

# **E-DOC**

**Medical Centre Management System  
FOE-USJ**

**Group No: 7**

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## **Abstract**

In abstraction, we aimed to create a web-based medical records system that provides a secure and user-friendly platform for accessing and managing medical records. We wanted to streamline the process of accessing medical records, reduce the risk of errors and miscommunication, and improve the overall efficiency of the medical center.

To achieve this goal, we implemented various functionalities for different user groups. For example, students can access their previous prescriptions issued by the medical center, manage their reports, and send medical reports to the medical center. Academic and non-academic staff can download their own medical prescriptions and view their medical history. For medical staff, the system includes the ability to issue medical prescriptions, approve medical reports, and access the medical history of users. The system also provides real-time updates about medicine stocks for the medical staff.

We used various technologies such as HTML, CSS, JavaScript, Bootstrap CSS framework, Firebase, Python, and Flask to create the web application. We used Firebase for authentication, storage, real-time database, Firestore database, hosting, and cloud functions. Python and Flask were used for server-side processing.

The web application was designed and developed with a focus on user experience and usability. We conducted extensive testing to ensure that the web application was high-quality, efficient, and secure. We also gathered feedback from users and stakeholders to identify areas for improvement and future development.

In summary, our abstraction aimed to create a secure and user-friendly web-based medical records system that provides a valuable resource for medical staff,

students and users. We used various technologies and methodologies to achieve this goal, and we conducted extensive testing and evaluation to ensure that the web application met the project objectives and requirements.

## **Acknowledgement**

We would like to express our sincere gratitude to all those who contributed to the successful completion of this project. Firstly, we would like to thank our project supervisor for providing us with valuable guidance and support throughout the project. Their expertise and insights were instrumental in helping us develop a high-quality web application.

We would also like to thank our team members for their hard work and dedication throughout the project. Each team member brought unique skills and perspectives that contributed to the success of the project. We worked collaboratively and effectively as a team, overcoming challenges and achieving our objectives.

We would like to acknowledge the support of our families and friends, who provided us with encouragement and motivation throughout the project. Their unwavering support helped us to stay focused and committed to the project.

Finally, we would like to thank the medical center staff and users who provided us with feedback and insights that helped us to improve the web application. Their valuable input allowed us to develop a web application that meets the needs of our target audience and provides a valuable resource for medical staff, students, and users.

In conclusion, we acknowledge the contributions of all those who helped us to complete this project successfully. Without their support, guidance, and feedback, this project would not have been possible.

# Table of Contents

<b>Abstract.....</b>	<b>1</b>
<b>Acknowledgement .....</b>	<b>3</b>
<b>Table of Figures.....</b>	<b>5</b>
<b>1. Introduction .....</b>	<b>6</b>
<b>2. Problem Specification .....</b>	<b>7</b>
2.1 Aims and Objectives.....	7
2.2 Problems .....	9
2.3 Milestones.....	10
<b>3. Design Methodology.....</b>	<b>11</b>
3.1 Architectural Diagram .....	11
3.2 UML designs .....	12
3.2.1 Use case .....	12
3.2.2 Activity .....	13
3.2.3 Sequence.....	16
3.2.4 Class .....	17
<b>4. Implementation.....</b>	<b>18</b>
4.1 Software services/Special Tools/Platforms .....	18
<b>5. Evaluation .....</b>	<b>21</b>
5.1 Testing .....	21
<b>6. Discussion.....</b>	<b>21</b>
6.1 Challenges .....	21
6.2 Further Implementations.....	22
<b>7. Conclusion.....</b>	<b>22</b>
<b>References .....</b>	<b>23</b>

# Table of Figures

figure 3.1: Architectural Diagram.....11

Figure 3.2: Use Case Diagram.....12

Figure 3.3: Activity Diagram For User.....13

Figure 3.4: Activity Diagram For Login .....14

Figure 3.5: Activity Diagram For Medical Staff.....15

Figure 3.6: Sequence Diagram For View Patient Information.....16

Figure 3.7: Class Diagram For Medical Center Website .....17

# 1. Introduction

E-Doc is a software based web application designed for the medical center of Faculty of Engineering, University of Sri Jayewardenepura. Currently faculty medical center keeps records in the books as hardware based information system. This hardware based system brings several type of difficulties to both users and the medical center admin such as it took several times to search medical history of one's, get medical reports uploaded by them. Students also don't have clear idea about their medical history.

It seems that both students, doctors (users) and patient information system (system) have some requirements that are not satisfied by the currently available hardware based system. E-Doc is to fulfill both user requirements and the system requirements of the faculty medical center. Using our web application each student & staff member medical record will appear under the University ID number on the faculty medical center website. Users can view their medical history by logging into their account. They can upload medicals by logging to their account and download the uploaded medical reports.

## 2. Problem Specification

### 2.1 Aims and Objectives

- E-Doc is unique software project which is mainly focusing to provide software application to computerized currently available hard copy based patient information system in our faculty medical center. If someone got medicine from medical center and after 3,4 days or week if he is still suffering from that sickness definitely they will go to meet outside doctor, government or maybe private sector doctor. In that situation if any student wants to know about their all the past medical activities related to medical center they have to come to the faculty medical center to have their records in hardcopy based system. It took extra time to come to the faculty.
- Medical center doctors haven't immediate knowledge of a patient's medical history. Therefore, to get information about an individual, they have to read all records. It took several time on searching the records on their books.
- Main purpose of this project is to make it easy to medical center admins to handle the medical history of a patient and users to find their old medical information without coming to the medical center. E-Doc web application is developed to solve all these issues. This web application can be accessed by any device PC, Laptop, Mobile phone, Tablet. Outsiders of the faculty can take the basic ideas of the medical center by visiting the website. But other functionalities are only for two main parties of this web application - user and admin. Web application maintains accounts for all the students, academic and non-academic staff of the faculty. When they take the services from the medical center all the activities are recorded into relevant users account. Hence no need to find records by searching through too many books.



- Admin has access to add records of the patients, maintain medicine stock, gives updates about the medicine stocks for the medical staff, get medical reports uploaded by users etc.
- It provides opportunities to users to take their medical history easily and upload medicals by their mobile phone or laptop. So if any user wants their past medical activities they do not need to come to the faculty anymore. They can access their medical history quickly at any time. Also do not need to memorize about the medical records they have uploaded. These documents can be easily download by logging to their account.

Main objectives of E-Doc are listed below.

- User ID number and account passwords are only required to access medical history.
- Can upload scanned medicals as secondary verification.
- Notification (via email) when medicals are approved.
- Can have updated current situation of the medical center.
- If an accident occurs during the lecture period, a notification email can be sent to the relevant lecturer.

## 2.2 Problems

- Students and doctors haven't immediate knowledge of a patient's medical history. Therefore, to get information about an individual, they have to read all records.
- Using our web application each student & staff member medical record will appear under the University ID number on the faculty medical center website.
- Users can view their medical history by logging into their account.

## 2.3 Milestones

- Conduct a needs assessment to identify the specific challenges faced by medical center admins, doctors, and patients in accessing and managing medical records.
- Develop a prototype of the E-Doc web application that addresses the identified needs, including user authentication, medical record management, and notifications.
- Test the E-Doc web application with a small group of users to identify and resolve any technical or usability issues.
- Conduct a larger-scale pilot study to assess the impact of the E-Doc web application on medical center efficiency, user satisfaction, and patient outcomes.
- Refine the E-Doc web application based on feedback from the pilot study and add new features such as medicine stock management and medical report uploads.

### 3. Design Methodology

#### 3.1 Architectural Diagram

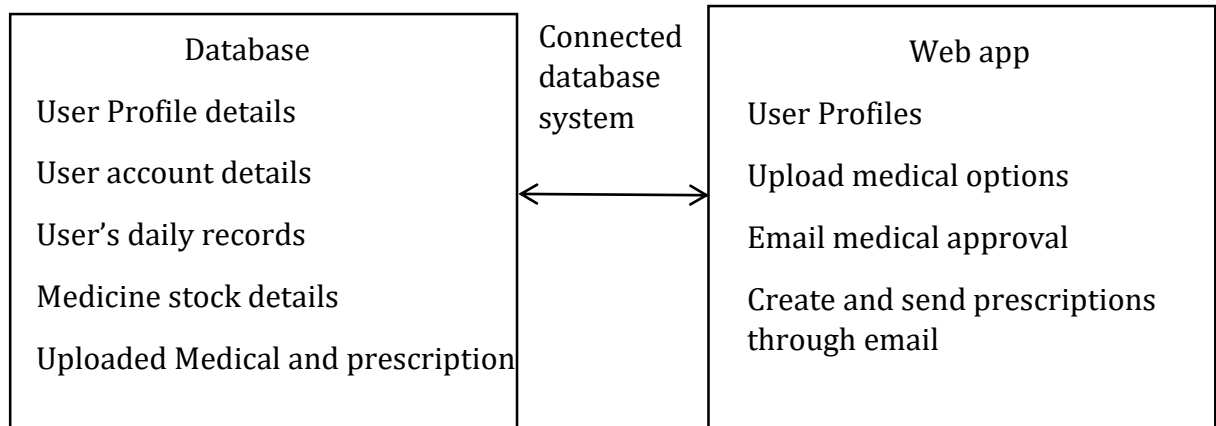


FIGURE 3.1: ARCHITECTURAL DIAGRAM

## 3.2 UML designs

### 3.2.1 Use case

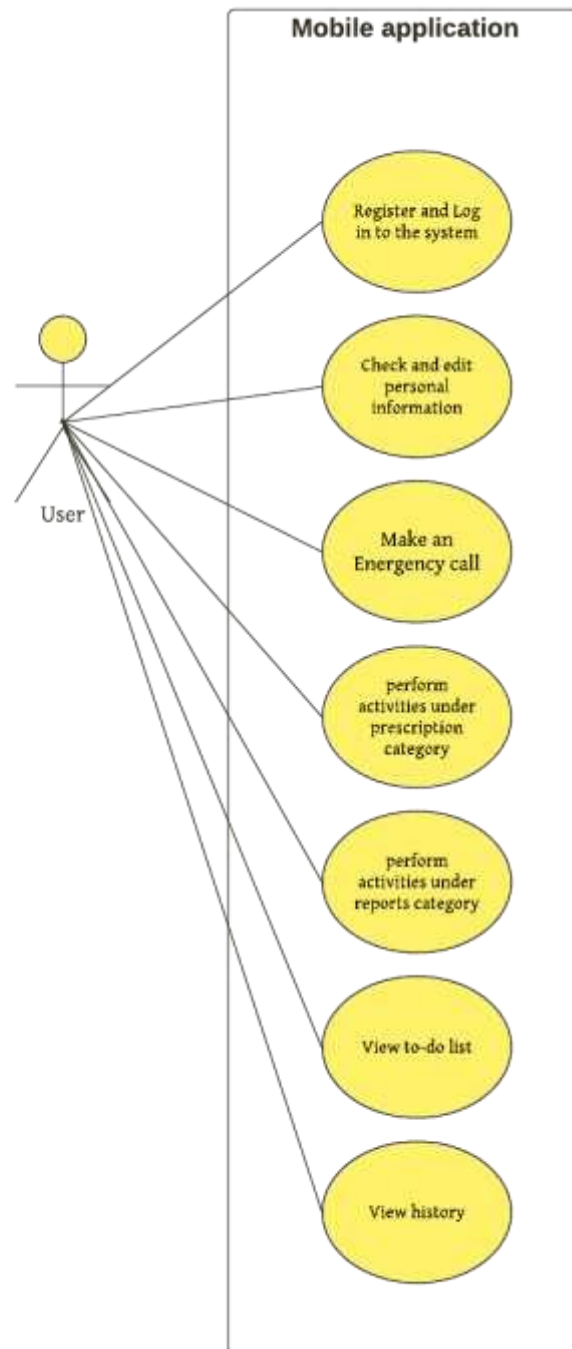


FIGURE 3.2: USE CASE DIAGRAM

### 3.2.2 Activity

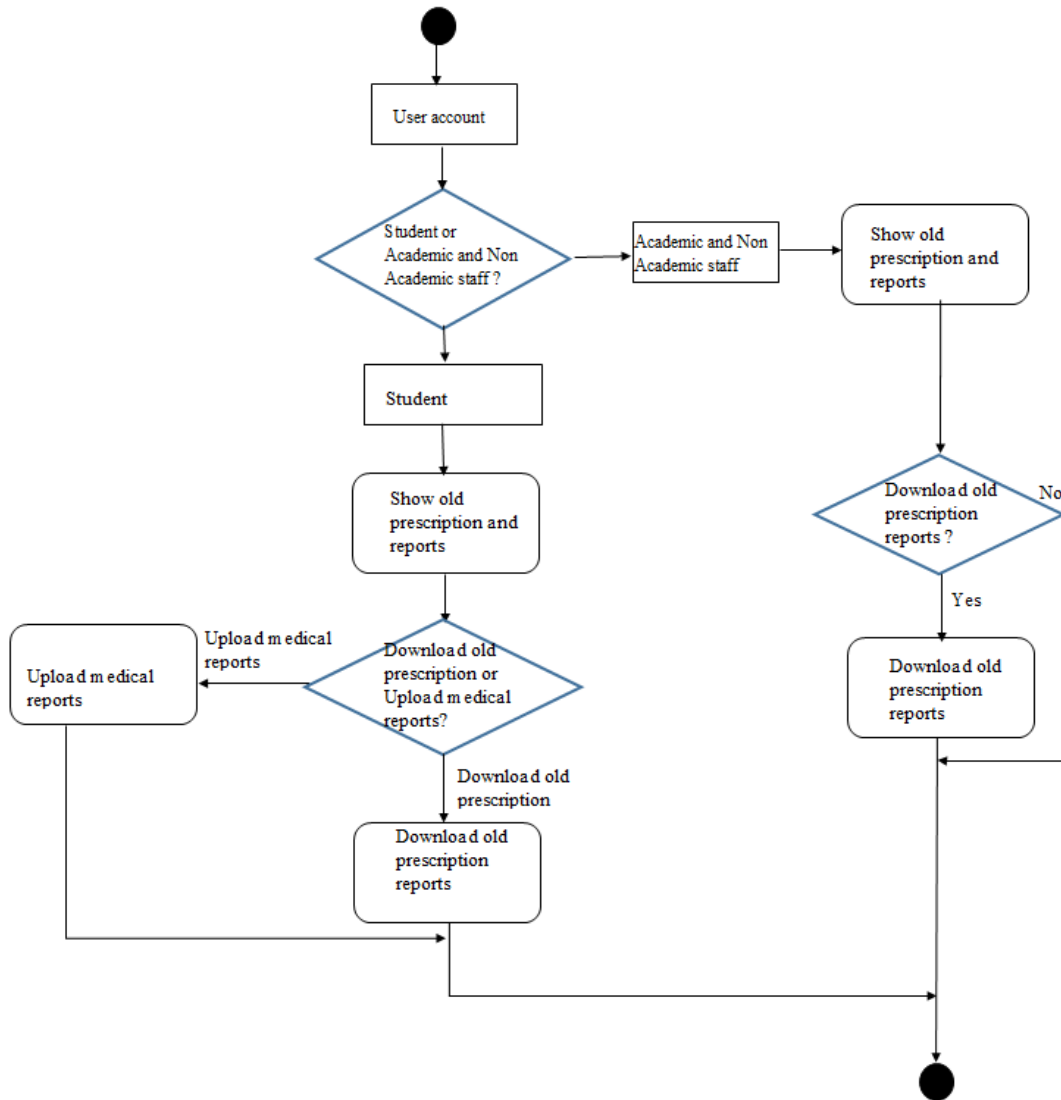


FIGURE 3.3: ACTIVITY DIAGRAM FOR USER

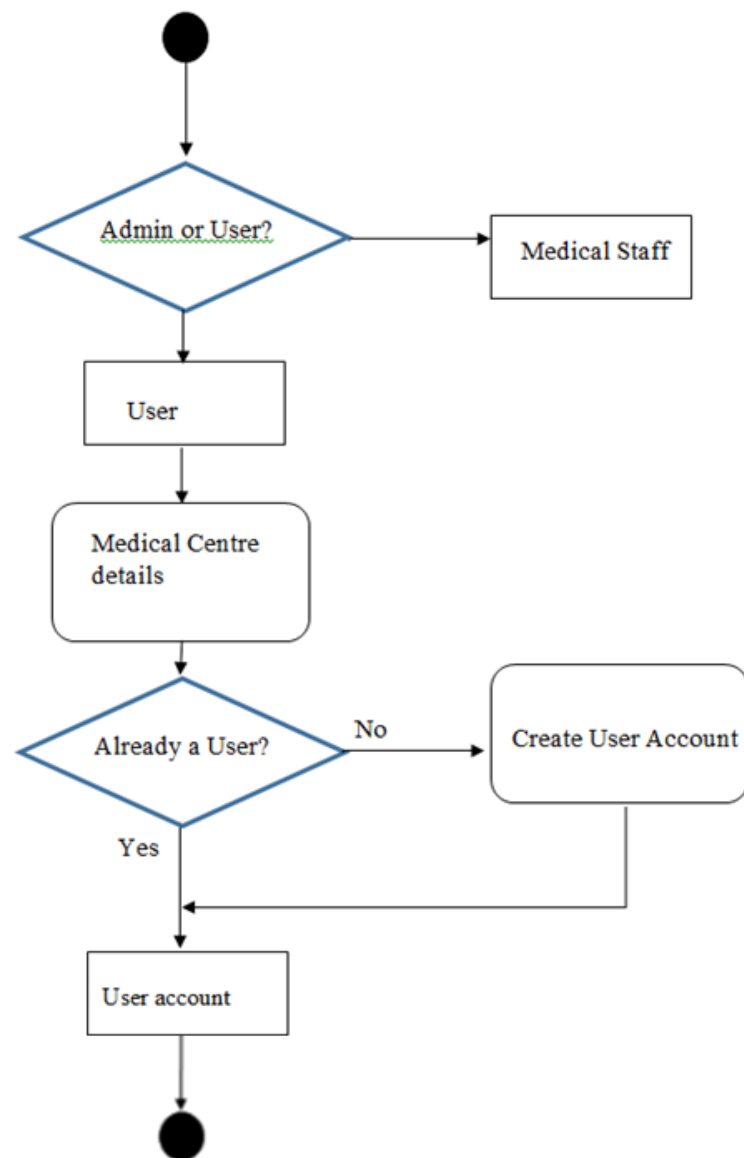


FIGURE 3.4: ACTIVITY DIAGRAM FOR LOGIN

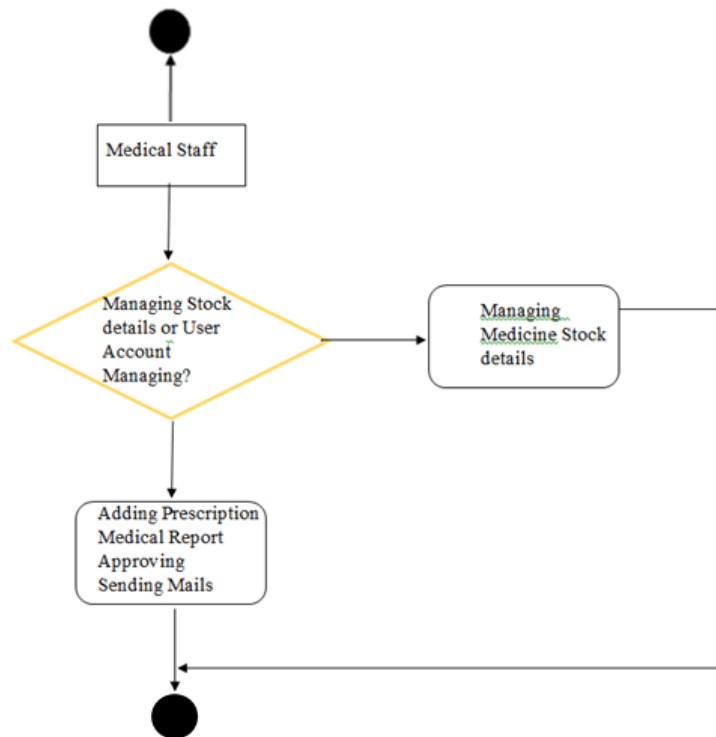


FIGURE 3.5: ACTIVITY DIAGRAM FOR MEDICAL STAFF



### 3.2.3 Sequence

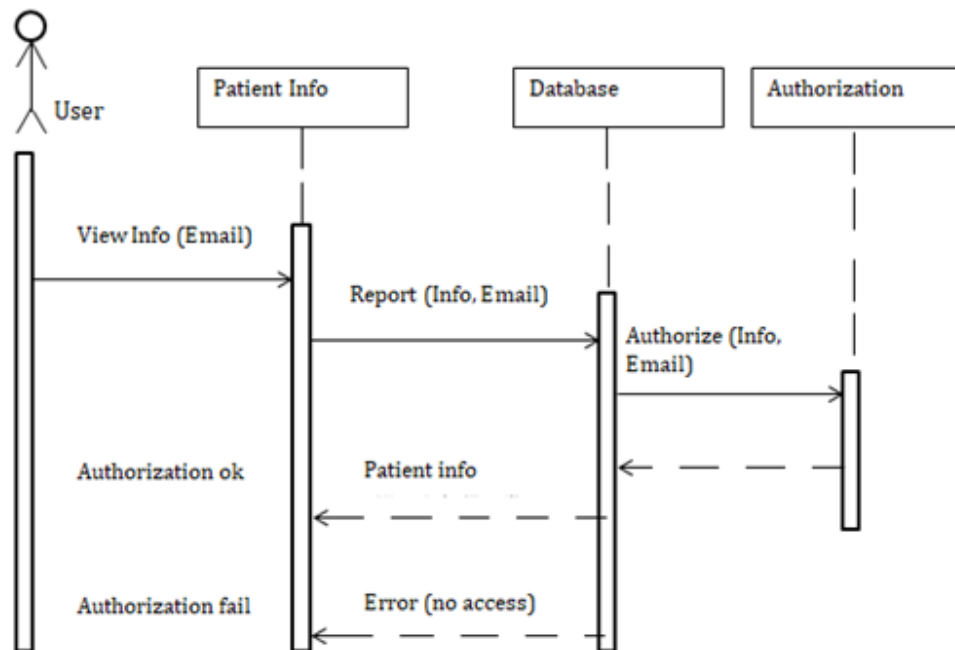


FIGURE 3.6: SEQUENCE DIAGRAM FOR VIEW PATIENT INFORMATION

### 3.2.4 Class

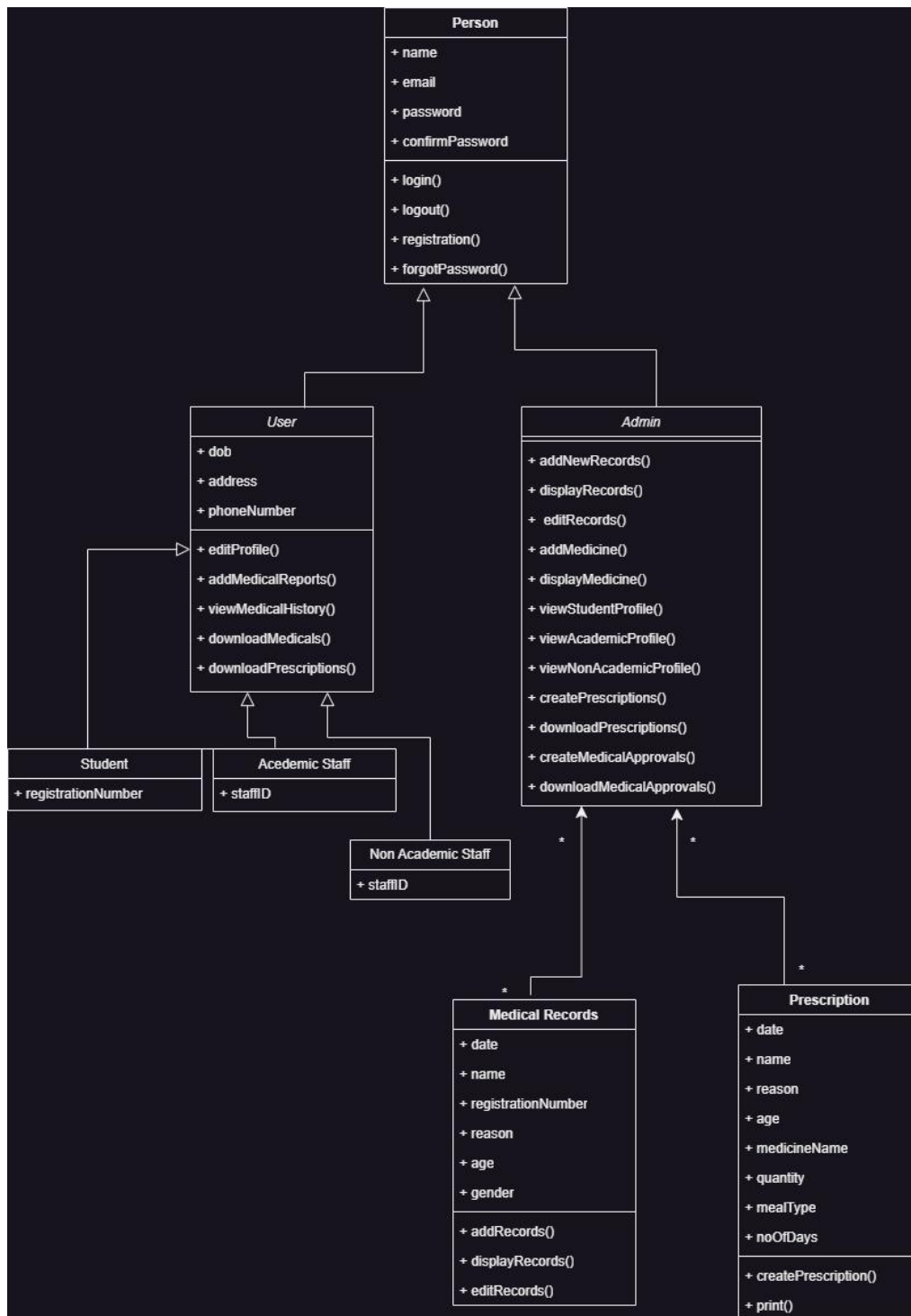


FIGURE 3.7: CLASS DIAGRAM FOR MEDICAL CENTER WEBSITE

## **4. Implementation**

### **4.1 Software services/Special Tools/Platforms**

#### **Description:**

We are implementing a web-based medical records system that allows users to access their medical history using only their email address and account password. The system includes the ability to upload scanned medicals as secondary verification and provides updates on the current situation of the medical center. The system allows students to access their previous prescriptions issued by the medical center, and provides functionalities for managing their reports, sending medical reports to the medical center, and downloading their own medical prescription and reports. The system also provides functionalities for academic and non-academic staff, including the ability to download their own medical prescriptions and view their medical history. For medical staff, the system includes the ability to issue medical prescriptions, approve medical reports through the website, and access the medical history of users. The system also provides updates about medicine stocks for the medical staff.

#### **Purpose:**

The purpose of this web-based medical records system is to provide a secure and user-friendly platform for accessing and managing medical records. The system is designed to streamline the process of accessing medical records, reduce the risk of errors and miscommunication, and improve the overall efficiency of the medical center.

#### Features:

The key features of the web-based medical records system include secure user authentication, the ability to upload scanned medicals for secondary verification, access to medical history and previous prescriptions, functionalities for managing and sending medical reports, and the ability to issue and approve medical prescriptions. The system also provides real-time updates on the medicine stocks for the medical staff.

#### Implementation details:

The implementation process involves designing and developing the web-based medical records system using HTML, CSS, JavaScript, and the Bootstrap CSS framework. The back-end functionality is being implemented using Firebase for authentication, storage, realtime database, Firestore database, hosting, and cloud functions. Additionally, Python and Flask are being used for server-side processing.

#### Testing and evaluation:

The web-based medical records system will be tested and evaluated to ensure that it meets the project requirements. This includes testing the front-end user interface for responsiveness and ease of use, as well as testing the back-end functionality for security, efficiency, and scalability.

#### Training and support:

Users of the web-based medical records system will receive training and support to ensure that they are able to use the platform effectively. This includes providing documentation and tutorials on how to use the system, as well as offering technical support to troubleshoot any issues that arise.

#### Benefits:

The benefits of this web-based medical records system include a secure and user-friendly platform for accessing and managing medical records, reduced risk of errors and miscommunication, and improved efficiency for the medical center. The system also provides real-time updates on medicine stocks for the medical staff, allowing for more effective inventory management.

#### Risks and mitigation:

Potential risks associated with the implementation of this web-based medical records system include security vulnerabilities and data loss. To mitigate these risks, we are implementing strong security measures, including encryption and multi-factor authentication, and regularly backing up data to ensure that it is not lost.

## **5. Evaluation**

### **5.1 Testing**

To ensure that our web application met the project requirements, we conducted various types of testing, including functional testing, usability testing, and security testing. Functional testing involved testing the individual components and features of the web application to ensure that they worked as intended. Usability testing involved testing the user interface and user experience to ensure that the web application was easy to use and navigate. Security testing involved testing the web application for vulnerabilities and ensuring that it met industry standards for data privacy and security.

After testing, we evaluated the results and made necessary improvements to the web application. We also gathered feedback from users and stakeholders to identify areas for improvement and future development. We used this feedback to update the web application and ensure that it met the needs of our users.

Overall, our testing and evaluation process ensured that the web application was high-quality, efficient, and secure. It also allowed us to make continuous improvements and enhancements to the web application based on user feedback and needs.

## **6. Discussion**

### **6.1 Challenges**

- Protecting the privacy of the students and academic staff.
- Providing the service to two different sections with two different interface.

- Provide an abstractive simple solution with a very little learning curve.
- Cost for using Cloud Function Firebase

## 6.2 Further Implementations

- Implementing a mobile application related to the web application.

Develop mobile application for patients and medical staff to access the management system on the go and include features such as reminders. And also enable secure communication and data synchronization between mobile and web-based platforms.

- Developing a feature to read handwritten prescriptions.

It will make medical staff easier to enter the prescription details for the system rather than entering manually.

- Use two factor authentication method.

This extra layer of confirmation will upgrade the system's generally security by requiring clients to supply a moment frame of confirmation, such as a one of a kind code sent to their portable gadgets, guaranteeing as it were authorized staff can get to delicate understanding data.

## 7. Conclusion

In conclusion, our web application project has been a great success. By creating a user-friendly and efficient platform for accessing and managing medical records, we have achieved our goal of providing a valuable resource for medical staff, students, and users. The project entailed developing a web-

based medical records system with several features such as secure user authentication, the ability to upload scanned medicals for secondary verification, access to medical history and previous prescriptions, functionalities for managing and sending medical reports, and the ability to issue and approve medical prescriptions. We also provided real-time updates on the medicine stocks for the medical staff, allowing for more effective inventory management.

Throughout the project, we learned valuable lessons and worked collaboratively as a team, overcoming challenges such as ensuring data privacy and security. We are proud of the final product and believe that it will have a significant impact on the medical field. Our web application will improve the efficiency of medical centers, reduce the risk of errors and miscommunication, and provide a more streamlined and user-friendly experience for medical staff and users.

Looking to the future, we plan to continue to improve our product by adding more features based on user feedback. We believe that there is always room for improvement and innovation and are committed to making our web application even more valuable to our users.

In conclusion, we have achieved our objectives and provided significant benefits to the users, medical staff, and students. We are grateful for the opportunity to work on this project and would like to express our appreciation to our team members, mentors, and anyone else who played a role in its success. We hope that our web application will continue to make a positive impact on the faculty medical center for years to come.

## References

- C. Team, "Front end vs. back end: Where should you start?," Codecademy Blog, 27-Aug- 2020. [Online]. Available: [https://www.codecademy.com/resources/blog/front-end-](https://www.codecademy.com/resources/blog/front-end-vs-back-) vs-back-



end/#:~:text=What%20languages%20are%20used%20in%20front%20end%20development%3F,affects%20how%20elements%20on%20the%20page%20move%20around. [Accessed: 19-Jan-2023].

- “8 back-end languages (plus tips for learning them).” [Online]. Available: <https://www.indeed.com/career-advice/career-development/backend-languages>. [Accessed: 19-Jan-2023].
- Janani, “Agile methodology: Definition, stages, types, and benefits,” Atatus, 21-Jan-2022. [Online]. Available: <https://www.atatus.com/glossary/agile-methodology/>. [Accessed: 21-Jan-2023].