

Title: Facial recognition attendance system

Part A:

1. Introduction:

A facial recognition attendance system is to be created to upgrade the older version of icheckin system as a medium for marking the attendance of a student. A screen will be placed in front of each class where the student has to stand in front of the screen to allow the system to validate their attendance. If the student's face picture is uploaded into the database and the student belongs to that class, then the system will mark the student as present and proceed to the next student. If the system does not recognise the face of the student or the student does not belong in the classroom, then the system will return an error message based on the scenario and not mark the attendance of the student. The creation of this system allows the lecturer/teacher to keep track of student attendance more effectively as students have to be physically at the institution to be marked as present. This also prevents outsiders from sitting in the classroom although not authorized.

2. Project Objectives:

- ❖ This also prevents any unauthorized people from entering the class that they do not belong in.
- ❖ One of the objectives of this project is to create an easier way for attendance for students and for the lecturers of the specified classroom.
- ❖ Another objective of this project would be to ensure that the students are attending class on a regular basis and not taking the check in code from another place.
- ❖ A good attendance rate to class will definitely have an impact on the student grades and understanding of the subject which is another plus point

3. **Project Scope:**

This project will be done within a 37 day period while the remaining 14 days will be for checking purposes for last minute changes to requirements or software functionality. The table below shows the tasks to be completed alongside the starting date and the days required to complete them:

Task	Start Date	Days to Complete
Discuss and ask questions	23-May	1
Introduction	25-May	3
Project Objectives	25-May	3
Project Scope	25-May	3
Choose Software process model	26-May	2
Explain Software process model	26-May	2
Gather all requirements	30-May	6
Describe system functionalities	7-Jun	6
Design prototype	13-Jun	3
Create UML diagrams	16-Jun	8
Finalize project	27-Jun	14
Project deadline	11-Jul	1

Figure 1.1: Table of the tasks to complete alongside start date and days required

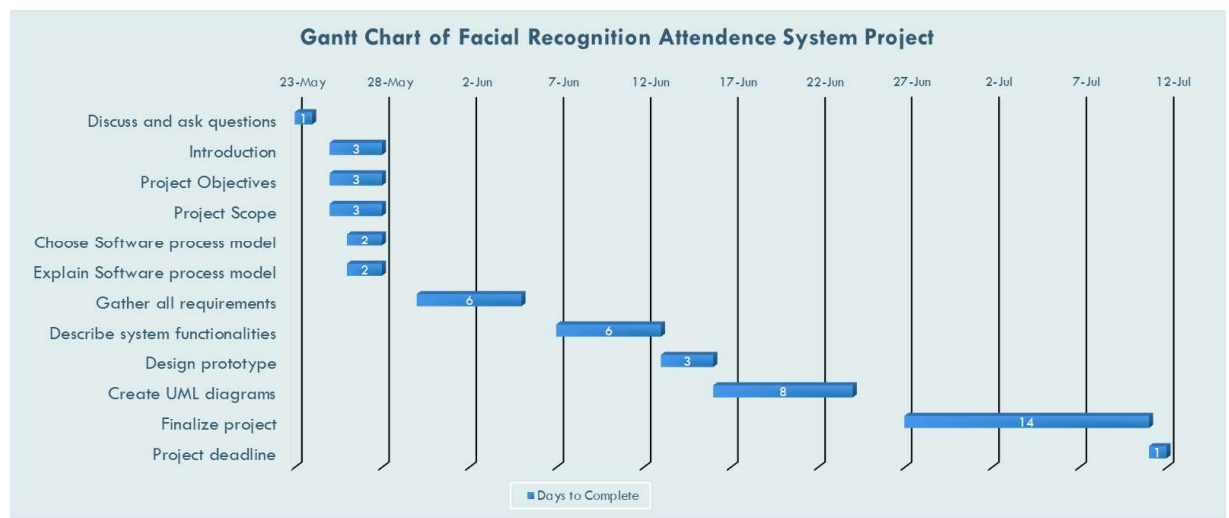


Figure 1.2: Gantt Chart of Facial Recognition attendance System Project

4. **Software Process Model:**

The software process model that was chosen for this project was Scrum, which is an Agile framework. The Scrum framework is based on continuous learning and adjustment to fluctuating factors

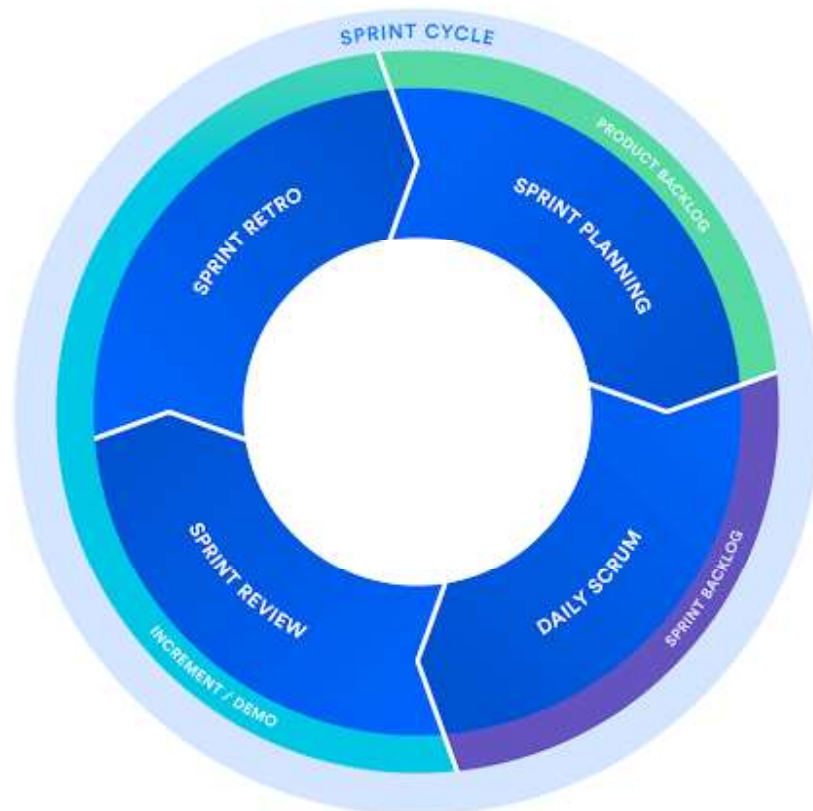


Figure 2.1: Scrum Framework

Explanation:

Scrum is centered around continuous improvement, which is a core principle of agile. There is always a misconception between Agile and Scrum that people think of it as the similar thing (Drumond). Scrum is a framework for workflow, but agile is a mindset. In the Scrum framework, there are scrum artifacts and scrum events or ceremonies. The artifacts are similar to a tool made to help solve the problem. There are three main artifacts in scrum and they are a product backlog, a sprint backlog, and an increment or sprint goal. (Drumond)

01. Scrum Artifacts:

- a. Product Backlog:
 - i. The product backlog is a list of tasks that must be completed or maintained. A good example is a collection of features, requirements, enhancements, and fixes that acts as the input of the sprint backlog. The requirements for this facial recognition attendance system are initially gathered by conducting interviews with the stakeholders such as students, lecturers and administrators. The requirements are necessary to create the main features of the system like face detection and so on. The Product backlog is usually maintained by the product owner
- b. Sprint Backlog:
 - i. The sprint backlog is the list of user stories or bug fixes chosen by the development team for implementation during the current sprint cycle (Drumond). Before each sprint, there will be a sprint planning meeting. In this case, the system will go through an implementation phase
- c. Increment:
 - i. The increment is basically the end product of the sprint or in other words the sprint goal (Drumond). Every project has a different milestone to show that the project has been done. In the facial recognition attendance system, the main objective is to get students to use Facial recognition to mark their attendance. The final product should be the Scanner and the system working together with it.

02. Scrum Ceremonies or Events

- a. Organize the backlog:
 - i. This part is managed by the product owner. The point of this part is to groom the backlog towards the product vision (Drumond) The product owner maintains this by using the feedback from the users and the development team to help prioritize and keep the list clean and ready to be worked with.
- b. Sprint Planning:
 - i. The Sprint Planning is basically a meeting to discuss all the important things to be done during the sprint (Drumond). This meeting is usually led by a scrum master. At the end of the meeting, every scrum member needs to be clear on what can be delivered in the sprint and how the increment can be delivered.
- c. Sprint:
 - i. The Sprint is the actual time when the scrum team works together to finish an increment (Drumond). The typical length of a sprint is two weeks. All the events from planning and retrospective happen during the sprint. Once the certain time interval for a sprint is established, it has to remain consistent throughout the development period. This helps the team learn from past experiences and apply that insight to future sprints.

- d. Daily Scrum:
 - i. A short meeting is done every morning to ensure the project is on the right track of development (Drumond). Some common questions asked during this phase would be:
 - 1. What did I do yesterday?
 - 2. What do I plan to do today?
 - 3. Are there any obstacles?
- e. Sprint Review:
 - i. This phase is where the increment will be tested and feedback will be given to improve the system (Drumond)..
- f. Sprint Retrospective:
 - i. This phase is where the team will lay out what went well and what did not go well. It will give the team some time to reflect on the mistakes and make sure they do not repeat it (Drumond).

03. Roles in Scrum:

- a. Scrum product Owner:
 - i. The product owner is in charge of building and managing the product backlog (Drumond)
 - ii. Closely partner with the business and the team to ensure everyone understands the system (Drumond)
 - iii. Give team clear guidance
 - iv. Decide when to ship the product (Drumond)
- b. Scrum Master:
 - i. Scrum master usually is a champion for scrum in their teams.
 - ii. They will usually teach other officials about scrum and can help optimize team performance. (Drumond)
 - iii. They are also responsible for scrum meetings and task allocation.
- c. Scrum Development Team:
 - i. Responsible for getting the job done.
 - ii. Each team member has strengths of their own and will focus on their strengths. (Drumond)
 - iii. There are usually around five to seven members.

The reasons for using Scrum in developing this Facial Recognition attendance system is because Scrum Framework is money efficient and fast paced in the development (Drumond). The framework is money efficient as the product is done in increments and there will be more room for change which eliminates the part of starting from the first part. It is fast-paced as the facial recognition system will have many versions which will be developed in a matter of weeks. This allows the developers to create the final product of the facial recognition system faster. One more reason why Scrum was chosen for this project is that it helps simplify the project to subparts which allows the project to be completed more effectively. Moreover, another reason for using Scrum framework for the facial recognition attendance system is that it relies on feedback which allows

the production of better increments which can be discussed during the sprints (Drumond). This allows time to be saved for the completion of the project.

Part B:

Requirements Plan:

Initially, the attendance system is based on a check in code that is generated by the lecturer and given to the students during the class. The main stakeholders in that system were the Lecturer, Student and the attendance administrator. The same stakeholders can be identified in this new system as the main idea is still intact which is to mark attendance. Other stakeholders that can be added here are software developers and project managers. Below are the stakeholders and their roles utilizing the system:

- I. Lecturer:(Navinder, Wei shuen, Naveen, Ee Hui)
 - A. The lecturer can be a stakeholder as they will be using the system to monitor the attendance of the course they are teaching.
 - B. The lecturer in this system will not be checking in the students but will be able to view the student database in the system.
 - C. In special cases where the system did not catch the face of the student or the system has timed out, the lecturer will have to verify that student by viewing the database, and check them in manually.
 - D. In a case where the person is not a student, the lecturer will not allow them in as the system does not have their details.
 - E. The lecturer is able to give a couple of requirements of the system to aid in the development process.
- II. Student:(Navinder, Wei shuen, Naveen, Ee Hui)
 - A. The students will be a stakeholder as well as they will be using the facial recognition attendance system.
 - B. Their face picture will be uploaded to the database and used for matching their face during the attendance process.
 - C. The students will be able to suggest some requirements on the student details that will be used to identify the student more accurately.
 - D. In cases where their face was not detected, the student can be identified with their student ID for verification so that the lecturer may mark their attendance.
- III. Administrator:(Navinder, Wei Shuen, Naveen, Lim Ee Hui)
 - A. The Admin is responsible for registering, removing and editing the student database that will be stored in the system.
 - B. They will also be able to do the same with the lecturers.
 - C. They will have access to all the information required for the system to function, mainly the face of every student and the course that they are studying.
 - D. The Admin can be a stakeholder as they were using the earlier check in system as well and would have some recommendations for improvements of the system.

What are some interview questions you want to ask the stakeholders?

01. Lecturer: (Navinder, Wei shuen, Naveen, Ee Hui)

- a. On a scale of 1 to 10, rate the check-in system that was used to mark the attendance of the students.

	1	2	3	4	5	6	7	8	9	10	
Very Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Good

- b. In your opinion, If the Check-In system was replaced with a facial recognition system, will that make the attendance easier to track?
- Yes
 - No
- c. In your opinion, If the Check-In system was replaced with a facial recognition system to mark attendance, what are some suggestions to make the system easier to use?
-
-
- d. In your opinion, what are some drawbacks if the system is implemented to mark attendance?
-
-
- e. In your opinion, will the implementation of this system help increase the total attendance of the class?
- Yes
 - No
- f. In your opinion, will the implementation of the system help increase the student engagement to the class?
- Yes
 - No

02. Student (Navinder, Wei shuen, Naveen, Ee Hui)

- a. On a scale of 1 to 10, rate the check-in system that is used to mark your attendance

	1	2	3	4	5	6	7	8	9	10	
Very Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Good

- b. In your opinion, as a student, if the Check-In system was replaced with a facial recognition system, would that make the attendance taking system easier?

- Yes
- No

- c. In your opinion, If the Check-In system was replaced with a facial recognition system to mark attendance, what are some suggestions to make the system easier to use?

- d. As a student, are you okay with uploading your face picture into the system for verification purposes of the facial recognition attendance system

- Yes
- No
- Maybe

- e. As a student, what are some drawbacks that you might face when using the Facial Recognition system to mark your attendance?

03. Administrator: (Navinder, Wei shuen, Naveen, Ee Hui)

- a. On a scale of 1 to 10, rate the check-in system that is used to monitor the student attendance and the ease of using the system?

1 2 3 4 5 6 7 8 9 10

Very Bad ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very Good

b. As an admin, what are the drawbacks of the check-in system?

c. In your opinion, If the Check-In system was replaced with a facial recognition system to mark attendance, what are some suggestions to make the system easier to use?

d. In your opinion, besides the face of the student, is there other information that can be used to identify the student?

System Functionality:

The requirements of this system can be divided into two parts which are functional requirements and non-functional requirements. Below is a more detailed explanation of each of the requirements:

1. Functional Requirements:

- 1.1. Students are able to stand in front of the display screen to mark their attendance. (Navinder)

Students must be within 2 meters in front of the scanner for it to properly scan their faces. If they are out of the range, the scanner will just ignore the face and wait until a proper face can be found.

- 1.2. Students are able to login to the system and view their attendance (Navinder)

Students will be able to access the web portal to login to their personal student account. After this, students will be able to request for an attendance report on the website. The website will connect to the database and generate the report accordingly.

- 1.3. Students are able to login and update face picture in the system (Navinder)

This feature is mainly for new students. New students will upload their faces to the system so the scanner will be able to match the scanned face to the face in the database. It is also for students who suddenly had changes to their appearances. Students can update their facial picture to the system if they feel like the scanner is having trouble scanning their face.

- 1.4. Lecturers are able to log in to the system and view the student attendance (Navinder)

Lecturers may need to log in to the system and check the student attendance. Lecturers can view the attendance of every student that belongs to the class that the lecturers teach.

- 1.5. Lecturers are able to log in to system to manually check in a student (Navinder)

In the event where the scanner fails, there should be a backup plan. Lecturers will be able to check in students manually

- 1.6. Lecturers are able to ban a Student from final exam if they have more than 5 absences (Navinder)

It is common practice for universities to bar a student from final exams if they have too many absences. Lecturers will have this option available to them the moment the system detects 5 absences from a specific student. However, it does not mean a student will automatically be banned when they have 5 absences, the lecturer must manually press a button. This is so that the student has space to appeal.

- 1.7. Lecturer has to activate the scanner by logging into the classroom computer (Wei Shuen)

Lecturers can only activate the scanner using the computers in the classroom. The computers will use their LAN to activate the specific scanner outside the classroom. This means that lecturers will not be able to activate the scanner from their homes.

- 1.8. Scanner should be able to scan the student's face within 2 seconds.(Wei Shuen)

Students do not want to stand outside the blazing hot sun for a long time, so to prevent a long queue, the scanner should respond fast.

- 1.9. Scanner should be able to tell a human face and a photo apart. (Wei Shuen)

Students should not be able to check in for their friends by showing a photo. The physical face must be there and the scanner should be able to tell the difference.

2. Non-Functional Requirements:

- 2.1. The system should have a large space to store all the student face pictures alongside their details. (Space requirement). Example: by using the Repository Architecture (Navinder, Ee Hui)

By using the repository architecture, space can be expanded in the future if needed. Since it is impossible to calculate ahead of time how many students will enroll into the university, it is better to make sure that space can be expanded in the future to accommodate changes if needed.

- 2.2. The lecturers are given the privilege to check in a student manually in a case of a system failure (Dependability Requirement) (Navinder, Ee Hui)

There is a chance that the scanner can fail. In that case, the lecturer must decide whether the student is on time or not and check the student in manually.

- 2.3. The system should be secure so the student details and face pictures are not leaked to unauthorized parties. (Security Requirements) (Navinder, Ee Hui)

Systems must conform to security standards and have some amount of encryption to protect against network and database attacks.

According to the Personal Data Protection Act (PDPA) 2010, the party that holds the personal data of an individual is responsible to protect that data from leaking to other third parties for unauthorized uses.

- 2.4. Before the development of the system, ethical and regulatory requirements should be considered first to ensure the functionality of the system is not unethical or against the law. (Regulatory Requirements, Ethical Requirements). (Navinder, Ee Hui)

The face pictures that are taken are solely used for the system and will not be shared to third party organizations. This is to prevent a lawsuit from arising in the future. Students should understand this fact and the website will prompt the terms and conditions before the students can update their face

- 2.5. There will be one scanner per classroom. This is for economical reasons. (Naveen, Wei Shuen)

If there are more than one scanner per classroom, it will not be cost-efficient as the overall cost for scanners will exponentially increase if more scanners

are added. Furthermore, there is no real use for more than one scanner outside the classroom.

- 2.6. Scanner will only work at the start of the class (30 minute timeframe). Within this 30 minutes time frame, students are able to arrive to class and get their face scanned and get their attendance recorded. (Naveen, Wei Shuen)

The scanner will automatically shut down after 30 minutes and students who did not scan before the timeframe will automatically be marked absent.

- 2.7. After the initial 10 minutes, students will be marked late. (Naveen)

By policies of the school, any student who arrives 10 minutes after the class start time is deemed late so in the face scanning system, it will be implemented.

- 2.8. Scanner will turn off after 30 minutes. This serves two purposes. One is for cost-savings and another is learning practicality. (Naveen)

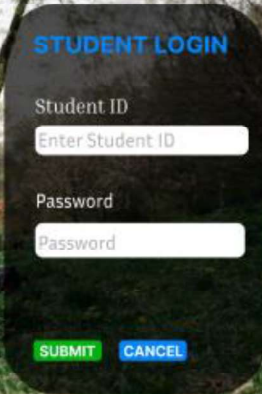
Firstly, if the student were to arrive more than 30 mins late, there is almost no point in joining the class as they have already missed a big portion of the lesson time. Secondly, having the scanner on for 30 minutes after the class start time will drain energy for a time period where it will not be frequently used and this is not efficient.

Prototype Design: (Group)

Link to Prototype: <https://www.figma.com/file/lvWzkURusQ0d0uT3hwZ78R/SE-Final-Project?node-id=0%3A1>

A. Student Login:

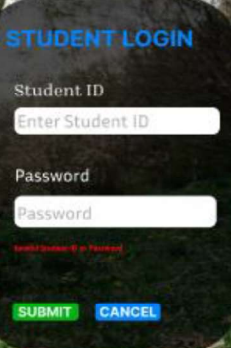
FACIAL RECOGNITION ATTENDANCE SYSTEM



The image shows a login form titled "STUDENT LOGIN" overlaid on a background photo of three students sitting on the grass in a park. The form has two text input fields: "Student ID" with a placeholder "Enter Student ID" and "Password" with a placeholder "Password". Below the fields are two buttons: "SUBMIT" (green) and "CANCEL" (blue).

The student Login Page consists of two text fields where one is to input the student ID and the other is to input the password.

FACIAL RECOGNITION ATTENDANCE SYSTEM



The image shows the same login form as above, but with an error message displayed below the password field: "Invalid Student ID or Password" in red text. The "SUBMIT" and "CANCEL" buttons are still present at the bottom.

This page shows an error message when the student inputs a wrong student ID or password.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Profile](#)[Attendance](#)[Edit Face](#)[Logout](#)

John Chan



Student ID	11111111
IC/Passport Number	01111121221
Student Card Number	223211211
Gender	Male
Race	Unknown
Nationality	Unknown
Marital Status	Single
Date of Birth	08-8-1998
Mobile Number	01198720976

This page shows the student details

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Profile](#)[Attendance](#)[Edit Face](#)[Logout](#)

Absence

Subject	Group	Date	Session	Reason
Computer Mathematics	5	7/7/2022	8.00 A.M.	-
Software Engineering	2	21/5/2022	10.00 A.M.	-
Computer Mathematics	5	7/7/2022	8.00 A.M.	-

ATTENDANCE HISTORY

[PRINT](#)

Subject Code	Session	Check-in Date
PRG2104	06-07-2020 12:00	06-07-2020 12:10
PRG2104	05-07-2020 16:00	05-07-2020 16:05
CSC2104	04-07-2020 10:00	04-07-2020 10:06
SEG2202	01-07-2022 17:30	01-07-2022 17:35
CSC2104	01-07-2020 16:00	01-07-2020 16:10
ENG2042	30-06-2022 12:00	30-06-2022 12:03
PRG2104	29-06-2022 16:00	29-06-2022 16:01
SEG2202	28-06-2020 10:00	28-06-2020 10:02
CSC2103	23-06-2020 15:30	23-06-2020 15:36
ENG2042	22-06-2020 10:00	22-06-2020 10:09
PRG2104	17-06-2020 8:00	17-06-2020 8:02

This page shows the attendance record for the student where there they show the student absence and their history of attendance. The student is also able to print the history of their attendance.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Profile](#)[Attendance](#)[Edit Face](#)[Logout](#)

Upload your photo

For FR to work, we need something from you: a photo of your Face.
A higher quality photo will increase the chance of FR correctly recognising you.

IMPORTANT

There are many ways to do this, but FR requires your selfie to adhere to some guidelines:

- No hats, masks or sunglasses. Make sure all your facial features can be seen clearly in the photo (eyes, nose, mouth, ears and etc...).
- Photo should be in PORTRAIT mode, 4:3 ratio.
- Lighting must be sufficient, avoid creating shadows on your face.
- Plain background, avoid 'noisy' backgrounds with complicated patterns.
- Photo should be clear and sharp, no blurry photos.
- Your face must be the main subject of the photo, like a passport photo.

Your Photo

NOTICE

Your photo has been processed successfully.
You can now use Facial Recognition for attendance marking.

NOTE: If the FR is slow at recognising you, you can always upload another clearer photo of yourself.



Submit photo

Choose File No file chosen

Please select a photo of yourself following the guidelines provided

Note: Photo will be used for FR purposes only.

Upload Photo


Example



This page is for the student to view their face image that is being used by the Facial Recognition attendance system and allows them to upload a new image of their face as well.

B. Lecturer Login:

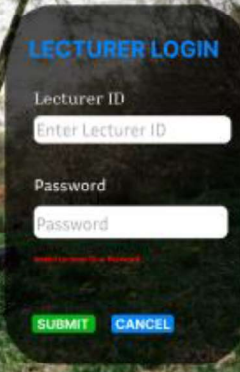
FACIAL RECOGNITION ATTENDANCE SYSTEM



The image shows a login form titled "LECTURER LOGIN" overlaid on a background photo of three students sitting on grass. The form has two input fields: "Lecturer ID" with the placeholder text "Enter Lecturer ID" and "Password" with the placeholder text "Password". Below the fields are two buttons: "SUBMIT" (green) and "CANCEL" (blue).

This page is the login page on the Lecturers end

FACIAL RECOGNITION ATTENDANCE SYSTEM



The image shows the same login form as above, but with a red error message displayed below the password field: "Invalid Username/Password". The "SUBMIT" and "CANCEL" buttons are still present at the bottom.

This page is the error that is displayed when the lecturer inputs the wrong ID or password.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Lecturer Profile Mark Attendance Activate Scanner

Logout

DR. Char Mills Paul



Lecturer ID	34728910
IC/Passport Number	01111121221
Lecturer Card no	453671921
Gender	Male
Race	Unknown
Nationality	Unknown
Marital Status	Single
Date of Birth	08-8-1998
Mobile Number	01198720976

This page shows the details of the lecturer

FACIAL RECOGNITION ATTENDANCE SYSTEM

Lecturer Profile Mark Attendance Activate Scanner

Logout

Subject Code: PRG2014 Date: 6/4/2022

Session: 8.00 A.M.

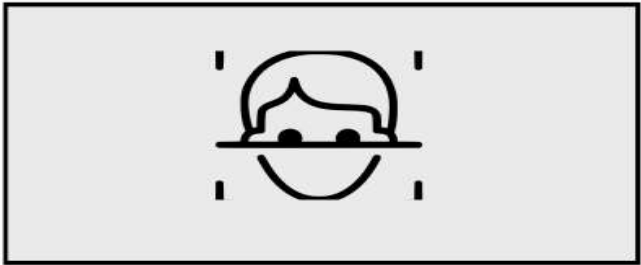
NOTE:
● Reverse Attendance
● Mark Attendance

Checked-in	Not Checked-in
Daniel Brown	Alexander the Great
Joseph Yang	Brian Pitt
Patrick Wilkins	SB Wilkins
Christina Park	Shaftin Anant
Matthew Casey	
Braden McKee	
Eric Bennett	
Janeth Lawson	
Corey Lin	
Jackie Morris	
Timothy Jones	
Angel Nelson	
Maria Barnes	
Benjamin Nelson	
Patricia Myers	

This page is for the lecturer to mark the attendance of the student manually when their face was not captured or for special cases.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Lecturer Profile Mark Attendance **Activate Scanner** Logout



Activate Scanner

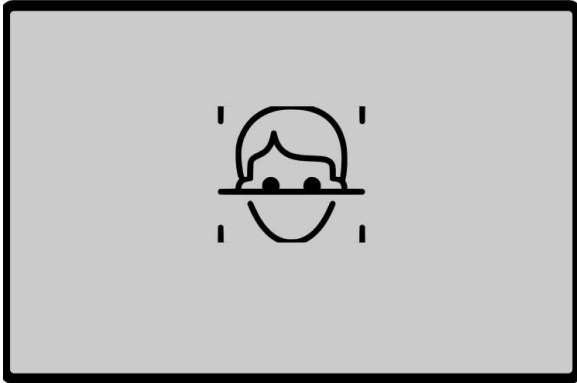
TIMER: 30:00

Note: The Scanner is only on for 30 minutes from the time it was activated.

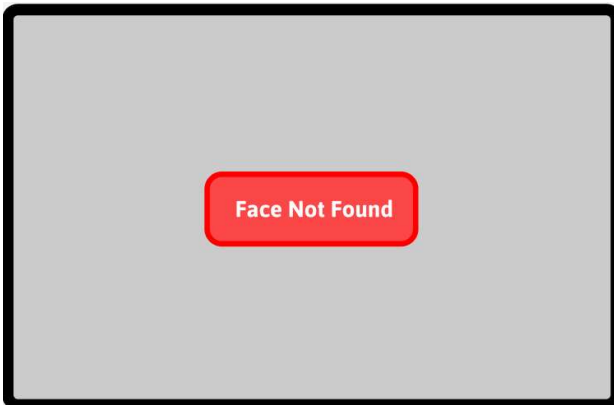
Time Activated	Time Deactivated
6/7/2022 13:00	6/7/2022 13:30
5/7/2022 08:00	5/7/2022 08:30
4/7/2022 10:00	4/7/2022 10:30

This page displays the scanner that is connected to the main scanner where there is a timer as the scanner is only active for 30 minutes.

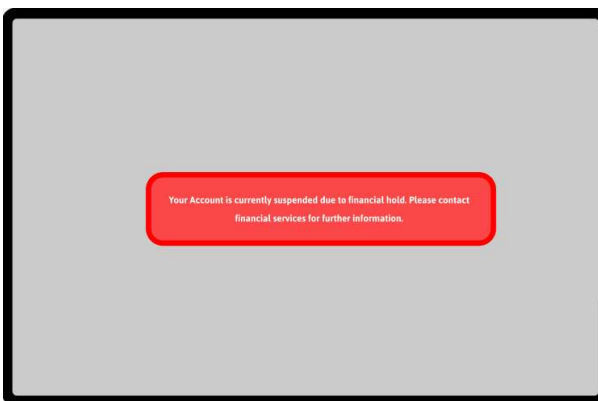
Scanner:



This is the Scanner Page which is the display in front of the classroom



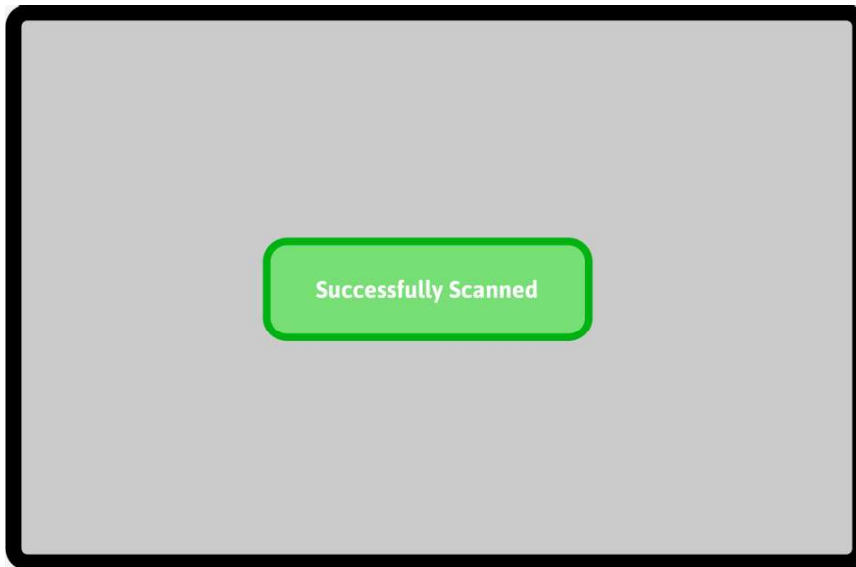
This is an example of the error where the student face is not found in the database



This is an error showing the student is under financial hold




This error is showing that the scanner failed to capture student face



This shows the scanner successfully scanned student face and marked their attendance

C. Admin Login:

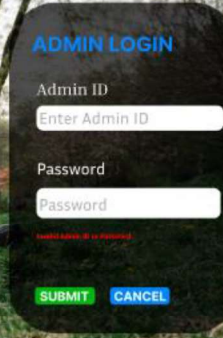
FACIAL RECOGNITION ATTENDANCE SYSTEM



The image shows a web application interface for an admin login. The background is a photograph of three people sitting on a grassy lawn in a park. Overlaid on the right side is a dark, rounded rectangular login form. At the top of the form, the text 'ADMIN LOGIN' is written in blue. Below this, there are two input fields: 'Admin ID' with a placeholder 'Enter Admin ID' and 'Password' with a placeholder 'Password'. At the bottom of the form are two buttons: a green 'SUBMIT' button and a blue 'CANCEL' button.

This page is the admin login page which asks them to input their ID and password.

FACIAL RECOGNITION ATTENDANCE SYSTEM



This image shows the same admin login form as the previous one, but with an error message displayed. The error message, 'Invalid Admin ID or Password', is written in red text and is positioned below the password input field. The 'SUBMIT' and 'CANCEL' buttons remain at the bottom of the form.

This is an error that is shown when the admin puts in a wrong ID or password.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Admin Profile](#)[Student Database](#)[Lecturer Database](#)[Logout](#)

John Cena



Admin ID	10101010
IC/Passport Number	9999999999
Lecturer Card no	453257910
Gender	Male
Race	Caucasian
Nationality	North American
Marital Status	Married
Date of Birth	08-8-1970
Mobile Number	01111121223

After logging in, the admin will be taken to this page where they will be shown Their personnel details.

Student Database:

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Enter Student Name/ID

SEARCH

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Barron
11111113	Sheila Perry
11111114	Katie Wright
11111115	Laurie Prince
11111116	Nicholas Poland
11111117	Brittany Garza
11111118	Jay Rodgers
11111119	Darrell Sanders
11111120	Hailey Pham
11111121	Julie Delacruz
11111122	Mark Hoffman
11111123	Devon Duncan
11111124	Christopher Thornton
11111125	Leslie Vincent

GENERATE ATTENDANCE REPORT

NEW

EDIT

DELETE

This page shows the student database which allows a few actions That will be explained below.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Grade Student Name / ID

SEARCH

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Barron
11111113	Shella Perry
11111114	Katie Wright
11111115	Laurie Prince
11111116	Nicholas Pollard
11111117	Brittany Garza
11111118	Jay Rodgers
11111119	Daniel Sanders
11111120	Haley Pham
11111121	Julie Delacruz
11111122	Mark Hoffman
11111123	Devon Duncan
11111124	Christopher Thornton
11111125	Leslie Vincent

GENERATE ATTENDANCE REPORT

NEW

EDIT

DELETE

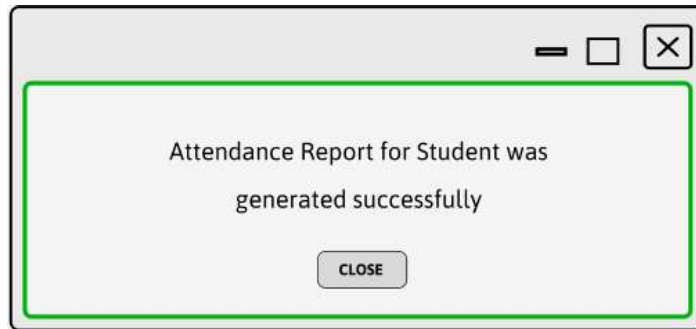
The first action that can be done is to generate an attendance report. First, The admin will click the student ID or name.

FACIAL RECOGNITION ATTENDANCE SYSTEM

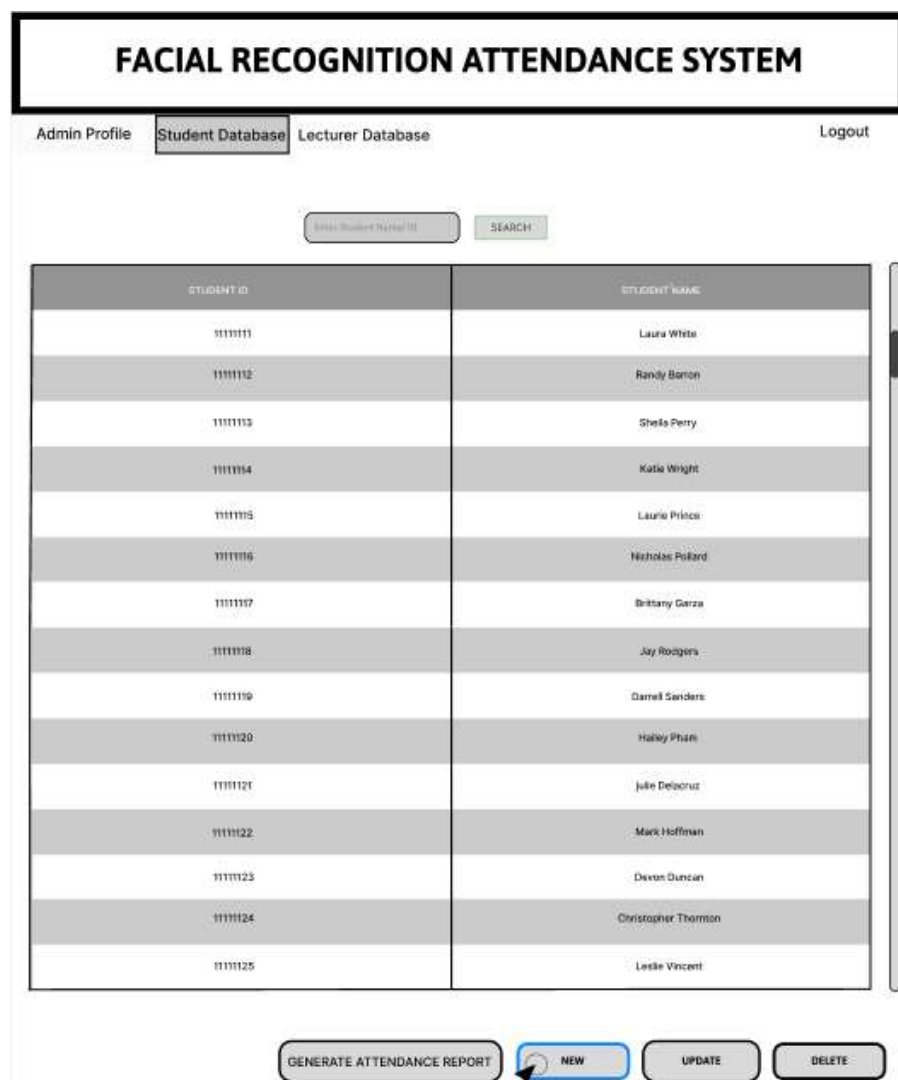
[Admin Profile](#)[Student Database](#)[Lecturer Database](#)[Logout](#)

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Barnes
11111113	Shella Perry
11111114	Katie Wright
11111115	Laurie Prince
11111116	Nicholas Probert
11111117	Brittany Garza
11111118	Jay Rodgers
11111119	Danell Sanders
11111120	Haley Pham
11111121	Jake Delacruz
11111122	Mark Hoffman
11111123	Dwain Duncan
11111124	Christopher Thornton
11111125	Leslie Vincent

Then the admin will click the generate attendance report button.



Once it is generated, the system will show this message.



The second action that can be done is to create new student details. After clicking the new button at the bottom, a pop up will open.

ADD NEW STUDENT DETAILS

Student Name

Student ID

Phone Number

Address

Password

CREATE

CANCEL

This pop up will allow the admin to create new student

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Enter Student's Name/ID

SEARCH

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Barron
11111113	Shella Perry
11111114	Karla Wright
11111115	Laurie Prince
11111116	Nicholas Ireland
11111117	Brittany Gorza
11111118	Jay Rodgers
11111119	Daniel Sanders
11111120	Hailey Pham
11111121	Julie Delacruz
11111122	Mark Hoffman
11111123	Devon Duncan
11111124	Christopher Thumton
11111125	Leslie Vincent

GENERATE ATTENDANCE REPORT

NEW

EDIT

DELETE

The third action that can be done is to edit the student record. The Admin will click the student ID or Name.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Enter Student Name/ID

SEARCH

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Ramon
11111113	Shella Perry
11111114	Kade Wright
11111115	Laurie Ponce
11111116	Nicholas Polard
11111117	Brittany Garza
11111118	Jay Rodgers
11111119	Danell Sanders
11111120	Hailey Pham
11111121	Julia Detacruz
11111122	Mark Hoffman
11111123	Devon Duccan
11111124	Christopher Thornton
11111125	Leslie Vincent

GENERATE ATTENDANCE REPORT

NEW

EDIT

DELETE

Then, the admin will click the edit button at the bottom.

UPDATE STUDENT DETAILS

Student Name

Phone Number

Address

Password

UPDATE CANCEL

This pop up will open where the admin can edit the Student details and press the update button once done.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Enter Student Name/ID

SEARCH

STUDENT ID	STUDENT NAME
11111111	Laura White
11111112	Randy Barron
11111113	Shelia Perry
11111114	Katie Wright
11111115	Laure Prince
11111116	Nicholas Poland
11111117	Brittany Garza
11111118	Jay Rodgers
11111119	Darrell Sanders
11111120	Haley Pham
11111121	Julia Delacruz
11111122	Mark Hoffman
11111123	Devon Duncan
11111124	Christopher Thornton
11111125	Leslie Vincent

GENERATE ATTENDANCE REPORT

NEW

EDIT

DELETE

The fourth action that can be done is to delete the student record. The Admin will click the student ID and then click the delete button.

DELETE STUDENT DETAILS

Are you sure you want to delete the student record?

DELETE

CANCEL

This pop up will open and they will decide whether to delete or cancel.

Lecturer Database:

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Enter Lecturer Name/ID

SEARCH

LECTURER ID	LECTURER NAME
31111111	Daniel Brown
31111112	Joseph Yang
31111113	Patrick Wilkins
31111114	Christina Park
31111115	Matthew Casey
31111116	Kristen McKee
31111117	Eric Bennett
31111118	Jacob Lawson
31111119	Cindy Lin
31111120	Janice Morris
31111121	Timothy Jones
31111122	Angel Nelson
31111123	Maria Barnes
31111124	Benjamin Nichols
31111125	Patricia Myers

NEW

EDIT

DELETE

This page is the lecturer database where 3 actions can be done. First is to Create new Lecturer details. The admin will click the new button.



A dialog box titled "Add New Lecturer" with standard window controls (minimize, maximize, close) in the top right corner. The dialog contains five input fields, each with a label to its left: "Lecturer Name", "Lecturer ID", "Phone Number", "Address", and "Password". At the bottom right of the dialog are two buttons: "CREATE" and "CANCEL".

Field Label	Input Type
Lecturer Name	Text
Lecturer ID	Text
Phone Number	Text
Address	Text
Password	Text

Buttons: CREATE, CANCEL

This pop up will open where the admin can enter the details of the lecturer and click create.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Admin Profile](#)[Student Database](#)[Lecturer Database](#)[Logout](#)

LECTURER ID	LECTURER NAME
31111101	Daniel Brown
31111102	Joseph Yang
31111103	Patrick Wilkins
31111104	Christina Park
31111105	Matthew Casey
31111106	Kristen McKee
31111107	Eric Bennett
31111108	Jacob Lawson
31111109	Cindy Lin
31111120	Janice Morris
31111121	Timothy Jones
31111122	Angel Nelson
31111123	Maria Barnes
31111124	Benjamin Nichols
31111125	Patricia Myers

The next action is to edit lecturer details. First the admin will click the Lecturer ID or name.

FACIAL RECOGNITION ATTENDANCE SYSTEM

Admin Profile

Student Database

Lecturer Database

Logout

Error Lecturer Name ID

SEARCH

LECTURER ID	LECTURER NAME
31111111	Daniel Brown
31111112	Joseph Yang
31111113	Patrick Wilkins
31111114	Christina Park
31111115	Matthew Cossey
31111116	Kristen McKee
31111117	Eric Bennett
31111118	Jacob Lawson
31111119	Cindy Lin
31111120	Janice Morris
31111121	Timothy Jones
31111122	Angel Nelson
31111123	Marla Barnes
31111124	Benjamin Nichols
31111125	Patricia Myers

NEW

EDIT

DELETE

Then they will click the edit button at the bottom.

UPDATE LECTURER DETAILS

Lecturer Name

Phone Number

Address

Password

UPDATE CANCEL

This pop up will open to allow the admin to edit the lecturer details.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Admin Profile](#)[Student Database](#)[Lecturer Database](#)[Logout](#)

LECTURER ID	LECTURER NAME
31111111	Daniel Brown
31111112	Joseph Yang
31111113	Patrick Wilkins
31111114	Christina Park
31111115	Matthew Casey
31111116	Kristen McKee
31111117	Eric Bennett
31111118	Jacob Lawson
31111119	Cindy Lai
31111120	Janice Morris
31111121	Timothy Jones
31111122	Angel Nelson
31111123	Maria Barnes
31111124	Benjamin Nichols
31111125	Patricia Myers

The third action that can be done is to delete lecturer details. First, the admin will click the lecturer ID or name.

FACIAL RECOGNITION ATTENDANCE SYSTEM

[Admin Profile](#)[Student Database](#)[Lecturer Database](#)[Logout](#)

LECTURER ID	LECTURER NAME
31111111	Daniel Brown
31111112	Joseph Yang
31111113	Patrick Wilkins
31111114	Christina Park
31111115	Matthew Casey
31111116	Kristen McKee
31111117	Eric Bennett
31111118	Jacobi Lawson
31111119	Cindy Lin
31111120	Jenice Morris
31111121	Timothy Jones
31111122	Angal Nelson
31111123	Maria Barnes
31111124	Benjamin Nichols
31111125	Patricia Myers

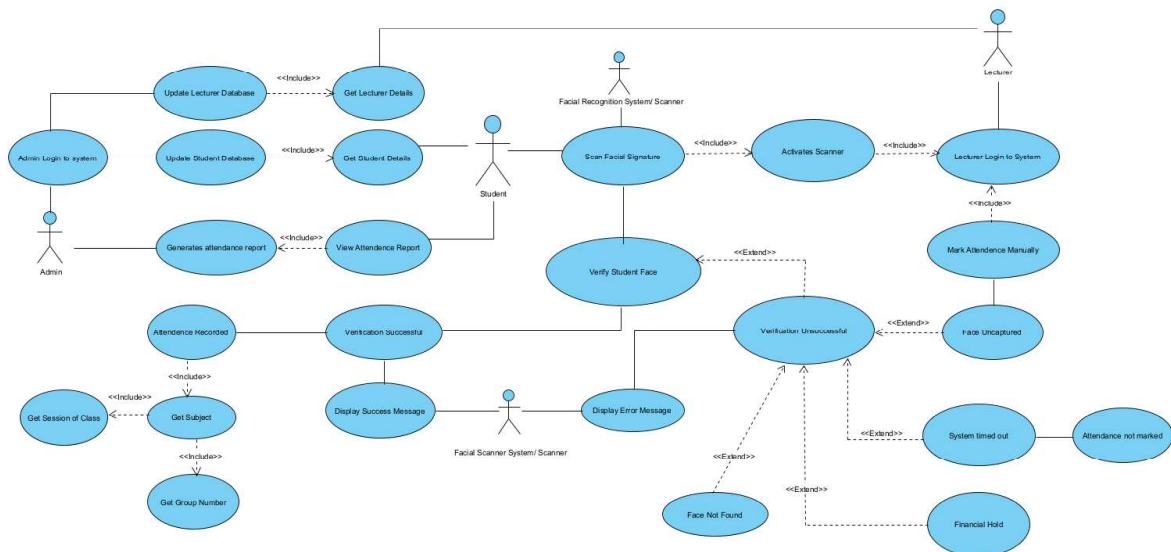
Then they will click the delete button at the bottom.



This pop up will be shown to give the admin a choice to delete or cancel.

Part C:

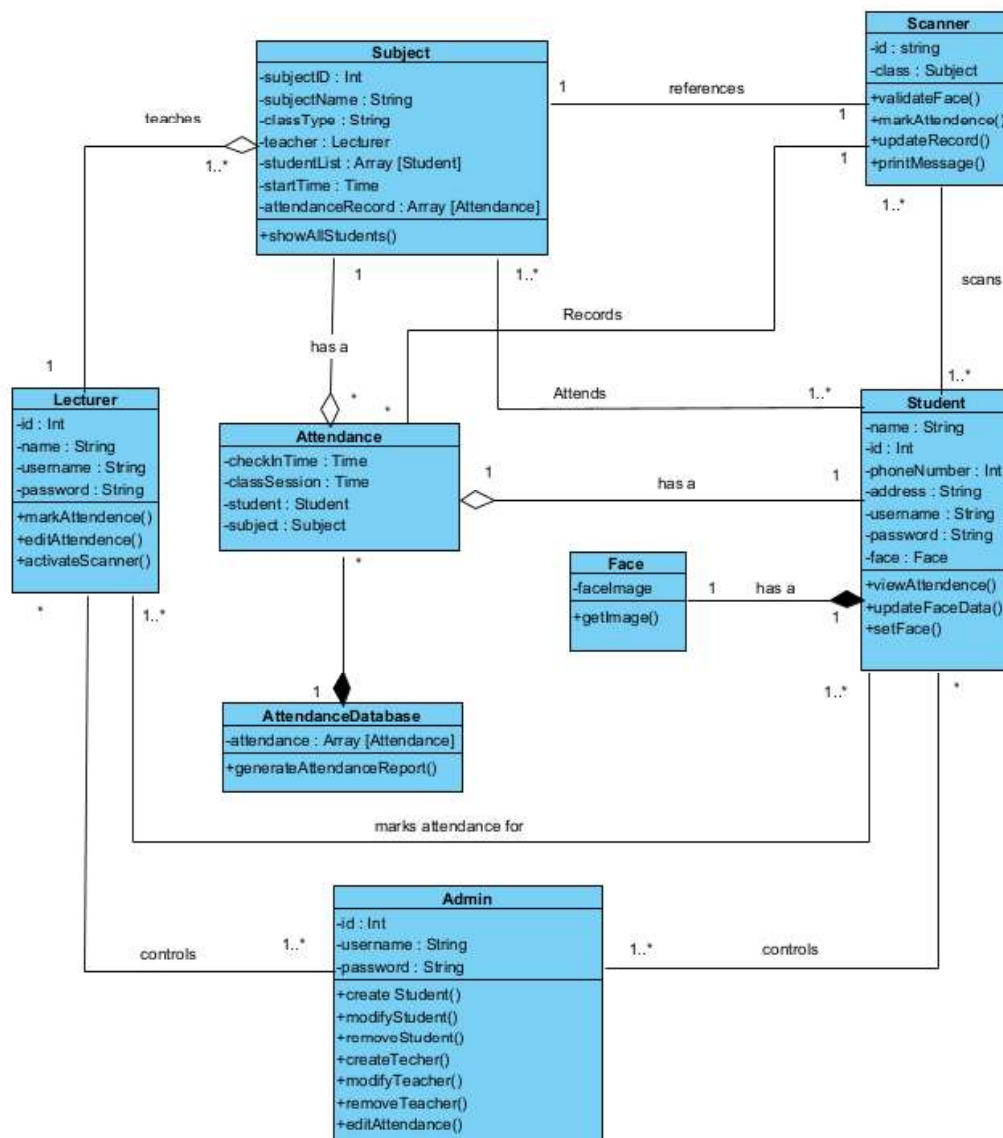
Use Case Diagram:



In the use case diagram of the facial recognition system, there are 3 main actors and they are the Admin, Student, Lecturer and the Facial Recognition System or known as the Scanner. The flow starts with the Admin actor who is able to update the lecturer database, update the student database and generate an attendance report for each student. The admin can do these actions after logging in to the system. After this, the next important actor is the lecturer. Once the lecturer logs in to the system, he/she is able to activate the Scanner to scan the students face and mark the attendance of the students manually based on the special cases given. The special case is when the Scanner does not pick up the face of the student and does not mark their attendance. The last actor that is involved in the system is the student which will get their attendance marked by standing in front of the Scanner to allow the facial recognition attendance system to validate their identity as a student. If their verification is successful, the system will mark their attendance as present based on the session of the class and the group number while displaying a success message on the Scanner. If the verification failed, there are four categories that the student will most likely fall in. The first one is that the face of the student was uncaptured as explained previously. This will be solved when the lecturer will mark the student attendance manually. The second case is when the system has timed out which means that it has passed its activation time of 30 minutes which means the student is late. In this case, the student will not have their attendance marked as they were very late to class. The third case is the financial hold case where the student is in financial hold and has their account locked out. In this case their attendance will not be marked and will be considered absent. The final case is when the face of the student is

not found. In this case, it means that the student is not a registered student and does not have a face image uploaded to the database. This means their attendance will not be marked and they will not be allowed to enter the classroom.

Class Diagram:



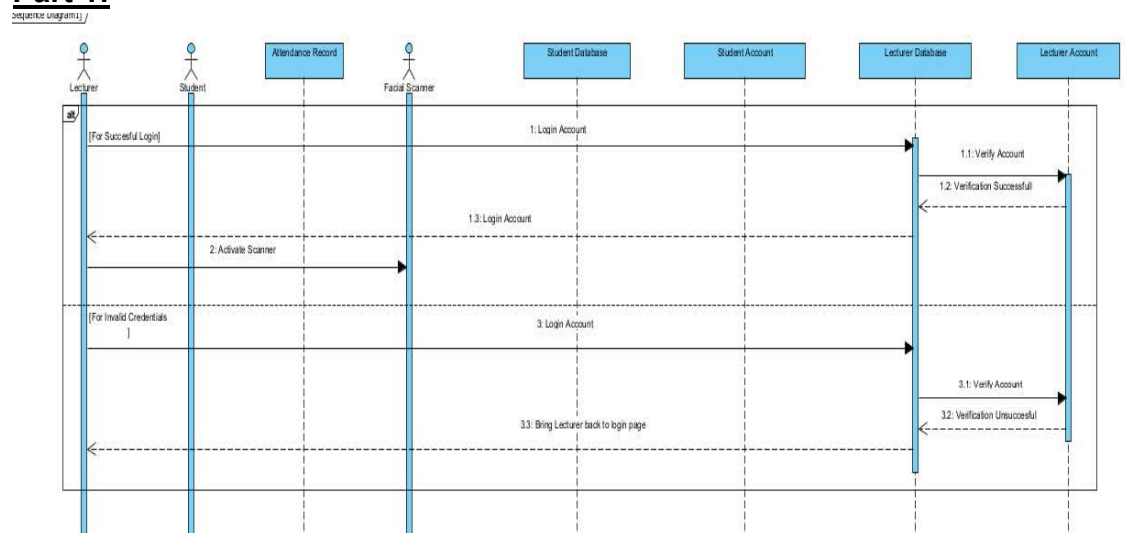
In the class diagram, there are seven classes for the facial recognition attendance system. The first class is the Admin class which keeps track of the admin details and actions performed by the admin. The actions that can be performed by the admin are they are able to create new student details, modify their account, remove their account, create teacher details, modify teacher details, remove teacher details and edit the attendance

record for students. The next class is the Student class which is controlled by the admin class. The student class is to keep track of the student details which acts like a database. The student class allows three actions for the students and they are to view attendance, update face data and set their face. The next class is the lecturer class which keeps track of the lecturer information and the lecturer class is controlled by the admin class. The lecturer class stores three actions that can be done by the lecturer and they are mark attendance, edit attendance and activate the scanner. The next class is called Subject. The subject class is to keep track of all the students enrolled in a subject. The main action is that it is able to show all students that are part of that class. The next class is the Scanner class which is responsible for handling the functions of the scanner. The scanner is able to validate faces, mark the attendance, update the record and print an error or success message. Each scanner has their own unique ID to identify them. The next class is the face class which is a part of the student class. The face class stores the face image of the student for verification in the system. The next class in the class diagram is the attendance class. The attendance class is responsible for keeping track of each student's attendance where they store the time checked in and the session of the class that was joined. The final class in the class diagram is the attendance database class. This class is responsible for generating the attendance report for each student.

Sequence Diagrams:

I. Diagram 1:

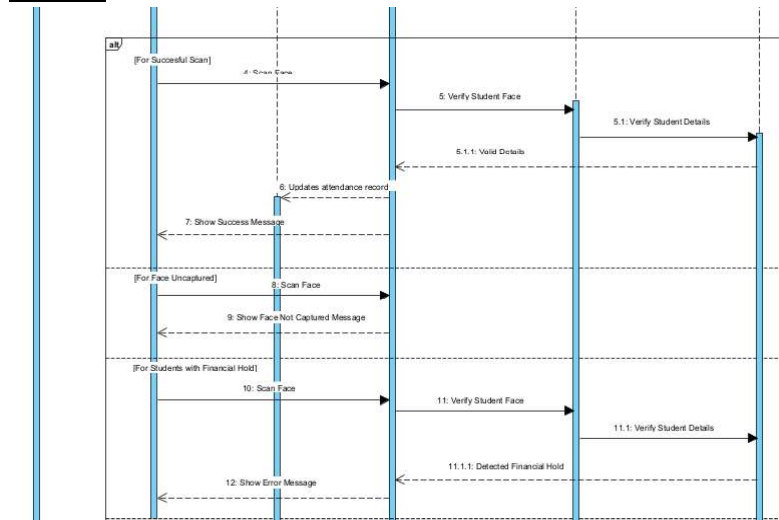
A. Part 1:



This part of the first sequence diagram is to explain the interaction of the actors in the main system which is the facial recognition attendance system. The three main actors here are the lecturer, student and the Scanner. An if-

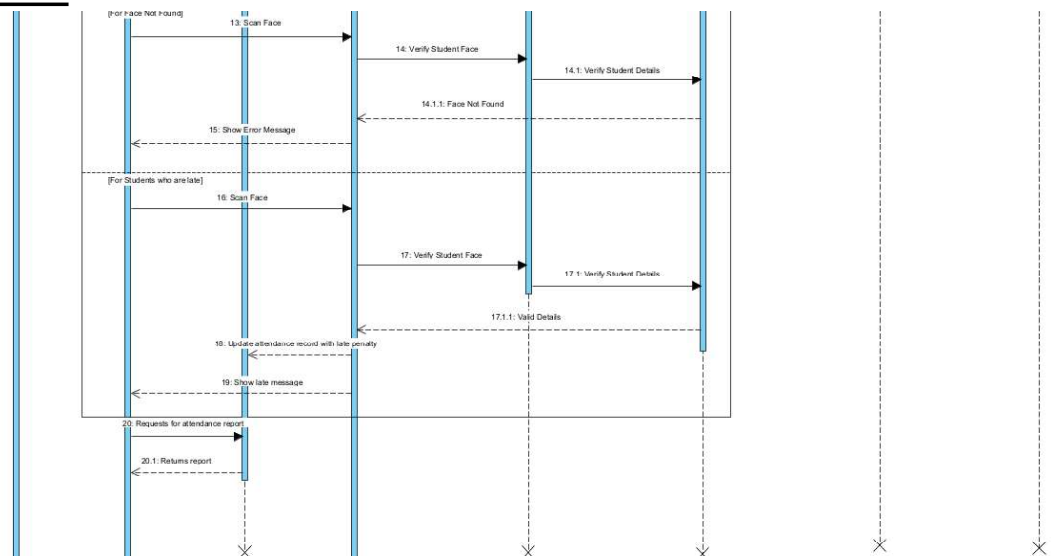
else statement happens here as there are two conditions. The first condition is when the login is successful and the second is when the login was unsuccessful. This login verification is to confirm the lecturer's login.

B. Part 2:



This part of sequence diagram 1 is to show the student getting their face scanned by the scanner and the 5 different outcomes after scanning. The five outcomes are a successful scan, the face of the student is uncaptured, when the student has a financial hold, the face of the student could not be found in the database and the student was late to class.

C. Part 3:

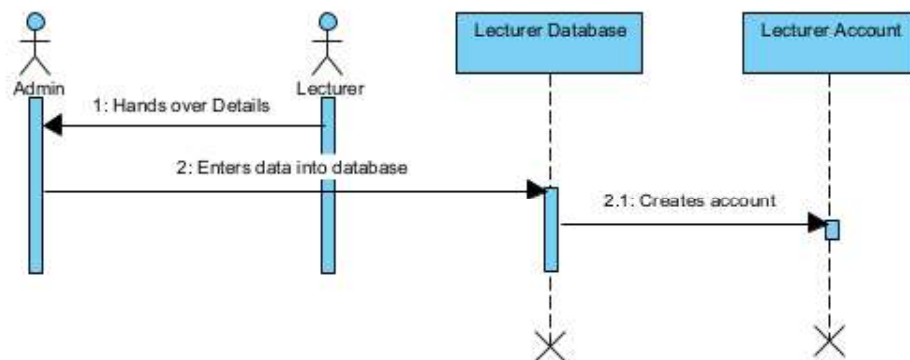


This part is a continuation of the previous part. After going through the

scanning process, the student is able to request for an attendance report where the record will return the report.

II. **Diagram 2:**

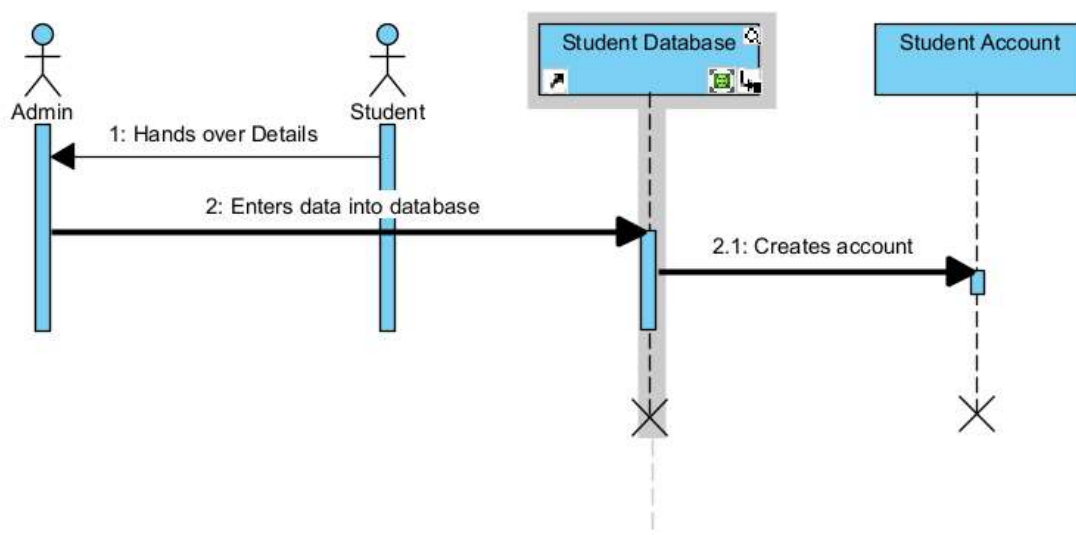
d [Sequence Diagram2]



This sequence diagram shows the interaction between the lecturer and the admin to create a new account for them in the lecturer database. The lecturer first hands over their details to the admin where the admin will then input the details into the database to be stored.

III. **Diagram 3:**

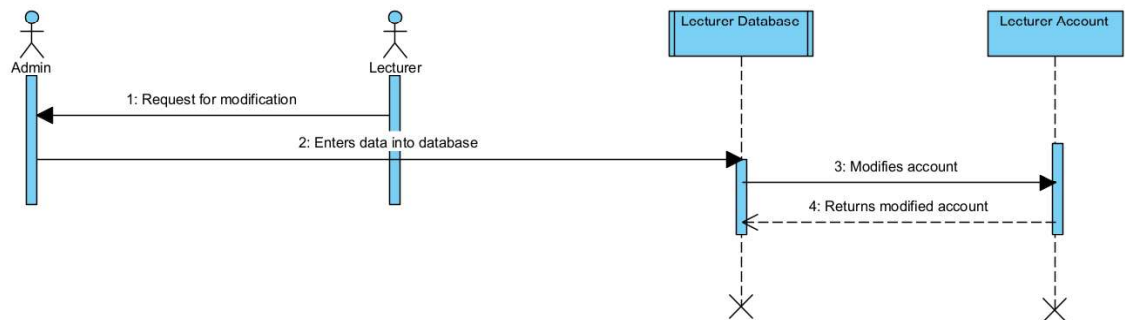
sd [Sequence Diagram3]



This sequence diagram shows the interaction between the student and the admin to create a new account for them in the database. The new student will hand their details over to the admin which will then be stored in the student database

IV. **Diagram 4:**

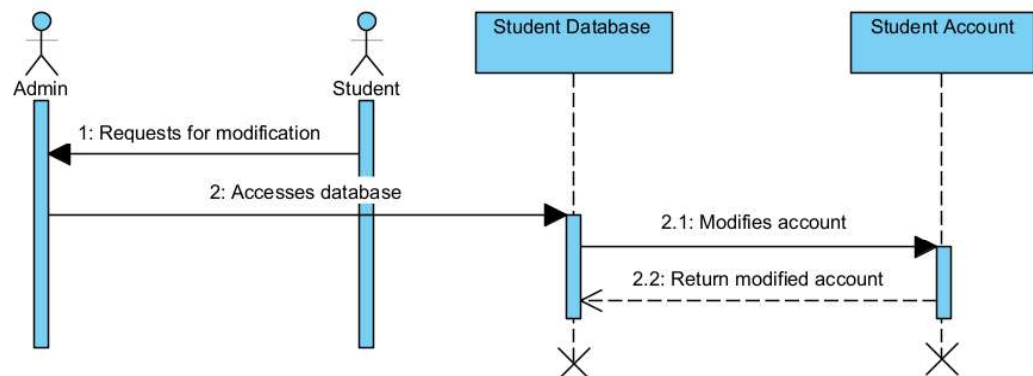
sd [Sequence Diagram4]



This sequence diagram shows the interaction between the lecturer and the admin to modify their account. The lecturer requests for an account modification to the admin where the admin will log into their system to edit the lecturer account.

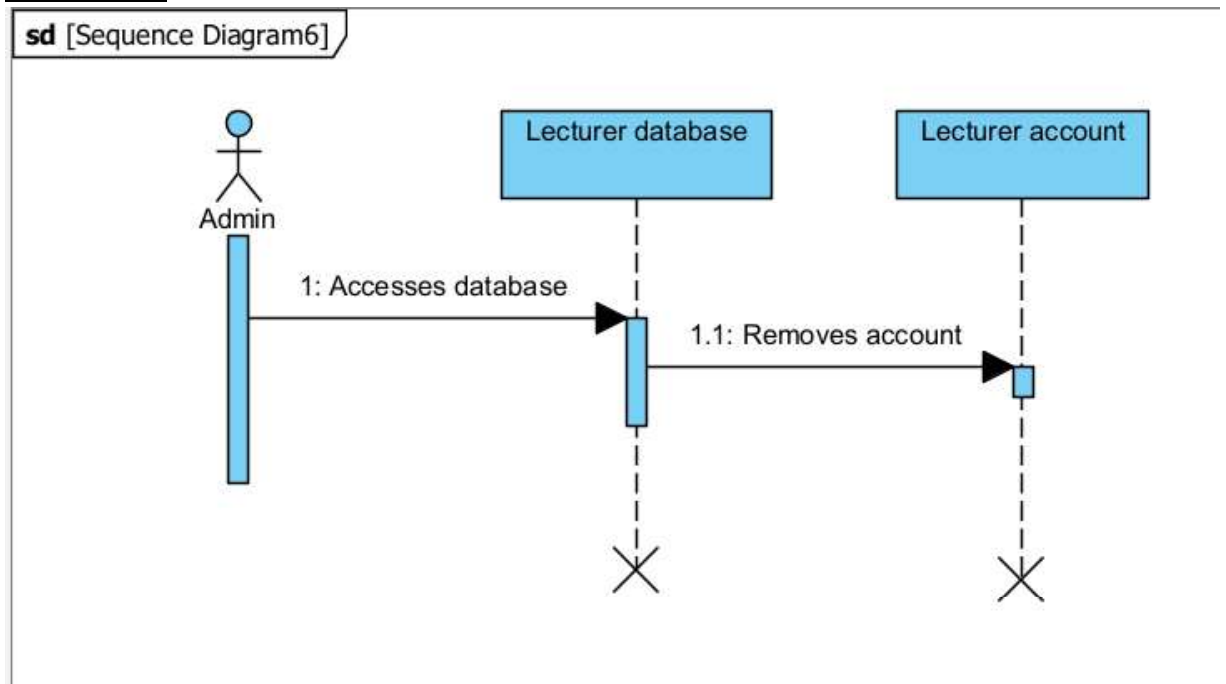
V. **Diagram 5:**

sd [Sequence Diagram5]



This sequence diagram shows the interaction between the Student and the admin to modify their account. The Student requests for an account modification to the admin where the admin will log into their system to edit the specific student account details.

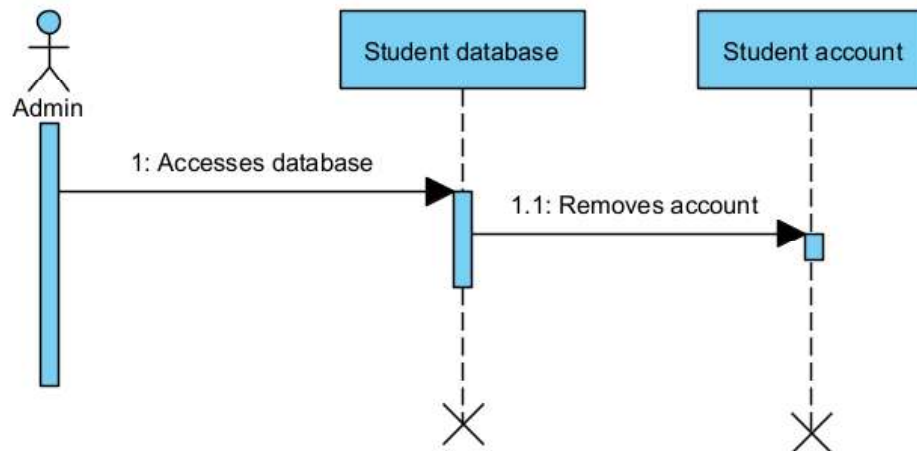
VI. **Diagram 6:**



This sequence diagram shows how the admin interacts with the lecturer database to delete a specific lecturer account.

VII. **Diagram 7:**

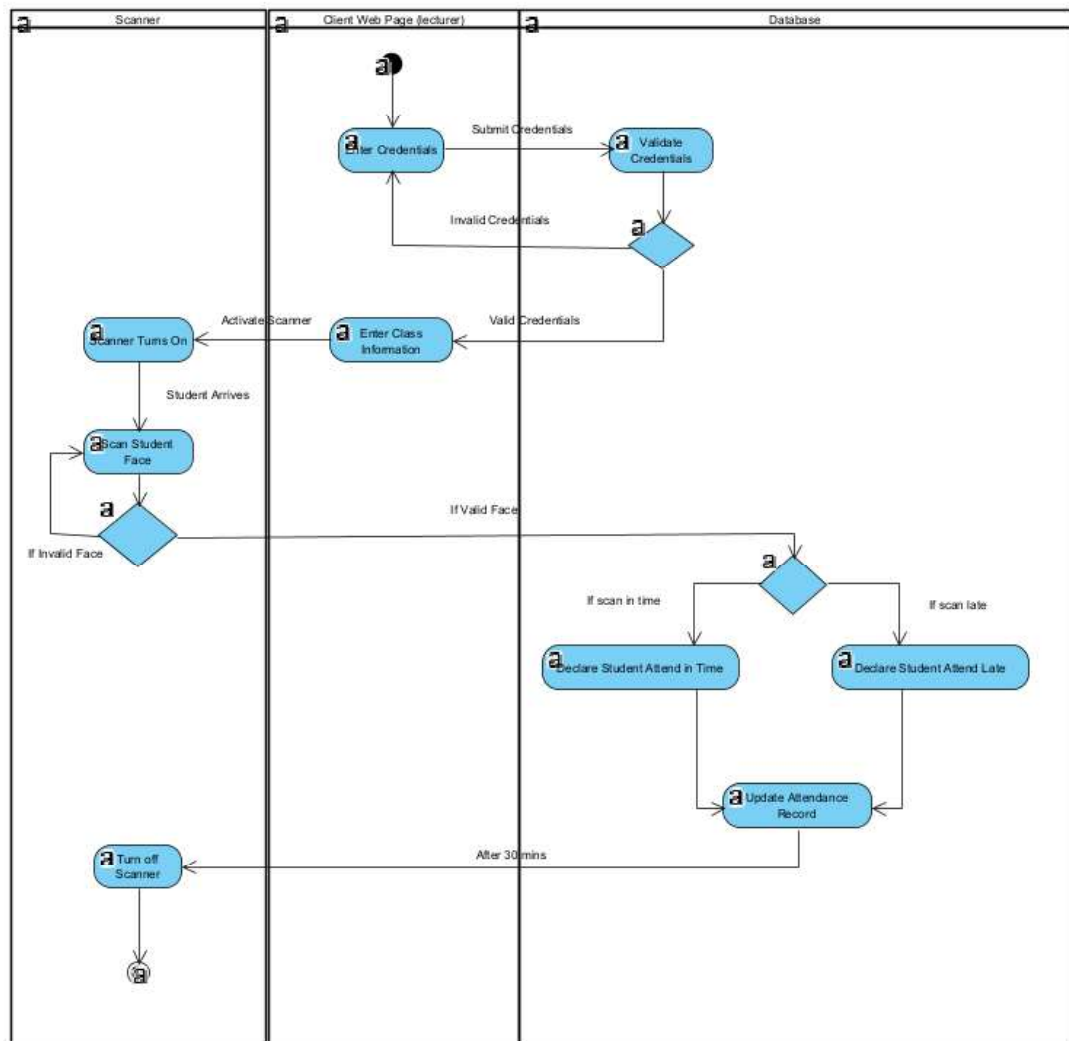
sd [Sequence Diagram7]



This sequence diagram shows how the admin interacts with the student database to delete a specific student account.

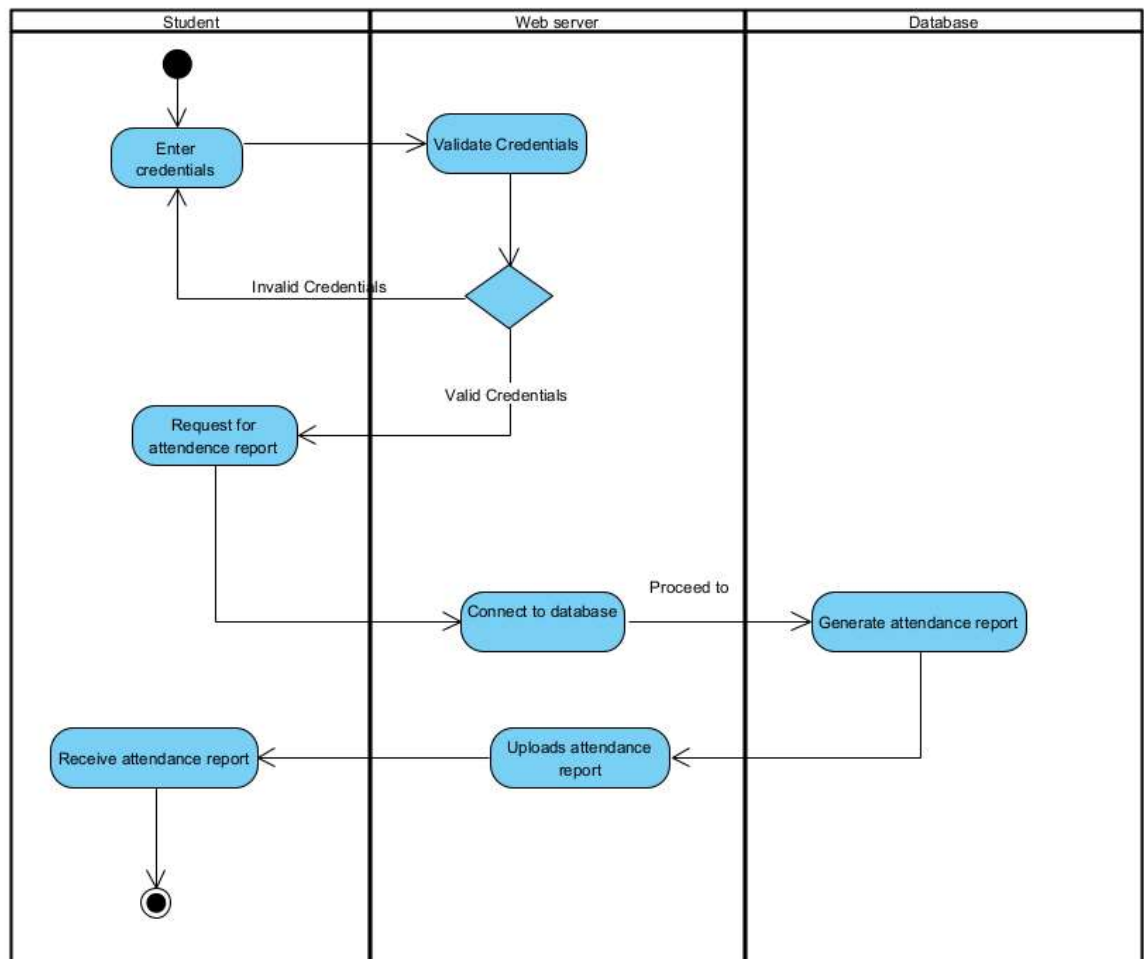
Activity Diagrams:

I. Diagram 1:



This activity diagram shows the flow of how the lecturer logs in to the system. First the lecturer will enter their credentials to login and it will be validated by the system. Once validated, the lecturer will be able to turn the scanner on to start scanning the faces of the students to mark their attendance. Once the student's face is scanned, the system will determine whether the student is late or on time before declaring their attendance in the student database. Once the scanner has passed 30 minutes, it will automatically shut down.

II. Diagram 2:



This activity diagram shows the flow of the student logging into the system to generate attendance reports. The student enters their credentials which will be validated by the system. Once the system has validated the student, the student is able to get into the system and request an attendance report. The request is then processed by connecting to the database where the admin will help complete the actions. Once the process is done, the student will receive their attendance report.

References

Drumond, C. (n.d.). *Scrum - what it is, how it works, and why it's awesome*. Retrieved July 10, 2022 from Atlassian: <https://www.atlassian.com/agile/scrum>