Department of computer science and mathematics

CSC490: Software Engineering

Hospital Management System

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Abstract

The purpose of this software system is to establish a system that can be used by the hospital to manage its work in a reliable and effective manner. This system will provide the hospital with the essential facilities and services to keep the data maintained using a reliable database system. This system will allow the hospital to serve the patient in less time and a more efficient process. Furthermore, the system should allow many users to access and modify, insert, and delete data at a time. Each user will be able to access a section in the system for which he/she is authorized to access. To illustrate, an employee working in financial management can access financial information, health care providers can access patient medical information like electronic health records, an employee working in the admission office is allowed to register a patient to enter the hospital, nurses and secretaries has the ability to schedule an appointment for a patient/person, etc. All in all, this system is a significant tool that must be presented in every hospital to ensure the right workflow.

Table of Contents

I. Introduction:

1. Purpose:

The main purpose of this document is to determine all the significant requirements of a hospital management system. Moreover, this document will display all the detailed descriptions of the subsystems that are in charge of allowing the system to run effectively.

2. Scope:

The presented document has a significant role in building the system of the hospital. This document is a licensed source that includes all the detailed descriptions of the system requirements and expected outcomes. Thus, this document is a major factor in the validation process of the system and the developers will only modify the document upon the client's request, otherwise; he/she has no right in modifying the presented document. Furthermore, this document could be considered as a resource for the client to go back to whenever they need further detailed clarification of how the system will work and all its features.

3. References:

- KindGeek: How to Develop a Hospital Management System

  Official website:

  https://kindgeek.com/blog/post/how-to-develop-a-hospital-management-system
- LAU Medical Center Rizk Hospital:

  Official website: https://www.laumcrh.com/
- American University of Beirut Medical Center

  Official website: http://www.aubmc.org/pages/home.aspx

4. Overview:

The document will firstly introduce background information about the hospital management system. The document will present an overview of the software system that will be developed. To emphasize, the document will include the functional and non-functional requirements. The functional requirements of the system will involve several subsystems with each subsystem having a purpose that justifies its presence, a user-requirements, and a detailed system requirement. Furthermore, use case diagrams, tabular representations, and sequential diagrams will be presented to allow further understanding of the software.

II. Overall Description:

1. Product perspective:

The main target of this system is to decrease the time consumed and to facilitate the hospitals' staff work to have better efficiency. This software will make the working environment less error-prone since manual work can be highly prone to errors where no condition and instant detectors are applied to catch the errors instantly. Thus, the system will decrease working procedure complexity and increase the speed and productivity of the overall system.

2. Product functions:

The hospital management system will be composed of 5 subsystems:

2.1. Hospital Services Management

2.2. Hospital Resources Management

2.3. Billing and Financial Management

2.4. Employee Management

2.5. Emergency Covid – 19 Department

3. User Characteristics:

The users of the hospital management system will mainly be the doctors, nurses, accountants, secretaries, etc. All the users should be trained on the system part that they will use. Illustrating, nurses, doctors, and secretaries might be trained to use the electronic medical records of a patient, employees working in the admission management must be trained how to use the registering subsystem, accountants must be trained on using the billing and financial management subsystem, etc. Recognizing what part of the system which user will use and training him/her on this part will ensure that the system will be used in the most effective manner.

4. General Constraints:

The system should be able to serve a specific number of users without errors, bugs, and delays. The system results should be accurate and specific. Users will be able to use the system using a specific password that will be given to achieve a secure system. Security is a must because the system will contain critical data that should not be accessed by random unauthorized users. Illustrating, managers will be allowed to access the whole system while accountants will only be allowed to access the billing and financial subsystem.

III. Functional Requirements:

1. Hospital Services Management:

a. Patient Admission:

Purpose:

The main purpose of this service is to organize the admission process that must be done for a patient before he/she enters the hospital to have the needed treatment. During the admission process the needed information of each patient will be collected and maintained.

User Requirements

- The authorized user will be able to register for the patient using different patient information.
- The authorized user will be able to check the available vacancies in the hospital.

System Requirements

- The system will display to the user, a "Patient Information" form that will allow the user to register for the patient in the hospital using the patient information displayed on the identity card as name, date of birth, etc.
- The system will allow the authorized user to assign unique ID for each patient. This ID will facilitate the work between the staff and will organize the patient medical information.
- The system will display a financial section when registering. This financial section will include the patient financial state, by that we mean that the patient should provide the type and details of his/her insurance guarantee status if he/she have insurance guarantee. The insurance will affect the treatment cost that will be set on the patient account during his/her treatment.

- The system will display to the user a specific section to submit the "Hospital Entry Paper" that is usually provided by the doctor. This paper specifies the reason of the patient entrance.
- The system will include a reliable database system that will store all the collected patient information that are needed to be stored.
- To validate the registering request, the system will display to the authorized user a list of the available beds that can be selected to the patients. If there are no available beds in the hospital, the admission request will be rejected. If there are available beds, the user will choose one bed from them and the chosen one will be deleted from the list of available beds. After the patient withdraw from the hospital, the vacant bed will be automatically added to the available beds list.

b. Electronic Health Records Management

Purpose:

An electronic medical record will store medical information about the patient's health history. The health history is like medicines, allergies, immunization, etc. Moreover, only the staff members taking care of the patient will be allowed to access the HER owned by the patient. Accessing the EHR will help in analyzing and studying the patient status, thus enabling the health care providers to take precise decisions.

User Requirements:

- The system will allow the authorized users to have access on the patient data.
- The system will allow the authorized users such as health care providers to access the records.
- The system will enable the user to search through the records using some search filters (ex: ID, Name, etc.).

System Requirements:

- The software system will include a database system that will store the patient medical information.
- The system will allow the authorized users to search, update the patient data whenever a new update appears, insert new data for new patients, delete data in case of false or incorrect data entry using some queries.
- If the searched EHR is not available, a sentence **"THE SEARCH YOU PROVIDED IS UNAVAILABLE"** must be displayed in red near the name searched for.
- To enable search filters to run, some algorithms and calculations will be implemented. This algorithm might be a "compare algorithms" that will compare the data based on the user request. For example, if the user wants the most recent HER inserted to appear first, the algorithm will compare the date of insertion between the EHR and based on the comparison results, the system will display the data in ascending order.

c. Patient Appointments Management

Purpose:

The main purpose of this service is to schedule and organize all appointments that will be assigned for people with their professional doctors within the hospital environment at a specific date and time. In addition, the system will ensure that only one appointment for each doctor will be made at a specific time to avoid time conflict.

User Requirements:

- The system will provide for the user a section to enter the needed patient information.

- The system will provide the user a list displaying all the appointments.

System Requirements:

- The system will display to the user a form to be filled with the needed information (name, phone number) of the person who want to have appointment with a specific doctor.
- When the needed information is added, the system will display for the user a list with all the available appointment dates and times to choose from.
- On choosing the appointment data and time, the system will remove the date and time slot that have been assigned to a specific appointment from the available lists as well as the room.
- When the user selects the day and time, the system will display for the user a list with all the available rooms.
- The system will display a confirmation request to the user to confirm on the selected date, time, and room.
- The system will allow the user to cancel an appointment, thus adding the vacant appointment to the available appointments list.

d. Surgery Scheduling:

Purpose:

Some patients need surgery to be treated, thus, we aim to design a surgery scheduling system so we make sure there will be no time conflict between one surgery and another. In addition, the system will automatically generate all the needed equipment and staff for any surgery will occur on the site.

User requirements:

- The software will facilitate the scheduling process of all the surgeries that will be on the site.
- The software will allow the user to keep track on any needed medical material for any surgery and if it is available.

System requirements:

- System will provide three tracker buttons showing empty, full, or It is being repaired surgery rooms at the instant time.
- A room will be considered repaired after finishing the surgery, then it will be considered empty when finishing the repairing.
- System will show for each scheduled surgery what material is needed and if they are available, if they are not available a contact with inventory department will be held.
- The system will check the availability of the surgery staff including surgeon, Nurses, and the anesthesiologist.
- System will schedule the starting and the predicted ending time.
- In case of any delay in the predicted ending time of the surgery, the system will automatically reschedule the surgeries that will be held after time.

e. Pharmacy Services Management:

Purpose:

The aim of the pharmacy services management system is to provide the hospital with the needed medicines and medical equipment to medicate the patient. Moreover, the pharmacy services management system will equip the hospital with the services and facilities that are needed such as selling and distributing the medication and pharmaceuticals in the hospital.

User Requirements:

- The system will allow the user to have access for the medicines information.
- The system will display for the user a section to search for a specific medicine.

System Requirements:

- The system will enable the user to search for a specific medicine and display all the medicines available in the store in which they are stored.
- The system will provide the user with the ability to add and delete medicines from the system using specific queries. It will also allow the modification of medicine information as the number of available items.
- If a requested medicine is available and the user selects it, the number of the ordered medicine will be removed from the system (if the available amount of specific medicine is 50 and someone wants to buy 5 then the available number will be reduced to 45). If the requested medicine is not available, the system will display for the user on the screen **"OUT-OF-STOCK"** message.
- After the selection, the system will formulate receipt for the order with all the details written.
- When the pharmacy wants to refill their stock with specific medicine, the system will allow the pharmacist to send a form filled with the needed medicines and medical equipment to the inventory management system.

2. Hospital Resource Management:

a. Room Scheduling:

Purpose:

Room Scheduling is a must in any future e-hospital system. This requirement will save time and money for the institution. The software will keep track on the full and empty rooms and how they are distributed between floors and wards. The key purpose of the requirement can be noticed form covid-19 pandemic, where all hospitals find it difficult to track their empty rooms and manage them between affected people and non-affected ones.

User requirements:

- The system will allow the user to have a system tracker for all empty and full rooms.
- The authorized user will be able to auto schedule patients' appointments and set them to a specific room.

System requirements:

- The system will provide a table, representing all rooms types with their status of availability.
- The system will show specifically each room in its own basics with a full description of its status of availability, needed equipment, patient's ID if they are in the room, and who is responsible for its managing and cleaning during the day and between shifts.
- The system can be access by authorized users only.
- The system will keep track on all the equipment's needed for any room if they are available or not, if they are not available, the user will send a request to the inventory management to buy the needed equipment.

b. Laboratory Management:

Purpose:

The aim of the laboratory management system is to provide a diagnosis that contains the results and analysis of the patient tests. The laboratory management system will assist the staff in collecting samples, processing, and delivering the reports to the patients.

User Requirements:

- The laboratory management system will help the staff in scheduling patient analysis and results time.
- The laboratory management system will allow the staff to add patient test results to the system and give feedback on the result.

System Requirements:

- The laboratory management system will allow the authorized user to insert and modify the patient's test results and patient needed personal information that are presented on the identity card using some specific queries.
- The system will schedule the time of test performance by setting appointments to the patients at specific dates and times. Moreover, the system will schedule the timing of test analysis so that all the tests can be carried in order or by type of emergency without any delay. Once the results are out, some health care provider will give feedback on the results.
- The laboratory management system will send a notification to the staff once the tests results are out.
- The laboratory management will allow the staff to order a receipt for the cost of generating the tests.

c. Inventory Management:

Purpose:

An inventory management system manages the hospital's supply chain, equipment timeline, and the check-in and check-out of the medical equipment. Available and unavailable components will be also tracked to organize the supply chain. It is also responsible to keep track of the expiration dates of medical equipment as they are very critical to be misused, thus reducing the probability of such medical errors occurring.

User requirements:

- The system will allow the authorized users to check all the medical equipment, supply, medicines, and other products information.
- Only authorized users will be allowed to access the system.
- The user will be allowed to search through the data using some filter tools.

System requirements:

- The system will include a database to store the needed information about the medical products. The needed information is as product name, date of expiration of product, check-in, and check – out, available quantity, quantity available, etc.
- The system will allow the authorized users to apply searching, adding, removing, and modifying on the data will be allowed using specific queries.
- If the day date skipped the expiration date, the expired product will be marked as red, and a notification will be sent to the authorized user. Moreover, the quantity available of the product whose date has expired will be decremented by the number of expired pieces of the product.
- If a product quantity has ended or the product searched for is unavailable, an unavailable item might be displayed in red with the word **"UNAVAILABLE"** near the name of the product.

- Algorithms and calculation methods will be implemented to enable the search filters to run correctly. Illustrating, compare algorithms will compare the data based on the user request. If the user wants the name of the product with the lowest quantity, to appear first, the algorithm will compare the number of available items between the products and based on the comparison results, the system will display the data in descending order.

3. Billing and Financial Management:

Purpose:

The hospital management system will be responsible in providing the mechanisms to facilitate the financial process at the hospital. The billing and financial management system will generate budgets, provide wage payments to the staff, and will manage purchases of medical supplies for the hospital. Furthermore, the system will collect and calculate all the hospital profits.

User Requirements:

- The system will allow authorized users to access and modify the data.
- The billing and financial management system will allow the authorized user to generate a receipt of the requested calculations.
- The system will allow authorized users to manage purchases of medical supplies.

System Requirements:

- The billing and financial management system will provide the user with a section that will display multiple information about the incomes of the staff. This section will include the income of an employee and his/her name.
- The billing and financial management system will display for the authorized users a section to insert the profits, wages, taxes, and all the financial flows in the hospital.
- The billing and management system will provide an interface that will allow the user to generate mathematical calculations to calculate the sum of profits and losses that the hospital has made.
- The Billing and financial management system will provide an interface to list or search for patient's invoices.

4. Employee Management:

a. Employee Data:

Purpose:

Employees in the hospital as doctors, nurses, managers, cleaning workers, etc. need to have their data stored. Employee data system serves as a product that enables the storing process of the employee data.

User requirements:

- The system will display to the users all the employee information.
- The authorized users can use some filter tools to search in the data as specialty, name, salary, etc.

System requirements:

- The system will only allow authorized users to modify and check the employee data.

- The system will include a database system that will store all the needed information for the employee like name, date of birth, specialty, salary, working hours, the start of work date, and end of work date in case the employee is no longer working in the hospital.
- Authorized users can retrieve, update, delete, insert new data into the system using some queries.
- Some algorithms are to be inserted into the system to enable the search filters to run. Sorting algorithms are to be used when ordering the data in ascending or descending order depending on the request. Additionally, some calculations are to be done to display the average salary of the employees.

b. Employee Shift Scheduling:

Purpose:

The hospital management system will provide the facilities and mechanisms to handle the staff scheduling shifts. The staff scheduling shifts system will be working on setting scheduling shifts for the staff to assure that organized working environment is available.

User Requirements:

- The staff scheduling shifts system will provide the authorized users with the ability to check the attendance information of the employees.
- The staff scheduling shifts will form an attendance sheet to keep track of the staff of who are attending during their shifts and who are not.

System Requirements:

- The staff scheduling shifts will display an interface where the attendance sheet that includes the dates and time will be displayed. On this attendance sheet, the authorized user will be able to set an employee/s at each section of the attendance sheet.
- The system will display a separate part for each working field to avoid mixing the employees shifts with the working field. To illustrate, if the needed employee at a specific time is 5 employees, we should not set the employees randomly without knowing the working field, for example, if the needed security guards at a time is 5, we should not count a nurse in the same schedule because he/she works in in different field. Thus, every working field will have a separate attendance and scheduling sheet and criteria.
- The system will keep track of the employees attending, by that we mean that if an employee arrived at his/her shift time, he/he must sign her name to ensure that the system will save that the employee was not absent. It the employee did not arrive at his/her shift time, the system will mark him as absent and a notification displaying **"THE EMPLOYEE "name" IS ABSCENT."**
- The staff scheduling shifts system will allow the authorized user to update, modify the schedule of the staff when needed using some queries.

c. Virtual Communication:

Purpose:

The communication between staff members as doctors and nurses can be facilitated using a virtual communication platform instead of the traditional face to face way especially during covid-19 pandemic. A virtual communication platform is a hospital software that provides chat box and calling button to tell nurses what they must do for a specific patient.

User requirements:

- The system will allow multiple users from all the hospital departments to communicate virtually.
- Users will be able to log in to the platform using user – id and password.

System requirement:

- Authorized users can send data to users who are authorized to see the sent data, otherwise; sending data to users who are unauthorized to see it is prohibited.
- Users will be allowed to delete their messages; however, they will not be allowed to delete other users' messages.
- The system will provide a separate interface to show emergency messages and notifications.
- The system provides a specific report type that can be sent to nurses to treat the paints.
- The system will have also chat box that can allow the communication process between the staff.

5. Emergency Covid – 19 Department:

Purpose:

During Covid – 19 pandemics, it is difficult to have all the staff and the patients engaged together. For safety reason, and to stop the spread of the disease, the Emergency covid 19 pandemic subsystem was created.

User requirement:

- The system will allow the users to insert the personal and medical info of the patient who are carrying the disease.

- The system will allow the users to generate a list with the total number of affected patients in the hospital.

System Requirements:

- The system will only be accessed by the authorized users.
- The system will allow the user to insert the patient covid – 19 info as the CT level and the day of affection.
- The user will be able to search for a patient and modify his/her information as the death date, recovery date, entry date, exit date, PCR results, CT level, etc.
- The system will allow the user to search for the medical staff who are in charge of the emergency covid – 19 pandemics as name and ID.
- The system will allow the user to check if the covid equipment's are available as oxygen, sanitizers, PCR test equipment's, etc. if the searched equipment's are not available, the system will issue a command to the inventory management to buy the needed materials.

IV. Non-Functional Requirements:

Non-functional requirements define the efficient operation of HMS and must specify the certain criteria the system must comply with.

Security:

- Patient identification and know your customer mechanisms.
- Logon ID and encrypted password.

- Data security of incoming information must be guaranteed.
- Roles & Permissions requirements, which are based on the idea that each user should see and do only what is allowed by the permission system, and all others should be blocked.

Performance:

- Time: the system response must be fast, within one second of the request.
- Capacity: support no less than 200 concurrent users, depending on the size of the organization, and is unlimited for admission.
- Law compliance: the system should be adapted to the legal framework of the country in which it is used.

Maintainability:

- Errors: the system records all errors that have occurred.
- Back-up: the availability of automatic and on-demand backups.
- Disaster recovery: allows you to quickly restore the code infrastructure on a new server in case of loss or theft of a working device.

Reliability:

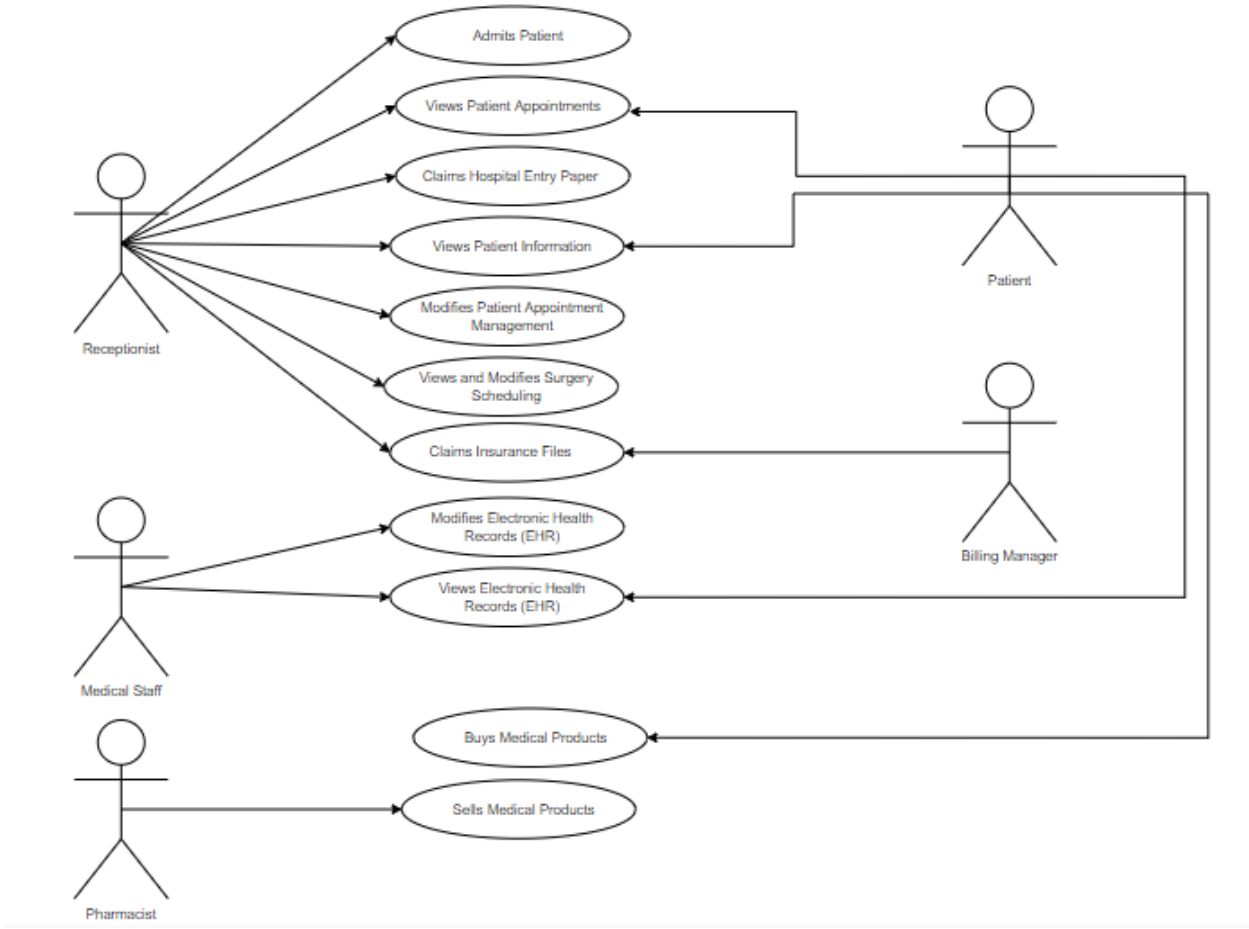
- Lies**:** in continuous accessibility of the system 24/7

Responsiveness design:

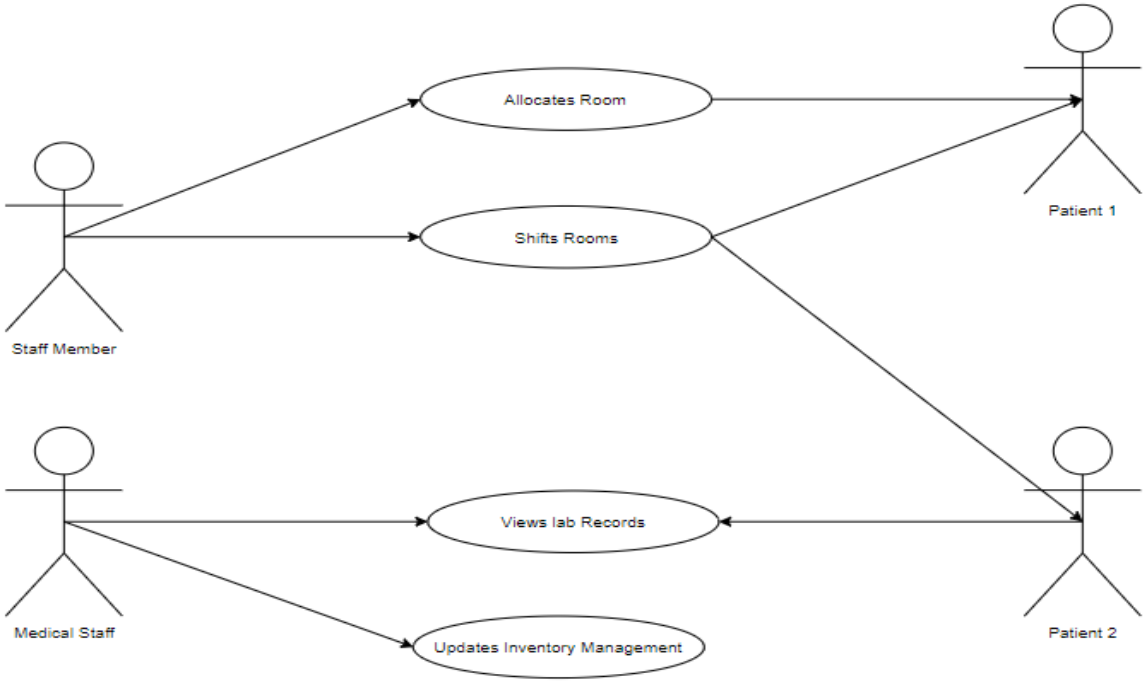
- The site should work well on all devices and browsers, so you do not have to create applications for other platforms.

V. Use Case Diagrams:

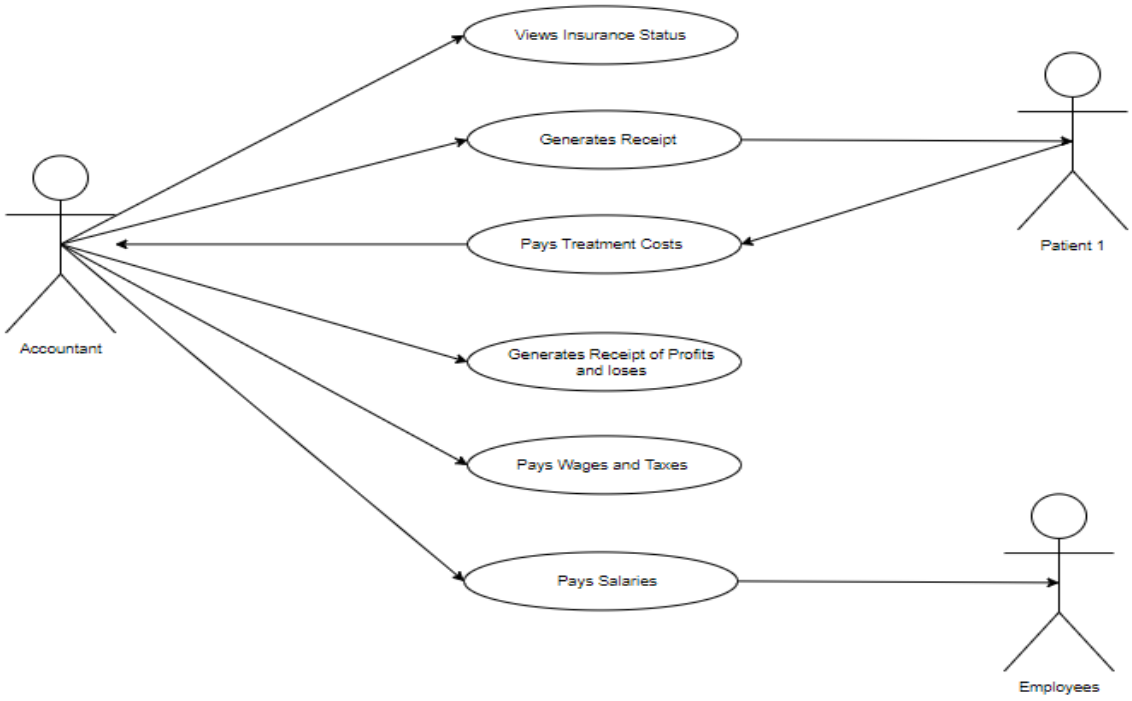
1. Hospital Service Management System:



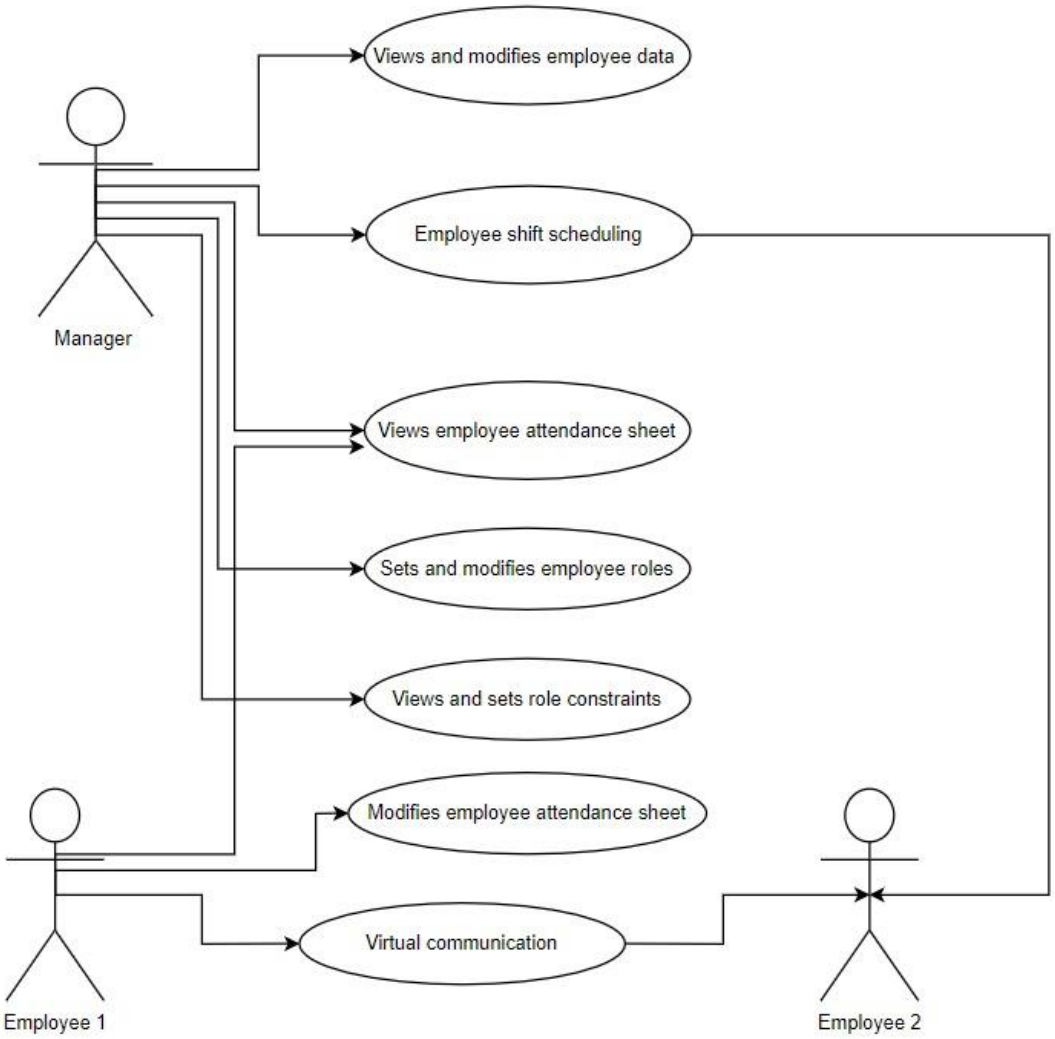
2. Hospital Resource Management:



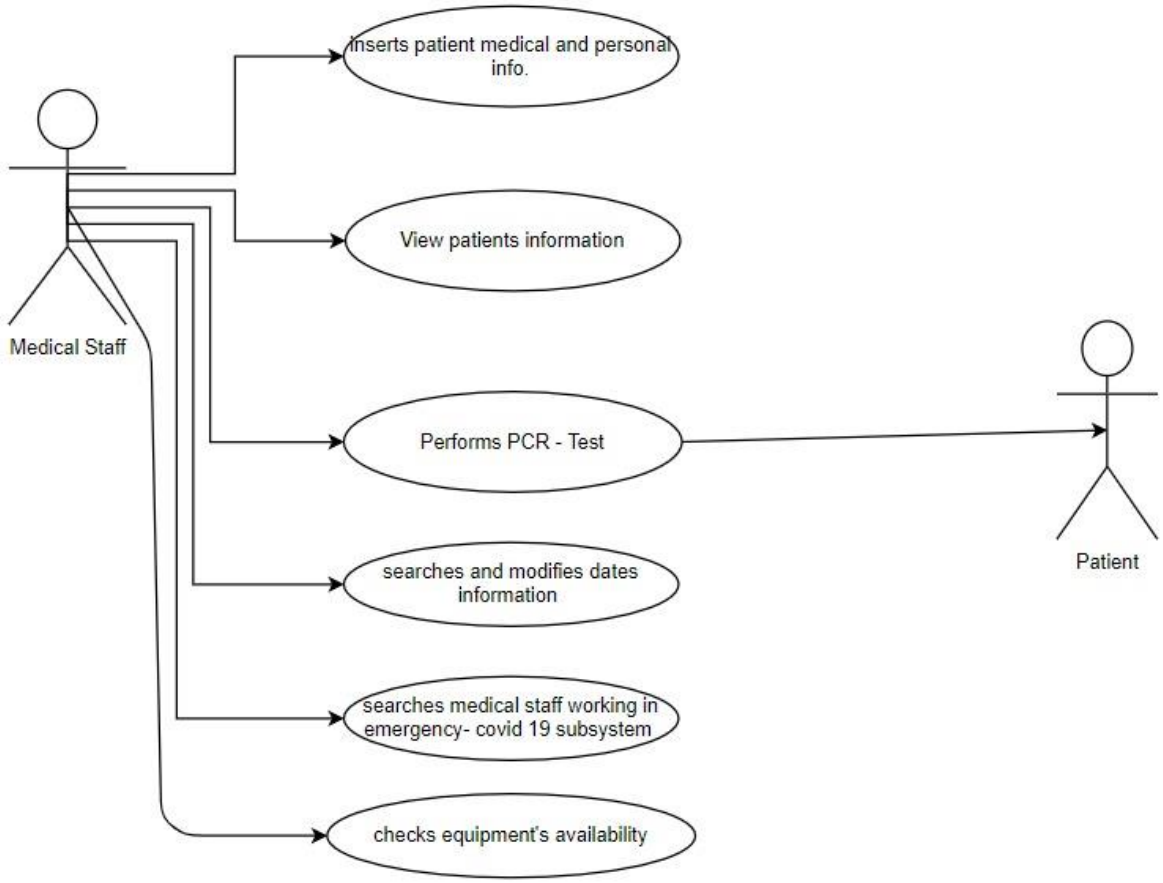
3. Billing and Financial Management:



4. Employee Management:



5. Emergency covid – 19 Department:



VI. Tabular Representation:

1. Hospital Services Management:

a. Patient Admission

Patient Admission	
Actors	Receptionist, Patient, Billing manager
Description	Upon the arrival of the patient to the hospital, the patient should provide the receptionist his/her personal information and the hospital entry paper that the patient should get from his/her doctor to approve the need for hospital entry. In addition, the patient should give the receptionist his/her financial status information to reduce the amount of money that should be paid by the patient (insurance or other kinds of guarantee). Then, by presenting (by the system) for the receptionist a "Patient Information" form, the receptionist will be able to add the information provided by the patient, assign a unique ID for the patient, and add them to the database. After that, the billing manager will claim the insurance files of the patient to make sure that the patient will pay only the reduced payment.
Data	Patient's personal and financial information.
Stimulus	User commands issued by the receptionist.
Response	The system will store all the information in the patient's database with the patient's related ID, and the system will confirm the admission process.
Comments	Security is a must in this system since it contains sensitive, thus only the authorized users (receptionist) will be able to access it to ensure that the system is properly secured. Also, note that the admission will be rejected if the patient does not have a hospital entry paper from his/her doctor that clarifies the main reason for the hospital entry. Unless if the case is an emergency, then the patient admission will be directly accepted.

b. Patient appointments

Patient Appointments	
Actors	Receptionist, Patient
Description	Upon the arrival of the patient to the hospital to book an appointment, the patient should provide for the receptionist his/her personal information that is: name, phone number. Then, the system will present for the receptionist a form to fill in with this information to store it in a file. Then, the receptionist will assign a specific date and time for the appointment. After that, the system will automatically remove this scheduled date and time from the available dates and times list. Afterwards, a room will be assigned for the appointment. Finally, the receptionist can cancel the appointment when the patient requests that.
Data	Patient's personal information, date and time and room of the appointment.
Stimulus	User commands issued by the receptionist

Response	The system will store all the information in a file that will ensure the appointments are scheduled properly.
Comments	Only authorized receptionists will be able to access this system to ensure that the system is well secured.

c. Surgery Scheduling

Views and Modifies Surgery Scheduling	
Actors	Receptionist
Description	A receptionist will schedule the surgery appointment to allow the medical staff to perform the needed treatment on time. After finishing the surgery, the room must be cleaned and all the equipment's have to be checked it they are available, if they are not available, a contact with the inventory management will be issued to request the needed materials. Afterwards, the room will be reassigned as available.
Data	Available rooms for the surgery.
Stimulus	User commands issued by the receptionist.
Response	The system will set an appointment for surgery.
Comments	Only authorized receptionists will be able to access this system to ensure that the system is well secured.

2. Hospital Resource Management

a. Inventory Management

Inventory Management	
Actors	Medical Staff.
Description	The medical staff must issue a list to the inventory management that will contain all the medical equipment's needed as insulin pumps, oxygen concentrators validators, heart machines, medicines, etc. they will always update the inventory management and requests their needs that needs to be bought. As the inventory management receives these updates and requests, it

	will buy the needed supplies to facilitate the treatment and work process for the staff. Additionally, the management will check for the purchasing requests that were issued by the pharmacy services management system, and when checking for the stocks available, it will keep track of their expiration date.
Data	Medical equipment needs.
Stimulus	A user command issued by medical staff.
Response	A configuration that the inventory management has been updated.
Comments	for security reasons, the medical staff user should have the authority to access the database to perform such an update operation.

3. Employee Management

a. Virtual Communication

Actors	**Employee 1, Employee 2**
Description	All the employees in the hospital may use this platform to send some sort of data to each other's. when sending the data, the employee should consider that the other employee is authorized to check this data. The actors should have access to their system portal to talk with doctors via the system. Doctors send the required patient's treatment to an assigned nurse. Nurse receives doctors' message, and they can reply to it. Nurses can ask doctors for a specific query during their shifts.
Data	Chats between doctors and nurses will be save in the Database.
Stimulus	User commands issued by the hospital employees.
Response	Notification of the message to the receiving user.
Comments	For security reasons, the exchanged messages would be highly secured because the sent message might contain private information. Only employees who shared the messages will have access to it.

b. Employee Shift Scheduling

Employee Shift Scheduling	
Actors	Manager
Description	The manager will specify the role for each employee and schedule his/her shift. The manager will provide an attendance sheet to keep the track of all the employees. Moreover, the manager will distribute the task for every role separately to avoid any confusion.
Data	Date, time, employee's name, and ID
Stimulus	The necessity to modify or to update the employee's schedule.
Response	The system will store all the data about the employee's schedule and personal information, and the attendance sheet.
Comments	Only authorized managers will have the authority to access the system to ensure that the system is well secured and maintained.

4. Emergency Covid – 19 Department:

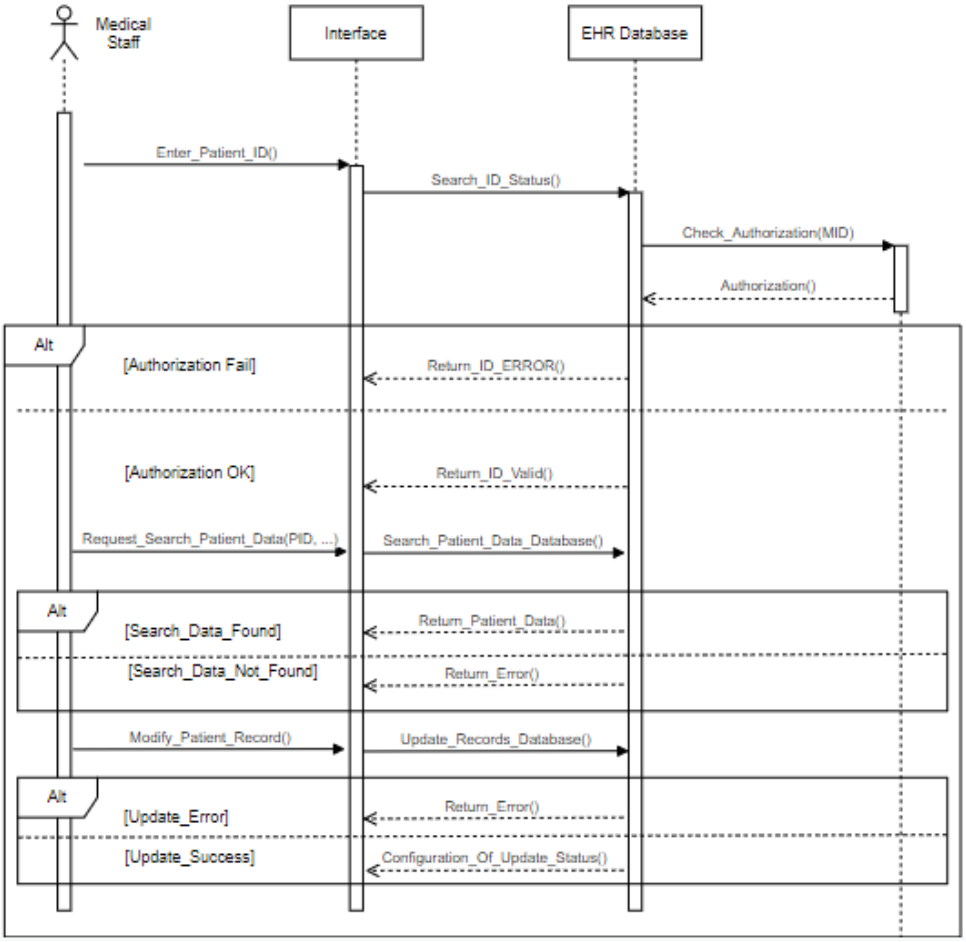
Emergency Covid – 19 Department.	
Actors	Medical staff., patient
Description	A patient having some covid – 19 symptoms will enter the emergency department to perform the PCR test. The medical staff will apply the test using the covid - 19 equipment. If the equipment is not available, the department will send a request for the inventory management to buy the needed equipment. After performing the test, if the result is positive, the PCR info will be inserted in addition to the patient personal information. afterwards, on patient recovery or on patient death, the data will be stored.

Data	Patient personal and the PCR test information.
Stimulus	The necessity to discover the patient PCR results.
Response	The system will return the PCR results of a patient.
Comments	Only authorized medical staff will have the authority to access the system to ensure that the system is well secured and maintained because it contains critical patient personal and medical information.

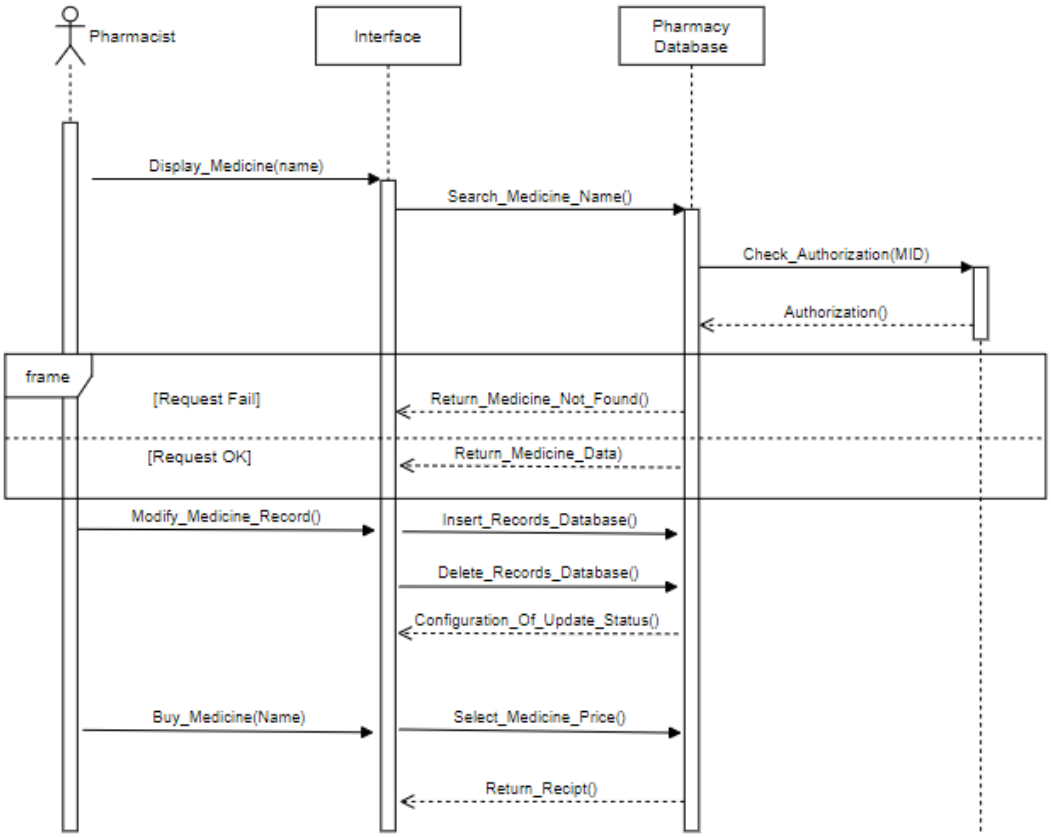
VII. Sequential Diagrams:

1. Hospital Services Management:

a. Modifies Electronic Health Records

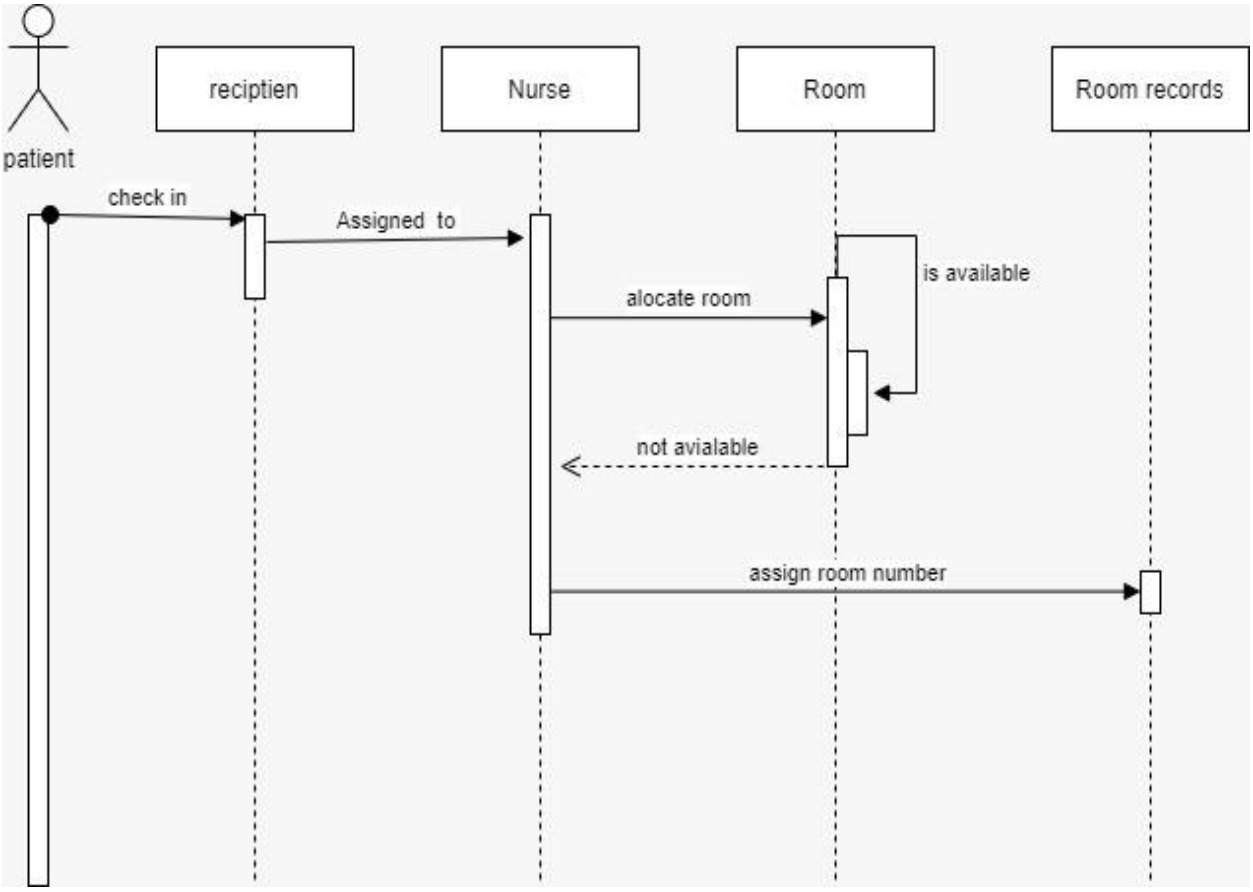


b. Pharmacy Services Management

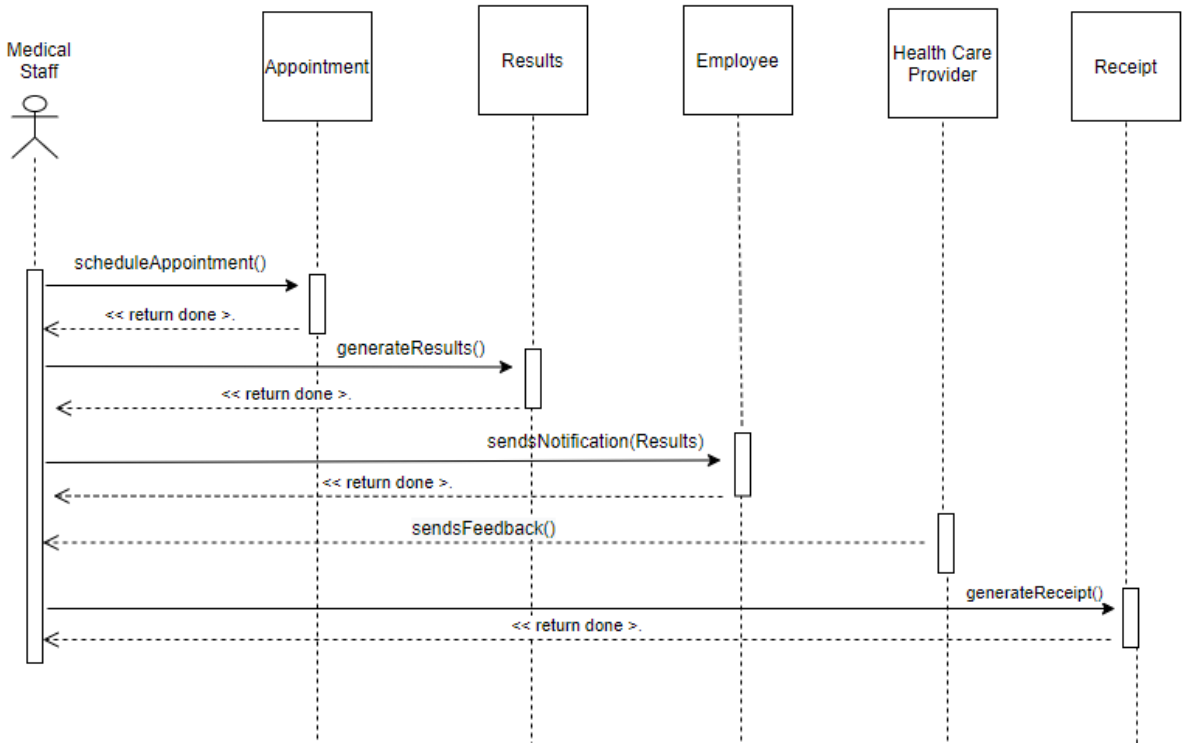


2. Hospital Resource Management

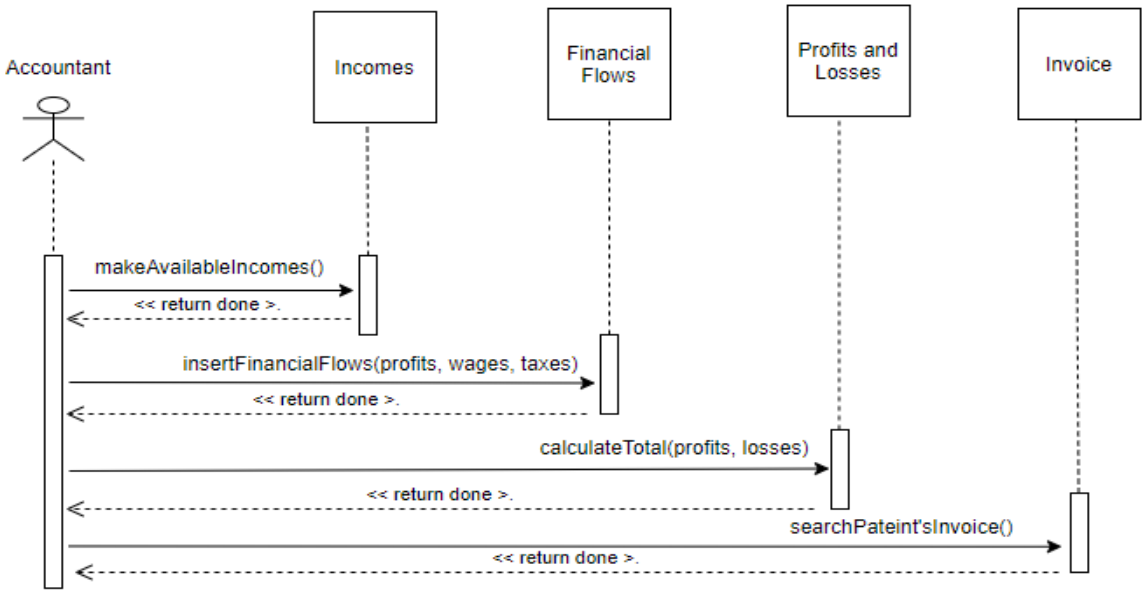
a. Room Scheduling:



b. Laboratory Management

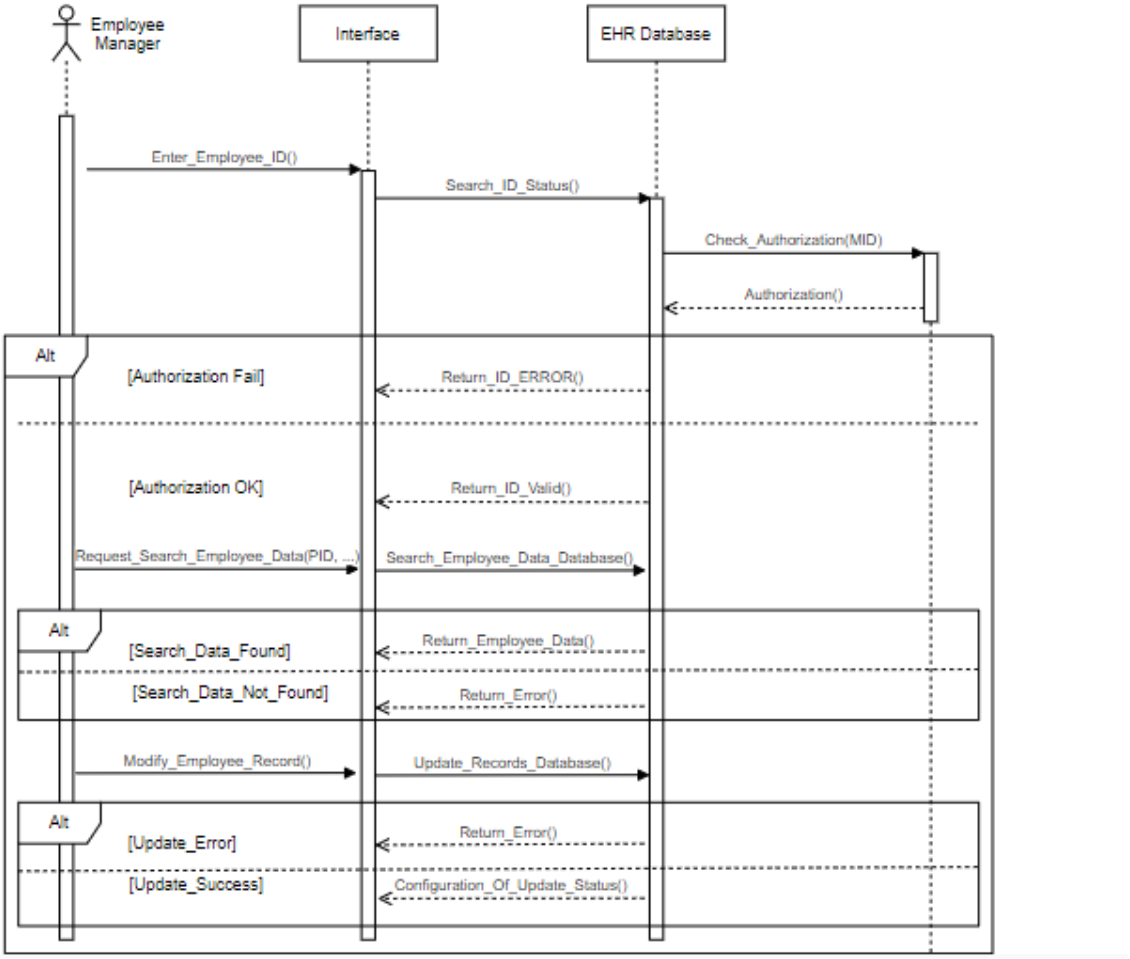


3. Billing and Financial Management



4. Employee Management

a. Employee Data



VIII. Appendix:

1. Coordinator Report:

   Coordinator Name: Gheeda Choucair

   Meetings:

Date	Members present	Duration time
Thursday, February 25, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	2 hours
Friday, February 26, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	2 hours
Saturday, February 27, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	4 hours
Sunday, February 28, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	3.5 hours
Friday, March 5, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh	3.5 hours

	Hassan Mshawrab	
Friday, March 12, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	4 hours
Saturday, March 13, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	4 hours
Sunday, March 14, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	3.5 hours
Wednesday, March 17, 2021	Gheeda choucair Rania Dakroub Reine El Ferekh Hassan Mshawrab	5 hours

Who did what:

1. **Abstract/ Introduction/ Overall Description**

   Gheeda choucair, Rania Dakroub, Reine El Ferekh

2. **Functional Requirements**

   i. **Hospital services management**

      a. Patient admission: Reine El Ferekh

b. Electronic Health Records Management: Gheeda Choucair

c. Patient Appointments Management: Reine El Ferekh

d. Surgery Scheduling: Hassan Mshawrab

e. Pharmacy Services Management: Reine El Ferekh

ii. Hospital Resource Management:

a. Room Scheduling: Hassan Mshawrab

b. Laboratory Management: Rania Dakroub

c. Inventory Management: Gheeda Choucair

iii. Billing and Financial Management: Rania Dakroub

iv. Employee Management

a. Employee Data: Gheeda Choucair

b. Employee Shift Scheduling: Rania Dakroub

c. Virtual Communication: Hassan Mshawrab

v. Emergency Covid – 19 Department: Gheeda Choucair, Rania Dakroub, and Reine El Ferekh

3. Non – Functional Requirements: Hassan Mshawrab

4. Use Case Diagrams: (Where done by all the group together in one meeting)

5. Tabular Representation:

i. Hospital Services Management:

a. Patient Admission: Reine El Ferekh

b. Patient Appointment: Reine El Ferekh

ii. Hospital Resource Management:

a. Inventory management: Gheeda Choucair

iii. Employee Management:

a. Virtual Communication: Hassan Mshawrab

b. Employee Shift Scheduling: Rania Dakroub

iv. **Emergency Covid – 19 Department:** Gheeda Choucair, Rania Dakroub, and Reine El Ferekh

5. **Sequential Diagrams:**

   i. Hospital Services Management:

      a. Electronic Health Records: Gheeda Choucair

      b. Pharmacy Services Management: Reine El Ferekh

   ii. **Hospital Resource Management:**

      a. Room Scheduling: Hassan Mshawrab

      b. Laboratory Management: Rania Dakroub

   iii. **Billing and Financial Management: Rania Dakroub**

   iv. **Employee Management:**

      a. Employee Data: Gheeda Choucair

Additional Remarks:

- We did the meetings through WEBEX and ZOOM.
- We had an interactive online chat WhatsApp group in which we discussed the project on daily basis.
- When we were facing troubles, we were always helping each other.

Signatures:

Gheeda choucair

Rania Dakroub

Reine El Ferekh