College of Computer
Department of Information Technology
CS 383 – Software Engineering

CS 383 Project

Electronic Students Attendance System

INTRODUCTION

The current existing attendance systems in educational facilities provide the attendance in manual method, or the lecturers will call everyone's name to submit their attendance. Managing students attendance during classes have become a time and effort wasting source. Moreover, considering the increase in numbers of students, eliminating this issue is highly necessary. Therefore, we have suggested implementing an electronic attendance system web-based software that works by NFC technology. A student will have an electronic ID card that stores the student's information (Student ID Number), and each class will have a device (NFC reader) that is useable with the ID card. By touching the ID card on the device, a system will take the attendance and store it in the database (The university system). If a student doesn't come within 15 minutes, the system will automatically consider this student to be absent. The system will be capable of identifying IDs' of students at any time but limits each located device to accept attendance from a specific valid group of students according to the predefined timetables of classes, otherwise, an error message shall be displayed. Lastly, the system stores in details of all students attendance record and generate lists and reports accordingly. Consequently, we can see that reducing time and effort costs are the ultimate advantages of our system. Moreover, it is more secure and allows lesser human errors comparing to traditional methods.

STAKEHOLDERS:

Student
Lecturer
Admin

FUNCTIONAL REQUIREMENTS:

1. The system shall have a web-based interface.
2. The system shall have a sub-interface for the located devices.
3. The device shall have an embedded keyboard and control buttons.
4. The device shall have a screen.
5. The device shall have an ID number.
6. The device shall have an NFC reader, which can read the NFC ID card of students.
7. The system shall have a classes-timetable configuration interface, which is accessed by a privet password.
8. The device shall display the ID number of the device, the class name according to timetables.
9. The system shall prompt for a password and only accept valid inputs.
10. When scanning is processed correctly, the system shall make a beep sound and send alert.
11. If scanning is missed, no sound will be made.
12. The system shall generate an attendance list for each class and in each device and prompt for an ID card, only during the first 15 of classes.
13. When a ID card is swiped on the NFC reader, the system shall recognize if this ID card is in the attendance list or not.
14. The system shall only allow admin to add new devices or remove them from the system and also add new classes to the timetables or remove them.

15. The system shall only allow admin, whom have the password, to change the timetable of classes registered for each located device.

16. When a valid student swipes his ID card at the right time and class, the system shall register its attendance.

17. If first 15 minutes of the class passes, the system shall automatically send an absent notification to any of the remaining students of the previously generated attendance list, whom they ID cards had not been swiped on the NFC reader.

18. Within the first 15 minutes of the class passes, and a valid student swipes its ID card, the system shall send him a time up and absent alert at each swipe.

19. If a not valid student swipes its ID card on NFC reader, the system shall send him an alert of wrong class.

20. The system shall allow a lecturer to log in to the system by its personal password, only from the web-based interface of the system.

21. The system shall allow the lecturer to view the attendance list of its classes.

22. The system shall allow student to view their attendance from the web-based interface.

23. The system shall allow the lecturer to register attendance manually for any of its students, and change it only within 7 work days.

24. When an attendance, swiped ID card, or absence is registered by the system, the system shall prevent lecturers from altering it.

25. The system shall automatically generate a report of the attendance, for each class, at the end the class.

26. The system shall automatically send the filled attendance lists to the database center of the university.

27. The system shall allow only the admin to view attendance lists, alter them, take attendance, record a student as absent, add lecturer or remove it, add student or remove it, at any time of the year.

NON-FUNCTIONAL REQUIREMENTS:

1. The system must be compatible with the universities' other systems.
2. The system must be maintainable.
3. The system must operate rabidly.
4. The system must recover from downtimes rabidly.
5. The system must be fault tolerant.
6. The system must be dependable and have minimal error incidents.
7. The system must be secure.
8. The system must provide an easy to use interfaces.
9. The system must be available at all times 24/7.
10. The system must accept valid students only at specified times.
11. The system devices must be safe to use.
12. The system must occupy the most sufficient and minimal memory space.
13. The system must be costly efficient.
14. The system must grant access to information accordingly.
15. The infrastructure network of the system must operate efficiently.
16. The system time and dates must be configured correctly.

A STRUCTURED SPECIFICATION OF REQUIREMENTS:

	First requirement
Function:	Lecturer takes attendance.
Description	It is the second option to take the student's attendance if problems occur with NFC reader or the student forgets University card.
Inputs:	Username, Password, Students ID.
Outputs:	Take attendance successfully.
Pre-conditions:	-The lecturer must sign into system(username/password). -Authentication.
Action:	- System display option to select user type. - Lecturer select user type. - System request lecturer information to login [username/password]. - After lecturer login into system . - System display option for lecturer [create attendance sheet, take attendance, view general report, filter attendance by date]. - lecturer press take attendance button . - System will show the course list base on teaching. - After the lecturer press on course. - System display a list of all classes. - Next lecturer could press one of the classes. - System requires the lecturer to enter the student ID. - Lecturer enters the student ID then press on button enter. - System display popup window to confirm and save or not. - Lecturer press on yes. - System update the list of student's attendance.
Post-conditions:	If a basic flow is successfully, the information of student attendance status (Attend) update .
Side effect:	None

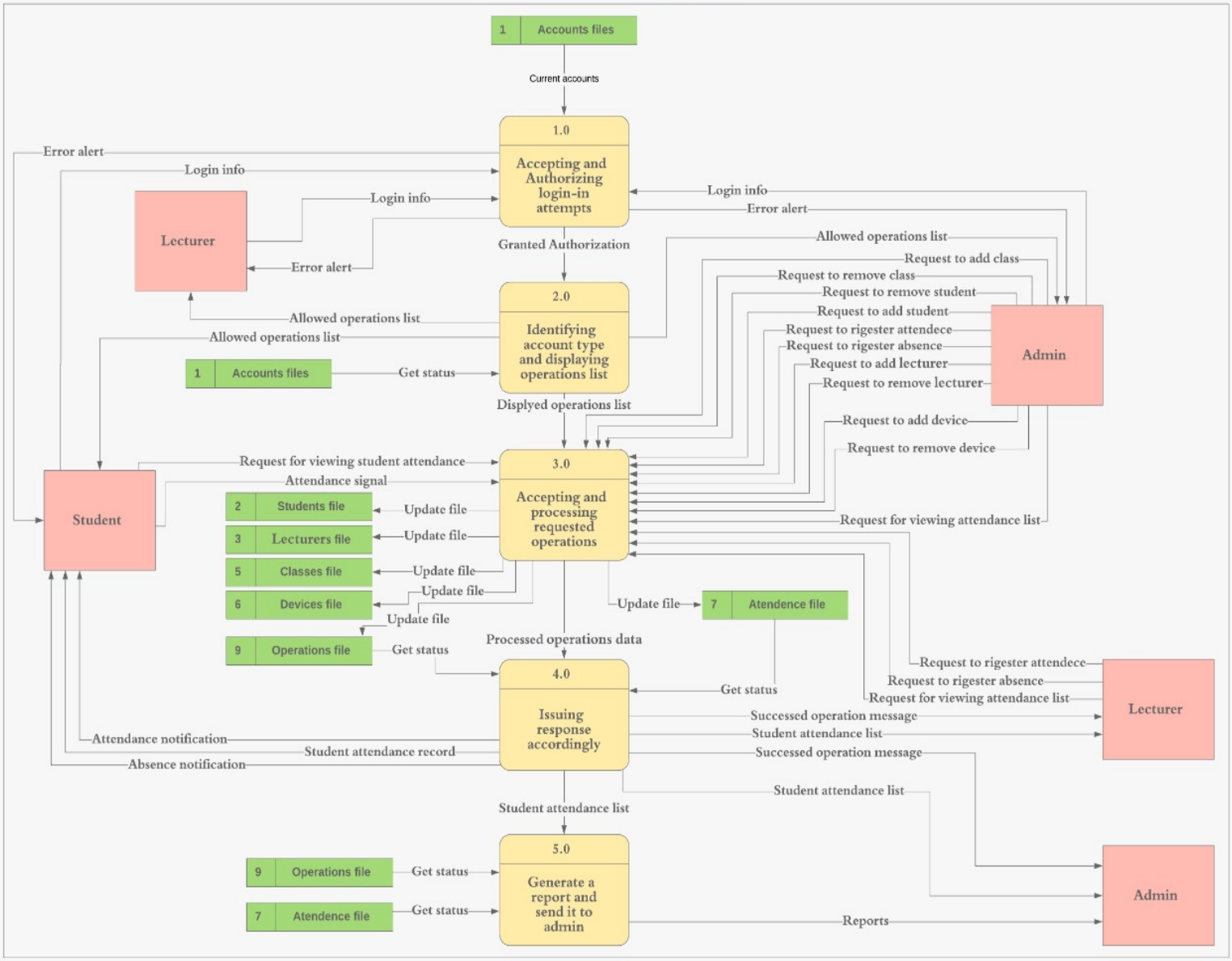
	Second requirement
Function:	Alert sent .
Description	The student will receive the alert of his/her current status.on his/her system account if attendance is taken successfully.
Inputs:	Scan the Card .
Outputs:	The alert reaches students .
Pre-conditions:	Student Scan the ID card .
Action:	- First Student Scan her/his card on the device [NFC reader]. - IF he/she student in this class and arrives on appointment. - the System (Device Screen) will be shown" Successfully your attendance" and send alert on her/his account in the system (attend). - If he/she student in this class and arrives after 15M. - The System(Device Screen) will be shown "your late" and send a alert(absent).
Post-conditions:	The system take the student's attendance successfully and provide information about student attendance status (Absent / Attend).
Side effect:	If a student doesn't come within 15 minutes, the system will automatically consider a student as absent

	Third requirement
Function:	Filter attendance by date .
Description	The lecturer can a view and download a general report for attendance.
Inputs:	Username, Password.
Outputs:	View attendance .
Pre-conditions:	The lecturer must sign into system(username/password) System validation of information.
Action:	- system display option to select user type. - Lecturer select user type. - System request lecturer information to login [username/password]. - After lecturer login into system . - System display option for lecturer [create attendance sheet, take attendance, View general report, filter attendance by date]. - Lecturer press view attendance button . - system display a list of courses. - After the lecturer select on course. - System display a calendar to choose specific date [from/to]. - the lecturer select a date[from/to] then click on button Search. - System will display a list of student with details and their status who in the course.
Post-conditions:	None
Side effect:	None

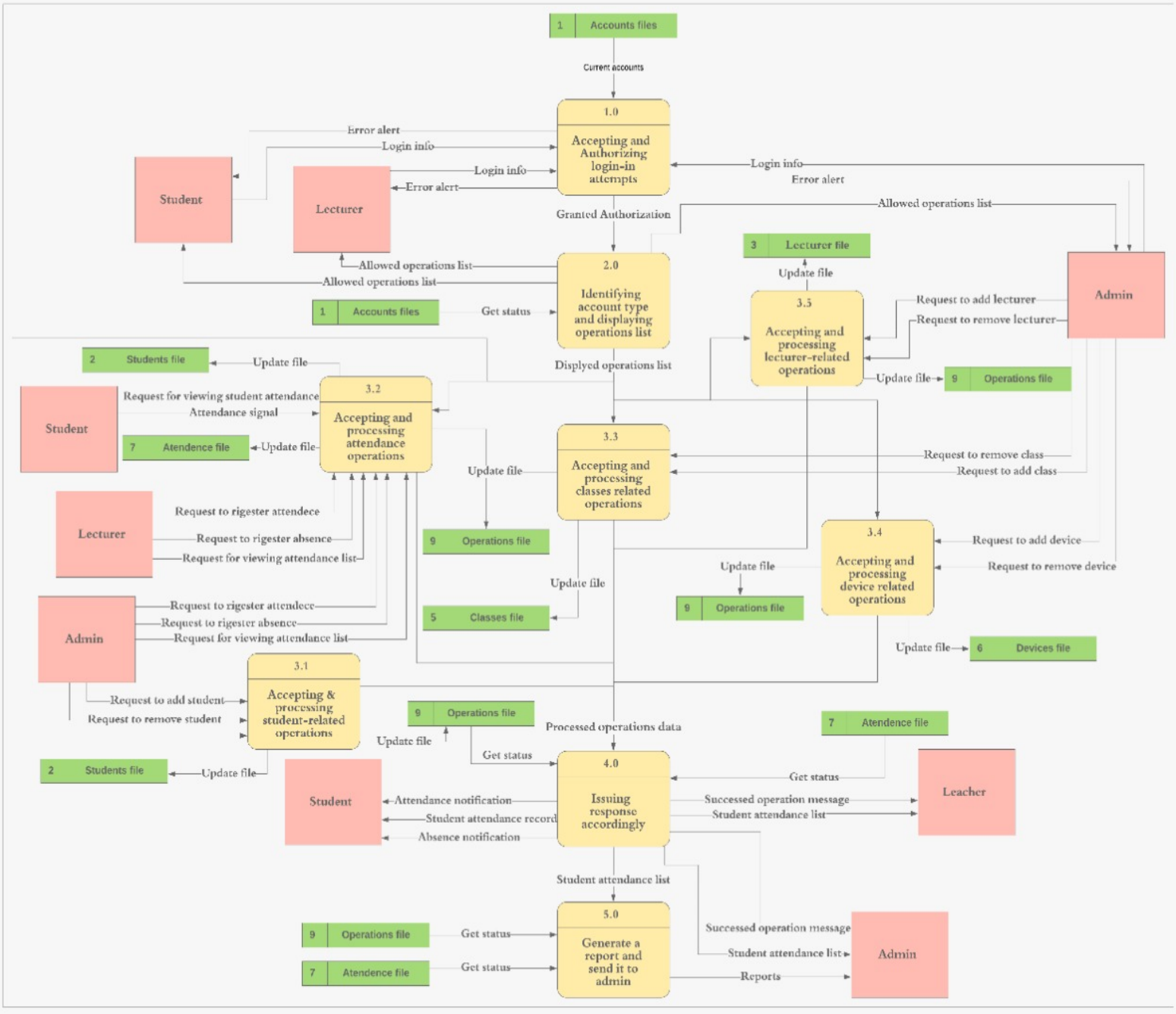
	Forth requirement
Function:	Display a personal attendance.
Description	the student can view his absence and attendance with time and date as will .
Inputs:	ID [student id] , password.
Outputs:	Personal attendance.
Pre-conditions:	-The student must sign into system(username/password). -Authentication.
Action:	- System display option to select user type. - Student select user type . - System request student information to login [ID /password]. - After student login into system . - System display option for student [profile details or view attendance]. - Student press on view attendance button to check his/her attendance. - Next , the system will display the list of courses in the semester. - After the student chooses one of the courses. - System will list all the classes, and his attendance status in details.
Post-conditions:	None
Side effect:	None

	Five requirement
Function:	NFC reader miss reading.
Description	The goal of miss reading is to inform the user of the event in which the automated system failed to record an attendance record.
Inputs:	Scan the Card .
Outputs:	The alert and feedback beep sound .
Pre-conditions:	Student Scan the ID card.
Action:	- First Student Scan her/his card on the device [NFC reader]. - after students scan their card. - iF he/she student in this class and arrives on appointment. - The System (Device Screen) will be shown" Successfully your attendance" and send alert on her/his account in the system (attend). - If he/she student in this class and arrives after 15M. - The System(Device Screen) will be shown "your late" and send a alert(absent).
Post-conditions:	If a basic flow is successfully, the information of student attendance status (Attend) update .
Side effect:	None

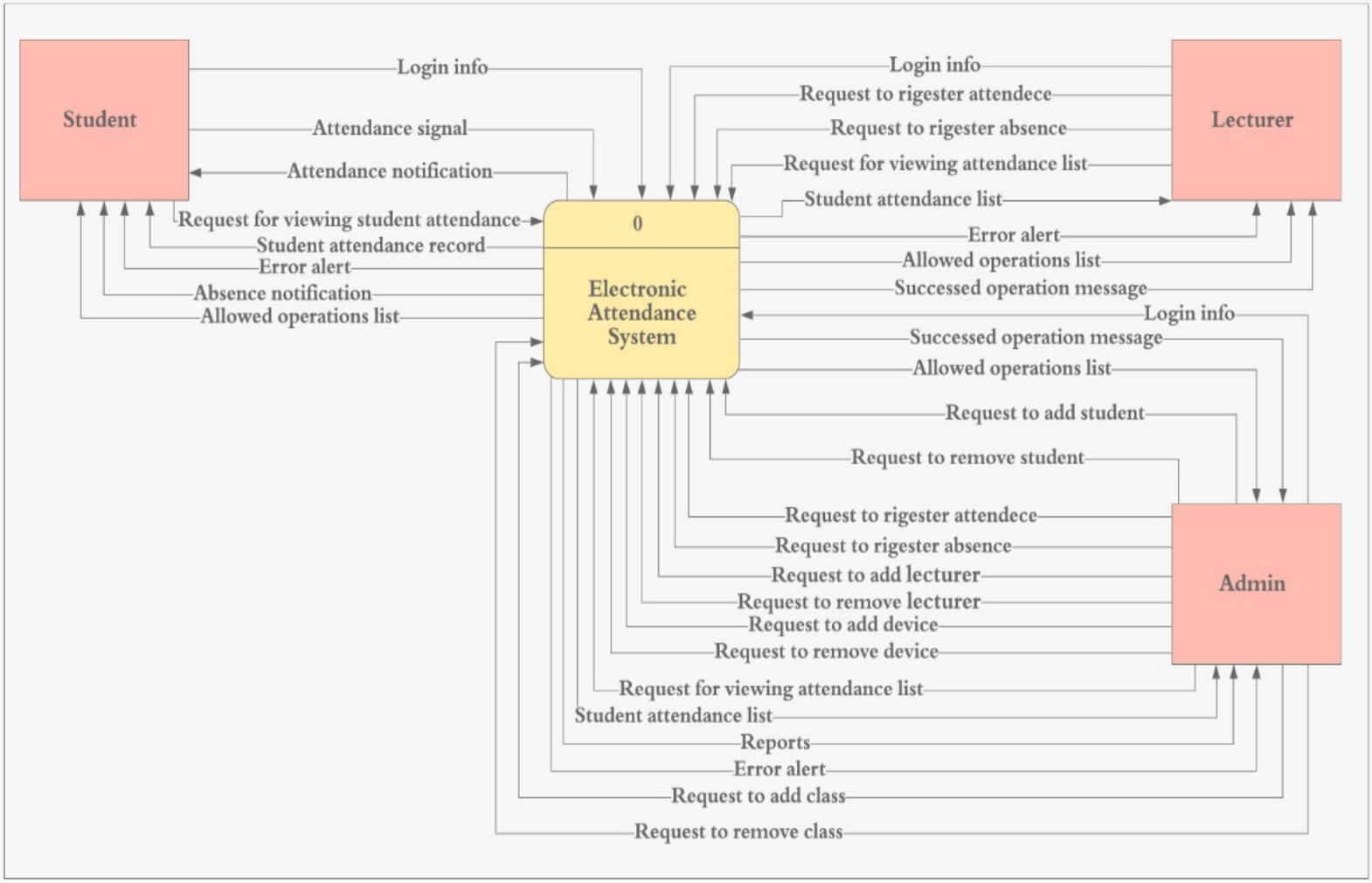
DFD LEVEL-0 DIAGRAM



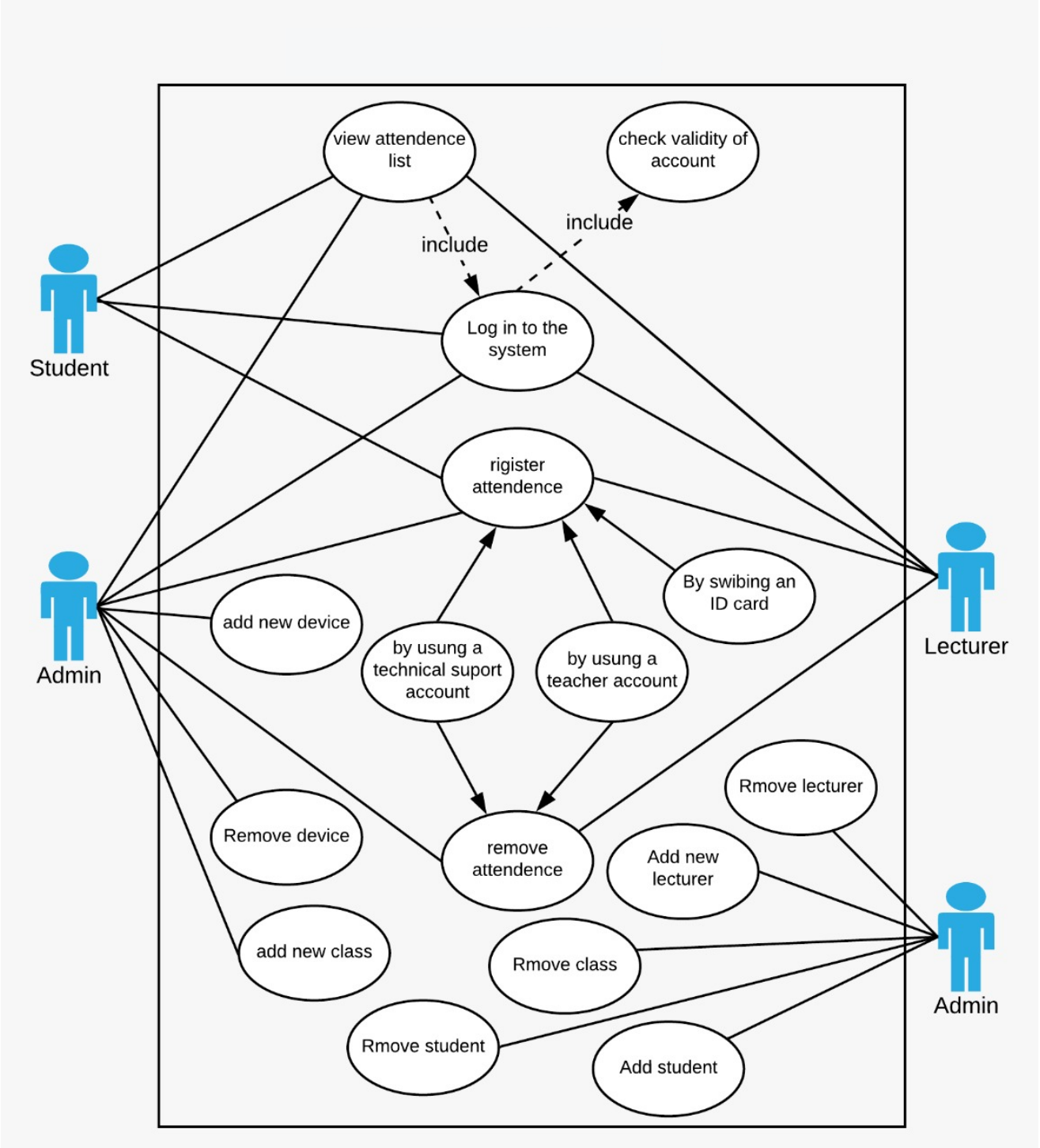
DFD LEVEL-1 DIAGRAM



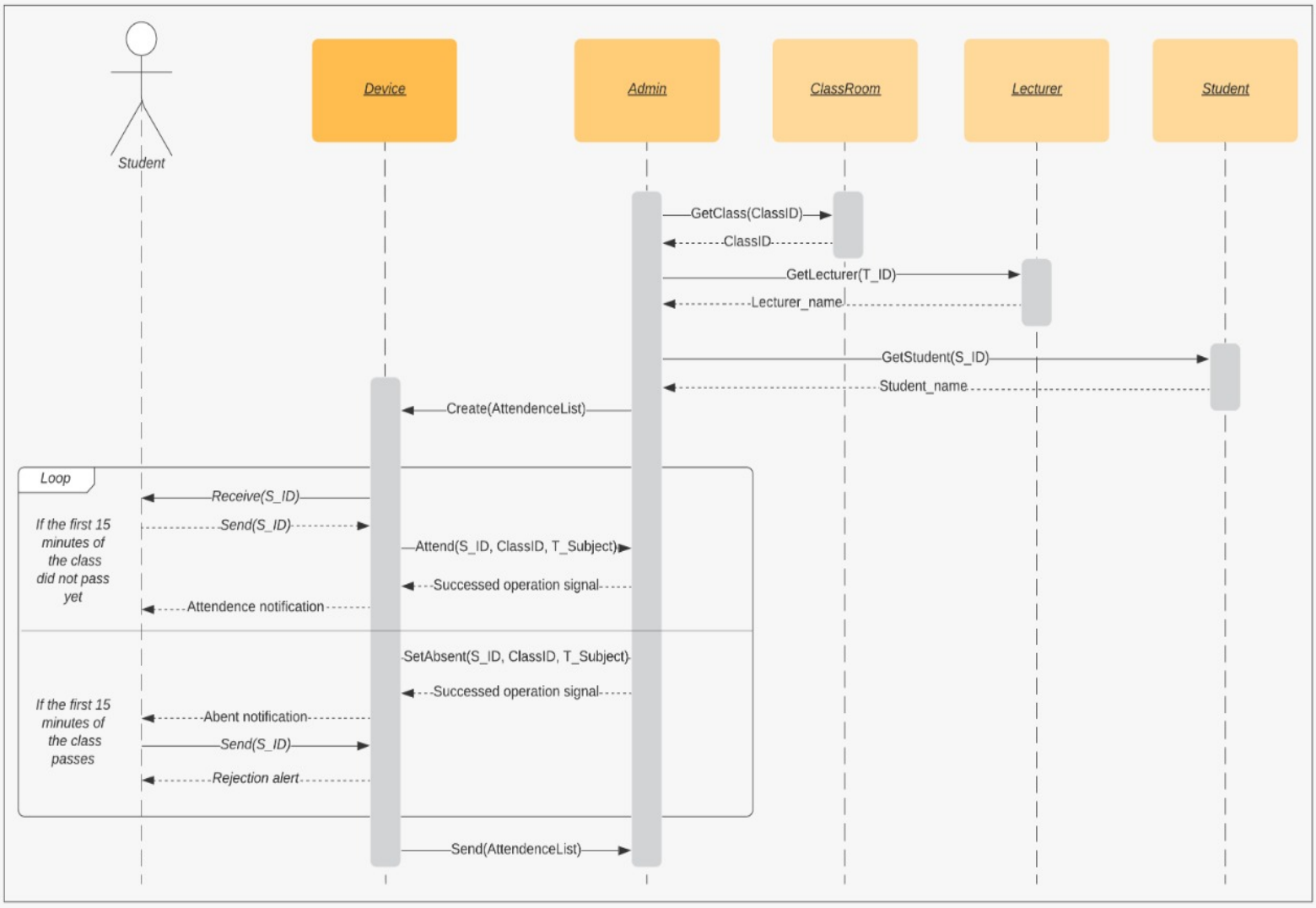
CINTEXT DIAGRAM



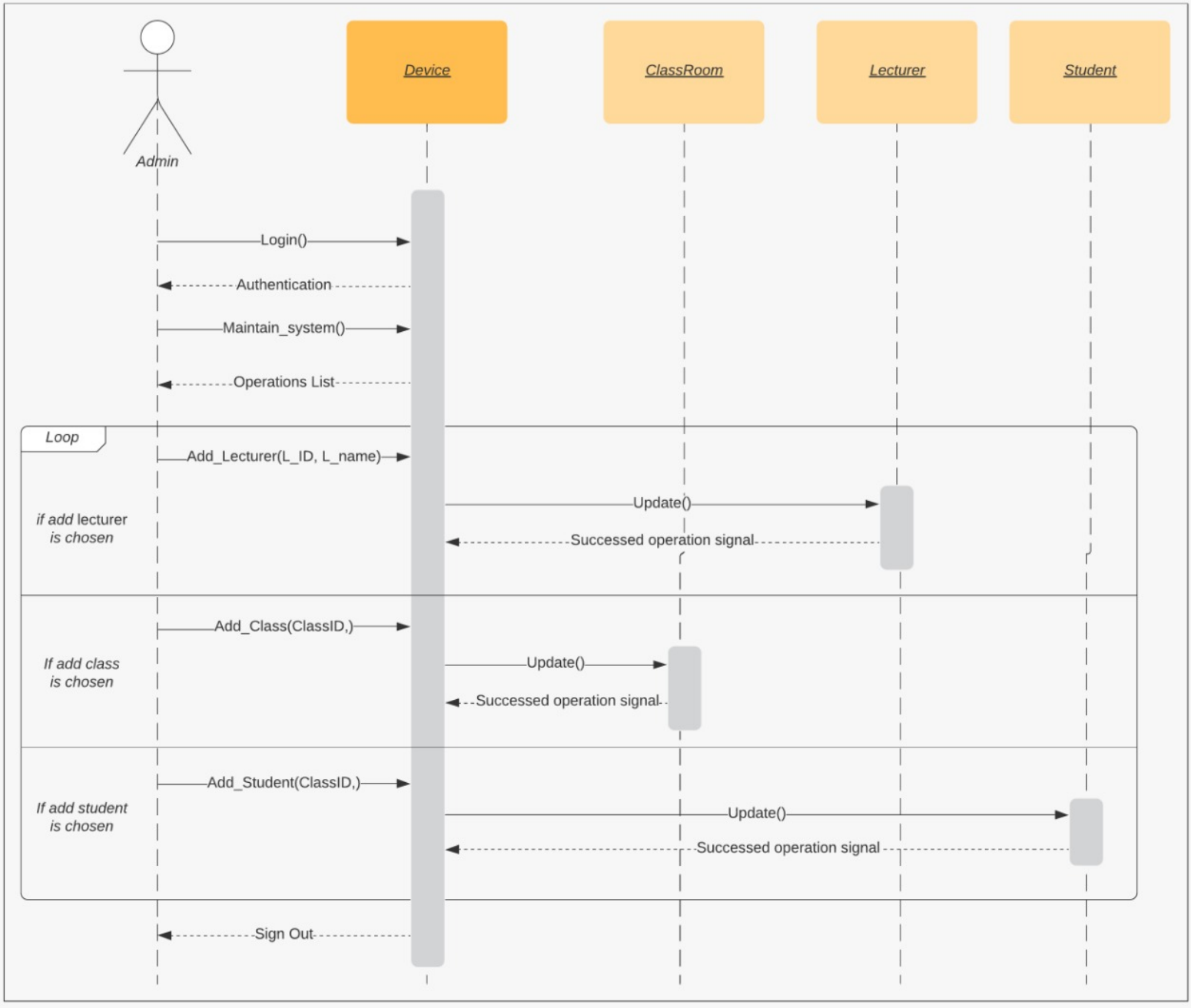
USE CASE DIAGRAM



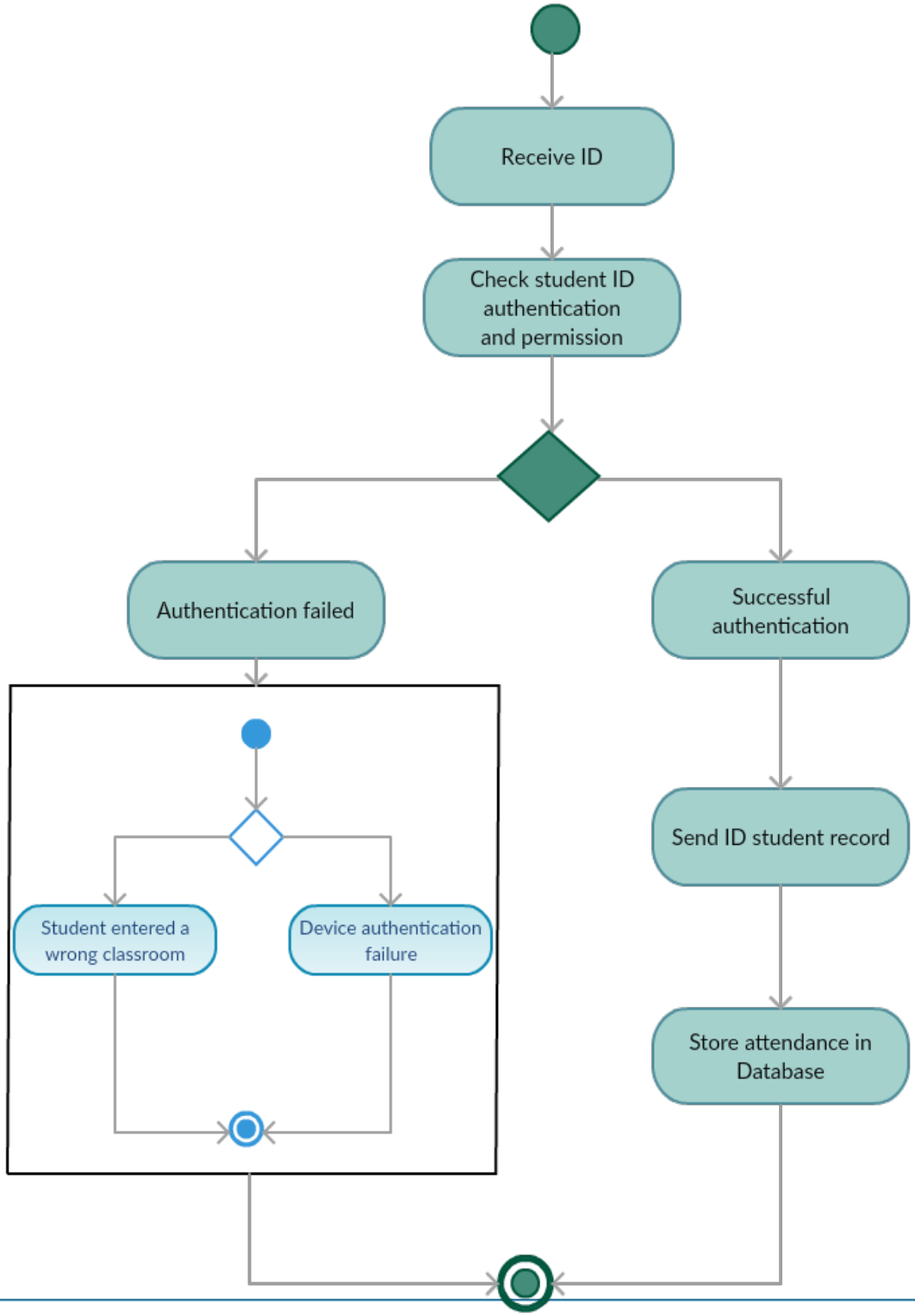
SEQUENCE DIAGRAM -1



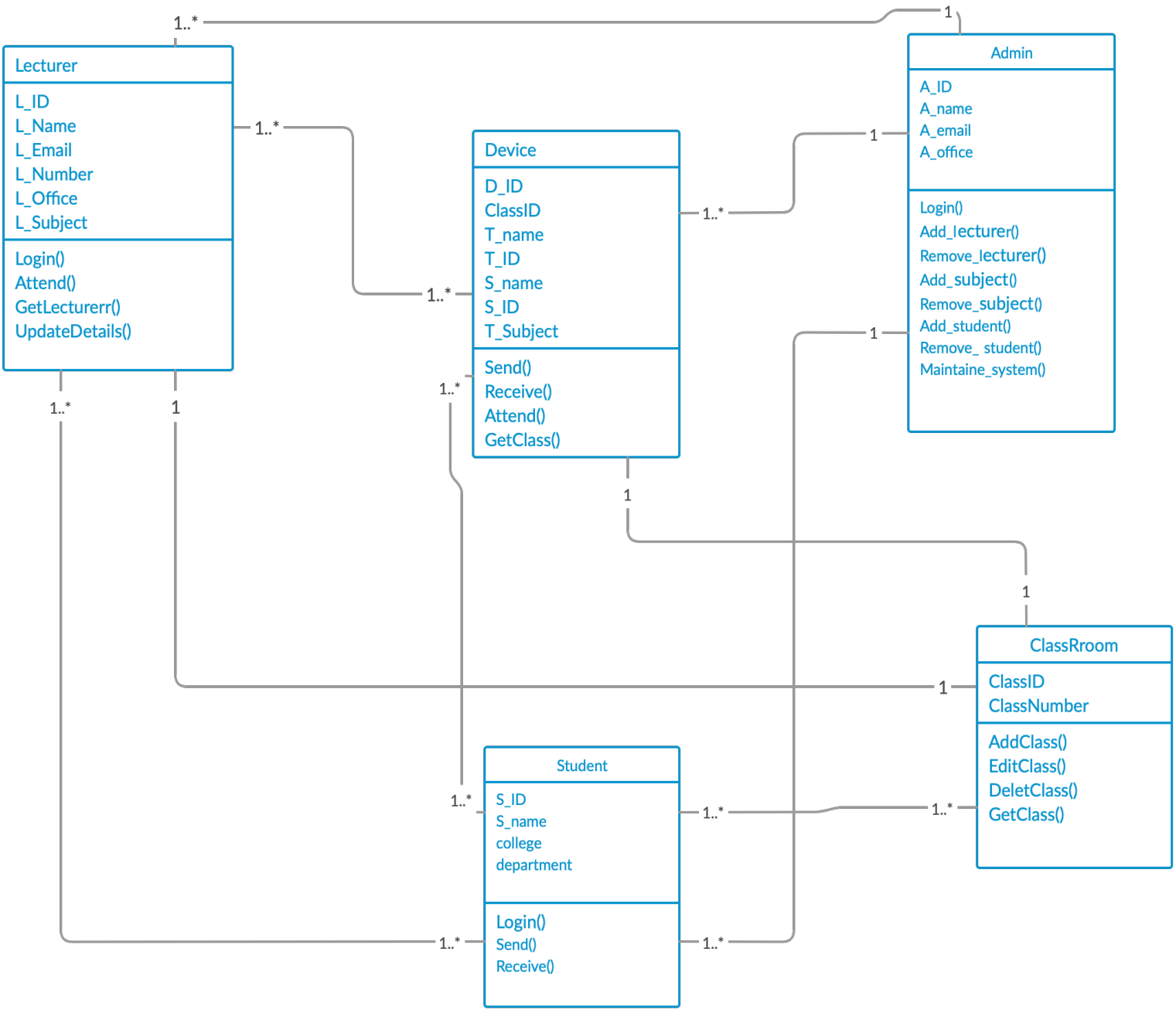
SEQUENCE DIAGRAM -2



ACTIVITY DIAGRAM



CLASS DIAGRAM



THE MODEL-VIEW-CONTROLLER(MVC) PATTERN