



CS308 Spring 2022

Design Document

Project: Student Attendance System

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Document Revision History

Rev1.0 April 17, 2022 – Initial version

Rev2.0 May 15, 2022 – Included short introduction, naming scheme correction in modules, corrected UML Class diagram, corrected Use Case Diagram, updated contribution table.

Rev3.0 May 26, 2022 – Added “Design Document” and date to the cover page.

1 Objectives

This document servers to present the design of the Student Attendance System. It contains the modules, three diagrams (UML, Use Case and Sequence), as well as a prototype user interface with a Trello board to show the development timeline for the web application.

Everything in our lives has been digitalized in some way, be it a simple or complex task. Something so simple such as taking attendance has completely gone under the radar at our university. This application is a solution to improve the way that task is accomplished. To replace the tedious task of manually writing on a piece of paper or filling up spreadsheets, this solution uses up less time and requires less work. By just simply scanning the barcode on the student card, the application does all the heavy lifting left. It saves the attendance record in a special table that can be looked up by the professor at any time. With this method, 2 major issues are tackled: time consumption and fraudulent activity. As mentioned before, the time this method would save creates opportunities to accomplish other tasks. This way, more focus can be placed on the students and help them understand lectures better. Additionally, fraudulent activity is not uncommon to bear witness to as students have a habit of signing their friends or doing something similar, therefore giving inaccurate attendance records. Technology is used to improve the way we do things, and that is exactly what this application does.

The entire process relies on just 2 things: the professor having the application installed on his/her device (PC, mobile phone, etc.) and having a personal account which will be created beforehand for everyone that needs it. After logging in with their account, the professor will have access to every feature the application provides, from recording the attendance and checking it to viewing their courses in detailed form. Moreover, it will provide snappy and easy to access information the professor would consider valuable, such as individual attendance records for students or managing the course information. The application will be able to run on a majority of devices and will require an internet connection. As far as the professor data is concerned, it will

be encrypted to maximize security and will be managed by an Admin team. Up to 100 people can use the application at the same time, which is plenty enough to cover one time slot of lectures at the university.

2 Modules

To make our application easier to understand, and be built, splitting up core concept into modules is necessary. The modules are based mostly on the functional requirements, which we covered in the software requirements document, lastly here are the modules:

1. Login (Aims to provide the user with a way to enter the system, independent of other features)
 - a. Username and password fields
 - b. Login Button (Sends form information for verification)
 - c. Forgot password option (Gives users an option to retrieve lost information - Non mandatory)
 - d. First Time login Function (Self-explanatory – Non mandatory)
2. List of courses (Displays the list of courses the professors are teaching, dependent on login information)
 - a. Details about that course button (Extends the area in which the course code is located, gives additional information about that course)
 - b. Start scanning attendance button (Opens attendance scanning)
 - c. Detailed view button (Opens Detailed attendance list)
3. Barcode/QR Code scanner (Provides a way to take attendance, by scanning QR or Barcodes of each student ID, continues from course list)
 - a. Code scan area (Retrieves information provided by a barcode/QR code)
 - b. Exit scanning button
 - c. Manual add student button (Opens an input box where the user can add a id manually)
 - d. Finish scanning button (Opens finished preview)
4. Finished preview (Shows which cards were scanned and which were not, continues from scanner)
 - a. List of scanned students (Provides a list of students scanned in that session)
 - b. Return to scanning (Button, returns to scanner)
 - c. Finish scanning (Exits scanner and dialogue box)
5. Detailed attendance list (Shows the percentage attended for each student, in the form of a list, continues from course list)
 - a. Every student attendance percentage (Shows every student name, last name and ID in one row as well as a preview of their attendance status for the preselected course)
 - b. View each student detailed attendance status button (Goes to detailed student attendance)
 - c. Exit button

6. Detailed student attendance list (Shows each class the student attended or missed, continues from detailed attendance list)
 - a. List of all classes if student was present or absent
 - b. Exit button

3 UML class diagram

The University has decided to use the app through which they would track attendance of the students. Professors teach the courses to students. Each professor has a name, email and a password. Professor can teach one or more courses. Each course has a name its unique id roomNum. Courses are attended by students and students can take up to 7 courses per semester. Each student has a name and its unique id. Each course has its own attendance record. Attendance is viewed by the professor and through this process the professor can check whether student has a satisfactory attendance for the course. Attendance record has the following functions: displays attendance status through icons and trough percentage and the professor can also select a specific date to check that day's attendance. See figure 1 below.

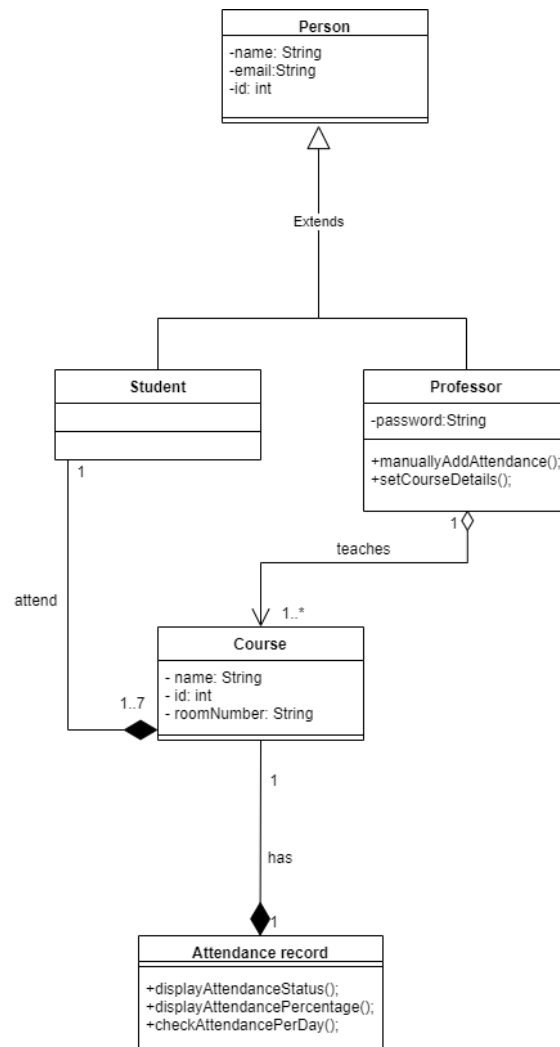


Figure 1. UML Diagram

4 Use Case Diagram

The system has 2 primary user classes, which includes professor and administrator. Each user class will have different levels of access and views of the system. Below we can see the use case diagram for our system (Figure 2).

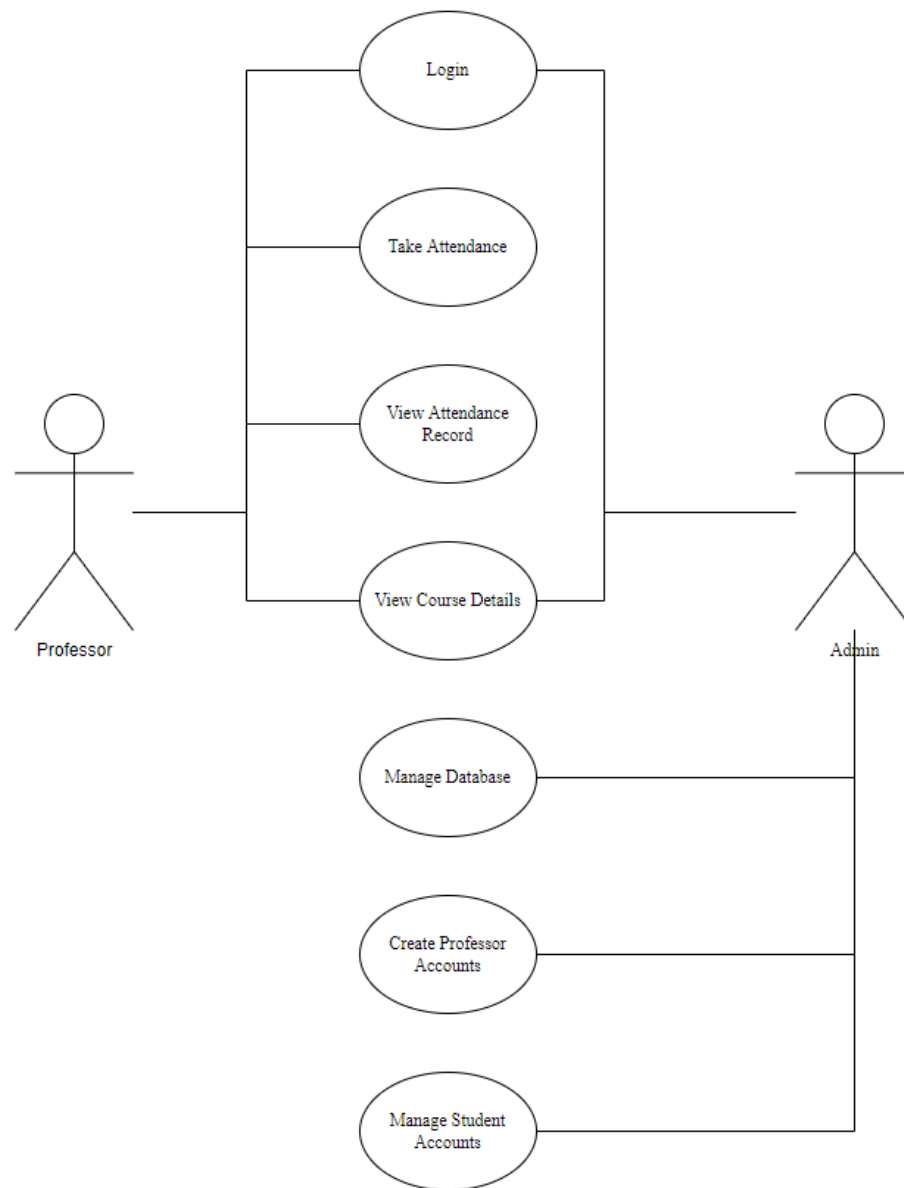


Figure 2. Use Case Diagram

5 Sequence Diagrams

Figure 3 represents the sequence diagram of our application; this is the basic process a user will experience.

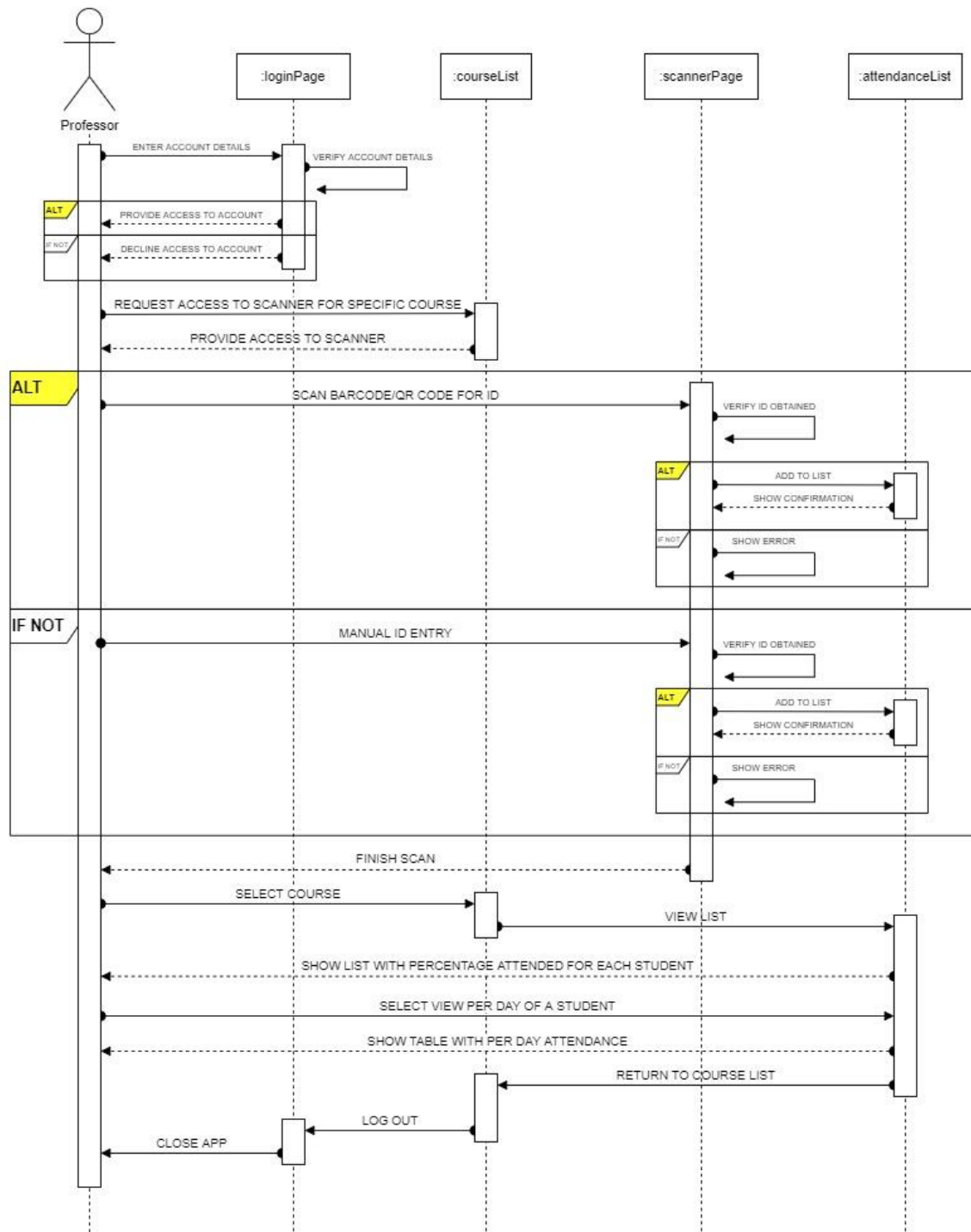
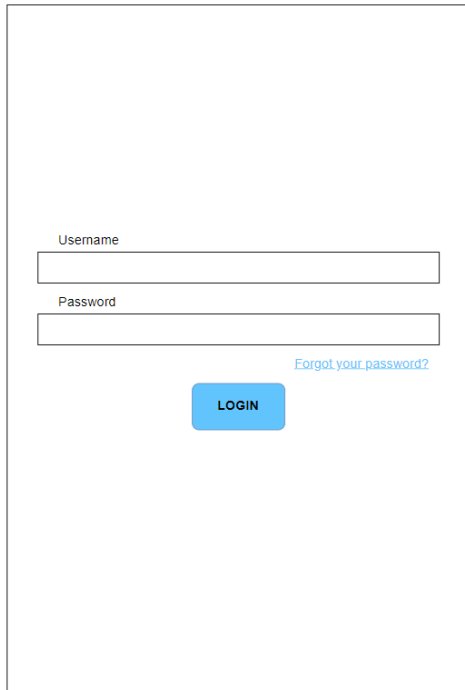


Figure 3. Sequence Diagram

6 User Interface

Here we can see the prototype of our user interface, the final product will not look the same but must contain all the buttons shown, as well as look somewhat similar in layout.

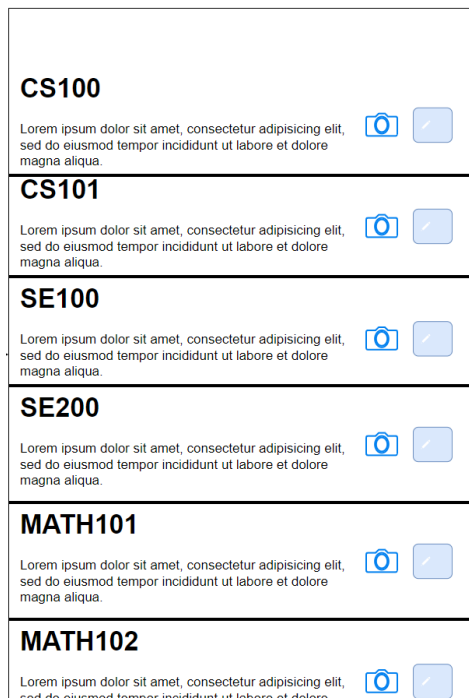
6.1 Login



A login screen prototype with a light blue background. It features two input fields: 'Username' and 'Password'. Below the password field is a link that says 'Forgot your password?'. At the bottom is a blue button with the text 'LOGIN' in white.

The login screen is the basic screen almost every application has. It includes the username (email) and password fields, as well as a forgot your password feature for those special cases. Lastly there is the login button which will check if your credentials are correct and log you into the system.











6.2 Home screen



A home screen prototype with a light blue background. It displays a list of six courses, each in a white box with a blue border. The courses are: CS100, CS101, SE100, SE200, MATH101, and MATH102. Each course entry includes a title, a placeholder text 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.', a camera icon, and a checkmark icon.












The home screen features a list of all the courses the professor is lecturing during the semester. Moreover, we can see two buttons, the camera button opens the scanner screen, in order to take attendance for the specific course. The button next to the camera opens the attendance list for that course. Lastly, there is a smaller text containing basic information about when and where the course is held, if clicked on it will contain additional information.

6.3 Home screen expanded

CS100 Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	 
CS101 Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	 
SE100 Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	 
SE200 Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	 
MATH101 Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	 


As we mentioned before, if we click on the course information it expands containing more useful information, the information hasn't been finalized yet, possibly will be total attendance for the course (all students combined), link to syllabus etc.

6.4 Attendance list

<input type="text" value="Search..."/>		
Student1	10/12	
Student2	9/12	
Student3	11/12	
Student4	2/12	
Student5	10/12	
Student6	12/12	
Student7	12/12	
Student8	10/12	
Student9	9/12	
Student10	11/12	
Student11	10/12	

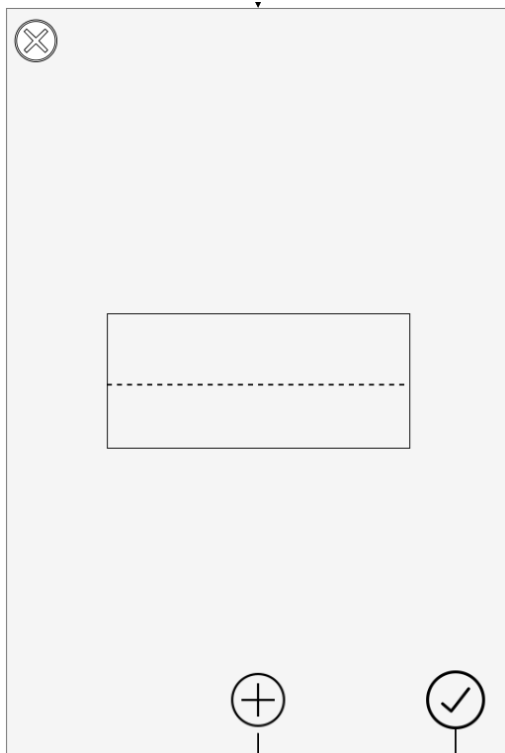
Attendance list shows us the attendance record for a specific course. As we can see we have a search bar so finding a specific student is easier. Additionally, we can see that each student has a green button next to them, this button takes us to the individual attendance list. Lastly this screen will feature a back button or swipe motion to get to the previous screen, to be determined.

6.5 Individual attendance list

 Name Surname 8/14	
DD/MM/YYYY	✗
DD/MM/YYYY	✓
DD/MM/YYYY	✗
DD/MM/YYYY	✓
DD/MM/YYYY	✗
DD/MM/YYYY	✓
DD/MM/YYYY	✗
DD/MM/YYYY	✓
DD/MM/YYYY	✗
DD/MM/YYYY	✓

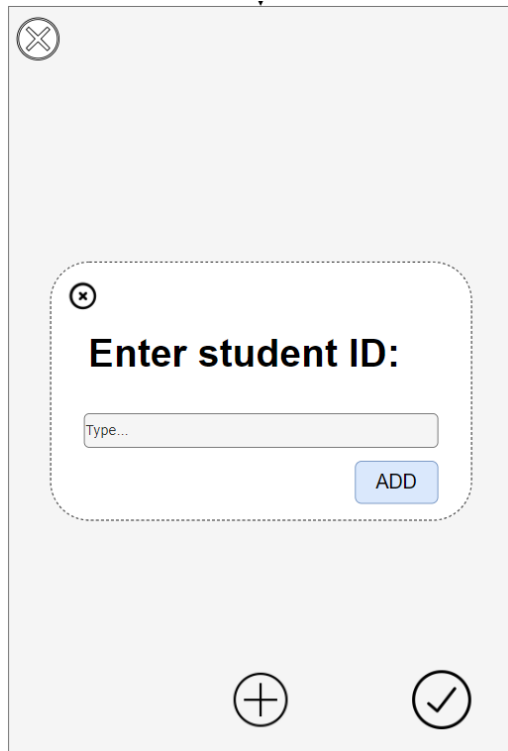
The individual attendance list shows us when a specific student attended or did not attend class, it features a “back” button to get back to the previous screen.

6.6 Scanner



The scanner screen is meant to be as simple and easily usable as possible. All the gray space is actually the user’s camera, the box in the middle represents where the user needs to point at the QR code/barcode. The “+” button in the middle brings up a manual add pop up. Additionally, we have the “check” button for when the professor is done scanning for today’s lecture, it will move the professor to the list of people who attended the current class screen. It is also important to keep in mind that there will be a notification for each successful scan. Lastly, of course there is a “back” button in the upper left to return to the home page.

6.7 Manual add



The manual add pop-up interface consists of a light gray background with a close button (X icon) in the top left corner. In the center, there is a white rounded rectangle with a dashed border. Inside this rectangle, there is a title bar with a close button (X icon) and the text "Enter student ID:". Below the title bar is a text input field with the placeholder text "Type...". To the right of the input field is a blue button labeled "ADD". At the bottom of the gray background, there are two circular icons: a plus sign (+) on the left and a checkmark (✓) on the right.

The manual add pop is necessary on the low chance that the student ID card is damage, or any other possible technical difficulties. There is a textbox in which you can enter the student ID. The Add button will simply add the student as present for today's attendance if he is attending the course and the ID typed is valid. Lastly, there is a button to close the pop up in the upper left corner.

6.8 List of people who attended current class

Class - DD/MM/YYYY		
Student1		✗
Student2		✓
Student3		✗
Student4		✓
Student5		✗
Student6		✓
Student7		✗
Student8		✓
Student9		✗
Student10		✓
		✓

After the professor is finished scanning for the day, he is presented with a list of all students who did or did not attend today's lecture. The professor can browse the list or he can click the "check" icon to return to the home screen.

7 Trello board

Link and picture (Figure 4) of our Trello board: <https://trello.com/b/xzbqAssz/attendance-scanner>

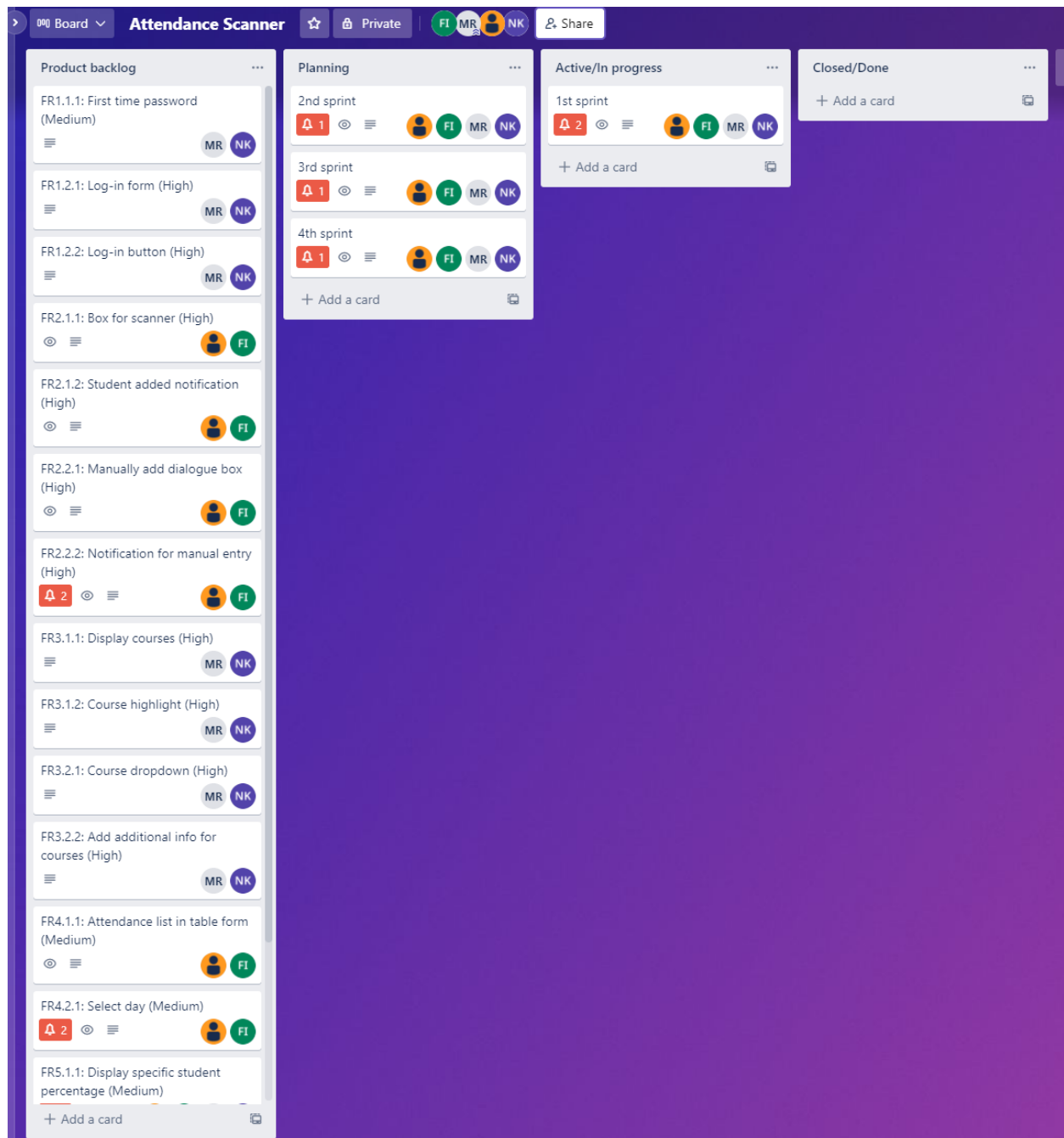


Figure 4. Trello Board

8 Contribution table

Project Name: Student Attendance System

Team members: Edin Žiga, Faruk Imamović, Nedim Kunovac, Mirza Redžepović

MILESTONE: Software Requirements Document/ Software Design
Document/Coding/Presentation preparation

Date: 26.05.2022.

Team member name	Task assigned	Status of the tasks
Edin Žiga	Design Document REV1.0 review, introduction and modules, REV2.0 updates and finalization, REV3.0 updates	Completed
Faruk Imamović	Design Document REV1.0 task distribution, review and finalization, lead user interface & use case diagram design, REV2.0 general review	Completed
Nedim Kunovac	Design Document REV1.0 review, sequence diagram design, REV2.0 general review	Completed
Mirza Redžepović	Design Document REV1.0 review, UML class diagram design and Trello integration, REV2.0 corrected diagram design	Completed