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I. OVERVIEW

Today, in parallel with the development of science and technology, computer science holds a central place in most areas of society. It has achieved brilliant scientific achievements with its leaps and bounds. The application of science and technology to human life is increasing and constantly interfering in most of the work in life. Information technology is one of those sciences. Coupled with the development of computer-aided manufacturing technology, the adoption of software applications is critical to the application of this science.

In the world as well as in Vietnam, information technology has become a spearhead industry, it is an indispensable science and technology in applying to social activities such as management, business information, ...

In recent years, in our country, informatics has been widely applied in the field of education and training. The application of management software in schools has greatly assisted managers from the management, management of the learning process, training and management of tuition fees - students. Ensure fast and accurate science.

In the face of the increasing number of universities and faculties, it is a waste of time and effort to keep the old management method. Therefore, the application of information technology in the management of universities is very reasonable.

Many students, faculties, departments, and training types that lead to student tuition fees also differ, the management of tuition fees becomes increasingly difficult. To help minimize that difficulty and to actively support the university's fee collection team, our team works on the "Student fees collection management" program.

II. INTRODUCE

2.1. Purpose of document

This is a detailed description of student fees collection management software, which is the basis for programming functions as well as scripting testing and program testing.

2.2. Scope

Documentation is the result of the software design process, which is the communication basis of the developer, which is the basis for testing, commissioning, maintenance, and provision of book management functions.

2.3. References

Number	Name of document	File Name
1	Requirements specification document	Requirements specification document.doc

2.4. Document description

The structure of the document consists of 5 parts:

- **Part 1 - Overview:** General introduction of the document, help the reader visualize the content, purpose and general layout of the document.
- **Part 2 - Introduce:** Pose the most basic requirements that software must have.
- **Part 3 - Use case model.:** Building architectural models and describing system architecture.
- **Part 4 - System architecture:** Describe data dictionary and build data dictionary.
- **Part 5 - Database design:** Design subsystems of the system.
- **Part 6 - User Interface Design:** An overview of the interfaces, interface images, and accompanying operations.
- **Part 7 - Implementation:** An overview of the interfaces, interface images, and accompanying operations.
- **Part 8 – Testing documents:** An overview of the interfaces, interface images, and accompanying operations.

III. USE CASE MODEL

3.1 Use case diagram

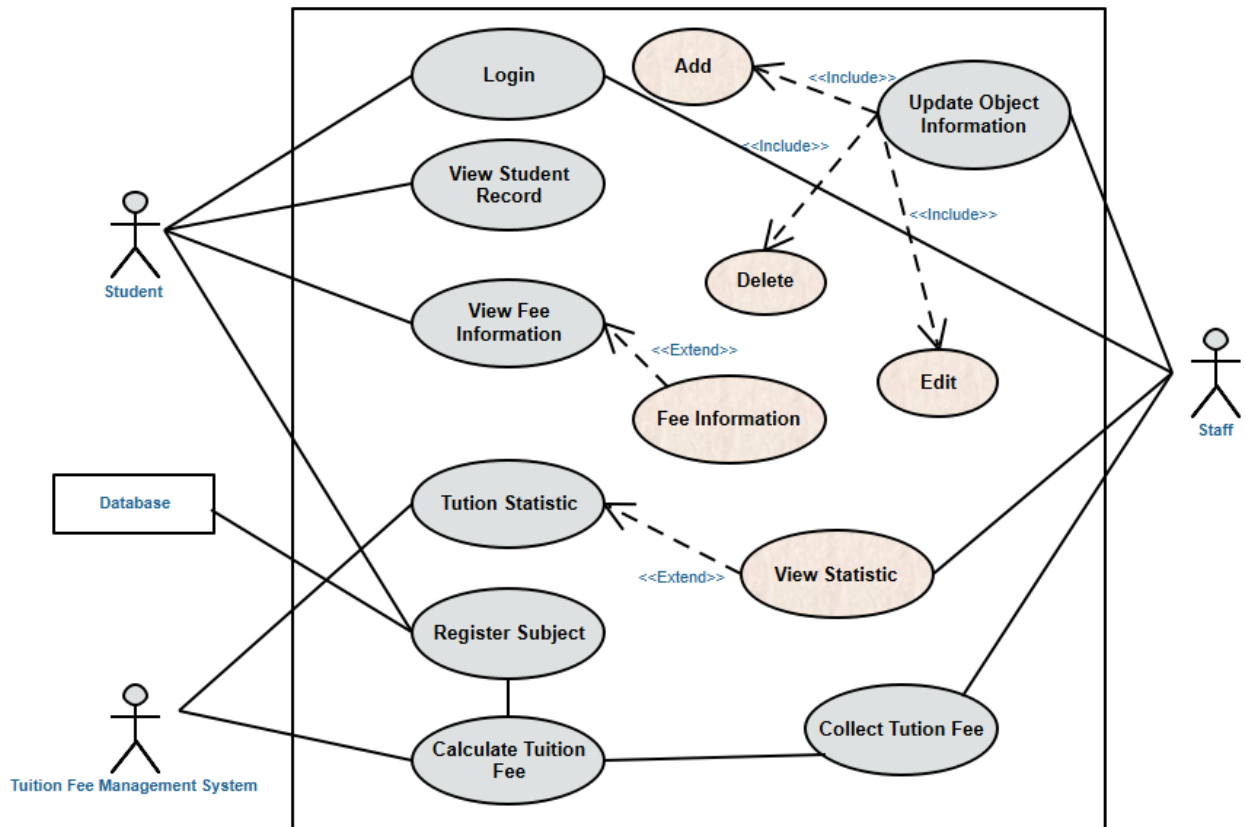


Figure 3.1: User case diagram for system “Student fees collection management”

3.2 Use case

3.2.1 Login

3.2.1.1 Scenarios

a) Successful scenario

- Enter a valid account name
- Enter the password that matches the account name
- Staff and students on their account to perform the necessary functions

b) Fail scenario

- Login failed because of wrong account name
- Login failed because the password does not match the account

3.2.1.2 Use case Description

- Use case: Login
- Actors: Student, Staff

- Goal: Login to student and staff accounts so that the subjects perform the necessary functions.

- Description: When students and staff enter the system, they will log in to their account by entering their username and password. Students will register for the course of the semester; View their profile and view subscription information periodically. Staff will update the objects such as: class section, class management, students, subjects exemptions; List the tuition fees paid each day and collect the tuition fees of each student to submit the invoice.

3.2.2. Register Subject

3.2.2.1 Scenarios

a) Successful scenario

Students register for each subject for each semester

- Select the year
- Select a semester
- Select the subject
- Choose a teacher who will teach the subject

b) Fail scenario

- There is no subject to register in that semester
- There is no teacher who student wants to apply for the course

3.2.2.2 Use case Description

- Use case: Register Subject
- Actors: Student
- Goal: Students register periodically
- Description: Students register for each semester by choosing the academic year, select the semester, select the subject, select the teacher then proceed to register. When registering for the course, the course registration information will be automatically updated in the registration database.

3.2.3. View Student Record

3.2.3.1 Scenarios

a) Successful scenario

Check for personal information such as: Student ID, Full Name, Address, Gender, Date of Birth, Subject, Email, ... and completely match.

b) Fail scenario

Check your personal information such as: Student ID, Full Name, Address, Gender, Date of Birth, Subject, Email, ... and inaccurate information.

3.2.3.2 Use case Description

- Use case: View Student Record
- Actors: Student
- Goal: Allows students to check their personal information
- Description: When the student successfully login to their account, there will enter the "Student Profile" section to check their personal information such as Student ID, Full Name, Address, Gender, Audience, Email, ...

3.2.4. Manage entity information

3.2.4.1. Scenarios

a) Successful scenario

- The staff informed by the education authorities: The next semester will have more student A
- The staff enters the personal information of student A
- The system records the existence and storage of A's information

b) Fail scenario

<Empty>

3.2.4.2. Use Case Description

Staff can perform additional operations, edit, delete information about objects such as: Class, Student, Management class, Exempt object to update for the System Database.

3.2.5. Statistic tuition

3.2.5.1. Scenarios

a) Successful scenario

- Student A wants to review the list of his tuition receipts submitted in the previous semester and asks the staff to look for them.
- The staff enters the time range of the previous semester.

- The system processes and displays a list of invoices collected in the previous semester.

b) Fail scenario

<Empty>

3.2.5.2. Use Case Description

Staff can perform a search to list the students who have paid tuition for a certain period of time, including information such as: student ID, student name, total amount, collection staff.

3.2.6. Statistic tuition

3.2.6.1. Scenarios

a) Successful scenario

- The staff performs login to the system using his account.
- The staff clicks on the tab view to perform the view function.
- The system displays a list of all the students along with the bills they have paid.

b) Fail scenario

<Empty>

3.2.6.2. Use Case Description

The staff uses his account to log in to the system and sees a list of all students who have paid tuition and related information.

3.2.7. View tuition fee information

3.2.7.1 Use case scenarios

a) Successful scenario

- Hoai logs into the system.
- She selects a View tuition fee payment information tab
- She selects Semester and Year
- She clicks the Load button
- She sees tuition fee payment information of that semester and year.

3.2.7.2 Use case description

- Use case: View tuition fee payment information
- Actors: Student

- Goal: To view tuition fee payment information
- Description:

When a student logs into the system, he/she clicks the View tuition fee payment information tab. He/she selects Semester and Year to see the tuition fee payment information of that semester of the year. The system will load information from bill entity. The student will see the tuition fee payment information of that semester of the year.

3.2.8. Calculate tuition fee

3.2.8.1 Scenarios

a) Successful scenario

- Hoai logs into the system
- She registers 9 subjects for semester 1 of the year 2018-2019
- The Tuition fee management system calculates and shows the tuition fee of that semester is 6050000VND.

3.2.8.2 Use case description

- Use case: Calculate tuition fee
- Actors: Tuition fee management system
- Goal: To calculate the tuition fee
- Description:

When a student logs into the system to register subjects for one semester. The tuition fee management system will calculate the tuition fee and show the tuition fee for each subject also the total tuition fee of that semester.

3.2.9. Collect tuition fee

3.2.9.1 Scenarios

a) Successful scenario

- Hoai arrives at Finance Department to pay tuition fee for semester 1 of year 2018-2019.
- Phuong enters Hoai's ID, selects Bill Name, Semester and Year. The system shows total bill information.
- Phuong tells Hoai the total tuition fee she has to pay.
- Hoai pays for the tuition fee.

- Phuong exports the bill and give it to Hoai.

a) Fail scenario

- Hoai arrives at Finance Department to pay the tuition fee for semester 1 of the year 2018-2019.

- Phuong enters Hoai's ID, selects Bill Name, Semester and Year. The system shows total bill information.

- Phuong tells Hoai the total tuition fee she has to pay.

- Hoai realizes she does not have enough money to pay the tuition fee. She tells Phuong that she will come back on another day to pay.

3.2.9.2 Use case description

- Use case: Collect tuition fee

- Actors: Staff

- Goal: To collect tuition fee

- Description:

When a student arrives to pay a tuition fee, the staff enter his/her ID, bill name, semester and year. The system will show details of tuition fee bill. The student pays for tuition fee, the staff exports bill and give it to the student.

3.3. Actor description

3.3.1. Student:

Students use the system to login to their account; Check your personal information such as: Student ID, Full Name, Address, Gender, Date of Birth, Subject, Email,... as well as change password in "Student Profile" section; Register the course for each semester, select the Year, Semester, Subjects and Subject Teachers in the "Credit Registration" section. In addition, students will use the system to view their payment information, in the "Payment Information" section will list the subjects of students in a term of a certain year and the status of payment of fees of the subjects in this semester.

3.3.2. Staff

The Staffs use the system to manage entity information, view tuition fee statistic and collect tuition fee.

3.3.3. Database

System input is a list of modules and lists the names of the teachers teaching that module.

3.3.4. Tuition Fee Management System

Calculates the total tuition of a given period of a student and statistics each period of tuition of each student as well as the statistics of tuition fees that the school collects on a daily basis.

IV. SYSTEM ARCHITECTURE

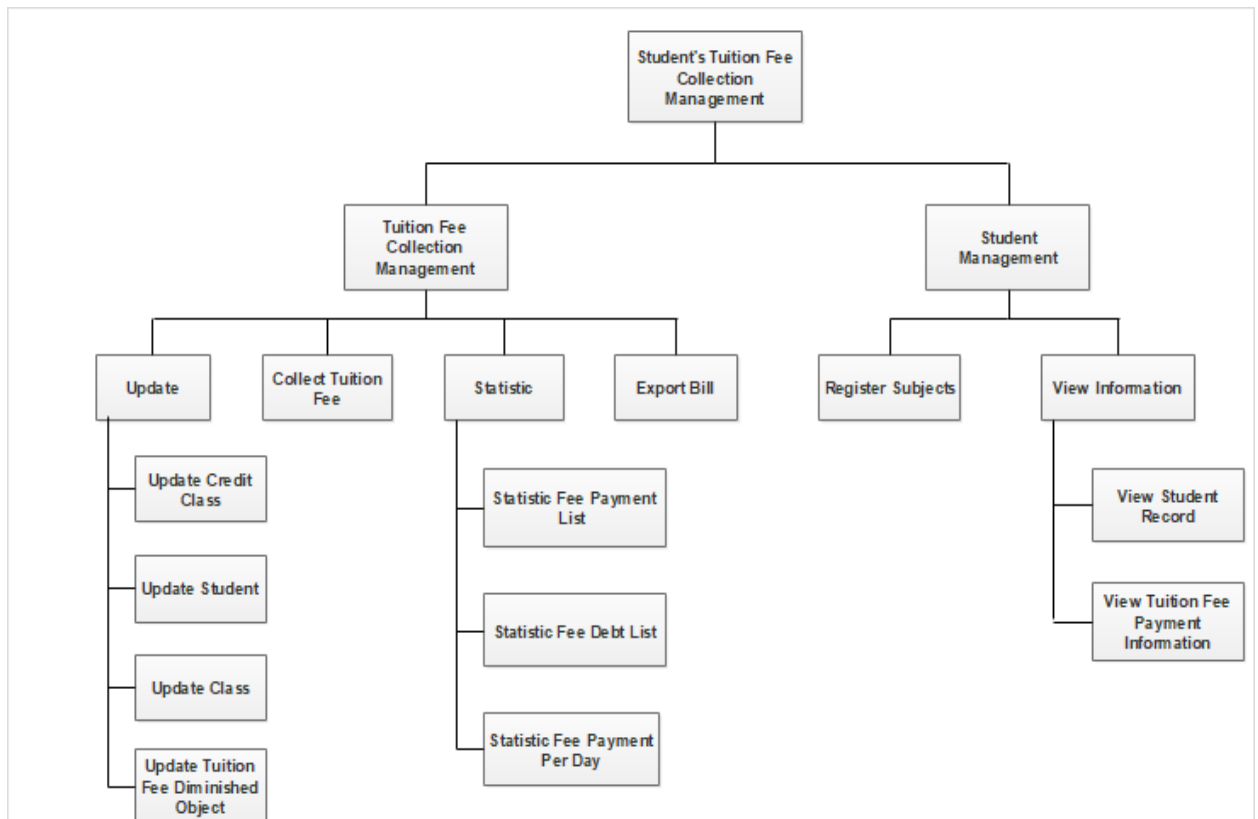


Figure 4.1. Business Function Diagram of Student's Tuition Fee Collection Management System

V. DATABASE DESIGN

5.1 Entity relationship diagram

5.1.1 Entities

Based on the specific activities of the Student's Tuition Fee Collection Management System and the above functional decomposition model, we identify the entities:

1. Student
2. Class
3. CreditClass
4. Employee
5. Bill
6. DiminishedObject

5.1.2 Entity relationship diagram

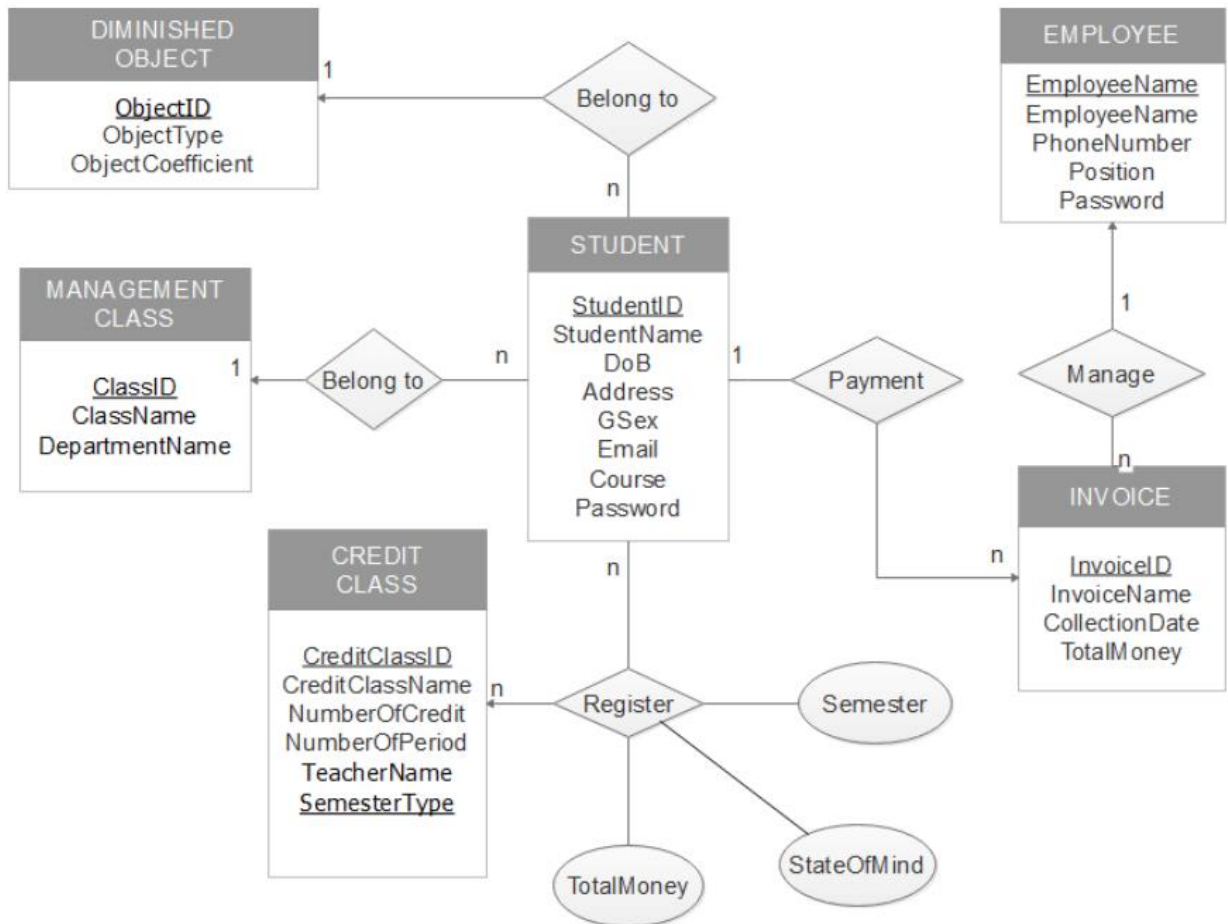


Figure 5.1. Entity Relationship Diagram

5.2 Specification Tables

CREDITCLASS					
<i>Field</i>	<i>Type</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
CreditClassID	CHAR(10)	PRIMARY	NO		ID
CreditClassName	NVARCHAR(50)		YES		Name
NumOfCredit	INT		YES		Number of credit
NumOfPeriod	INT		YES		Number Of Period
TeacherName	NVARCHAR(50)		YES		Name Of Teacher
SemesterType	CHAR(10)	PRIMARY	NO		Type Of Semester

STUDENT					
<i>Field</i>	<i>Type</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
StudentID	CHAR (10)	PRIMARY	NO		ID
StudentName	NVARCHAR(100)		YES		Name
DoB	DATE		YES		Date Of Birth
StudentAdd	NVARCHAR(50)		YES		Address
Sex	NVARCHAR(10)		YES		Sexuality
Email	VARCHAR(50)		YES		Email
Term	VARCHAR(50)		YES		
Password	CHAR(10)		YES		Password
ClassID	CHAR(10)	REFERENCES	NO		Class ID
ObjectID	CHAR(10)	REFERENCES	NO		Object ID

DIMINISHEDOBJECT					
<i>Field</i>	<i>Default</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
ObjectID	CHAR (10)	PRIMARY	NO		ObjectID
ObjectType	NVARCHAR(30)		YES		Type Object
Coeff	FLOAT		YES		Diminish Coefficient

BILL					
<i>Field</i>	<i>Type</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
BillID	CHAR(10)	PRIMARY	NO		ID
BillName	NVARCHAR(50)		YES		Name
PaymentDate	DATE		YES		Date of Payment
Total	BIGINT		YES		Total money
StudentID	CHAR(10)	REFERENCES	NO		Student ID
EmployeeID	CHAR(10)	REFERENCES	NO		Employee ID

EMPLOYEE					
<i>Field</i>	<i>Type</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
EmployeeID	CHAR (10)	PRIMARY	NO		ID
EmployeeName	NVARCHAR(50)		YES		Name
PhoneNum	CHAR(15)		YES		Phone Number
Position	NVARCHAR(20)		YES		Position
Password	CHAR(10)		YES		Password

CLASS					
<i>Field</i>	<i>Type</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
ClassID	CHAR(10)	PRIMARY	NO		ID
ClassName	NVARCHAR(50)		YES		Name
Faculty	NVARCHAR(50)		YES		Faculty

REGISTER					
<i>NULL</i>	<i>Default</i>	<i>Index</i>	<i>NULL</i>	<i>Default</i>	<i>Note</i>
StudentID	CHAR (10)	PRIMARY	NO		ID
CreditClassID	CHAR (10)	PRIMARY	NO		ID
SemesterType	CHAR (10)	PRIMARY	NO		Type
Year	CHAR(50)		YES		School Year
Total	BIGINT		YES		Total Money

5.3 Logical design

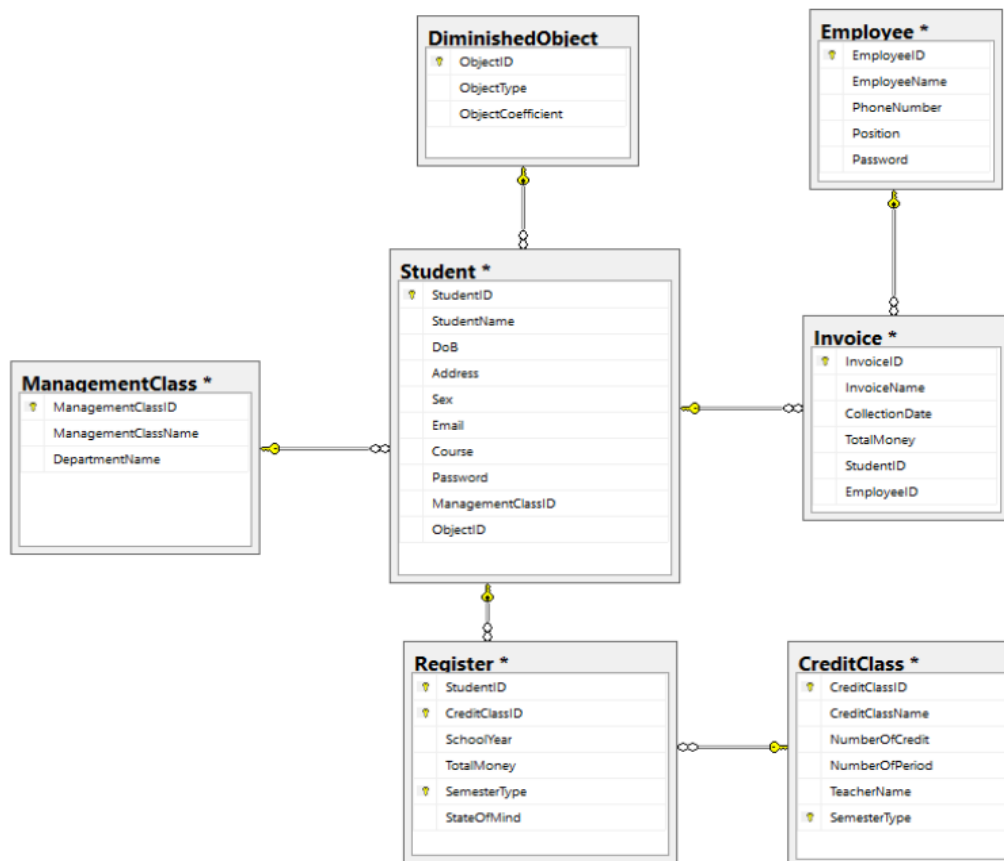


Figure 5.2. Logical design

VI. USER INTERFACE DESIGN

6.1 Architecture MENU

The main menu of the Menu is built for two different users: Employee and Student.

- For Employee access:

Bill Information

Student

Student ID:

Bill

Bill ID:

Bill Name:

Semester:

Year:

Total:

Num Of Subject

Subject	Credit	Class	Teache	Semest	Year	Total	Status
*							

Collector

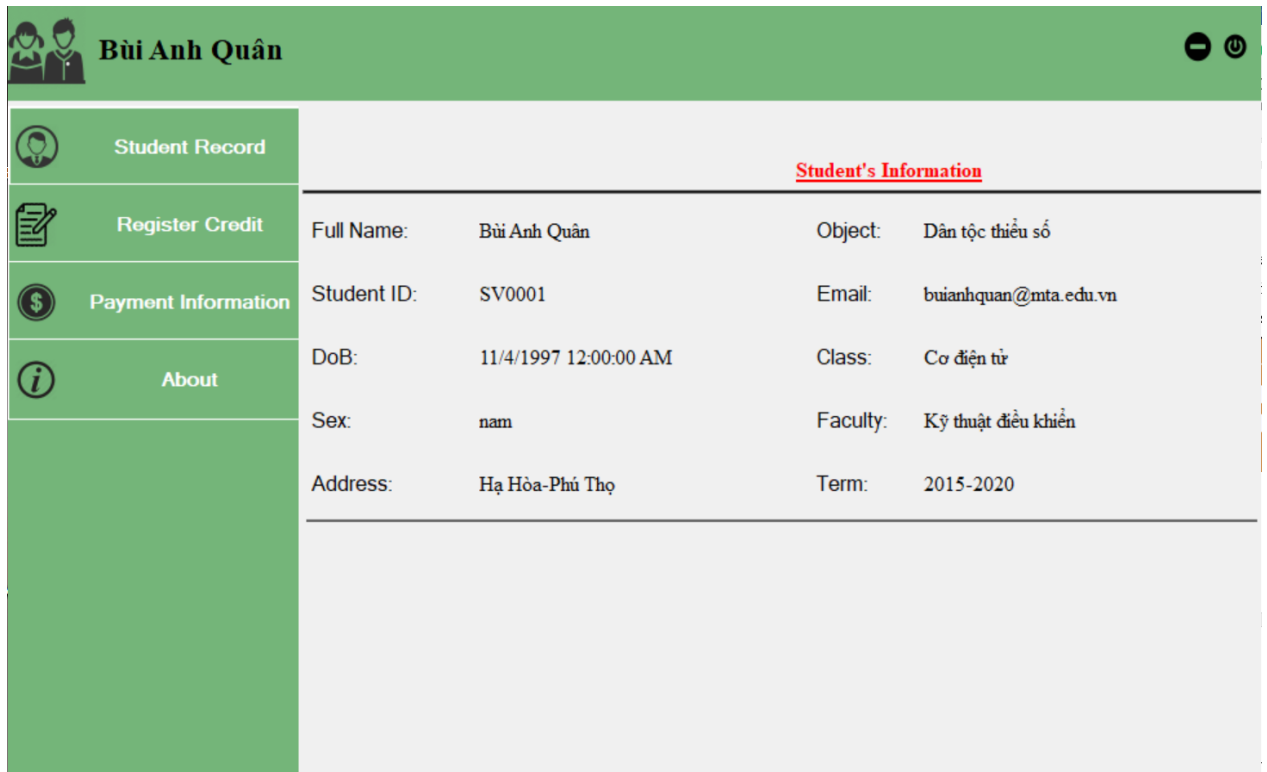
EmployeeID:

Name:

PhoneNum:

Figure 6.1: Interface for login under Employee access

- For Student Access:



The interface shows a sidebar menu on the left with four items: 'Student Record' (selected), 'Register Credit', 'Payment Information', and 'About'. The main area displays 'Student's Information' for a user named 'Bùi Anh Quân'. The information is organized into two columns with labels on the left and values on the right.

Student's Information			
Full Name:	Bùi Anh Quân	Object:	Dân tộc thiểu số
Student ID:	SV0001	Email:	buianhquan@mta.edu.vn
DoB:	11/4/1997 12:00:00 AM	Class:	Cơ điện tử
Sex:	nam	Faculty:	Kỹ thuật điều khiển
Address:	Hạ Hòa-Phú Thọ	Term:	2015-2020

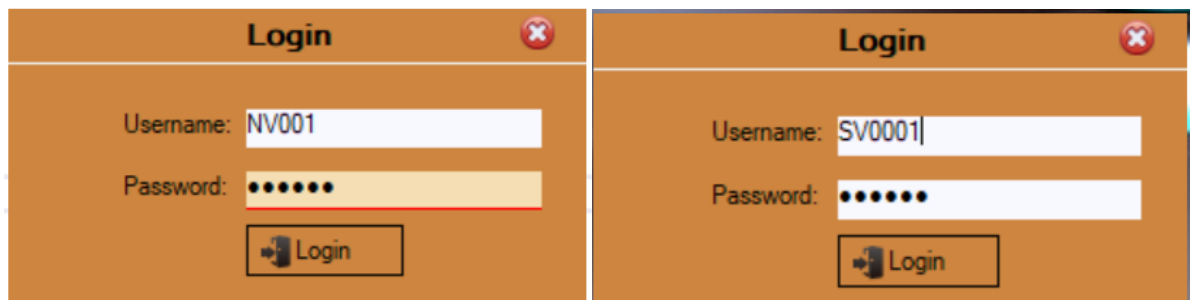
Figure 6.2: Interface for login under Student access

6.2. Interface of functions

6.2.1 Form Login

When the program runs, a login window appears, allowing the user to enter a User name (this use Employee Code or Student Code) and Password.

There are two subjects that are built as Employees and Students.



The figure shows two instances of the 'Login' window. Both windows have a title bar with 'Login' and a close button. They contain two input fields: 'Username:' and 'Password:'. The 'Password:' field is masked with dots. A 'Login' button is located at the bottom of each window.

Left window: Username: NV001, Password: [masked]

Right window: Username: SV0001, Password: [masked]

Figure 6.3: The login window

Description:

No.	Name	Type	Note	Describe
1	txtUserName	Textbox	None	Allow the user to enter username
2	txtPassword	Textbox	PasswordChar = *	Allow the user to enter Password
3	btnLogIn	Button	None	When the user click the button, system check the values of texboxes, if information is correct, announces to user log in successfully, the system will hide this form and load FormMain

6.2.2 Form Collect Tuition Fees

This section allows the Employee to collect tuition fees and view the payment information of each Student Periodically for each academic year when the Student pays fees; update student's pay tuition information and billing information in the database; Print invoice information for students.

The screenshot shows a web application interface for collecting tuition fees. On the left is a purple sidebar with navigation buttons: 'Collect Fee' (with a flame icon), 'Manage' (with a document icon), 'Statistic' (with a bar chart icon), and 'About' (with an information icon). The main content area is titled 'Bill Information' and features a 'Window Snip' button. It is divided into several sections:

- Student:** A form with a 'Student ID' text input field.
- Bill:** A form with 'Bill ID' (text input, showing 'HD0013'), 'Bill Name' (dropdown menu, showing '- Choose Bill Name -'), 'Semester' (dropdown menu, showing '- Choose Semester -'), 'Year' (dropdown menu, showing '- Choose Year -'), and 'Total' (text input).
- Student (Details):** A form with 'Student ID', 'Student Name', 'Class', 'Address', 'Email', and 'Term' text input fields.
- Collector:** A form with 'EmployeeID' (text input, showing 'NV001'), 'Name' (text input, showing 'Lê Doãn An'), and 'PhoneNum' (text input, showing '01242229222'). It includes 'Update' and 'Export Bill' buttons.
- Num Of Subject:** A table with columns: 'Num Of Subject', 'Credit', 'Subject', 'Class', 'Teache', 'Semest', 'Year', 'Total', and 'Status'. The table is currently empty.

Figure 6.4: Collect tuition fee interface and billing information

Description:

No.	Name	Type	Note	Describe
1	txtStudentID	Textbox	None	Allow the employee to enter Student ID
2	txtBillID	Textbox	None	Bill ID is created automatically
3	cbbBillName	ComboBox	None	Allow employee choose bill name
4	cbbSemester	ComboBox	None	Allow employee choose semester
5	cbbYear	ComboBox	None	Allow employee choose year

6	txtTotal	Textbox	None	Display total money the student have to pay for credits registered in selected semester
7	txtBillID	Textbox	None	Display bill ID
8	txtBillName	Textbox	None	Display bill name
9	txtTotal	Textbox	None	Display total money
10	txtPaymentDate	Textbox	None	Display payment date
11	txtSemester	Textbox	None	Display semester
12	txtYear	Textbox	None	Display year
13	txtStudentID	Textbox	None	Display student ID
14	txtStudentName	Textbox	None	Display student name
15	txtClass	Textbox	None	Display student class
16	txtAddress	Textbox	None	Display student address
17	txtEmail	Textbox	None	Display student email
18	txtTerm	Textbox	None	Display student term
19	txtEmpID	Textbox	None	Display employee ID
20	txtEmpName	Textbox	None	Display employee name
21	txtEmpPhone	Textbox	None	Display employee phone number
22	btnUpdate	Button	None	When employee clicks on button Update, system will update bill information in database.

23	btnExport	Button	None	When employee clicks on button Export Bill, system will export bill information into pdf
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6.2.3 Form Manage Credit Class

Credit Class List

Credit Class ID	Credit Class Name	Number Of Credit	Number Of Period	Teacher	Semester Type
ASM01 ...	Lập trình...	3	60	Trần Ng...	HK1
ASM01 ...	Lập trình...	3	60	Trần Ng...	HK2
ASM01 ...	Lập trình...	3	60	Trần Ng...	HKP
ATT01	Đảm bảo...	3	60	Nguyễn ...	HK1
ATT01	Đảm bảo...	3	60	Nguyễn ...	HK2
ATT01	Đảm bảo...	3	60	Nguyễn ...	HKP
CDL01	Cơ sở d...	4	75	Đỗ Thị ...	HK1
CDL01	Cơ sở d...	4	75	Đỗ Thị ...	HK2
CDL01	Cơ sở d...	4	75	Đỗ Thị ...	HKP
CTR01	Cấu trúc...	3	60	Nguyễn ...	HK1
CTR01	Cấu trúc...	3	60	Nguyễn ...	HK2
CTR01	Cấu trúc...	3	60	Nguyễn ...	HKP
CVH01	Cơ sở v...	2	30	Hoàng ...	HK1

Details

Credit Class ID:

Credit Class Name:

Number Of Credit:

Number Of Period:

Teacher:

Semester Type:

Figure 6.5: Credit Class management interface

Description:

No.	Name	Type	Note	Describe
1	dgvCreClassList	Data Grid View	None	Display credit class list
2	txtCreClassID	Textbox	None	Allow employee enter credit class ID

3	txtCreClassName	Textbox	None	Allow employee enter credit class name
4	txtNumOfCredit	Textbox	None	Allow employee enter number of credit
5	txtNumOfPeriod	Textbox	None	Allow employee enter number of period
6	txtTeacher	Textbox	None	Allow employee enter teacher name
7	txtSemType	Textbox	None	Allow employee enter semester type
8	btnEdit	Textbox	None	When employee clicks on button Edit, she can edit credit class information
9	txtAdd	Textbox	None	When employee clicks on button Add, system will add credit class information into database
10	txtDelete	Textbox	None	When employee clicks on button Delete, system will delete credit class information from database

6.2.4 Form Manage Student

Lê Doãn An

Collect Fee

Manage

Statistic

About

Credit Class **Student** **Class** **Diminished Object**

Filter By Class: Year:

Student ID	Student Name	DoB	Address	Sex	Email	Term	Password
SV0001	Bùi Anh Quân	11/04/1997	Hà Hòa-Phủ Thọ	nam	buianhquan@mta...	2015-2020	110497
SV0002	Bùi Anh Tuấn	03/02/1996	Đồng Anh-Hà Nội	nam	buianhtuan@mta...	2014-2019	030296
SV0003	Bùi Đăng Cường	06/10/1996	Thái Thụy-Thái B...	nam	buidangcuong@...	2015-2020	061096
SV0004	Bùi Hải Quân	30/08/1998	Thạch Thất-Hà Nội	nam	buihaiquan@mta...	2016-2021	300898
SV0005	Bùi Huy Hoàng	11/04/1998	Nhò Quan-Ninh ...	nam	buihuyhoang@mt...	2016-2021	110498
SV0006	Bùi Huy Trung	19/08/1997	Trúc Ninh-Nam Đ...	nam	buihuytrung@mta...	2015-2020	190897
SV0007	Bùi Minh Thủy	07/07/1997	Đức Thọ-Hà Tĩnh	nữ	buiminhthuy@mt...	2015-2020	070797
SV0008	Bùi Minh Tuấn	07/02/1996	Đồng Anh-Hà Nội	nam	buiminhtuan@mt...	2014-2019	070296
SV0009	Bùi Quang Thọ	27/06/1997	Hà Hòa-Phủ Thọ	nam	buiquangtho@mt...	2015-2020	270697

Student ID:

Student Name:

DoB:

Address:

Sex:

Email:

Term:

Password:

Class ID:

Object ID:

Add **Edit** **Delete**

Figure 6.6: Student Management Interface

Description:

No.	Name	Type	Note	Describe
1	dgvCreClassList	Data Grid View	None	Display credit class list
2	txtCreClassID	Textbox	None	Allow employee enter credit class ID
3	txtCreClassName	Textbox	None	Allow employee enter credit class name
4	txtNumOfCredit	Textbox	None	Allow employee enter number of credit

5	txtNumOfPeriod	Textbox	None	Allow employee enter number of period
6	txtTeacher	Textbox	None	Allow employee enter teacher name
7	txtSemType	Textbox	None	Allow employee enter semester type
8	btnEdit	Textbox	None	When employee clicks on button Edit, she can edit credit class information
9	txtAdd	Textbox	None	When employee clicks on button Add, system will add credit class information into database
10	txtDelete	Textbox	None	When employee clicks on button Delete, system will delete credit class information from database

6.2.5 Form Manage Class

CLASS LIST

Class ID	Class Name	Faculty
ANHTTT	An ninh hệ thống th...	Công nghệ thông tin
BDATTT	Bảo đảm an toàn th...	Công nghệ thông tin
CDT	Cơ điện tử	Kỹ thuật điều khiển
CNTT	Công nghệ thông tin	Công nghệ thông tin
CTM	Chế tạo máy	Cơ điện tử
DTH	Địa tin học	Viện công trình đặc ...
DTVT	Điện tử viễn thông	Vô tuyến điện tử
DTYS	Điện tử y sinh	Hóa lý kỹ thuật
KHMT	Khoa học máy tính	Công nghệ thông tin
KTD	Kỹ thuật điện	Cơ điện tử
KTHH	Kỹ thuật hóa học	Hóa lý kỹ thuật
KTSH	Kỹ thuật sinh học	Hóa lý kỹ thuật
KTVL	Kỹ thuật vật liệu	Hóa lý kỹ thuật
OTO	Ô tô	Động lực

DETAILS

Class ID:

Class Name:

Faculty:

Add Edit Delete

Figure 6.7: Management Class Management Interface

Description:

No.	Name	Type	Note	Describe
1	dgvClass	Data Grid View	None	Display class list
2	txtClassID	Textbox	None	Allow employee enter class ID
3	txtClassName	Textbox	None	Allow employee enter class name
4	txtFaculty	Textbox	None	Allow employee enter faculty

5	btnAdd	Button	None	If employee clicks on button Add, system will add class information into database
6	btnEdit	Button	None	If employee clicks on button Edit, she can edit class information
7	btnDelete	Button	None	If employee clicks on button Delete, system will delete class information from database

6.2.6 Form Manage Diminished Object

DMN OBJECT LIST

Object ID	Object Name	Coefficient
DT01	Dân tộc thiểu số	0.5
DT02	Con thương binh, bện...	0.4
DT03	Con liệt sĩ	0.35
DT04	Vùng sâu vùng xa	0.45
DT05	KV1-nông thôn	0.6
DT06	KV2-nông thôn	0.65
DT07	KV3-nông thôn	0.7
*		

DETAILS

Object ID:

Object Name:

Coefficient:

Add Edit Delete

Figure 6.8: Diminished Object Management interface

Description:

No.	Name	Type	Note	Describe
1	dgvObject	Data Grid View	None	Display diminished object list
2	txtObjectID	Textbox	None	Allow employee enter object ID
3	txtObjectName	Textbox	None	Allow employee enter object name
4	txtCoefficient	Textbox	None	Allow employee enter coefficient
5	btnAdd	Button	None	If employee clicks on button Add, system will add diminished object information into database
6	btnEdit	Button	None	If employee clicks on button Edit, she can edit diminished object information
7	btnDelete	Button	None	If employee clicks on button Delete, system will delete diminished object information from database

6.2.7 Form Statistic Fee Payment List

This section allows the Employee to list the payment schedule for a given day or payment list for a certain period of time.

The screenshot shows a web application with a purple sidebar and a main content area. The sidebar contains four navigation items: 'Collect Fee' (with a flame icon), 'Manage' (with a document icon), 'Statistic' (with a bar chart icon), and 'About' (with an information icon). The main content area has a header with three tabs: 'Fee Payment List' (selected), 'Fee Debt List', and 'Fee Payment List Per Day'. Below the tabs is a 'Statistic Information' section with 'From:' and 'To:' labels. Both date pickers are set to '26 December 2018'. A 'Reload' button is located to the right of the 'To:' date picker. Below the date pickers is a table with the following columns: 'Student ID', 'Student Name', 'Total', 'Payment Date', and 'Employee'. The table is currently empty.

Figure 6.9: Statistics of Charge List over a period of time

Description:

No.	Name	Type	Note	Describe
1	dgvPaymentList	Data Grid View	None	Display fee payment list
2	dtpStart	Date Time Picker	None	Allow employee choose starting date to view statistic fee payment list
3	dtpEnd	Date Time Picker	None	Allow employee choose ending date to view statistic fee payment list
4	btnReload	Button	None	Reload fee payment list

6.2.8 Form Statistic Fee Debt List

Allows Employee to list students' debt arrears for a semester of any one year

The screenshot shows a web application interface for managing student fees. The sidebar on the left contains four main sections: 'Collect Fee', 'Manage', 'Statistic', and 'About'. The 'Statistic' section is currently selected. The main content area has three tabs: 'Fee Payment List', 'Fee Debt List', and 'Fee Payment List Per Day'. The 'Fee Debt List' tab is active, displaying a form for selecting a semester and year, and a table for listing students with their debt information. The table has columns for Student ID, Student Name, DoB, Address, Num Of Subject, and Debt. The table is currently empty.

Figure 6.10: Statistic list of fee debt about semester

Description:

No.	Name	Type	Note	Describe
1	dgvDebtList	Data Grid View	None	Display fee debt list
2	cbbSemester	ComboBox	None	Allow employee choose semester
3	cbbYear	ComboBox	None	Allow employee choose year

6.2.9 Form Statistic Payment List Per Day

Allows Employees to view students' payment of the day

The screenshot shows a web application interface for fee management. The sidebar on the left is purple and contains four menu items: 'Collect Fee' (with a flame icon), 'Manage' (with a clipboard icon), 'Statistic' (with a bar chart icon), and 'About' (with an information icon). The main content area has a white background. At the top, there are three tabs: 'Fee Payment List', 'Fee Debt List', and 'Fee Payment List Per Day'. The 'Fee Payment List Per Day' tab is active. Below the tabs, there is a 'Filter By Day:' label followed by a date picker showing '20 May 2018' and a 'Reload' button. Below the filter, there is a table with the following columns: 'Student ID', 'Student Name', 'Total Paid', and 'Employee'. The table is currently empty, showing only the header row and a single data row with an asterisk in the 'Student ID' column.

Figure 11: Statistics list of daily fee payment

Description:

No.	Name	Type	Note	Describe
1	dgvListPerDay	Data Grid View	None	Display fee payment list per day
2	dtpDate	Date Time Picker	None	Allow employee choose date to view statistic
3	btnReload	Button	None	Reload fee payment list per day

6.2.10 Form View Student Record

This section will allow students to check their personal information such as StudentID, Full Name, Address, Sex, Date of Birth, Course, Email, ...

Student's Information			
Full Name:	Bùi Anh Quân	Object:	Dân tộc thiểu số
Student ID:	SV0001	Email:	buianhquan@mta.edu.vn
DoB:	11/04/1997 12:00:00 SA	Class:	Cơ điện tử
Sex:	nam	Faculty:	Kỹ thuật điều khiển
Address:	Hà Hòa-Phủ Thọ	Term:	2015-2020

Figure 6.12: Student Profile

Description:

Display student's information

6.2.11 Form Register Credit

Provides an interface for students to register subjects for each semester of them. In the register section, allows Student select the Year, Semester, Subjects, and Subject Teachers.

Bùi Anh Quân

Student Record

Register Credit

Payment Information

About

Register Subject

Student's Information

Full Name:
Coefficient:

Class:

Faculty:

Term:

Register

Choose Year:
Subject Name:

Choose Semester:
Teacher Name:

Choose Subject:
Number Of Period:

Choose Teacher:
Number Of Credit:

Class ID:

Registered List

Credit Class ID	Subject	Num Of Credit	Teacher	Num Of Period	Semester	Status

Figure 6.13: Course registration interface

When complete registering for the course, the course registration information will be updated automatically in the register table in the database.

Description:

No.	Name	Type	Note	Describe
1	dgvRegList	Data Grid View	None	Display registered credit class list
2	txtName	Textbox	None	Display student's name
3	txtClass	Textbox	None	Display student's class
4	txtFaculty	Textbox	None	Display student's faculty
5	txtTerm	Textbox	None	Display student's term
6	txtCoeff	Textbox	None	Display student's diminished coefficient

7	cbbYear	ComboBox	None	Allow student choose year
8	cbbSem	ComboBox	None	Allow student choose semester
9	cbbSubject	ComboBox	None	Allow student choose subject
10	cbbTeacher	ComboBox	None	Allow student choose teacher
11	txtSubject	Textbox	None	Display subject name
12	txtTeacher	Textbox	None	Display teacher name
13	txtPeriod	Textbox	None	Display number of period
14	txtCredit	Textbox	None	Display number of credit
15	txtClass	Textbox	None	Display class ID
16	btnSubmit	Textbox	None	When student clicks on Submit button, she submits the selection

6.2.12 Form View Payment Information

List the student's courses for one semester in a year and the status of the payment for subjects during that semester to provide information to the student about his or her fee payment status.

Bùi Anh Quân

Student Record
 Register Credit
 Payment Information
 About

Payment Information

Choose Semester:
 Choose Year:

Subject Information

Subject	Credit Class ID	Teacher	Semester	Year	Total	Status

Figure 6.14: Payment Information

Description:

No.	Name	Type	Note	Describe
1	dgvSubInf	Data Grid View	None	Display payment information
2	cbbSem	ComboBox	None	Allow student to choose semester to view payment information
3	cbbYear	ComboBox	None	Allow student to choose year to view payment information
4	btnReload	Button	None	Reload payment information
5	btnExport	Button	None	Export payment information

VII. IMPLEMENTATION

VIII. TESTING DOCUMENTS

8.1. Test case

Seq.No	Condition to be tested	Test data	Expected result
1	Login	Enter valid username and valid password	User should be able to log in
2	Login	Enter valid username and invalid password	User should not be able to log in
3	Login	Enter invalid username and valid password	User should not be able to log in
4	Login	Enter invalid username and invalid password	User should not be able to log in
5	View student record	Login with right type of user	User should be able to view student record
6	View student record	Not login	User should not be able to view student record
7	View student record	Login fail	User should not be able to view student record
8	View fee information	Login with right type of user	User should be able to view fee information
9	View fee information	Not login	User should not be able to view fee information
10	View fee information	Login fail	User should not be able to view fee information
11	Register subject	Login with right type of user and choose all fields rightly	User should be able to register subject

12	Register subject	Not login	User should not be able to register subject
13	Register subject	Login fail	User should not be able to register subject
14	Register subject	There is no subject in the semester user chose	User should not be able to register subject
15	Register subject	There is no teacher who student wants to apply for the course	User should not be able to register subject
16	Update object information	Login with right type of user	User should be able to update object information
17	Update object information	Not login	User should not be able to update object information
18	Update object information	Login fail	User should not be able to update object information
19	View statistic	Login with right type of user	User should be able to view statistic
20	View statistic	Not login	User should not be able to view statistic
21	View statistic	Login fail	User should not be able to view statistic
22	Statistic tuition	Login with right type of user and choose all fields rightly	System should be able to statistic tuition
23	Statistic tuition	Not login	System should not be able to statistic tuition
24	Statistic tuition	Login fail	System should not be able to statistic tuition

25	Statistic tuition	Choose fields incorrectly	System should not be able to statistic tuition
26	Calculate tuition fee	Login with right type of user and register subjects correctly	System should be able to calculate tuition fee
27	Calculate tuition fee	Not login	System should not be able to calculate tuition fee
28	Calculate tuition fee	Login fail	System should not be able to calculate tuition fee
29	Calculate tuition fee	Register subjects fail	System should not be able to calculate tuition fee
30	Collect tuition fee	Login with right type of user and choose all fields rightly	User should be able to collect tuition fee
31	Collect tuition fee	Not login	User should not be able to collect tuition fee
32	Collect tuition fee	Login fail	User should not be able to collect tuition fee
33	Collect tuition fee	Choose fields incorrectly	User should not be able to collect tuition fee

8.2. Test Scenario

Seq.No	Requirement Name	Test Scenario(TS)		Test Case(TC)	
		TS Name	TS ID	TS Name	TC ID
1	Login (UC01)	ok	TS_UC01.01	1. Enter valid UserName and valid Password	TS_UC01.01_TC01

		Cancel	TS_UC01.02	1. Enter valid UserName and invalid Password	TS_UC01.02_TC01
				2. Enter invalid UserName and valid Password	TS_UC01.02_TC02
				3. Enter invalid UserName and invalid Password	TS_UC01.02_TC03
2	Register Subject (UC02)	Successful	TS_UC02.01	1. Students register for each subject for each semester(Select a year, a subject, Choose a teacher who will teach the subject)	TS_UC02.01_TC01
		Fail	TS_UC02.02	1. There is no subject to register in that semester	TS_UC02.02_TC01
				2. There is no teacher who student wants to apply for the course	TS_UC02.02_TC02
3	View Student Record (UC03)	Successful	TS_UC03.01	1. Check for personal information such as: Student ID, Full Name, Address, Gender, Date of Birth, Subject,	TS_UC03.01_TC01

				Email, ... and completely match	
				1. StudentID information is incorrect	TS_UC03.02_TC01
				2. Full Name information is incorrect	TS_UC03.02_TC02
				3. Address information is incorrect	TS_UC03.02_TC03
				4. Date of birth information is incorrect	TS_UC03.02_TC04
				
4	Manage entity information (UC04)	Successful	TS_UC04.01	1. Employees manage information about objects such as Credit Class, Student, Management Class, Diminished Object with basic functions such as Add, Edit, Delete for each object	TS_UC04.01_TC01

		Fail	TS_UC04.0 2	1. Add invalid objects information	TS_UC04.02_TC01
				2. Could not add objects information	TS_UC04.02_TC02
5	View Fee Information (UC05)	Successful	TS_UC05.0 1	1. List success the student's courses for one semester in a year and the status of the payment for subjects during that semester	TS_UC05.01_TC01
				1. Statistic wrong	TS_UC05.02_TC01
		Fail	TS_UC05.0 2	2. Can't login to view the fee information	TS_UC05.02_TC02
6	Statistic tuition (UC06)	Successful	TS_UC06.0 1	1. Login with right type of user and choose all fields rightly	TS_UC06.01_TC01
				1. Statistic wrong	TS_UC06.02_TC01
		Fail	TS_UC06.0 2	2. Can't login to view the statistic	TS_UC06.02_TC02
7	Collect tuition fee (UC07)	Successful	TS_UC07.0 1	1. The exact amount of the student's tuition is paid and the total amount of tuition	TS_UC07.01_TC01

				paid by the student in that semester	
		Fail	TS_UC07.02	1. Register subjects fail	TS_UC07.02_TC01
				2. Login fail	TS_UC07.02_TC02
				3. Not login	TS_UC07.02_TC03
8	Calculate Tuition fee (UC08)	Successful	TS_UC08.01	1. Preferred tuition fee	TS_UC08.01_TC01
		Fail	TS_UC08.02	Preferred invalid money	TS_UC08.02_TC01
9	View Statistic (UC09)	Successful	TS_UC09.01	list success the payment schedule for a given day or payment list for a certain period of time.	TS_UC09.01_TC01
		Fail	TS_UC09.02	1. Login fail	TS_UC09.02_TC01
				2. Not login	TS_UC09.02_TC02

8.3. Requirement Traceability Matrix

Seq.No	UCID	TSID	TCID	Status	Defects
1	UC01	TS_UC01.01	TS_UC01.01_TC01	Passed	No
2	UC01	TS_UC01.02	TS_UC01.02_TC01	Passed	No
3	UC01	TS_UC01.02	TS_UC01.02_TC02	Passed	No

4	UC01	TS_UC01.02	TS_UC01.02_TC03	Passed	No
5	UC02	TS_UC02.01	TS_UC02.01_TC01	Passed	No
6	UC02	TS_UC02.02	TS_UC02.02_TC01	Passed	No
7	UC02	TS_UC02.02	TS_UC02.02_TC02	Passed	No
8	UC03	TS_UC03.01	TS_UC03.01_TC01	Passed	No
9	UC03	TS_UC03.02	TS_UC03.02_TC01	Passed	No
10	UC03	TS_UC03.02	TS_UC03.02_TC02	Passed	No
11	UC03	TS_UC03.02	TS_UC03.02_TC03	Passed	No
12	UC03	TS_UC03.02	TS_UC03.02_TC04	Passed	No
13	UC04	TS_UC04.01	TS_UC04.01_TC01	Passed	No
14	UC04	TS_UC04.02	TS_UC04.02_TC01	Passed	No
15	UC04	TS_UC04.02	TS_UC04.02_TC02	Passed	No
16	UC05	TS_UC05.01	TS_UC05.01_TC01	Passed	No
17	UC05	TS_UC05.02	TS_UC05.02_TC01	Passed	No
18	UC05	TS_UC05.02	TS_UC05.02_TC02	Passed	No
19	UC06	TS_UC06.01	TS_UC06.01_TC01	Passed	No
20	UC06	TS_UC06.02	TS_UC06.02_TC01	Passed	No
21	UC06	TS_UC06.02	TS_UC06.02_TC02	Passed	No
22	UC07	TS_UC07.01	TS_UC07.01_TC01	Passed	No
23	UC07	TS_UC07.02	TS_UC07.02_TC01	Passed	No
24	UC07	TS_UC07.02	TS_UC07.02_TC02	Passed	No
25	UC07	TS_UC07.02	TS_UC07.02_TC03	Passed	No
26	UC08	TS_UC08.01	TS_UC08.01_TC01	Passed	No
27	UC08	TS_UC08.02	TS_UC08.02_TC01	Passed	No
28	UC09	TS_UC09.01	TS_UC09.01_TC01	Passed	No
29	UC09	TS_UC09.02	TS_UC09.02_TC01	Passed	No
30	UC09	TS_UC09.02	TS_UC09.02_TC02	Passed	No