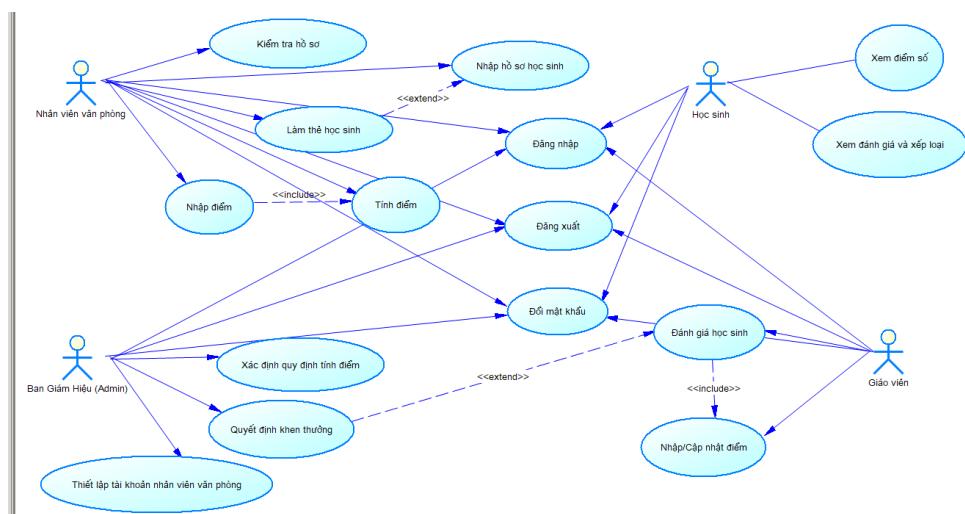


Figure 1: Use case diagram

4.2 Decompose a use case

4.2.1 Employee information management function

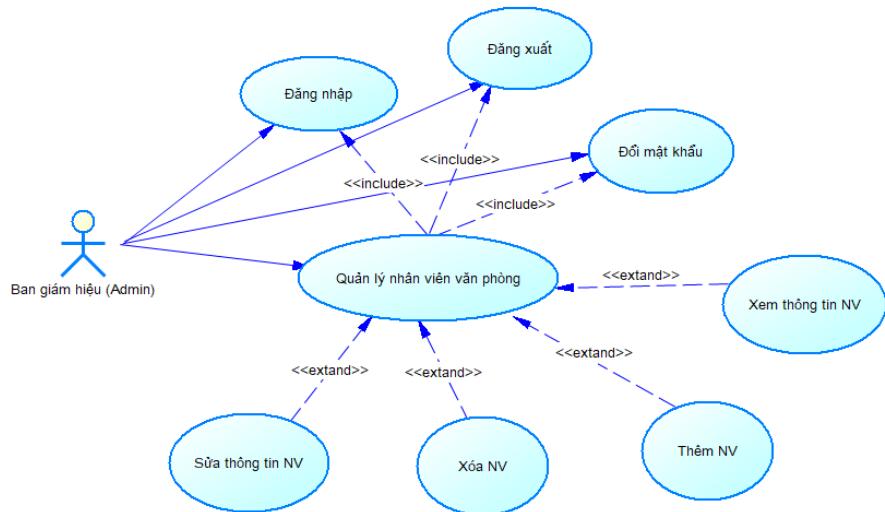


Figure 2: Employee information management function

4.2.2 Student and teacher information management function

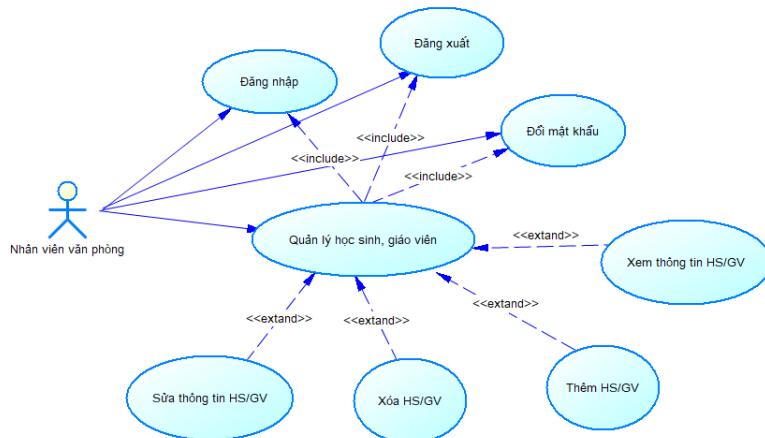


Figure 3: Student and teacher information management function

4.2.3 Evaluation of academic results

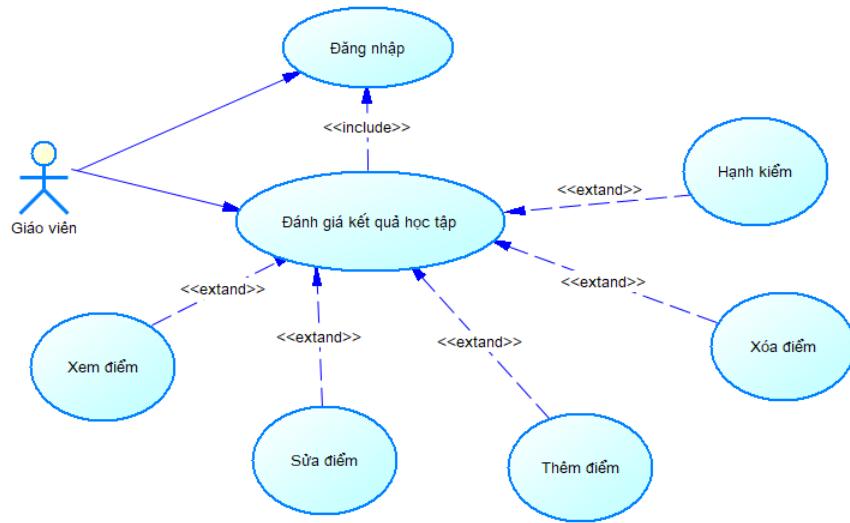


Figure 4: Evaluation of academic results

4.2.4 Reward management function

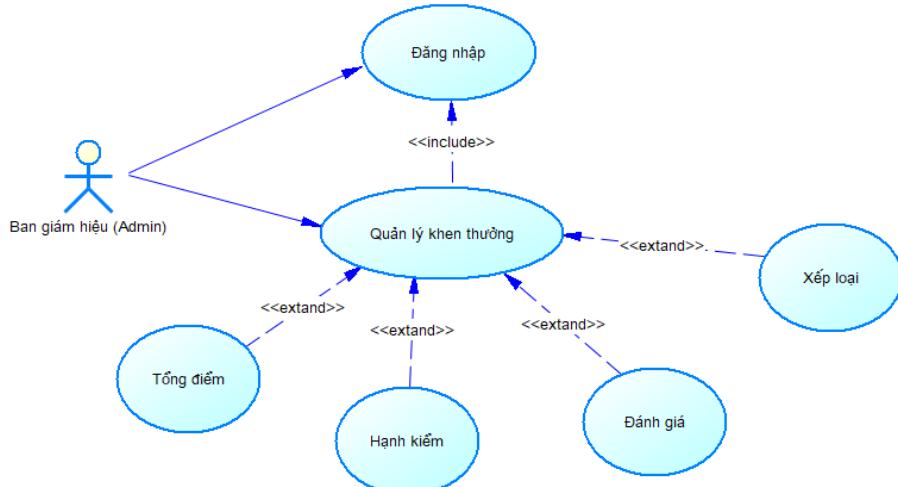


Figure 5: Reward management function

4.3 Use case diagram description

4.3.1 Description of the System Functions

* File Management:

- **File Verification:** Office staff check and confirm student admission files.
- **File Entry:** Staff enter students' personal information into the database.
- **Student ID Creation:** Create student ID cards with personal information and a unique student code.

* Grade Management:



- **Determine Grade Information:** Staff determine the relevant grade information to be entered into the system.
- **Enter Grades:** Enter oral grades, 15-minute test grades, one-period test grades, and semester grades into the system.
- **Determine Grading Method:** Determine the method for calculating semester averages based on the regulations of the school administration.
- **Calculate Grades:** Calculate subject averages and semester averages by class type.

* Reward Management:

- **Comments and Evaluation of Academic Performance and Behavior:** Homeroom teachers enter comments and behavior evaluations into the system.
- **Report on Class Performance:** The system generates reports on class performance and discipline, and suggests students for rewards.
- **Decide on Rewards for Individuals and Groups:** The school administration decides on rewards for students and classes based on the reports.

4.3.2 Description of User Interaction with the System

* File Management:

- **File Verification:**
 - **User:** Office Staff.
 - **Action:** Check and request additional documents if necessary.
- **File Entry:**
 - **User:** Office Staff.
 - **Action:** Enter students' personal information into the system.
- **Student ID Creation:**
 - **User:** Office Staff.
 - **Action:** Create and issue student IDs.

* Grade Management:

- **Determine Grade Information:**
 - **User:** Grade Management Staff.
 - **Action:** Determine the class, subject, and grade type to prepare for entry.
- **Enter Grades:**
 - **User:** Grade Management Staff.
 - **Action:** Enter all types of grades for students.
- **Determine Grading Method:**
 - **User:** Grade Management Staff.
 - **Action:** Set up grading rules according to class types.
- **Calculate Grades:**
 - **User:** System.
 - **Action:** Automatically calculate semester averages.



* Reward Management:

- **Comments and Evaluation of Academic Performance and Behavior:**

- **User:** Homeroom Teachers.
- **Action:** Enter comments and evaluations into the system.

- **Report on Class Performance:**

- **User:** System.
- **Action:** Generate reports on academic performance and discipline.

- **Decide on Rewards for Individuals and Groups:**

- **User:** School Administration.
- **Action:** Decide on rewards based on reports.

* Teachers:

- **Grade Management:**

- **User:** Subject Teachers.
- **Action:** Enter and update grades for each subject.

- **Comments and Evaluation of Academic Performance and Behavior:**

- **User:** Homeroom Teachers.
- **Action:** Enter comments and evaluations into the system.

* Students:

- **View Grades:**

- **User:** Students.
- **Action:** Check their grades through the system.

- **View Classifications and Rewards:**

- **User:** Students.
- **Action:** Check their academic classification and rewards.

4.3.3 How the System is Used

* Office Staff:

- Check and enter student files.
- Create and issue student IDs.
- Enter grades and determine grading rules.

* Subject Teachers:

- Enter and update grades for each subject.

* Homeroom Teachers:

- Provide comments and evaluations on students' academic performance and behavior.

* School Administration:

- Review class performance reports.
- Decide on rewards for outstanding individuals and groups.

* Students:

- Check their grades, academic classification, and rewards through the system.

5 Context diagram

5.1 Data Flow Diagram

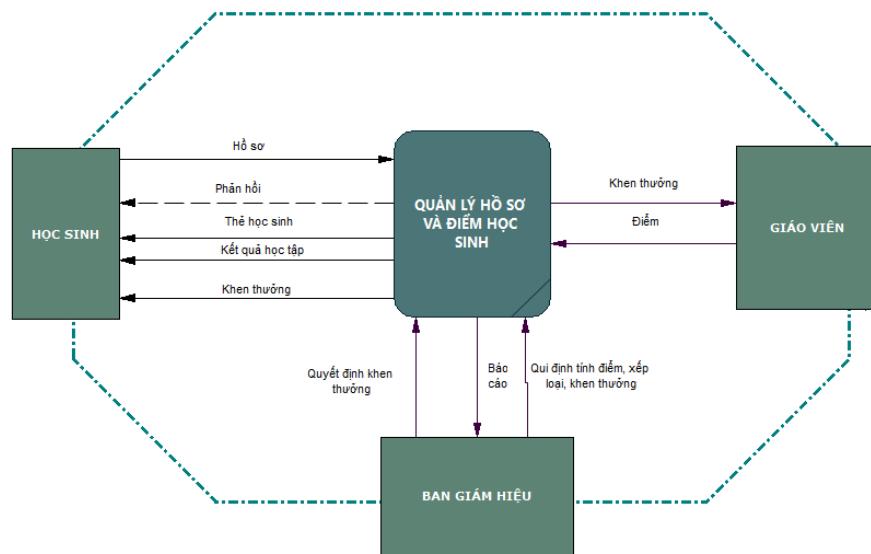


Figure 6: Data Flow Context Diagram

5.2 Data Flow Diagram Description

This Data Flow Diagram (DFD) illustrates the interactions between various actors and the central system managing student records and grades. The key entities involved are:

- **Students:** They provide personal records and receive feedback on their academic performance. Students also submit their academic progress and can receive commendations based on their achievements.
- **Teachers:** They input grades and commendations for students, along with managing student performance evaluations.
- **Management Board:** This entity reviews reports generated by the system. Based on these reports, the board makes decisions regarding commendations for students.
- **Central System (Student Record and Grading Management):** This is the hub of the DFD, processing inputs from students and teachers. It handles student records, feedback, academic results, and commendations. It also generates reports for the Management Board and determines grading criteria and commendations.

6 Data Flow Diagram From Business Model

6.1 Data Flow Diagram

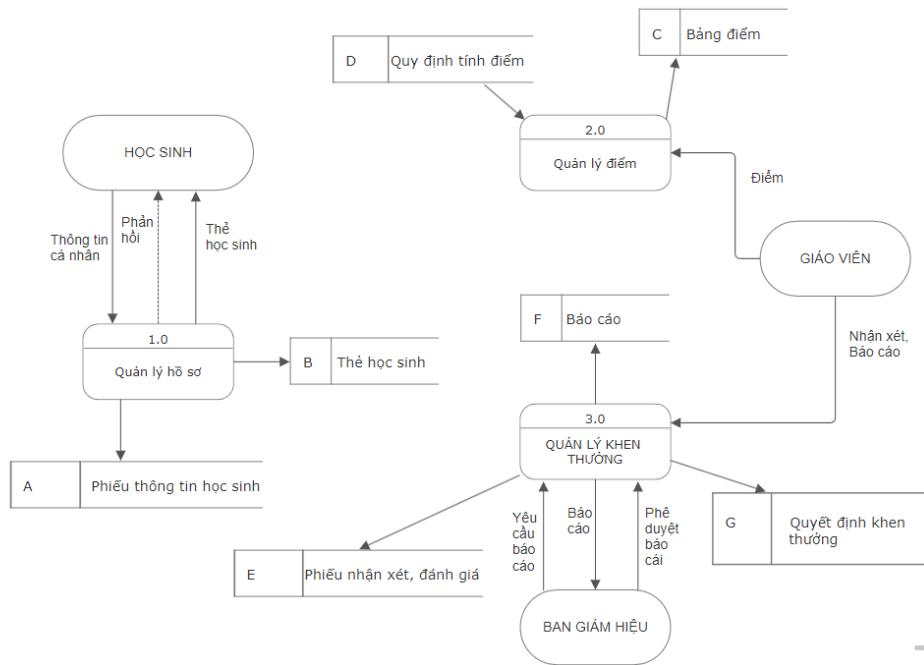


Figure 7: Data Flow Diagram

6.2 Data Flow Diagram Description

Entities:

- **Student:** Represents the students in the system.
- **Teacher:** Represents the teachers who input grades and provide feedback.
- **Management Board:** Represents the school board or principal who manages approval and requests for reports.

Processes:

• 1.0 Record Management:

- Handles the management of student records, including personal information.
- Inputs: Student feedback and personal information.
- Outputs: Student cards and student information forms

• 2.0 Grade Management:

- Manages the grades of students.
- Inputs: Grades from teachers and scoring regulations.
- Outputs: Grade sheets.

• 3.0 Reward Management:

- Manages rewards based on student performance.
- Inputs: Reports from grade management and requests/reports from the principal.

- Outputs: Evaluation forms , reports, and approved reward decisions .

Data Stores:

- **A - Student Information Form:** Stores the information about students.
- **B - Student Card:** Stores the student cards.
- **C - Grade Sheet:** Stores the grades of students.
- **D - Scoring Regulations:** Stores the rules for calculating grades.
- **E - Evaluation Form:** Stores the evaluation and feedback on students.
- **F - Report:** Stores various reports related to student performance.
- **G - Reward Decisions:** Stores the approved reward decisions.

7 Data Flow Diagram Level 1

7.1 User Management

- Data Flow Diagram

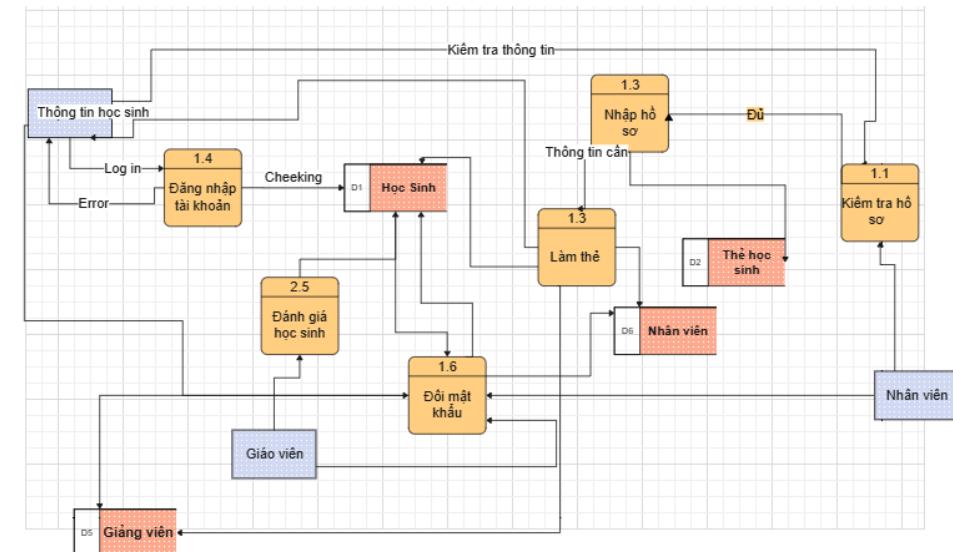


Figure 8: User Management Data Flow Diagram

- **Student :** The student interacts with various processes, including logging in, updating their profile, and viewing their evaluations.
- **Teacher/Lecturer :** Teachers or lecturers primarily interact with the system through the Evaluate Student (2.5) process.
- **Staff:** Staff members interact with processes like Enter Profile (1.3) and Create Card to manage student information.
- **Main Process:**
 - **Check Profile (1.1 - Kiểm tra hồ sơ):**
This process involves verifying the student's information. It ensures that the data being processed is accurate and complete. Verified data is then passed on to the next stages, such as profile entry or card creation.

- #### – Enter Profile (1.2 - Nhập hồ sơ):

This process is where the student's profile is entered into the system. It involves taking the necessary information from the Student Information and entering it into the system after verification.

- #### – Create Card (1.3 - Làm thẻ):

After entering the student's information, a card (likely a student ID) is created. This process accesses the student's data and generates a card that is then stored in the Student Card (Thẻ học sinh - D2) data store.

- Login (1.4 - Đăng nhập tài khoản):

This process handles the student's login to the system. It checks the student's credentials against the stored information. If the login is successful, the student gains access to the system; if there is an error, the process will handle it accordingly.

- Evaluate Student (2.5 - Đánh giá học sinh):

Teachers or lecturers evaluate students based on their academic performance and conduct. The results of these evaluations are likely stored for later access and further processing.

- Change Password (1.6 - Đổi mật khẩu):

Students or staff can use this process to change their account passwords. This process ensures that the system's security is maintained by allowing users to update their credentials.

- Data Stores:

- #### – Student Profile (Hồ sơ học sinh - D1):

This data store holds the profiles of all students, which are accessed during login and profile updates.

- Student Card (Thẻ học sinh - D2):

This store contains the physical or digital student cards created by the system after the profile has been entered and verified.

7.2 Score Management

- Data Flow Diagram

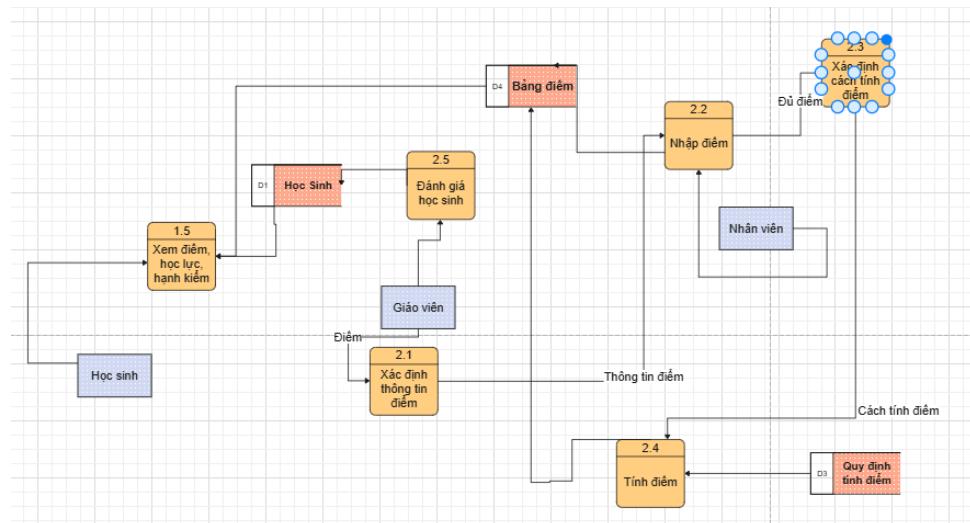


Figure 9: Score Management Data Flow Diagram

- **Student:** View Grades, Academic Performance, Conduct (1.5). Students can access and view their grades, academic performance, and conduct records through this process. This process interacts with the Grade Sheet (Bảng điểm) to retrieve the necessary information for the students to view.



- **Teacher:** Evaluate Student (2.5): Teachers evaluate students based on their academic performance and conduct. The evaluation results are stored and interact with the Grade Sheet (Bảng điểm) and the student's profile.
- **Staff:** Enter Grades (2.2): Staff members are responsible for entering the student's grades into the system. This process interacts with the Grade Sheet (Bảng điểm), where the grades are stored after entry.
- **Main Process:**
 - **Determine Grade Information (2.1):**
This process involves gathering all necessary grade information before it is entered into the system. The grade information is essential for the following processes and is shared with the Calculate Grades (2.4) process.
 - **Calculate Grades (2.4):**
The system calculates the final grades based on the input from Determine Grade Information (2.1) and the Grade Calculation Method (2.3). This process utilizes the Grade Calculation Rules (Quy định tính điểm - D3) to determine the correct calculation method.
 - **Determine Grade Calculation Method (2.3):**
This process involves identifying the appropriate method for calculating grades, which is dictated by the rules stored in Grade Calculation Rules (D3). Once the method is determined, it feeds into the Calculate Grades (2.4) process to ensure accurate calculations.

- **Data Stores:**

- **Grade Sheet (Bảng điểm - D4):** This is the primary data store where all grades are recorded. It is accessed and updated by various processes such as Enter Grades (2.2) and Calculate Grades (2.4).
- **Grade Calculation Rules (Quy định tính điểm - D3):** This data store contains the rules and regulations that dictate how grades should be calculated. It is referenced by the Determine Grade Calculation Method (2.3) process.

7.3 Reward Management

- **Data Flow Diagram**

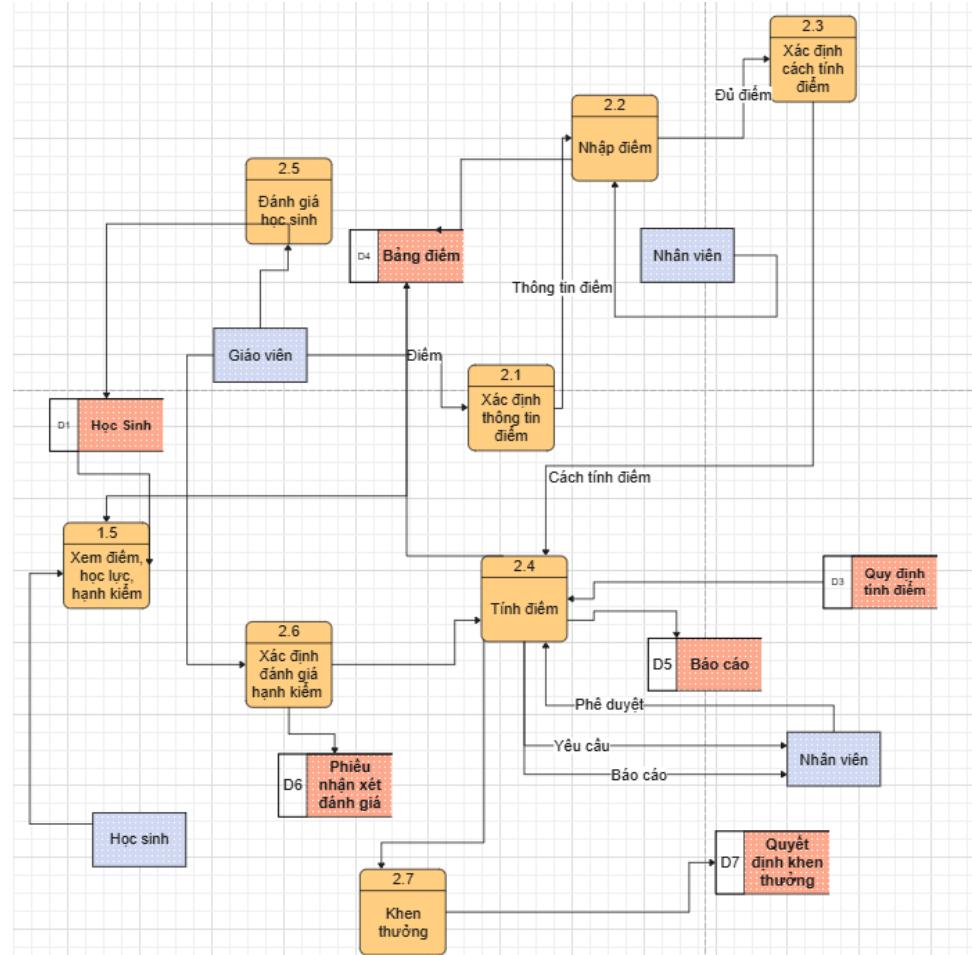


Figure 10: Reward Management Data Flow Diagram

- **Student:** Students can view their grades, academic performance, and conduct through this management process.
- **Teacher:** Teachers play a crucial role in evaluating students (2.5) and determining conduct evaluations (2.6). This information is then stored in the Evaluation Form (D6).
- **Staff:** Staff are involved in entering grades (2.2) and determining the method of grade calculation (2.3). After calculations, the grades are approved and stored in a Report (D5) to manage the reward process.
- **Main Process:**
 - **Determine Grade Information (2.1):** Grade data is identified before being entered into the system.
 - **Enter Grades (2.2):** Staff enter student grades into the system.
 - **Determine Grade Calculation Method (2.3):** The system determines the method of grade calculation based on rules stored in the Grade Calculation Rules (D3).
 - **Calculate Grades (2.4):** After entering grades and determining the calculation method, the student's grades are calculated.
 - **Evaluate Students (2.5):** Teachers provide a comprehensive evaluation of the student based on academic performance and conduct.
 - **Determine Conduct Evaluation (2.6):** The student's conduct is assessed by the teacher.
 - **Reward (2.7):** The final process is determining and issuing the reward decision based on the approved report.



- Data Stores:

- **Grade Sheet (D4)**: Stores the student's grade information after it has been entered and calculated.
- **Report (D5)**: The report on grade calculations and evaluations is submitted for approval before rewards are issued.
- **Grade Calculation Rules (D3)**: Contains the rules regarding how grades should be calculated.
- **Reward Decision (D7)**: The final decision regarding student rewards.

8 Identify Entities And Attributes, Identify Relationships And Attributes

8.1 Entities And Attributes

Table 1: Entities and Attributes

No	Entity	Primary Key	Attribute
1	Student	<u>StudentID</u>	- StudentName - Gender - DOB - Address - Religion - Email - Nation - FatherName - MotherName
2	Teacher	<u>TeacherID</u>	- TeacherName - Address - PhoneNum
3	Subject	<u>SubjectID</u>	- SubjectName - NumOfLessons - Coefficient
4	Class	<u>ClassID</u>	- ClassName - NumOfStudent
5	Score	<u>ScoreID</u>	- Score
6	ScoreType	<u>TypeID</u>	- TypeName - Coeff
7	Semester	<u>TypeID</u>	- TypeName - Coeff
8	Class_Grade	<u>ClassGradeID</u>	- ClassGradeName
9	School_Year	<u>SchoolYearID</u>	- SchoolYearName
10	Result	<u>ResultID</u>	- ResultName
11	Academic_Performance	<u>AcePefrmID</u>	- AcePerfrmName - LowerBoundScore - UpperBoundScore
12	Conduct	<u>ConductID</u>	- ConductName

Continued on next page

Table 1 – *Continued from previous page*

No	Entity	Primary Key	Attribute
12	UserType	<u>ConductID</u>	- UserID - UserName
13	User	<u>ConductID</u>	- UserType - Name - Username - Password

8.2 Entities And Relationships

Table 2: Entities and Attributes

No	Relationship	Entity	Description
1	Belongs to	Student – Class	Who? → Student Belongs to What? → Classroom
		Class – School_Year	What? → Classroom Belongs to What? → School Year
		Class – Class_Grade	To what? → Class Belongs to what? → Class_Grade
		Score – Semester	What? → Score Belong to what? → Semester
		Score – ScoreType	What? → Score Belong to what? → ScoreType
2	Teaching	Teacher – Subject	Who? → Teacher What does the teacher teach? → Subject
		Subject – Class	What? → Subject Where is it taught? → Class
3	Chairman	Teacher – Class	Who? → Teacher In charge of what? → Class
4	Studying	Student – Subject	Who? → Student What do they learn? → Subject
		Student – Score	Who? → Student What? → Grade Belongs to what? → Subject Belongs to what? → Semester Belongs to what? → School Year Belongs to what? → Class
5	Manage	User – Teacher	Who? → User Who do they manage → Teacher
		User – Student	Who? → User Who do they manage → Student



9 Analyze BPM

9.1 Business Process Model Describe

A process related to student records management, student evaluation, and awarding. This process includes various departments such as the **Clerical Staff**, the **Management and training department**, the **School Council**, and other departments.

- **Clerical Staff:**

- Receive student records
- Check records
- Store records
- Distribute awards to students
- Enter student scores
- Confirm scores
- Calculate GPA
- Create performance reports
- Recommend award criteria

- **School Council:**

- Check performance reports
- Determine award criteria
- Confirm list of award winners

9.2 WORK FLOW

- **Students submit applications:** Applications are sent to the **Clerical Staffs**.
- **Check records:** Staff are checked for validity.
- **Store records:** Student Information are stored in the database.
- **Enter scores:** Student Information entered by clerical staff.
- **Calculating scores:** Clerical calculates the average score and other indicators.

- **Report review:** **School Council** reviews and approves the report.
- **Criteria decision:** **School Council** decides the award criteria.
- **Determining award-winning students:** Clerical Staff determines the list of award-winning students.
- **Award distribution:** The Secretariat distributes awards to students.

9.3 Business Process Model Diagram

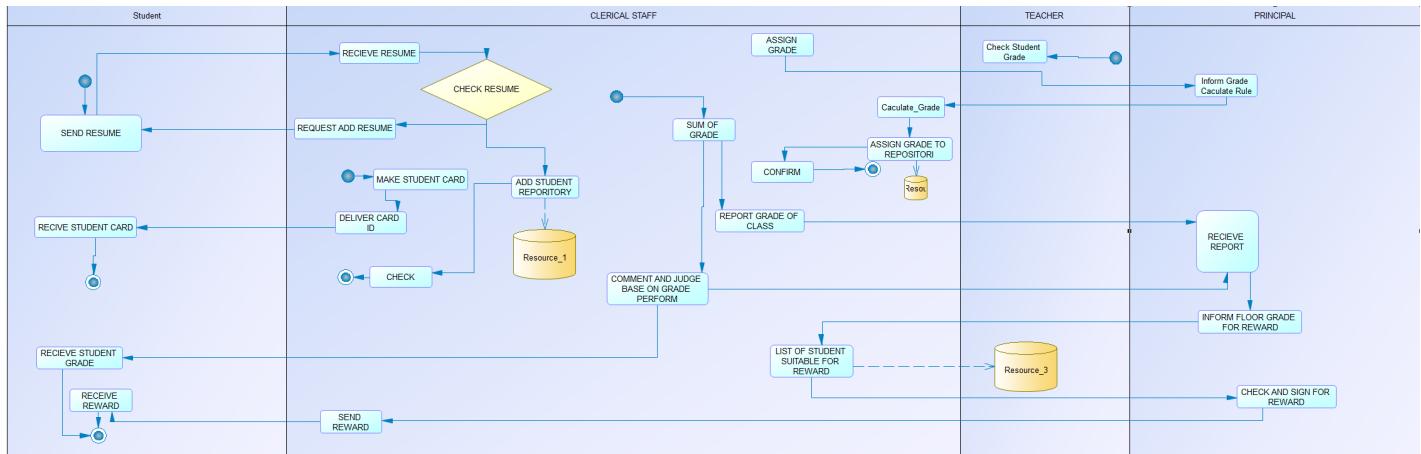


Figure 11: Business Process model

10 Draw diagram and normalization

10.1 Diagram

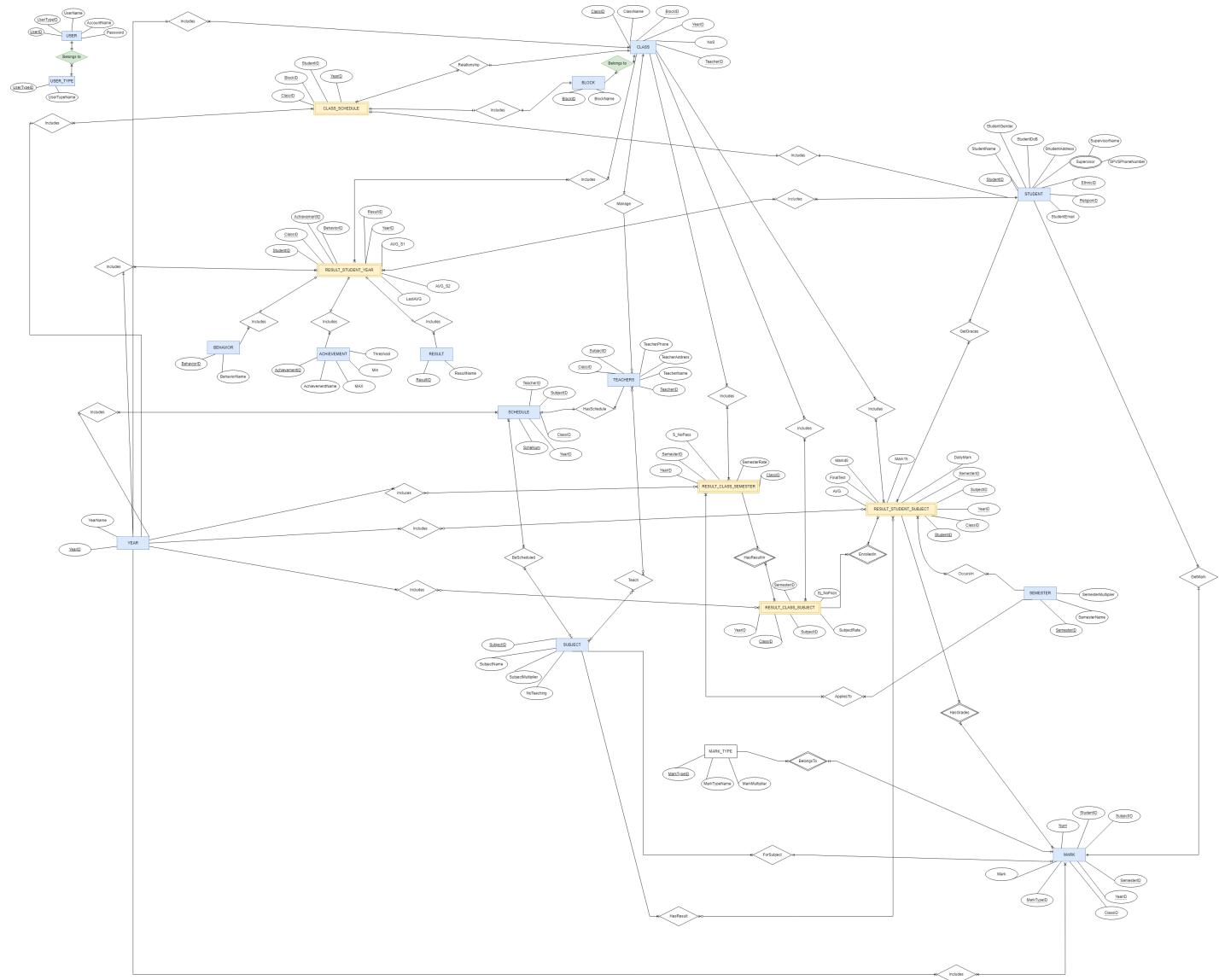


Figure 12: ERD Normalization

10.2 Normalization



Table 3: Normalization

Attributes	1NF	2NF	3NF
<u>ClassID</u>	<u>ClassID</u>	<u>ClassID</u>	<u>ClassID</u>
YearID	YearID	YearID	YearID
ClassName	ClassName	ClassName	ClassName
<u>StudentID</u>	<u>StudentID</u>	<u>StudentID</u>	<u>StudentID</u>
StudentName	StudentName	StudentName	StudentName
StudentDoB	StudentDoB	StudentDoB	StudentDoB
<u>TeacherID</u>	<u>TeacherID</u>	<u>TeacherID</u>	<u>TeacherID</u>
TeacherName	TeacherName	<u>TeacherID</u>	<u>TeacherID</u>
TeacherAddress	TeacherAddress	TeacherName	TeacherName
TeacherPhone	TeacherPhone	TeacherAddress	TeacherAddress
SemesterID	SemesterID	TeacherPhone	TeacherPhone
SemesterName	SemesterName	<u>SemesterID</u>	<u>SemesterID</u>
SemesterMultiplier	SemesterMultiplier	SemesterName	SemesterName
<u>SubjectID</u>	<u>SubjectID</u>	SemesterMultiplier	SemesterMultiplier
SubjectName	SubjectName	<u>SubjectID</u>	<u>SubjectID</u>
SubjectMultiplier	SubjectMultiplier	SubjectName	SubjectName
NoTeaching	NoTeaching	SubjectMultiplier	SubjectMultiplier
<u>Num</u>	<u>Num</u>	<u>Num</u>	<u>Num</u>
Mark	MarkID	MarkID	MarkID
MarkType	MarkType	MarkType	MarkTypeID
MarkTypeName	MarkTypeName	MarkTypeName	<u>MarkTypeID</u>
MarkMultiplier	MarkMultiplier	MarkMultiplier	MarkTypeName
ScheNum	<u>ScheNum</u>	<u>ScheNum</u>	MarkMultiplier
BehaviorID	<u>BehaviorID</u>	TeacherID	<u>ScheNum</u>
BehaviorName	BehaviorName	SubjectID	TeacherID
AchievementID	<u>AchivementID</u>	SemesterID	SubjectID
AchievementName	AchievementName	ClassID	SemesterID
MAX	MAX	<u>BehaviorID</u>	ClassID
Min	Min	<u>AchievementID</u>	<u>BehaviorID</u>
Threshold	Threshold	MAX	<u>AchievementID</u>
ResultID	<u>ResultID</u>	Min	MAX
ResultName	ResultName	Threshold	Min
		<u>ResultID</u>	Threshold
			<u>ResultID</u>

11 Sequence Diagram

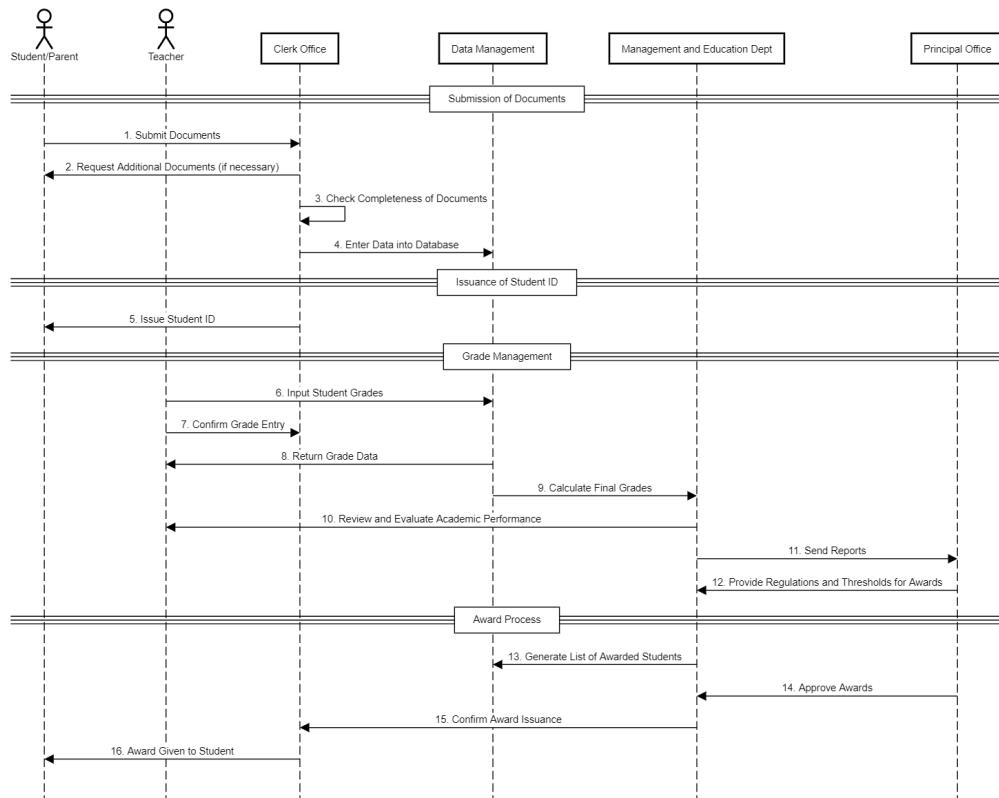


Figure 13: Sequence Diagram of the Student Management System

11.1 Document Submission Process

The sequence diagram is a visual representation that illustrates the sequence of events occurring within a system or between different components. It depicts the key processes within a Student Management System, involving various departments and roles, including students/parents, teachers, the clerk office, data management, the management and education department, and the principal's office.

11.2 Grade Management Process

- Submit Documents** (Student/Parent → Clerk Office): Students or their parents submit the necessary documents to the clerk office.
- Request Additional Documents (if necessary)** (Clerk Office → Student/Parent): The clerk office reviews the documents and requests any additional documents if they are incomplete.
- Check Completeness of Documents** (Clerk Office → Data Management): The clerk office verifies that all required documents are submitted and complete.
- Enter Data into Database** (Clerk Office → Data Management): Once the documents are verified, the data is entered into the database by the data management team.
- Issue Student ID** (Clerk Office → Student/Parent): After the data is entered, a unique student ID is issued to the student.
- Input Student Grades** (Teacher → Data Management): Teachers enter the grades for students into the system.

7. **Confirm Grade Entry** (Teacher → Data Management): The entered grades are confirmed by the teacher to ensure accuracy.
8. **Return Grade Data** (Data Management → Teacher): The confirmed grade data is returned to the teacher.
9. **Calculate Final Grades** (Data Management → Management and Education Dept): The data management team calculates the final grades based on the confirmed grade data.
10. **Review and Evaluate Academic Performance** (Management and Education Dept → Principal Office): The academic performance is reviewed and evaluated based on the final grades.
11. **Send Reports** (Management and Education Dept → Principal Office): Reports on academic performance are sent to the principal's office.
12. **Provide Regulations and Thresholds for Awards** (Principal Office → Management and Education Dept): The principal's office provides regulations and thresholds for awards based on the performance reports.
13. **Generate List of Awarded Students** (Management and Education Dept): A list of students eligible for awards is generated.
14. **Approve Awards** (Principal Office → Management and Education Dept): The principal's office reviews and approves the list of students for awards.
15. **Confirm Award Issuance** (Management and Education Dept → Principal Office): The management and education department confirms the issuance of awards.
16. **Award Given to Student** (Management and Education Dept → Student/Parent): Finally, the award is given to the student.

12 The Data Model Relationship Diagram

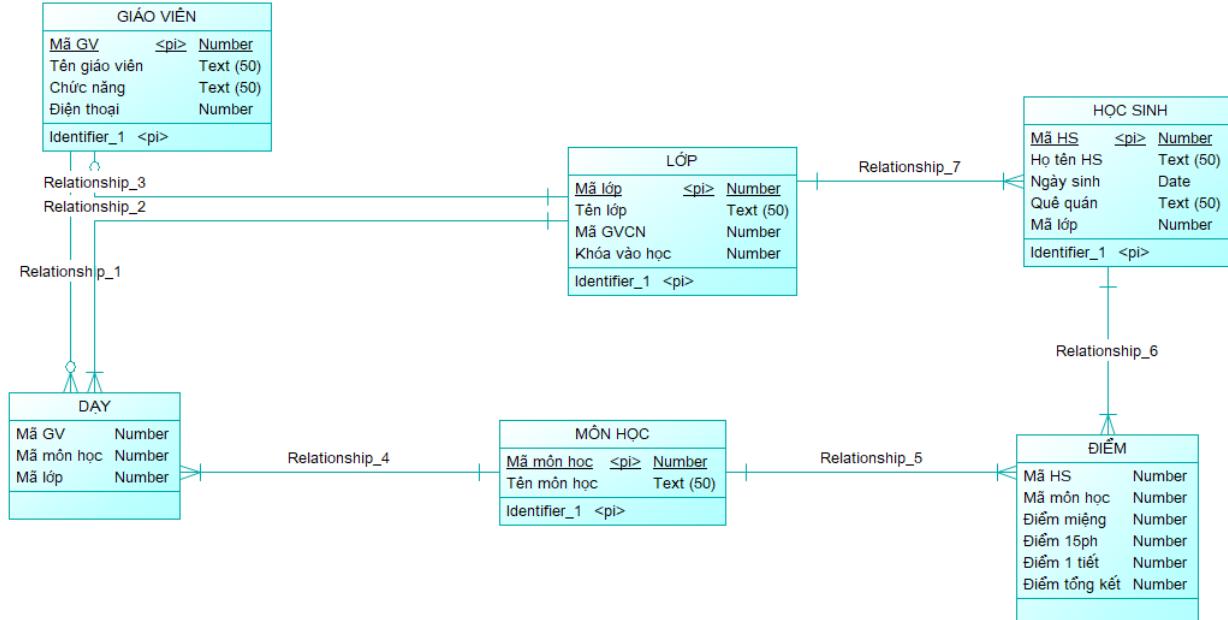


Figure 14: The Data Model Relationship Diagram

The Data Model Relationship Diagram that illustrates the relationships between various entities in a school database system. Here's a brief description:

- **Entities:**

- **Teacher (GIÁO VIÊN):** Contains information such as Teacher ID, Name, Function, and Phone Number.
- **Class (LỚP):** Contains Class ID, Class Name, Homeroom Teacher ID, and Start Year.
- **Student (HỌC SINH):** Contains Student ID, Name, Date of Birth, Hometown, and Class ID.
- **Subject (MÔN HỌC):** Contains Subject ID and Subject Name.
- **Score (ĐIỂM):** Contains Student ID, Subject ID, and various types of scores (e.g., Oral Test, Final Score).
- **Teaches (DAY):** Represents the association between Teacher, Subject, and Class.

- **Relationships:**

- Teachers are related to Classes (as homeroom teachers and through the subjects they teach).
- Students are enrolled in Classes.
- Students receive Scores for different Subjects.
- Teachers teach Subjects in specific Classes.
- This diagram provides a high-level overview of how teachers, students, classes, subjects, and scores are interconnected in the database.

13 ERD

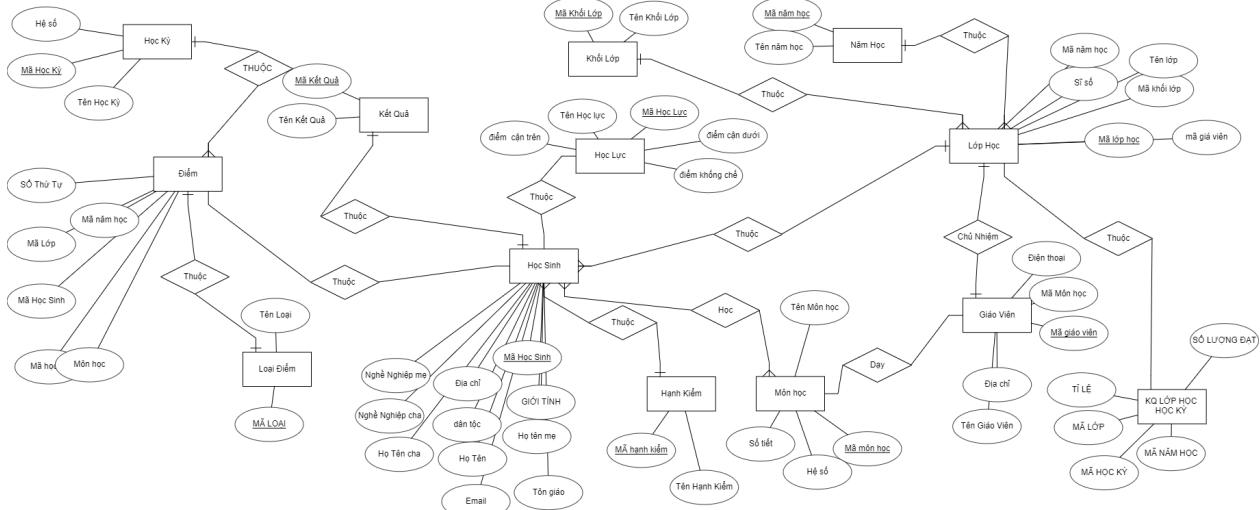


Figure 15: ERD DIAGRAM



13.1 Entities and Attributes

13.1.1 Student

Attribute	Note
Student ID	Primary Key
Full Name	
Gender	
Address	
Ethnicity	
Religion	
Father's Name	
Father's Occupation	
Mother's Name	
Mother's Occupation	
Email	

Table 4: Student Table Information

13.1.2 Teacher

Attribute	Note
Teacher ID	Primary Key
Teacher Name	
Address	
Phone Number	
Subject ID	Foreign Key

Table 5: Teacher Table Information

13.1.3 Subject

Attribute	Note
Subject ID	Primary Key
Subject Name	
Number of Lessons	
Coefficient	

Table 6: Subject Table Information



13.1.4 Class

Attribute	Note
Class ID	Primary Key
Class Name	
Grade ID	Foreign Key
Academic Year ID	Foreign Key
Number of Students	
Teacher ID	Foreign Key

Table 7: Class Table Information

13.1.5 Academic Year

Attribute	Note
Academic Year ID	Primary Key
Academic Year Name	

Table 8: Academic Year Table Information

13.1.6 Grade

Attribute	Note
Grade ID	Primary Key
Grade Name	

Table 9: Grade Table Information

13.1.7 Semester

Attribute	Note
Semester ID	Primary Key
Semester Name	
Coefficient	

Table 10: Semester Table Information



13.1.8 Score

Attribute	Note
Serial Number	Primary Key
Student ID	Foreign Key
Subject ID	Foreign Key
Semester ID	Foreign Key
Academic Year ID	Foreign Key
Class ID	Foreign Key

Table 11: Score Table Information

13.1.9 Score Type

Attribute	Note
Score Type ID	Primary Key
Score Type Name	

Table 12: Score Type Table Information

13.1.10 Conduct

Attribute	Note
Conduct ID	Primary Key
Conduct Name	

Table 13: Conduct Table Information

13.1.11 Result

Attribute	Note
Result ID	Primary Key
Result Name	

Table 14: Result Table Information

13.2 Relationships

- Grade is linked with Student, Class, Subject, Semester, School Year, and Grade Type.
- Student belongs to a Class.
- Teacher is the homeroom teacher of a Class and teaches a Subject.
- Subject has attributes such as Coefficient and Number of Lessons.
- Class belongs to a School Year and Grade Level.
- Academic Performance and Conduct belong to Student.
- Result belongs to both Grade and Student.

13.3 Detailed Relationships

- Result is linked with Grade to determine the academic outcomes of students.
- Class is linked with Teacher to manage the class and the subjects that the teacher is responsible for.
- Student has relationships with Academic Performance, Conduct, and Result for a comprehensive evaluation.

14 CDM Analysis

14.1 Conceptual Data Model Diagram

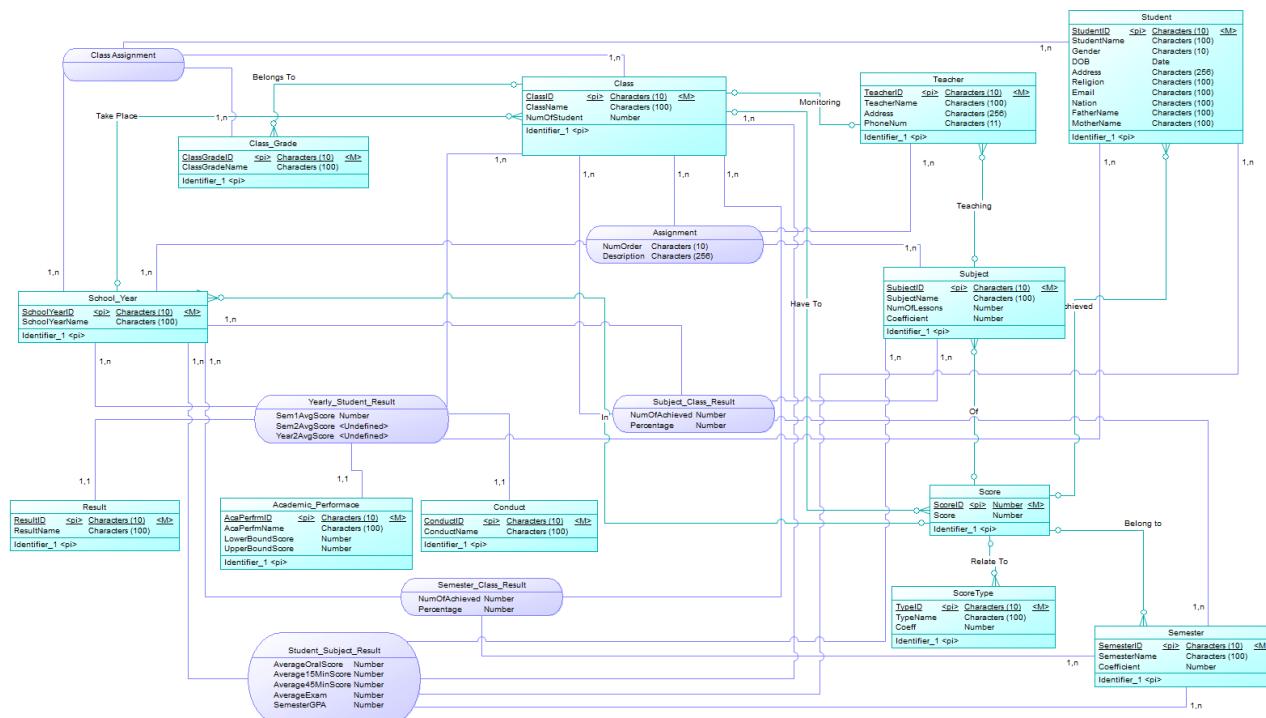


Figure 16: High School Student Score Management System CDM

14.2 CDM Description

As shown in Figure 16, the conceptual data model provides an overview of the components and relationships in the system such as the management of: **Score**, **Student**, **Class**, **Class_Grade**, **Subject**, **Semester**, **School_Year**, and **Results**.

15 Association between Entities:

- Association Class Assignment** indicates the assignment of **Student** to a **Class** within the appropriate **Class_Grade** and **School_Year** that the **Student** has registered for. Each **Class** can have many **Students**, but a **Student** only belongs to one **Class**.
- Association Assignment** shows the assignment of a **Teacher** to teach a **Subject** in a particular **Class**. A **Subject** can be taught by multiple **Teachers**, but each **Teacher** is assigned to only one **Subject**.
- After each **School Year**, **Semester**, and **Subject**, the **Student's** results are recorded in **Yearly Student Result**, **Subject Class Result**, **Semester Class Result**, and **Student Subject Result**. These results are convenient for generating statistics and reports for the system's development.

16 Relationship between Entities:

- Relationship Monitoring indicates that a Teacher can only supervise one Class.
- Relationship Teaching shows that each Subject can be taught by multiple Teachers, but to improve the quality of education, each Teacher is assigned to teach only one Subject.
- Relationship Achieved represents the Score that a Student has earned after completing the assessments.
- Relationship Relate To between Score Type and Score indicates that a Score comprises various Score Types.
- Relationship Belong To indicates that a Score corresponds to each Semester and Relationship Have To shows that the Score is also linked to each Class and School Year.

17 LDM Analysis

17.1 Logical Data Model Diagram

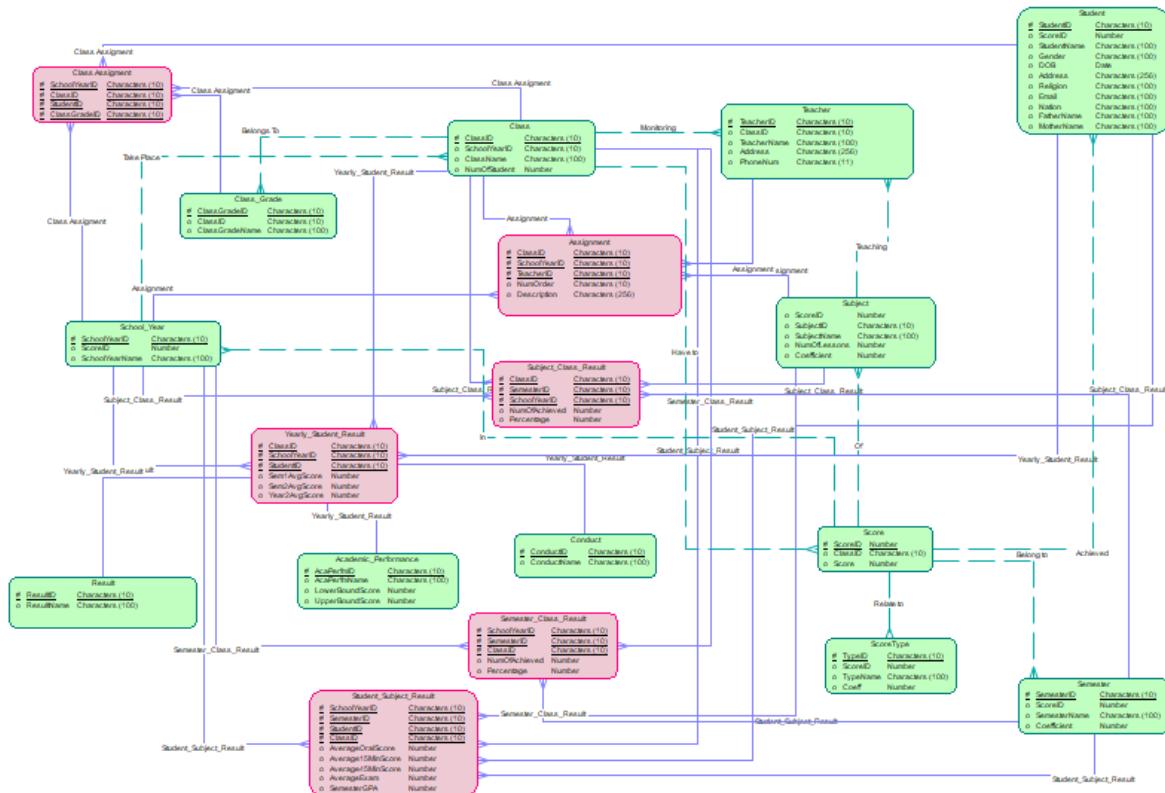


Figure 17: High School Student Score Management System LDM

17.2 LDM Description

The Logical Data Model (LDM) provided represents a comprehensive structure for managing a school system, focusing on the academic performance of students, the organization of classes, and the assignment of teachers. Here's a detailed description of the entities and their relationships:



17.2.1 Entities and Attributes:

1. Student

- **Attributes:**

- **StudentID:** A unique identifier for each student.
- **StudentName:** The full name of the student.
- **DateOfBirth:** The birthdate of the student.
- **Gender:** The gender of the student.
- **GuardianName:** The name of the student's guardian.
- **ContactNumber:** The contact number for the student or their guardian.

- **Purpose:** Represents the individual learners in the school system.

2. Teacher

- **Attributes:**

- **TeacherID:** A unique identifier for each teacher.
- **TeacherName:** The full name of the teacher.
- **ContactNumber:** The contact number for the teacher.
- **Email:** The teacher's email address.
- **Position:** The role or title of the teacher within the school.

- **Purpose:** Represents the educators responsible for teaching subjects and assigning coursework.

3. Class

- **Attributes:**

- **ClassID:** A unique identifier for each class.
- **ClassName:** The name of the class.
- **GradeLevel:** The educational level of the class (e.g., Grade 10).
- **SchoolYear:** The academic year in which the class is conducted.

- **Purpose:** Represents a specific group of students who are taught together during the school year.

4. Subject

- **Attributes:**

- **SubjectID:** A unique identifier for each subject.
- **SubjectName:** The name of the subject (e.g., Mathematics).
- **Code:** A unique code representing the subject.

- **Purpose:** Represents the different academic disciplines taught to students.

5. SchoolClass

- **Attributes:**

- **SchoolClassID:** A unique identifier for the combination of a class and a subject.
- **ClassID:** References the specific class.
- **SubjectID:** References the specific subject.

- **Purpose:** Serves as a junction entity linking **Class** and **Subject**, representing the specific subjects being taught in each class.

6. Assignment

- **Attributes:**

- **AssignmentID:** A unique identifier for each assignment.
- **Description:** A detailed description of the assignment.



- **DueDate:** The deadline for the assignment submission.
- **Purpose:** Represents tasks or projects assigned to students as part of their coursework.

7. Result

- **Attributes:**
 - **ResultID:** A unique identifier for each result entry.
 - **StudentID:** References the student who achieved the result.
 - **Score:** The numeric score achieved by the student.
 - **Remarks:** Additional comments or feedback on the student's performance.
- **Purpose:** Stores the outcomes of various assessments, assignments, or exams.

8. Yearly_Student_Result

- **Attributes:**
 - **YearlyResultID:** A unique identifier for yearly student results.
 - **StudentID:** References the student.
 - **AcademicPerformance:** A summary or evaluation of the student's performance over the year.
 - **OverallScore:** The cumulative score or grade for the student for the year.
- **Purpose:** Aggregates and stores students' academic performance across a school year.

9. Semester_Student_Result

- **Attributes:**
 - **SemesterResultID:** A unique identifier for semester-based results.
 - **StudentID:** References the student.
 - **SemesterID:** References the specific semester.
 - **ResultID:** References the specific result achieved in that semester.
- **Purpose:** Tracks the academic results of students on a semester basis.

10. Student_Class_Result

- **Attributes:**
 - **StudentClassResultID:** A unique identifier for the results within a specific class.
 - **ClassID:** References the class.
 - **StudentID:** References the student.
 - **ResultID:** References the result associated with the class.
- **Purpose:** Links students' performance results to specific classes.

11. Student_Subject_Result

- **Attributes:**
 - **StudentSubjectResultID:** A unique identifier for subject-specific results.
 - **SubjectID:** References the subject.
 - **StudentID:** References the student.
 - **ResultID:** References the specific result for that subject.
- **Purpose:** Tracks students' performance in individual subjects, providing detailed insight into their academic progress.

12. Semester

- **Attributes:**
 - **SemesterID:** A unique identifier for each semester.
 - **SemesterName:** The name or label of the semester (e.g., Fall 2024).



- Duration: The length of the semester.
- StartDate: The start date of the semester.
- EndDate: The end date of the semester.
- **Purpose:** Defines the academic period, used to organize the timeline of results and academic activities.

17.2.2 Relationships:

- **Student and Yearly_Student_Result:** A one-to-many relationship where each student can have multiple yearly results.
- **Student and Semester_Student_Result:** A one-to-many relationship where each student can have multiple results per semester.
- **Class and SchoolClass:** A one-to-many relationship linking classes to specific subjects.
- **Teacher and Assignment:** A one-to-many relationship indicating that a teacher can assign multiple assignments.
- **Student and Student_Class_Result:** A one-to-many relationship showing that each student can have multiple results per class.
- **Student and Student_Subject_Result:** A one-to-many relationship where each student can have multiple results for different subjects.
- **Result and Student_Class_Result:** A one-to-one relationship where each class result is associated with a specific result entry.
- **Result and Student_Subject_Result:** A one-to-one relationship where each subject result corresponds to a specific result entry.

17.2.3 Summary:

The LDM establishes a robust structure for managing various aspects of student performance within a school. It interconnects students, teachers, classes, subjects, assignments, and results, enabling detailed tracking of academic progress, both on a yearly and semester basis. Through these relationships, the system can generate comprehensive reports on student achievements, facilitating better educational management and decision-making.

18 Physical Data Model (PDM) Analysis

18.1 Logical Data Model Diagram

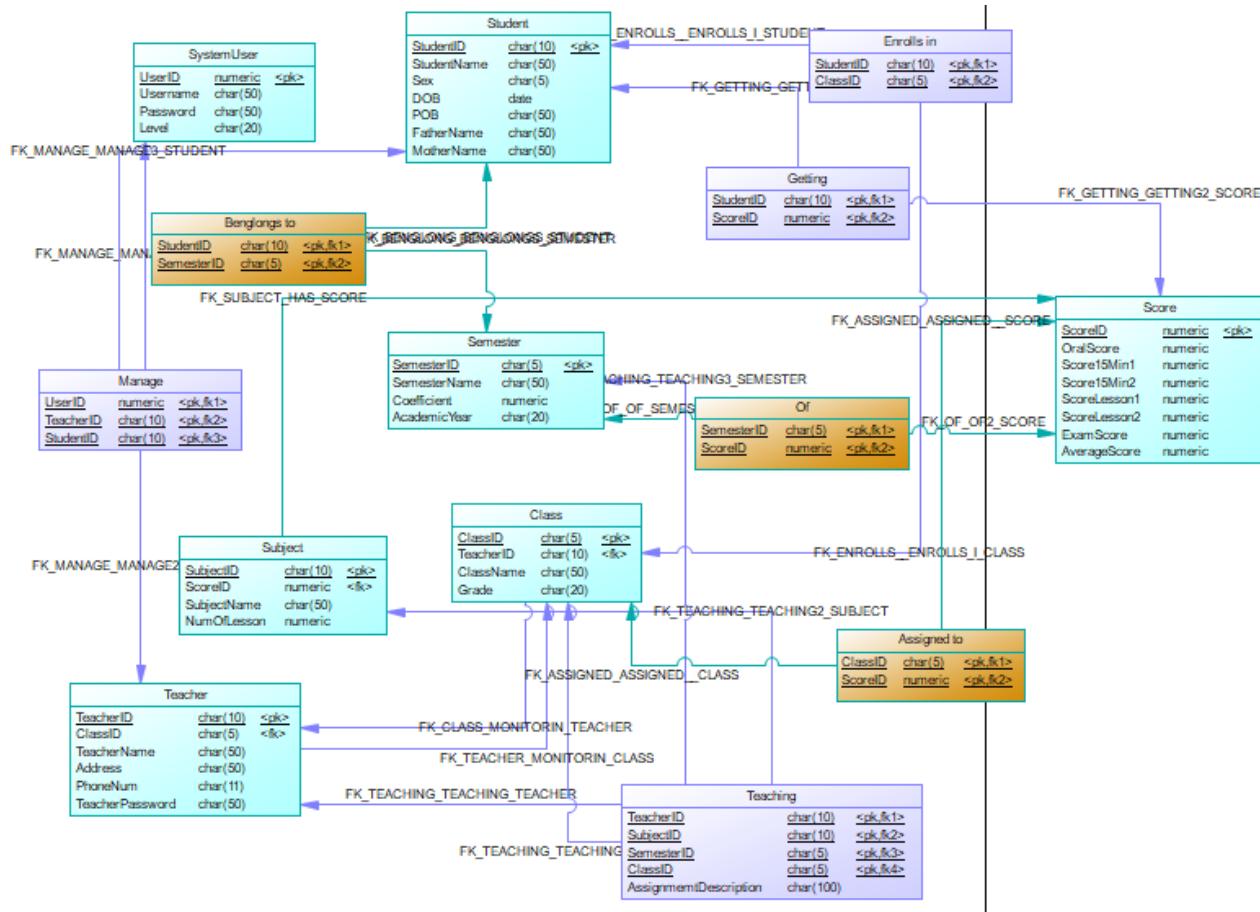


Figure 18: High School Student Score Management System PDM

18.2 PDM Description

The provided Physical Data Model (PDM) represents a relational database schema designed for managing a student information system. The PDM outlines the entities, their attributes, and the relationships that define how data is organized and interconnected within the system. This model is crucial for implementing a structured database that supports key operations such as student management, class enrollment, and score tracking.

18.2.1 Entity Descriptions

- **SystemUser**
 - **Primary Key (PK):** UserID (numeric)
 - **Attributes:**
 - * Username: char(50)
 - * Password: char(50)
 - * Level: char(20)
 - **Purpose:** Manages user accounts within the system, including students, teachers, and administrators.
- **Student**
 - **Primary Key (PK):** StudentID (char(10))



- **Attributes:**

- * StudentName: char(50)
- * Sex: char(50)
- * DOB: date (Date of Birth)
- * POB: char(50) (Place of Birth)
- * FatherName: char(50)
- * MotherName: char(50)

- **Purpose:** Stores personal and demographic information for each student.

- Semester

- **Primary Key (PK):** SemesterID (char(10))

- **Attributes:**

- * SemesterName: char(50)
- * Coefficient: numeric
- * AcademicYear: char(20)

- **Purpose:** Captures information about academic semesters, including the academic year and the weighting coefficient.

- Class

- **Primary Key (PK):** ClassID (char(10))

- **Foreign Key (FK):** TeacherID (references Teacher)

- **Attributes:**

- * ClassName: char(50)
- * Grade: char(20)

- **Purpose:** Represents academic classes, including details on the class name, associated grade, and the teacher responsible.

- Subject

- **Primary Key (PK):** SubjectID (numeric)

- **Attributes:**

- * SubjectName: char(50)
- * NumOfLesson: numeric

- **Purpose:** Stores data about the subjects taught, including the name and the number of lessons.

- Teacher

- **Primary Key (PK):** TeacherID (char(10))

- **Attributes:**

- * TeacherName: char(50)
- * Sex: char(50)
- * Address: char(50)
- * PhoneNum: char(50)
- * TeacherPassword: char(50)

- **Purpose:** Contains information on teachers, including their personal details and login credentials.

- Score

- **Primary Key (PK):** ScoreID (numeric)

- **Attributes:**



- * OralScore: numeric
- * Score15Min1: numeric
- * Score15Min2: numeric
- * Score1Hour: numeric
- * ScoreLesson: numeric
- * ExamScore: numeric
- * AverageScore: numeric

- **Purpose:** Records the scores of students across different evaluation methods, such as oral exams, short tests, and final exams.

18.2.2 Relationship Descriptions

- **SystemUser-Manages-Student**

- **Relationship Type:** One-to-Many
- **Foreign Key:** UserID (in SystemUser)
- **Description:** System users can manage multiple students, linking user management functionalities with student data.

- **Student-BelongsTo-Semester**

- **Relationship Type:** Many-to-One
- **Foreign Key:** SemesterID
- **Description:** Students are associated with a particular semester, indicating their enrollment period.

- **Student-EnrollsIn-Class**

- **Relationship Type:** Many-to-Many (with Class)
- **Foreign Key:** ClassID
- **Description:** Students enroll in various classes, creating a link between the students and the classes they attend.

- **Class-AssignedTo-Subject**

- **Relationship Type:** Many-to-Many (with Subject)
- **Foreign Key:** SubjectID
- **Description:** Subjects are assigned to classes, specifying which subjects are taught in which classes.

- **Teacher-Monitors-Class**

- **Relationship Type:** One-to-Many
- **Foreign Key:** TeacherID
- **Description:** Teachers are responsible for monitoring specific classes, managing class-related academic activities.

- **Student-Gets-Score**

- **Relationship Type:** Many-to-One
- **Foreign Key:** ScoreID
- **Description:** Students receive scores, linking the performance data with individual students.

- **Teacher-Teaches-Subject**

- **Relationship Type:** Many-to-Many (with Subject)
- **Foreign Key:** TeacherID, SubjectID
- **Description:** Teachers teach various subjects, establishing a direct link between educators and the subjects they are responsible for.

18.2.3 Summary

The PDM provides a comprehensive structure for managing student information, class assignments, subject teaching, and score recording. The entities and relationships are well-defined, ensuring the system can handle complex queries and operations related to student academic management.

19 OOM Analysis

19.1 OOM Diagram

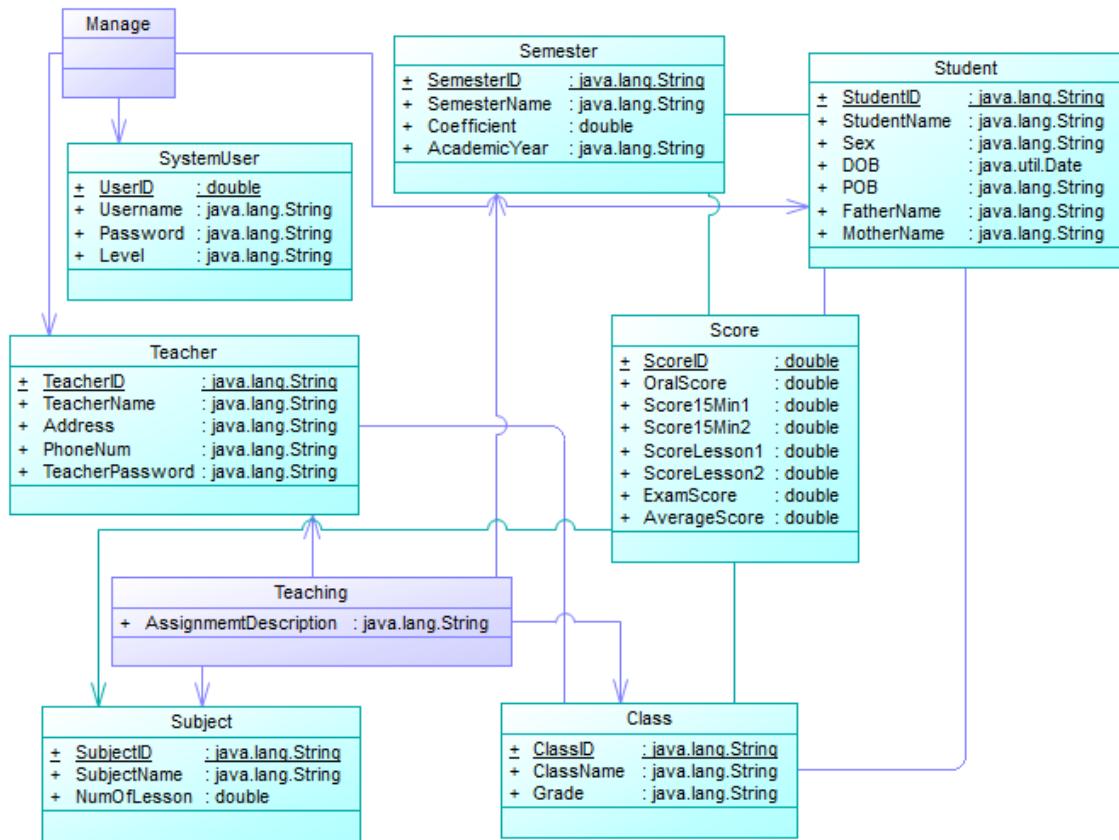


Figure 19: High School Student Score Management System OOM

19.2 High School Student Score Management System OOM

19.2.1 Manage

No specific attributes, but can be considered as the overall management class for the system.

19.2.2 SystemUser

19.2.2.a Attributes

- **UserID:** User ID.
- **Username:** Login name.
- **Password:** Password.
- **Level:** User level.



19.2.2.b Function

Manages user information in the system.

19.3 Classes Related to Teachers

19.3.1 Teacher

19.3.1.a Attributes

- **TeacherID:** Teacher ID.
- **TeacherName:** Teacher's name.
- **Address:** Address.
- **PhoneNum:** Phone number.
- **TeacherPassword:** Teacher's password.

19.3.1.b Function

Manages teacher information.

19.3.2 Teaching

19.3.2.a Attributes

- **AssignmentDescription:** Description of the assignment.

19.3.2.b Function

Links teachers and subjects.

19.4 Classes Related to Students

19.4.1 Student

19.4.1.a Attributes

- **StudentID:** Student ID.
- **StudentName:** Student's name.
- **Sex:** Gender.
- **DOB:** Date of birth.
- **POB:** Place of birth.
- **FatherName:** Father's name.
- **MotherName:** Mother's name.

19.4.1.b Function

Manages student information.



19.5 Classes Related to Semesters

19.5.1 Semester

19.5.1.a Attributes

- **SemesterID:** Semester ID.
- **SemesterName:** Semester name.
- **Coefficient:** Semester coefficient.
- **AcademicYear:** Academic year.

19.5.1.b Function

Manages semester information.

19.6 Classes Related to Scores

19.6.1 Score

19.6.1.a Attributes

- **ScoreID:** Score ID.
- **OralScore:** Oral score.
- **Score15Min1, Score15Min2:** 15-minute test scores.
- **ScoreLesson1, ScoreLesson2:** Lesson scores.
- **ExamScore:** Exam score.
- **AverageScore:** Average score.

19.6.1.b Function

Manages student score information.

19.7 Classes Related to Subjects and Classes

19.7.1 Subject

19.7.1.a Attributes

- **SubjectID:** Subject ID.
- **SubjectName:** Subject name.
- **NumOfLesson:** Number of lessons.

19.7.1.b Function

Manages subject information.

19.7.2 Class

19.7.2.a Attributes

- **ClassID:** Class ID.
- **ClassName:** Class name.
- **Grade:** Grade level.

19.7.2.b Function

Manages class information.

19.8 Relationships Between Classes

- Relationship between **Teacher** and **Teaching**: A teacher can teach multiple subjects, and each subject can be taught by multiple teachers.
- Relationship between **Student** and **Score**: Each student can have multiple scores for different subjects and tests.
- Relationship between **Semester** and **Score**: Scores are recorded for a specific semester.
- Relationship between **Subject** and **Class**: Each class can study multiple subjects, and each subject can be studied by multiple classes.

20 XML Analysis

20.1 XML Diagram

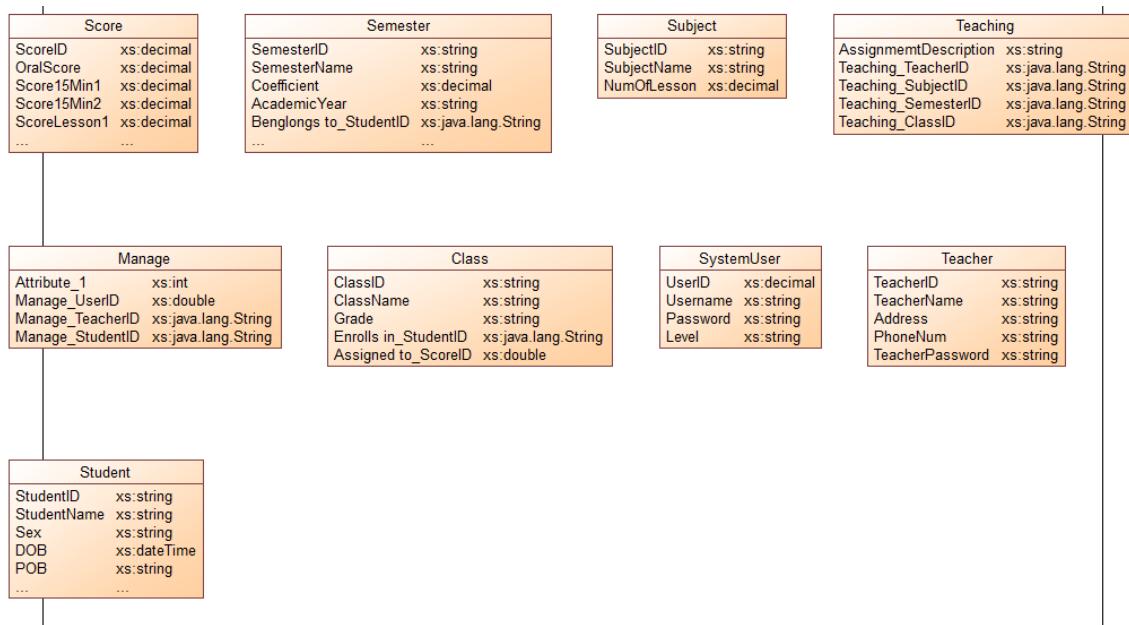


Figure 20: High School Student Score Management System XML

20.2 Main Entities

20.2.1 Score

20.2.1.a Attributes

- ScoreID**: Score code.
- OralScore**: Oral score.
- Score15Min1, Score15Min2**: 15-minute test scores.
- ScoreLesson1**: Lesson score.



20.2.1.b Function

Manages student scores.

20.2.2 Semester

20.2.2.a Attributes

- **SemesterID:** Semester code.
- **SemesterName:** Semester name.
- **Coefficient:** Coefficient.
- **AcademicYear:** Academic year.
- **BelongsTo_StudentID:** Links to Student ID.

20.2.2.b Function

Manages semester information.

20.2.3 Manage

20.2.3.a Attributes

- **Attribute_1:** Optional attribute.
- **Manage_UserID, Manage_TeacherID, Manage_StudentID:** IDs of the manager, teacher, and student.

20.2.3.b Function

Manages user information in the system.

20.2.4 Class

20.2.4.a Attributes

- **ClassID:** Class code.
- **ClassName:** Class name.
- **Grade:** Grade level.
- **EnrollsIn_StudentID:** List of students in the class.
- **AssignedTo_ScoreID:** Links to Score ID.

20.2.4.b Function

Manages class information.

20.2.5 Student

20.2.5.a Attributes

- **StudentID:** Student code.
- **StudentName:** Student's name.
- **Sex:** Gender.
- **DOB:** Date of birth.
- **POB:** Place of birth.



20.2.5.b Function

Manages student information.

20.2.6 Subject

20.2.6.a Attributes

- **SubjectID:** Subject code.
- **SubjectName:** Subject name.
- **NumOfLesson:** Number of lessons.

20.2.6.b Function

Manages subject information.

20.2.7 SystemUser

20.2.7.a Attributes

- **UserID:** User code.
- **Username:** Login name.
- **Password:** Password.
- **Level:** User level.

20.2.7.b Function

Manages system user information.

20.2.8 Teacher

20.2.8.a Attributes

- **TeacherID:** Teacher code.
- **TeacherName:** Teacher's name.
- **Address:** Address.
- **PhoneNum:** Phone number.
- **TeacherPassword:** Teacher's password.

20.2.8.b Function

Manages teacher information.

20.2.9 Teaching

20.2.9.a Attributes

- **AssignmentDescription:** Description of the assignment.
- **Teaching_TeacherID, Teaching_SubjectID, Teaching_SemesterID, Teaching_ClassID:** Links to teacher, subject, semester, and class IDs.

20.2.9.b Function

Links teachers and the subjects they teach.



20.3 Relationships Between Entities

- Relationship between **Teacher** and **Teaching**: A teacher can teach multiple subjects, and each subject can be taught by multiple teachers.
- Relationship between **Student** and **Score**: Each student can have multiple scores for different subjects and tests.
- Relationship between **Semester** and **Score**: Scores are recorded in a specific semester.
- Relationship between **Subject** and **Class**: Each class can study multiple subjects, and each subject can be studied by multiple classes.

21 User Interface

21.1 Log In As Teacher

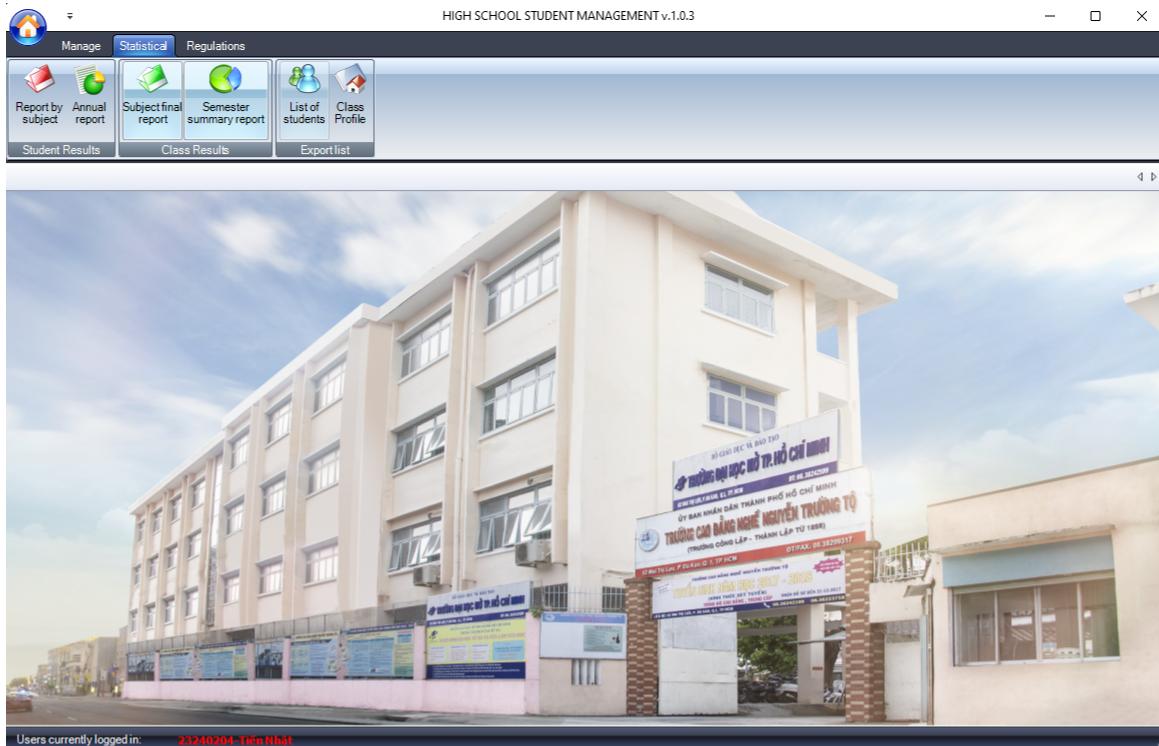


Figure 21: Main Page

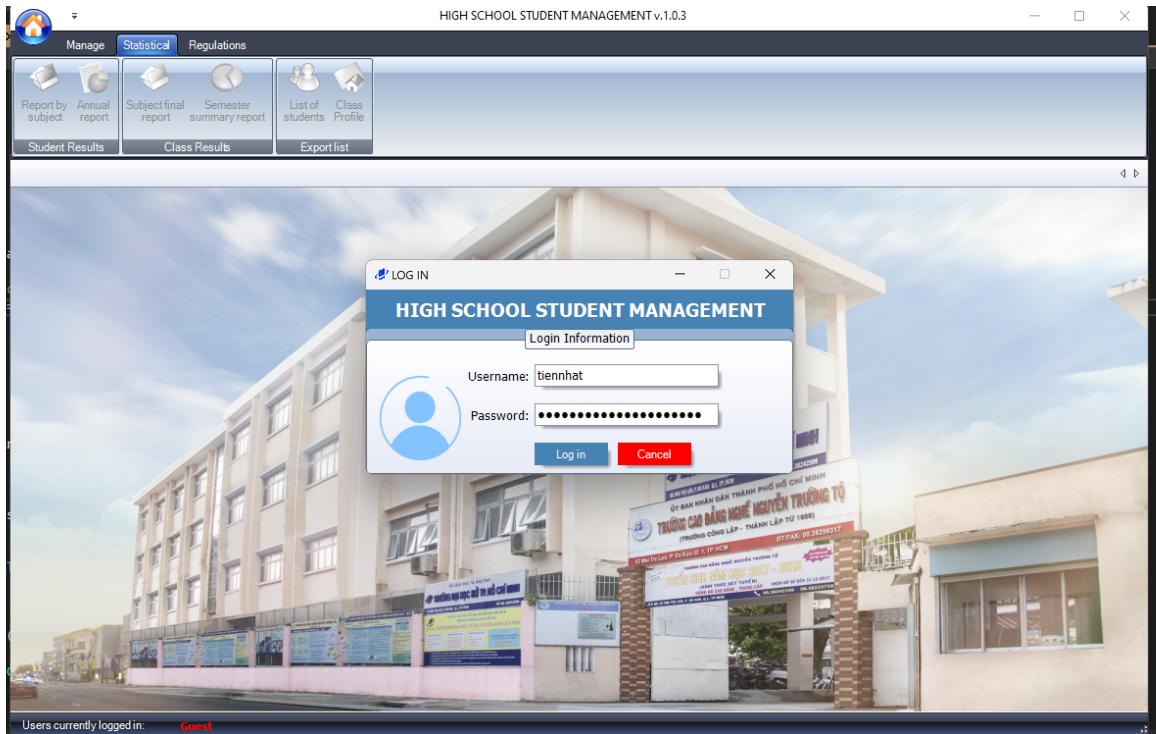


Figure 22: Login as Teacher

The screenshot shows the 'HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [SUBJECT]' window. The top menu bar includes 'Manage', 'Statistical', 'Regulations', and a 'SUBJECT' tab (which is selected). Below the menu is a toolbar with icons for Class Grade, Semester, School Year, Subject, Score, Result, Academic Performance, Conduct, Student, Class Assignment, Ethnic, Religious, Occupation, and Teacher Assignment. The main area displays a table titled 'List of subjects' with 9 entries. The table has columns for Subject ID, Subject Name, Number of lessons, and Coefficient. The data is as follows:

Subject ID	Subject Name	Number of lessons	Coefficient
MH0008	Đạo Đức	30	1
MH0006	Địa Lý	45	1
MH0003	Hóa Học	60	1
MH0005	Lịch Sử	45	1
MH0007	Ngữ Văn	90	2
MH0004	Sinh Học	60	1
MH0009	Thể Dục	30	1
MH0001	Toán	90	2
MH0002	Vật Lý	60	1

Figure 23: Subject Management



The screenshot shows the 'Enter Student Score' module of the software. The main window title is 'HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [ENTER STUDENT SCORE]'. The interface includes a toolbar with icons for Manage, Statistical, Regulations, Class - Class Grade, Semester, School Year, Subject, Score, Result, Academic Performance, Conduct, Student, Class Assignment, Teacher, Assignment, and Teacher. Below the toolbar is a navigation bar with 'SUBJECT' and 'ENTER STUDENT SCORE' buttons, and links for 'List of score entries', 'Save score', 'View score', 'Exit', and 'Help'. A table displays student scores for 10 students, with columns for Student ID, Student Name, Oral Score, 15 Min Score, 45 Min Score, and Exam Score. The right side of the screen shows a sidebar titled 'Nhập điểm học sinh' (Enter student scores) with dropdown menus for School Year (2023-2024), Class (10A1), Semester (Học Kỳ 1), and Subject (Hóa Học). A 'Show list' button is also present.

Figure 24: Teacher Assign Student Score

21.2 School Principal

The screenshot shows the 'LOG IN' dialog box of the software. The dialog title is 'HIGH SCHOOL STUDENT MANAGEMENT' and it contains 'Login Information' fields for 'Username' (hoangthanh) and 'Password' (*****). It has 'Log in' and 'Cancel' buttons. The background of the software window shows a photograph of a modern school building with multiple stories and large windows. At the bottom left of the software window, there is a status message: 'User currently logged in: Do not have'.

Figure 25: Principal Log In



HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [CLASS]

The screenshot shows the 'CLASS' tab of the management system. On the left, there's a navigation bar with icons for Manage, Statistical, and Regulations. Below it are buttons for Class, Class Grade, Semester, School Year, Subject, Score, Result, Academic Performance, Conduct, Student, Class Assignment, Teacher, and Assignment. A search bar at the top right says 'Search for information' with fields for 'Enter search information:' and radio buttons for 'Search by class ID' and 'Search by class name'. The main area displays a table of classes:

Class ID	Class Name	Class Grade	No Students	School Year	Giáo viên
LOP1012324	10A1	Khối 10	35	2023-2024	Lê Thị Minh Nguyệt
LOP1012425	10A1	Khối 10	39	2024-2025	Hồ Văn Quang
LOP1022324	10A2	Khối 10	36	2023-2024	Huynh Túc Tài
LOP1022425	10A2	Khối 10	38	2024-2025	Phan Hồng Thôm
LOP1032324	10A3	Khối 10	34	2023-2024	Lam Trung Tiến
LOP1032425	10A3	Khối 10	35	2024-2025	Huynh Thanh Tuyen
LOP1112324	11A1	Khối 11	37	2023-2024	Huynh Thanh Tuyen
LOP1112425	11A1	Khối 11	40	2024-2025	Lam Trung Tiến
LOP1122324	11A2	Khối 11	38	2023-2024	Phan Hồng Thôm
LOP1122425	11A2	Khối 11	38	2024-2025	Huynh Túc Tài
LOP1212324	12A1	Khối 12	39	2023-2024	Hồ Văn Quang
LOP1212425	12A1	Khối 12	38	2024-2025	Lê Thị Minh Nguyệt

At the bottom left, it says 'Users currently logged in: 23240101 - Hoàng Thành'.

Figure 26: Class Information Management

HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [STUDENT]

The screenshot shows the 'STUDENT' tab of the management system. The layout is similar to Figure 26, with a navigation bar, buttons for various management functions, and a search bar. The main area displays a table of students:

Student ID	Student Name	Sex	DOB	Address	Ethnic	Religion	Father
HS0001	Nguyễn Văn Tú	<input type="checkbox"/>	02/01/2005	Long Xuyên	Kinh	Tin Lành	Hoàng
HS0002	Nguyễn Ngọc Án	<input type="checkbox"/>	02/01/2005	Bến Tre	Kinh	Phật Giáo	Phạm
HS0003	Lê Hoàng Anh	<input type="checkbox"/>	15/04/2005	Chợ Mới	Kinh	Thiên Chúa	Trần H
HS0004	Huynh Thiên Chí	<input type="checkbox"/>	02/01/2004	Đồng Tháp	Kinh	Cao Đài	Ngô M
HS0005	Lý Ngọc Duy	<input type="checkbox"/>	02/01/2005	Long Xuyên	Kinh	Tin Lành	Lê Văn
HS0006	Huynh Ngọc Điệp	<input checked="" type="checkbox"/>	02/01/2005	Bến Tre	Kinh	Phật Giáo	Nguyễn
HS0007	Trần Thị Huệ	<input checked="" type="checkbox"/>	15/04/2005	Chợ Mới	Kinh	Thiên Chúa	Phạm
HS0008	Nguyễn Thành Huy	<input type="checkbox"/>	02/01/2004	Đồng Tháp	Kinh	Cao Đài	Hoàng
HS0009	Trần Phước Lập	<input type="checkbox"/>	02/01/2005	Long Xuyên	Kinh	Tin Lành	Võ Qu
HS0010	Trương Thị Nga	<input checked="" type="checkbox"/>	02/01/2005	Bến Tre	Kinh	Phật Giáo	Nguyễn
HS0011	Nguyễn Thị Nga	<input checked="" type="checkbox"/>	15/04/2005	Chợ Mới	Kinh	Thiên Chúa	Vũ Văn
HS0012	Trần Thị Hồng Nghi	<input checked="" type="checkbox"/>	02/01/2004	Đồng Tháp	Kinh	Cao Đài	Trịnh M
HS0013	Huynh Thị Mỹ Ngọc	<input checked="" type="checkbox"/>	02/01/2005	Long Xuyên	Kinh	Tin Lành	Lê Quốc
HS0014	Trần Thị Mỹ Nhân	<input checked="" type="checkbox"/>	02/01/2005	Bến Tre	Kinh	Phật Giáo	Nguyễn
HS0015	Trương Thị Ngọc Nhung	<input checked="" type="checkbox"/>	15/04/2005	Chợ Mới	Kinh	Thiên Chúa	Lê Hữu
HS0016	Huynh Quốc Phuong	<input type="checkbox"/>	02/01/2004	Đồng Tháp	Kinh	Cao Đài	Ngô H
HS0017	Lý Ngọc Phương	<input checked="" type="checkbox"/>	02/01/2005	Long Xuyên	Kinh	Tin Lành	Trần H
HS0018	Nguyễn Thị Phương	<input checked="" type="checkbox"/>	02/01/2005	Bến Tre	Kinh	Phật Giáo	Vũ Thị
HS0019	Nguyễn Phú Quốc	<input type="checkbox"/>	15/04/2005	Chợ Mới	Kinh	Thiên Chúa	Trần N
HS0020	Võ Thiên Quốc	<input type="checkbox"/>	02/01/2004	Đồng Tháp	Kinh	Cao Đài	Hoàng

Figure 27: Student Information Management



The screenshot shows the 'TEACHER' section of the management system. The interface includes a top menu bar with 'Manage', 'Statistical', and 'Regulations' tabs, and a toolbar with icons for Class, Class Grade, Semester, School Year, Subject, Score, Result, Academic Performance, Conduct, Student, Class Assignment, Teacher, and Assignment. Below the toolbar is a navigation bar with links for SUBJECT, ENTER STUDENT SCORE, RANKING RESULTS, ACADEMIC PERFORMANCE, CONDUCT, STUDENT, ASSIGN STUDENTS INTO CLASSES, TEACHER, and ASSIGNMENT. A search bar titled 'Search for information' is on the right. The main content area displays a table titled 'List of teachers' with columns: Teacher ID, Teacher Name, Address, Subject, and Phone. The data in the table is as follows:

Teacher ID	Teacher Name	Address	Subject	Phone
GV0001	Hồ Văn Quang	100 Trần Hưng Đạo, Long Xuyên	Toán	0975058876
GV0002	Phan Hồng Thắm	Lạc Quoi - Trị Tôn	Vật Lý	0976630315
GV0003	Huỳnh Thành Tuyền	10C Nguyễn Trung Trực, Châu Đốc	Hóa Học	0699015456
GV0004	Lam Trung Tiên	Long Dien B, An Phú	Sinh Học	0845241566
GV0005	Huỳnh Túc Tài	Rạch Giá, Kiên Giang	Lịch Sử	0123456789
GV0006	Lê Thị Minh Nguyệt	000 Long Xuyên, An Giang	Địa Lý	0123456789

Figure 28: Teacher Information Management

The screenshot shows the 'ASSIGNMENT' section of the management system. The interface is similar to Figure 28, with a top menu bar, toolbar, and navigation bar. The main content area displays a table titled 'List of assigned teachers' with columns: No, School Year, Class ID, Subject, and Giáo viên (Teacher). The data in the table is as follows:

No	School Year	Class ID	Subject	Giáo viên
1	2023-2024	LOP1012324	Toán	Hồ Văn Quang
2	2023-2024	LOP1012324	Vật Lý	Phan Hồng Thắm
3	2023-2024	LOP1012324	Hóa Học	Huỳnh Thành Tuyền
4	2023-2024	LOP1012324	Sinh Học	Lam Trung Tiên
5	2023-2024	LOP1022324	Toán	Hồ Văn Quang
6	2023-2024	LOP1022324	Vật Lý	Phan Hồng Thắm
7	2023-2024	LOP1022324	Hóa Học	Huỳnh Thành Tuyền
8	2023-2024	LOP1022324	Sinh Học	Lam Trung Tiên
9	2023-2024	LOP1112324	Toán	Hồ Văn Quang
10	2023-2024	LOP1112324	Vật Lý	Phan Hồng Thắm
11	2023-2024	LOP1112324	Hóa Học	Huỳnh Thành Tuyền
12	2023-2024	LOP1112324	Sinh Học	Lam Trung Tiên

On the right side, there is a 'Enter information' panel with fields for No, School Year (2023-2024), Class (10A1), Subject (Toán), and Teacher teaches (Hồ Văn Quang). A 'Save to list' button is at the bottom.

Figure 29: List of Teacher Teaching Subjects of Each Class



HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [SUBJECT]

This screenshot shows the 'SUBJECT' management interface. At the top, there are tabs for Manage, Statistical, and Regulations. Below the tabs are several icons representing different management functions: Class Grade, Semester, School Year, Subject, Score, Result, Academic Performance, Conduct, Student, Class Assignment, Teacher, and Assignment. A toolbar below the icons includes links for CLASS GRADE, SEMESTER, SCHOOL YEAR, SUBJECT, ENTER STUDENT SCORE, RANKING RESULTS, ACADEMIC PERFORMANCE, and CONDUCT. The main area displays a table titled 'List of subjects' with columns for Subject ID, Subject Name, Number of lessons, and Coefficient. The data in the table is as follows:

Subject ID	Subject Name	Number of lessons	Coefficient
MH0001	Toán	90	2
MH0002	Vật Lý	60	1
MH0003	Hóa Học	60	1
MH0004	Sinh Học	60	1
MH0005	Lịch Sử	45	1
MH0006	Địa Lý	45	1
MH0007	Ngữ Văn	90	2
MH0008	Đạo Đức	30	1
MH0009	Thể Dục	30	1

Figure 30: Subject Management Information

HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [ACADEMIC PERFORMANCE]

This screenshot shows the 'ACADEMIC PERFORMANCE' management interface. The layout is similar to Figure 30, with tabs for Manage, Statistical, and Regulations, and various management icons. The main area displays a table titled 'List of qualifications' with columns for Academic ID, Academic Title, Upper Bound Score, Lower Bound Score, and Control Score. The data in the table is as follows:

Academic ID	Academic Title	Upper Bound Score	Lower Bound Score	Control Score
HL0005	Kém	3.4	0	0
HL0004	Yếu	4.9	3.5	2
HL0003	Trung bình	6.4	5	3.5
HL0002	Khá	7.9	6.5	5
HL0001	Giỏi	10	8	6.5

Figure 31: School Student Upgrade Rule

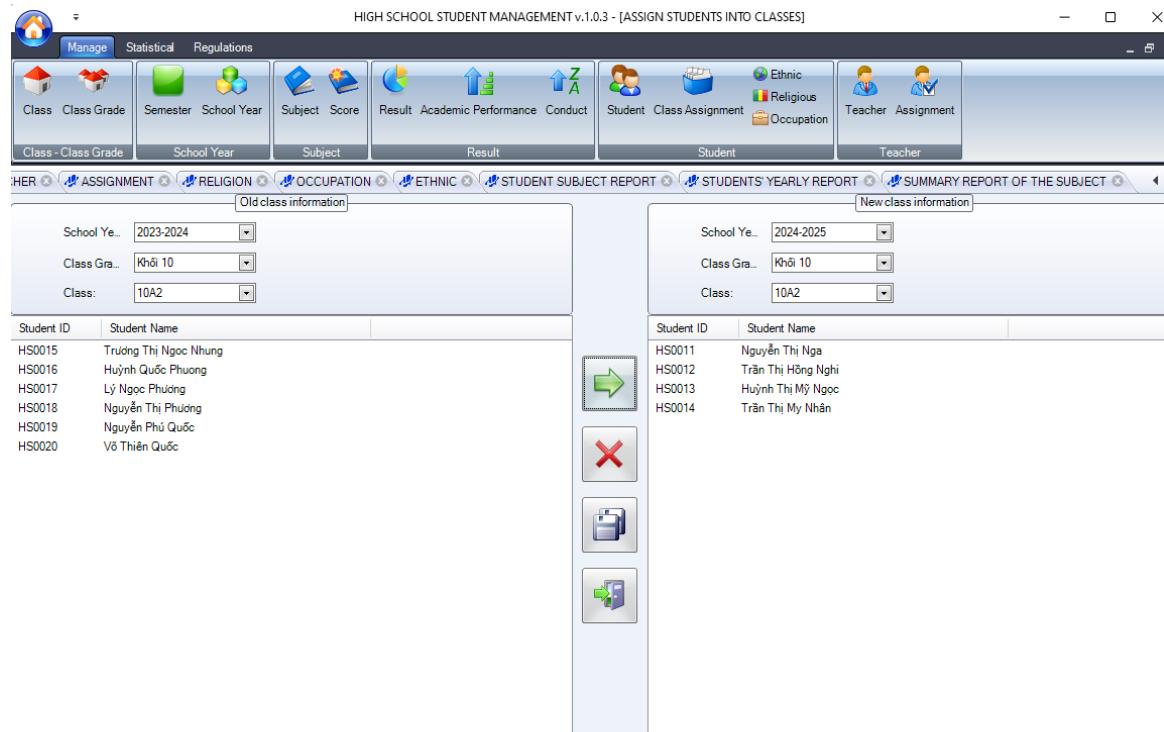


Figure 32: Upgrade Student To Next Class For New School Year

21.3 Clerical Staff

The screenshot shows a software interface titled "HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [LIST OF STUDENTS]". The main window has a toolbar with icons for Manage, Statistical, and Regulations. Below the toolbar are buttons for Report by subject, Annual report, Subject final report, Semester summary report, List of students, and Class Profile. A navigation bar at the top includes links for REPORT, STUDENTS' YEARLY REPORT, SUMMARY REPORT OF THE SUBJECT, ASSIGN STUDENTS INTO CLASSES, SEMESTER SUMMARY REPORT, LIST OF STUDENTS, and others.

The main area displays a grid of student data. The columns are labeled: No, STUDENT ID, STUDENT NAME, GENDER, D.O.B, ADDRESS, and EMAIL. The data consists of 47 rows, each representing a student with their unique ID, name, gender, date of birth, address, and email. The data is as follows:

No	STUDENT ID	STUDENT NAME	GENDER	D.O.B	ADDRESS	EMAIL
28	HS0028	Vang Si Thanh	Nam	02/01/2004	Đồng Tháp	hs028@gmail.com
29	HS0029	Đỗ Thị Bích Thảo	Nữ	02/01/2004	Long Xuyên	hs029@gmail.com
30	HS0030	Hồ Minh Thiên	Nam	02/01/2004	Bến Tre	hs030@gmail.com
31	HS0031	Nguyễn Thị Anh Thư	Nữ	15/04/2004	Chợ Mới	hs031@gmail.com
32	HS0032	Phạm Nguyễn B. Trinh	Nữ	02/01/2003	Đồng Tháp	hs032@gmail.com
33	HS0033	Võ Ngọc Trinh	Nữ	02/01/2004	Long Xuyên	hs033@gmail.com
34	HS0034	Nguyễn Huỳnh Minh Trí	Nam	02/01/2004	Bến Tre	hs034@gmail.com
35	HS0035	Đỗ Xuân Trinh	Nam	15/04/2004	Chợ Mới	hs035@gmail.com
36	HS0036	Nguyễn Hiếu Trung	Nam	02/01/2003	Đồng Tháp	hs036@gmail.com
37	HS0037	Nguyễn Thanh Trung	Nam	02/01/2004	Long Xuyên	hs037@gmail.com
38	HS0038	Trần Thành Trúc	Nữ	02/01/2004	Bến Tre	hs038@gmail.com
39	HS0039	Cao Minh Tuấn	Nam	15/04/2004	Chợ Mới	hs039@gmail.com
40	HS0040	Nguyễn Hoàng Tuấn	Nam	02/01/2004	Đồng Tháp	hs040@gmail.com
41	HS0041	Trương Minh Tuyên	Nam	02/01/2003	Long Xuyên	hs041@gmail.com
42	HS0042	Lê Thanh Tung	Nam	02/01/2003	Bến Tre	hs042@gmail.com
43	HS0043	Phạm Thị Bích Vi	Nữ	15/04/2003	Chợ Mới	hs043@gmail.com
44	HS0044	Đặng Quang Vinh	Nam	02/01/2003	Đồng Tháp	hs044@gmail.com
45	HS0045	Âu Ngọc Vũ	Nam	02/01/2003	Long Xuyên	hs045@gmail.com
46	HS0046	Hồ Thành Vũ	Nam	02/01/2002	Bến Tre	hs046@gmail.com
47	HS0047	Phan Quốc Vương	Nam	15/04/2003	Chợ Mới	hs047@gmail.com

Figure 33: Report of Student Participate in Class



HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [STUDENT SUBJECT REPORT]

Manage Statistical Regulations

Report by subject Annual report Subject final report Semester summary report List of students Class Profile Student Results Class Results Export list

STUDENT SUBJECT REPORT LIST OF STUDENTS SUBJECT ENTER STUDENT SCORE SEMESTER SUMMARY REPORT SUMMARY REPORT OF THE SUBJECT

School Year: 2023-2024 Semester: Học Kỳ 1 Class: 10A2 Subject: Toán View

1 of 1 Find | Next

STUDENT SUBJECT REPORT

School Year: 2023-2024 Semester: Học Kỳ 1
Class: 10A2 Subject: Toán Date of establishment: 21/08/2024

No	STUDENT ID	STUDENT NAME	AVERAGE ORAL	AVERAGE 15 MIN	AVERAGE 45 MIN	TEST SCORES	SEMESTER GPA
1	HS0015	Trương Thị Ngọc Nhung	4	8	8	9	7.4
2	HS0016	Huỳnh Quốc Phương	8	5	8	9	7.6
3	HS0017	Lý Ngọc Phương	9	9	6	7	7.4
4	HS0018	Nguyễn Thị Phương	8	9	9	8	8.6
5	HS0019	Nguyễn Phú Quốc	6	7	8	6	7
6	HS0020	Võ Thiên Quốc	6	8	0	6	4

Figure 34: Report of Student Grade in Class

HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [STUDENTS' YEARLY REPORT]

Manage Statistical Regulations

Report by subject Annual report Subject final report Semester summary report List of students Class Profile Student Results Class Results Export list

LIST OF STUDENTS SUBJECT ENTER STUDENT SCORE SEMESTER SUMMARY REPORT SUMMARY REPORT OF THE SUBJECT STUDENTS' YEARLY REPORT

School Year: 2023-2024 Class: 10A2 View

1 of 1 Find | Next

STUDENTS' YEARLY REPORT

School Year: 2023-2024 Class: 10A2 Date of establishment:

No	STUDENT ID	STUDENT NAME	SEMESTER 1 GPA	SEMESTER 2 GPA	YEARLY AVERAGE SCORE	ACADEMIC PERFORMANCE	CONDUCT	RESULT
1	HS0015	Trương Thị Ngọc Nhung	6.8	7.72	0	Kém	Tốt	Ôt lai
2	HS0016	Huỳnh Quốc Phương	6.84	8.8	0	Kém	Tốt	Ôt lai
3	HS0017	Lý Ngọc Phương	5.64	8.8	0	Kém	Tốt	Ôt lai
4	HS0018	Nguyễn Thị Phương	7.84	8.88	0	Kém	Tốt	Ôt lai
5	HS0019	Nguyễn Phú Quốc	5.32	8.88	0	Kém	Tốt	Ôt lai
6	HS0020	Võ Thiên Quốc	3.96	8.88	0	Kém	Tốt	Ôt lai

Figure 35: Report of Student Grade in Two Semester



The screenshot shows the 'HIGH SCHOOL STUDENT MANAGEMENT v.1.0.3 - [SEMESTER SUMMARY REPORT]' window. At the top, there are tabs for 'Manage', 'Statistics' (which is selected), and 'Regulations'. Below the tabs are several icons: 'Report by Annual subject', 'Subject final report', 'Semester summary report', 'List of students', 'Class Profile', and 'Export list'. The main area is titled 'SEMESTER SUMMARY REPORT' and shows the following data:

No	CLASS ID	CLASS NAME	CLASS SIZE	ACHIEVEMENT QUANTITY	RATIO
1	LOP1012324	10A1	35	0	0 %
2	LOP1022324	10A2	36	5	13.89 %

At the bottom of the window, it says 'Users currently logged in: 2023-2024 - Minh Phuc'.

Figure 36: Report of Class Average Grade

22 Project Resources

For further details and resources related to this project, you can access the following links:

- **GitHub Repository:** <https://github.com/nhingthao1203/ISDT>
- **Google Drive Folder:** [Download Here](#)



References

- [1] S.S. Bagui and R.W. Earp. *Database Design Using Entity-Relationship Diagrams*. CRC Press, 2022.
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- [4] S. Hoberman and G. McGeachie. *Data Modeling Made Simple with PowerDesigner*. Technics Publications, 2011.