



جامعة جدة University of Jeddah

CCSW 223: Software Engineering

University of Jeddah

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Lab 1

Project name : SafeHealth

Introduction and definition of the project

As time goes on it seems like more ‘mysterious’ sicknesses and diseases are emerging while our public healthcare technology is not following suit, evidenced by the 2019-present covid-19 outbreak.

Sick people are tired, and tired people most likely are unable to keep up with the medical back and forth visits, especially physically. Our inspiration to create this project is to make accessing one’s healthcare providers an easy and seamless experience.

We believe that the first step we can take is creating this application that could help people diagnose their sickness from home with the best quality and accuracy.

We proposed and ironed out many ideas to help with each problem we encountered.

We tried to provide easy, useful, and specific criteria for understanding the project’s estimated outcomes and its efficiency. Including a list of its advantages and disadvantages. Our project will include multiple features that are not limited to virus diagnosis. For example, our clients will also be able to communicate with their assigned doctors or caregivers from home, apply for discounted fee offers for their appointments and more.

We hope we can make hospital appointments as available and comfortably as possible, as your doctor will always be just a couple clicks away!

Lab2

Interview Description

Aims:

- Examination and analysis of information provided by interviewees.
- Investigating all the circumstances and problems faced by various people on many different measures such as the financial and time aspects.
- Helping the elderly, low-income families and disabled by making healthcare more accessible.
- Delivering various health tests and advice.

Open Questions:

- Describe any recent doctor visit you did; would you have preferred doing it online from home?
- Describe any recent symptoms or changes you have experienced in your health. Was it sudden or gradual?
- When you had symptoms like rashes, sneezing, or coughing, did you ever decide not to get tested for viruses? If yes, would you mind sharing the factors or worries that led you to make that choice?
- What difficulties do you face when you want to go to the hospital?
- What specific features or information would you find most valuable on a virus test center website?
- Would you prefer online doctor visits or tests over traditional ones? why / why not?

Closed Questions:

- Does your job require direct contact with strangers?
- Have you ever had problems with your immunity?
- Do you take seasonal/yearly vaccines?
- Do you find regular doctor visits bothersome?
- Does your job offer you paid leave time when you feel unwell?
- Do you think that if there was an initial examination of symptoms at home, it would help you a lot? Would you change your mind not to go to make sure it is not symptoms of a virus?

Q1. Do you find regular doctor visits bothersome?

Joud: Yes, going to the doctor is bothersome when I'm not on holiday. Finding a convenient time is really challenging especially during exams.

Hala: Yes, I only go when it's urgent.

Q2. Describe any recent doctor's visit you made; would you have preferred doing it online from home.

Joud: My last doctor's visit was routine, just a check-up to make sure everything's in order. While it was necessary to be there in person for some tests and examinations, I could see the appeal of doing certain follow-up appointments online from home. It would save a lot of time and hassle, without sacrificing the quality of care. I wish I could contact my doctor regularly without having to go in.

Hala: My recent doctor's visit was quite necessary, as I needed some tests and examinations that couldn't be done remotely. However, for follow-up appointments or routine check-ins, I can see the appeal of doing them online from home. It would offer convenience, especially for those with mobility issues or busy schedules, while still ensuring access to healthcare.

Q3. When you had symptoms like rashes, sneezing, or coughing, did you ever decide not to get tested for viruses? If yes, would you mind sharing the factors or worries that led you to make that choice?

Joud: I did get these symptoms before so many times and didn't trouble myself to go and schedule an appointment to get tested because I thought it was a regular flu. Even if the symptoms stayed for a long time.

Hala: I never tested for viruses before Covid-19. I usually brushed it off as just a cold.

Q4. Describe any recent symptoms or changes you have experienced in your health. Was it sudden or gradual?

Joud: Luckily, I haven't experienced any recent symptoms or changes in my health. Everything has been stable and consistent. However, if there were any sudden or gradual changes, I would consult with a healthcare professional to address them promptly.

Hala: Recently, I've noticed some changes in my health, particularly feeling more fatigued than usual and experiencing occasional headaches. gradually increasing in intensity over the past few weeks. I'm monitoring them closely and considering scheduling a doctor's appointment for a checkup.

Q5. What difficulties do you face when you want to go to the hospital?

Joud: I am having difficulty with transportation.

Hala: Most of the appointments are late, which leads to a deterioration in my health.

Q6. Would you prefer online doctor visits or tests over traditional ones? why / why not?

Joud: I prefer the initial diagnosis because sometimes it does not require coming to the hospital.

Hala: Online, easier, and faster.

Q7. Does your job require direct contact with strangers?

Joud: as a student, I'm required to interact with strangers, like when I'm in my classes working with my classmates, but other times, my tasks can be done independently, without direct contact.

Hala: In my line of work, I deal with people constantly. Whether it's patients, colleagues, or the public, direct contact is almost unavoidable. While I enjoy interaction, it can be draining and worrisome sometimes.

Q8. Does your job offer you paid leave time when you feel unwell?

Joud: Luckily, as a student in KSA we are offered paid sick leave, which is a relief. Knowing I have that safety net allows me to prioritize my health without worrying about losing income. It's important to have that security, but I still can't miss my classes unless I have doctor orders telling me to do.

Hala: Unfortunately, my job doesn't provide paid leave. If I'm not feeling well, I must use my personal time or risk not getting paid. It can be stressful, especially when dealing with unexpected health issues.

Q9. Do you take seasonal/yearly vaccines?

Joud: Juggling studies, social life, and a million other things - sometimes make my health an afterthought. I try to stay on top of vaccinations, but deadlines, exams, and sleep deprivation take priority. Then, bam! Flu season hits, and I'm stuck in bed missing out on everything.

Hala: I try to! in my role as an HR professional, I witness the ripple effects of neglecting health, even when employees are committed to their well-being. Balancing demanding schedules, family needs, and personal commitments can easily lead to missed vaccinations or check-ups. So, I try to keep up with them especially after covid-19 but get too busy to do so sometimes.

Q10. What specific features or information would you find most valuable on a virus test center website?

Joud: Having a user-friendly scheduling system is important, my grandfather for example can't schedule himself appointments because the interface is complex sometimes. And reminders for the appointment in case we forget.

Hala: I would like to be able to connect with the doctor online especially for non-urgent concerns because it saves the hassle of going to the doctor and telling him my symptoms and waiting to see if I need a lab test or not. And then going back again to the doctor so he can read my results. It's time consuming.

Interviewer	Interviewee	Analytic comments
Abrar Habibullah Q (1)	Jood Wajeesh, computer science student, 16 Feb Hala, Human Resources 14 Feb	People find scheduling appointments difficult as it might conflict with their own schedule. This can lead us to a flexible appointment scheduling where there is going to be an easy way to reschedule appointments.
Dana Majed Q (2)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	In the second question both interviewees described the visit as comprehensive, mentioning the necessity of physical examinations and tests during in-person visits. However, they also acknowledged the benefits of online consultations for certain follow-up appointments or routine check-ins, citing convenience and timesaving as advantages without compromising the quality of care.
Abrar Habibullah Q (3)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	The interviewee indicates that their decision was influenced by the assumption that it's a common illness, even if the symptoms persisted. This means we need to provide contents to emphasize the importance of getting tested for these symptoms.
Dana Majed Q (4)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	In the 4th question we see a difference in both interviewee experiences regarding recent health changes. The first response portrays a lack of recent symptoms or changes, while the second response acknowledges the presence of symptoms and changes. This contrast highlights the variability of health experiences among individuals and underscores the importance of addressing any symptoms or changes promptly through medical consultation and monitoring.
Lama Ahmed Q (5,6)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	From those two questions, we demonstrated the importance of our application. Both people agreed that the difficulties of going to the hospital require an initial examination to diagnose the condition.
Renad Hassan Q (7,8)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	Many struggles with taking time off for checkups due to lost income, making traditional healthcare less accessible. Hala's (HR worker) and Joud's (student) experiences showcase this. Our app's fast doctor communication helps people assess if an in-person visit is truly needed, increasing healthcare accessibility.
Renad Hassan Q (9)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	We conclude that even if people are aware of how important it is to take care of their health. They still often neglect it due to busyness. This showcases the importance of sending reminders and alerts periodically.
Abrar Habibullah Q (10)	Jood Wajeesh, computer science student, 16 Feb Hala, HR 14 Feb	We need to ensure that the scheduling system is easy and straightforward, designed for all ages and various segments of society. There's also the need of integrating an automated reminder system.

Interviews summary:

Interviews with Joud and Hala revealed key insights for our healthcare app development. Scheduling difficulties call for a flexible and easily reschedulable system. While both interviewees valued in-person visits for initial consultations and physical examinations, online consultations were seen as beneficial for follow-ups and routine check-ins due to their convenience and time-saving qualities. Joud's delayed diagnosis due to assuming a common illness highlights the need for educational content promoting timely testing. Additionally, contrasting responses about recent health changes emphasize the importance of personalized care and attention to individual needs. Our app's fast doctor communication feature tackles accessibility concerns by helping users determine if an in-person visit is needed, particularly relevant for busy or financially constrained individuals. To further combat neglected health due to busyness, timely reminders and alerts will be integrated. Finally, a user-friendly scheduling system designed for diverse users is crucial. These insights combined pave the way for a flexible, convenient, and personalized app that encourages early diagnosis and prioritizes individual needs, ultimately improving overall healthcare accessibility.

Lab 3

1. The Project Planning Phase

The planning phase aims to refine our project goals, identify necessary activities, and create a roadmap for achieving them. This includes documenting project plans, defining deliverables and requirements, and crafting a detailed schedule. By creating a comprehensive plan, we can effectively manage time, resources, and costs, ensuring smooth project execution.

2. The Purpose of the Project

a. User Business/Background:

Despite technological advancements, viruses continue to pose a significant health challenge. We observed that time and financial constraints often discourage individuals from seeking virus testing, even when experiencing symptoms. Our app tackles this issue by offering an easily accessible and user-friendly platform for virus testing. Additionally, our website integrates health history tracking, appointment scheduling, and online doctor consultations, eliminating barriers to timely medical attention.

Motivation:

We recognize the crucial role of early virus detection in managing its spread and minimizing health complications. Our vision is to empower individuals with a safe and convenient testing solution, allowing them to customize the application to their specific needs while contributing to public health initiatives.

Considerations:

The problem we address resonates deeply, as many individuals face hurdles to regular testing due to various concerns and scheduling difficulties. By consolidating these processes into a single, user-centric app, we aim to:

- **Reduce wait times:** Eliminate the need for physical doctor visits for initial examinations, saving users valuable time and effort.
- **Increase accessibility:** Simplify scheduling appointments, accessing medical history, and receiving test results, all within the app.
- **Improve convenience:** Enable online consultations and flexible scheduling options, accommodating busy schedules and minimizing potential exposure in waiting rooms.
- **Promote timely action:** Allow users to track their health status and receive prompt medical guidance based on test results.

b. Project Goals:

Our project aims to increase healthcare affordability and accessibility for everyone, focusing on the importance of virus testing and treatment awareness.

3. Preliminary Report

a. The Problem:

We identified several flaws in the current system that hinder optimal user experience and timely access to healthcare:

- Limited user-friendliness: The current system can be challenging to navigate for individuals experiencing symptoms, deterring them from seeking timely testing.
- Scheduling complexities: Existing methods for scheduling appointments, tracking medical history, and conducting initial tests lack simplicity and convenience.
- Inconvenient follow-ups: Traveling to the doctor for post-test consultations can be inconvenient and potentially delay necessary actions.

b. Findings:

Traditional doctor visits present several challenges:

- Extended wait times: Long waiting rooms can be frustrating and time-consuming.
- Limited availability: Scheduling urgent appointments can be difficult, creating delays in accessing care.
- Congregating waiting rooms: Increased exposure to contagious illnesses is a concern, especially for high-risk individuals.
- Rigid appointment systems: Inflexible scheduling options can clash with busy schedules, hindering timely access to care.
- Delayed access to records: Prompt access to medical records and communication with healthcare providers outside of appointments can be difficult.

c. Recommendations/Proposed Solutions:

- Online consultations and pre-examinations: Reduce wait times and offer flexibility for users experiencing symptoms.
- Online check-ups: Conveniently serve high-risk individuals and those seeking consultations without in-person visits.
- Integrated medical history: Seamlessly access and update medical records within the app for enhanced continuity of care.
- Flexible scheduling options: Offer appointment slots catering to diverse needs and minimize wait times.
- Sick leave notifications: Enable convenient receipt of medical leave notices through the app.

d. Cost & Schedule Estimate:

Cost estimation	Estimated Time	Phase	description
1500\$	3 weeks	Project Planning	Team meetings and communications, scheduling, risk analysis
10,000\$	3 weeks	Requirement Gathering and Analysis	Business analyst time, stakeholder interviews, user stories development
30,000\$	7 weeks	Design Phase	UI/UX design, prototyping
20,000\$	9 weeks	Development Phase	Development, Software specification and tools, Storage, and server
15,000\$	5 weeks	Testing	Quality assurance testing, manual/automated tests
25,000\$	3 weeks	Software validation	Functional and non-functional testing, performance testing
18,000\$	3 weeks	Software Evolution	Bug fixes, minor enhancements, maintenance, Budget should cover post-release support if needed
=\$119,500	= 33 weeks		

Lab 4

The feasibility study:

SafeHealth is a software system aimed at improving healthcare accessibility and simplifying the user experience. SafeHealth promises a safe, reliable, and convenient method for individuals to test for viruses, potentially reducing reliance on traditional clinic and hospital visits.

Report writing:

1- Problem Definition:

The main problem facing our current system is the significant lack of visits to virus testing centers. There are many reasons for contracting a spreading virus, including lifestyle habits, and pre-existing health conditions. However, many people are unable to visit a doctor to ensure their safety due to various circumstances, such as cost, lack of time, or their fears about the outcome and contact with people. There is also a delay in learning the results of the examination, and there is insufficient awareness of the importance of conducting continuous examinations when feeling symptoms. To improve access to rapid testing and encourage early detection and treatment of virus-related problems, these issues must be addressed. To address this problem, our system, SafeHealth offers temporary home testing for the virus and avoiding contact with people as a solution. The purpose of the examination is to identify any changes in the examination or signs of infection early, and clients are eligible for fee reduction offers for their appointments.

2- Scope Objectives of SafeHealth:

SafeHealth is an application that provides a variety of tests to detect health problems specifically related to spreading viruses. It aims to identify and analyze their causes and try to improve the user's immunity, remind appointments, and provide fun exercises to strengthen the immune system so that they help the user in an easy, simple, and flexible way. It teaches users the importance of taking care of their body health.

Moreover, there is the possibility to practice everything that is read and viewed through the instructions and visual explanations that you will find in the application. The user will be able to chat with the application to try to understand his condition and develop a solid plan to continue until the user's immunity improves. The user will also communicate through the application with a doctor at home in a quick way.

What distinguishes SafeHealth from other applications:

- easy to use.
- Results appear quickly
- Communication with the doctor is quick
- Finding immediate solutions temporarily
- Helping a large segment of society.

- Helping low-income people.

3-alternative solutions:

1. Self-use testing devices, by taking swabs from the mouth and nose

Users can use this device provided by medical institutions in simple steps.

2. "Flow Flex" Pills for self-testing for the virus at home, which detects infection in people who suffer from symptoms or do not suffer from them.

4- Cost and benefits of Alternatives:

Alternative 1: Self-Use Testing Devices:	Alternative 2: Flow Flex Pills:
Cost: -Design Architecture – minimum 300\$ -Manufacturing Testing Devices – estimated ~ 7.95\$ a test -Delivering Device – estimated 800\$ each stock	Cost: -Research and Development for the pill – minimum 10,000\$ -Manufacturing and Packaging – 1.45\$ per unit -Safe Storage – 500\$ per month -Delivering The Pills Safely - estimated 800\$ each stock
Benefits: -Financial Saving: this method can be cost-effective for both patients\users and medical virus tests centers. -Convenience: easier for patients\users to test themselves at home	Benefits: -Ease of Use: this is a simple and convenient testing method -Financial Saving: Can be a bit more expensive than a test device, but it still saves more than physical medical test centers.

5-Software impact:

To enhance the existing system for the proposed features, several additions and modifications are recommended. First, integrate a comprehensive scheduling system to facilitate seamless appointment management. Next, implement a symptom tracking module that sends automated alerts to users based on their reported symptoms. Additionally, introduce a secure messaging platform to enable effective communication between doctors and patients. It is crucial to prioritize data privacy and security, ensuring compliance with relevant standards to safeguard sensitive information. These enhancements will contribute to a more versatile and user-friendly app, promoting efficient appointment scheduling, proactive symptom monitoring, and improved doctor-patient interactions.

6-Potential changes into the organization:

Upon successful implementation of SafeHealth several positive changes can be anticipated within the organization. Firstly, there will be improved operational efficiency with the introduction of a robust scheduling system, streamlining the appointment process for both staff

and patients. The incorporation of a symptom tracking module will enable proactive monitoring, leading to early detection and containment of potential outbreaks.

The integration of a secure messaging platform for doctor-patient communication will foster better collaboration and timely exchange of crucial information. This can enhance the overall quality of healthcare services provided by the organization. Moreover, the emphasis on data privacy and security compliance will instill trust among users, reinforcing the organization's commitment to safeguarding sensitive information.

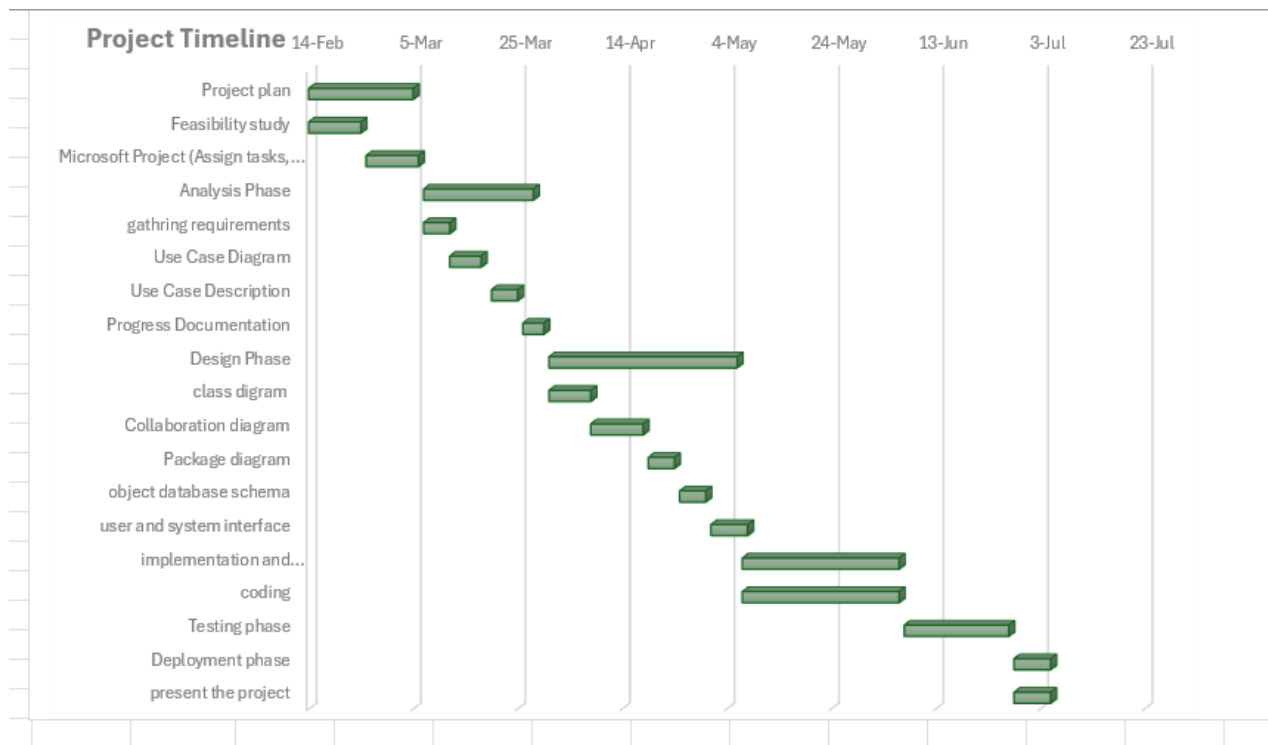
In essence, the organization can expect increased effectiveness in managing appointments, quicker response to emerging health concerns, strengthened communication channels, and an overall elevation of the quality of healthcare services because of SafeHealth.

7- Recommended Alternative of the course of Action:

Based on the analysis of alternatives and taking the goals of our study in mind. The best course of action to take is to implement our Virus test website alongside with the self-testing devices, as it provides an accessible and quick solution for a large segment of society.

Project Plan:

Task name	Duration	Start	Finish	Predecessors	Resource Names
Project plan	20 days?	14-Feb	3/5/2024		
Feasibility study	10 days?	14-Feb	24-Feb		Renad,Lama,Abrar,Dana
Microsoft Project (Assign tasks, Gent chart)	10days?	25-Feb	5-Mar		Renad
Analysis Phase	21 days?	7-Mar	30-Mar		
gathering requirements	5 days?	7-Mar	11-Mar		Renad,Lama,Abrar,Dana
Use Case Diagram	6 days?	12-Mar	18-Mar		Lama
Use Case Description	5 days?	20-Mar	25-Mar		Dana
Progress Documentation	4 day?	26-Mar	29-Mar		Renad
Design Phase	36 days?	31-Mar	6-May		
class digram	8 days?	31-Mar	7-Apr		Abrar
Collaboration diagram	10 days?	8-Apr	18-Apr		Lama
Package diagram	5 day?	19-Apr	24-Apr		Dana
object database schema	5 day?	25-Apr	29-Apr		Lama,Abrar
user and system interface	7 day?	1-May	6-May		Renad
implementation and development phase	30 days?	7-May	6-Jun		Dana
coding	30 days?	7-May	6-Jun		
Testing phase	20 days?	7-Jun	27-Jun		Abrar
Deployment phase	7 days?	28-Jun	4-Jul		Renad,Lama,Abrar,Dana
present the project	7 days?	28-Jun	4-Jul		
	134 days				



Lab5

1. List the stockholders of the project.

The stockholders:

- a. The Client : the client as the person who makes the investment in the product.
 - **Investors:** Individuals or organizations providing financial support for the development and implementation of the application and system.
 - **Funding Entities:** Organizations or institutions that may be providing grants, loans, or other forms of financial support for the project.
- b. The Customer : The person intended to buy the product.
 - **General Public:** Individuals who are concerned about their health and want a convenient and reliable way to diagnose the virus from the comfort of their homes.
 - **High-risk Individuals:** Individuals with pre-existing health conditions or those considered high-risk for virus infections who may be more proactive in using the application for early diagnosis.
 - **Health-conscious Individuals:** People who prioritize regular health check-ups and are interested in using technology for early detection of health issues, including virus infections.
- c. Other Stakeholder : The roles and (if possible) names of other people and organizations who are affected by the product.
 - **Healthcare Professionals:** Doctors, nurses, and other healthcare professionals who may use the diagnostic results provided by the application to guide further treatment and care.
 - **Healthcare Institutions:** Hospitals, clinics, and healthcare facilities that may integrate the application's data into their systems or collaborate with the project for improved public health outcomes.
 - **Government Health Departments:** Public health agencies and government bodies responsible for managing and controlling the spread of infectious diseases may be interested in the application's data for monitoring and response purposes.
 - **Regulatory Authorities:** Agencies responsible for regulating healthcare technologies and applications, ensuring compliance with safety and ethical standards.

- **Data Privacy Advocates:** Individuals or organizations focused on protecting user privacy and ensuring that the application adheres to data protection regulations.

2. Identify the scope of the work.

a.The Current Situation

Content

Our program will contribute to combating the high spread of the virus, the cost of transportation, as well as the lack of awareness and long waits for appointments. Our program provides advanced technology for your initial diagnosis of your infection with the virus, and you can share your report and test results, perform the screening test with doctors to get their advice, or keep it for future reference.

Motivation:

Our application also provides valuable information and advice about taking care of your health, not neglecting it, and raising awareness of potential problems when you ignore symptoms. You will be able to learn more about the virus, its causes, and preventive measures to maintain your health.

b.The Context of the Work

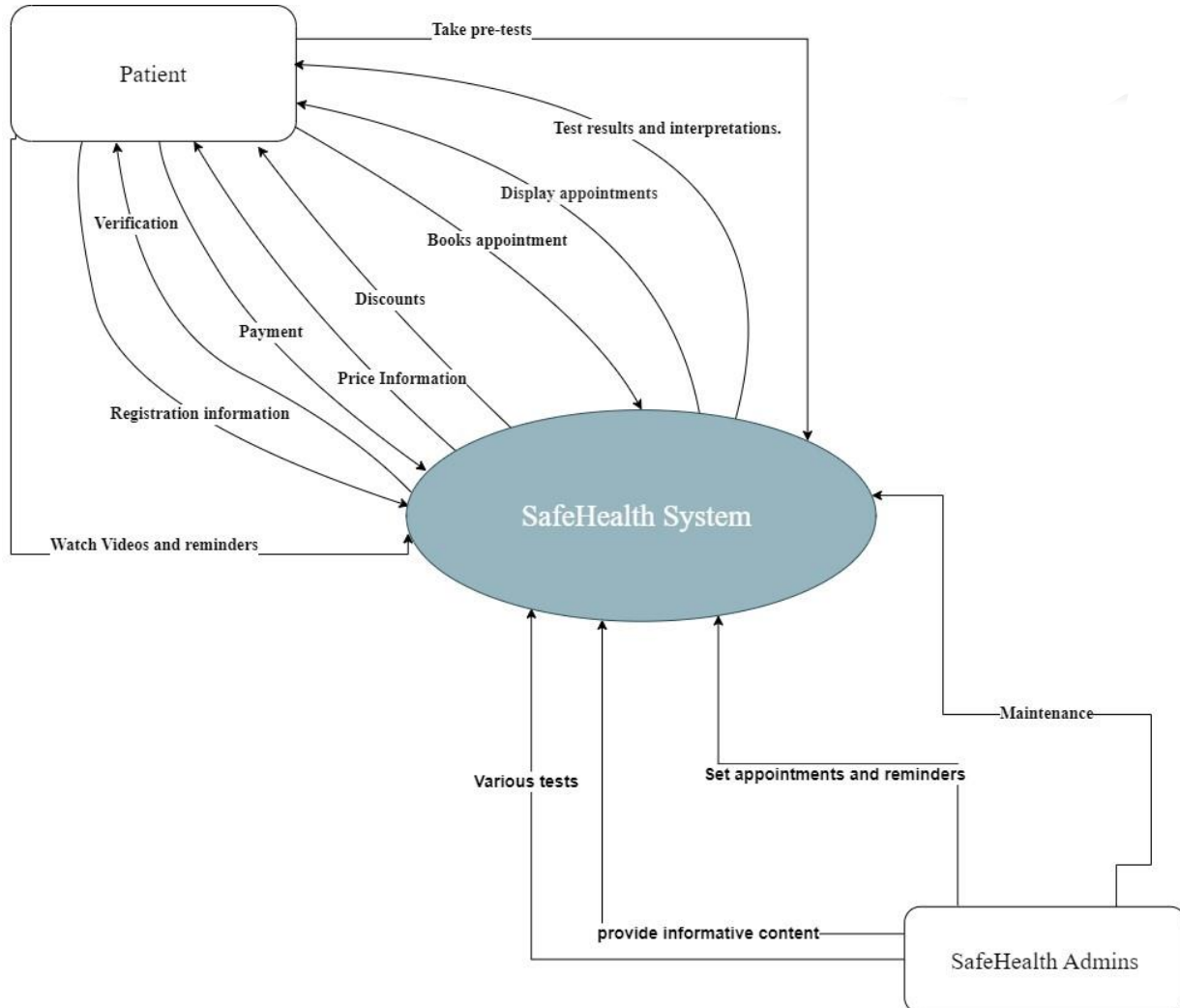
Content:

As depicted in the work context diagram, our objective is to bridge the divide between patients and health administrators.

Motivation:

Our goal is to streamline your healthcare journey, ensuring it's effortless and accessible. This entails simplifying appointment scheduling and updates, as well as disseminating crucial information on safeguarding yourself and your loved ones against viruses.

3. Draw context diagram of your project:



4. Conduct an event table for your project.

Event Name	Input and Output	Summary
1. Patient Registration	Patient information details (in) → confirmation (out)	Sign up/in account.
2. Patients Online Services	Chat box for Service (out) → Sending messages / calling (in)	Online Patient services using a chat/call.
3. Appointments Scheduling	Patient preferred date (in)	Enabling patients to schedule appointment for testing
4.Home Testing Request	Patient ordering of home testing kit (in)	Patients request of home testing device for virus detection
5. Payment	Patients paying (in)	Patients paying for the preferred way of testing.
6. Confirmation	Confirmation of appointment// Confirmation of dispatch (out)	Patients receive a confirmation on SMS or E-mail
7. Reminders	Reminding notification of appointment (Out)	Sending reminders to users of their upcoming appointments to ensure they don't miss them.
8. Test Results	Test results from laboratory (in)	The test results are received from the lab and put into the system and into each patient's account.
9. Test Results	Putting test results into patients' medical history (in)	Putting test results into patients' medical history The system produces a sales report to a user.
10. Doctor Consultation Request	Patient request for a virtual consultation (in)	Patients requesting consultation for further medical advices.

Lab6

3. Project activities

1. Write down the Functional and Non Functional Requirements of your project?

ID	Requirement Definition
FR1	Create an account
FR1.1	The system shall enable a user to create an account
FR2	User Registration and Authentication:
FR2.1	Users should be able to log in securely using their credentials.
FR3	Health History Tracking:
FR3.1	The system shall allow users to input, store, and update their health history information.
FR4	Categorize records:
FR4.1	Users should be able to categorize health records (e.g., allergies, medications, medical conditions) for easy access and management.
FR5	Appointment Scheduling:
FR5.1	Users should be able to view available appointment slots based on their preferred date, time, and healthcare provider.
FR5.2	The system shall send reminders and notifications for upcoming appointments.
FR6	Online Consultations:
FR6.1	The system shall facilitate online consultations between users and healthcare providers.
FR7	Virus Testing and Results:
FR7.1	The system shall provide users with options for virus testing appointments.
FR7.2	Users should be able to receive test results securely through the app.
FR7.3	The system shall notify users of any urgent follow-up actions based on test results.
FR8	User Notifications and Alerts:
FR8.1	The system shall send relevant health-related notifications and alerts to users.
FR8.2	Users should receive reminders for medication schedules, follow-up appointments, and health check-ups.
FR8.3	the system shall provide alerts for potential health risks or emergencies based on user data analysis.

Non-Functional requirement:

User Interface

ID	Requirement definition
UI1	The system will provide constraints in the user interface to log in using a secure username and password for authorization requirements.
UI2	The system must incorporate a highly intuitive and user-friendly interface, allowing users of all ages to navigate and interact with ease. This design approach should account for varying levels of technological proficiency to ensure accessibility across diverse age demographics.
UI3	The user interface will be in a form of graphical user interface (GUI).

- **Hardware Interface**

ID	Requirement definition
HI1	The system will combine test and checkup bookings with healthcare facilities. This integration can be achieved through manual verification by the staff or by scanning the patient's QR code. Each booked appointment will be verified at the entrance to ensure it corresponds to a valid record in the system. This eliminates the need for patients to repeatedly provide personal information such as age, name, and phone number. It also allows the medical facility to access all past medical records stored in the system.
HI2	To keep the servers reliable and perform well, the system will use strong, industry-standard servers to handle high traffic times. These busy times might happen during a viral outbreak, public health emergencies, when there's a lot of flu, or after health warnings. If the servers go down, they shouldn't be offline for more than 30 minutes. The user interface needs to allow smooth communication and data flow, ensuring health-related information and consultation requests are transmitted quickly and without delays.
HI3	The system should have automated backups to regularly save critical patient data, preventing loss from hardware failures or other issues. The backup storage must also be encrypted to maintain data security.

- **Software Interface**

ID	Requirement definition
SI1	The healthcare system must connect to the database to retrieve key information, such as usernames and passwords, to confirm the identity of patients and medical staff. This secure process ensures that only authorized individuals can access the healthcare platform.
SI2	The system should enable users, in cooperation with healthcare facilities, to seamlessly upload past medical data while adhering to strict security protocols. This approach helps unify users' medical records across different facilities, making the data easier to access while ensuring it remains secure.
SI3	The system's graphical user interface (GUI) should support multiple language preferences. It must also be flexible enough to accommodate users with disabilities, offering features like voice command integration and alt text for accessibility.

- **Security Requirements**

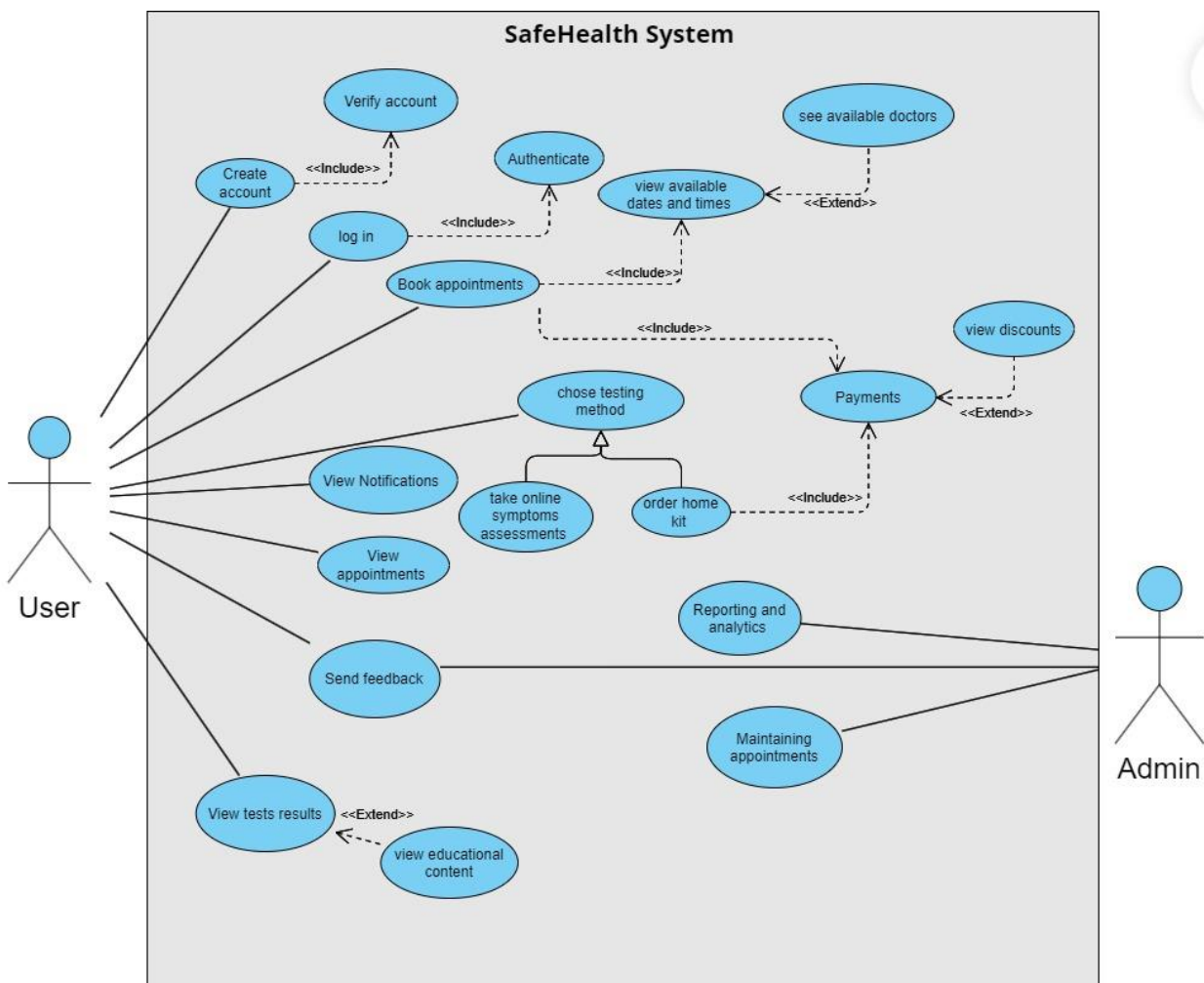
ID	Requirement definition
SE1	The system shall provide log in page.
SE2	The system must ensure the safety and security of payment details.
SE3	The system should grant users access only to the services for which they have authorization.
SE4	The system must use encrypted data storage to protect patient information, including health history, test results, appointments, and online consultations. Encryption should meet industry standards to ensure compliance with healthcare privacy laws and reduce the risk of unauthorized access
SE5	The system must implement strict security protocols to ensure that users, in collaboration with healthcare facilities, can upload past medical data without compromising data safety. The system should use encryption, secure access controls, and other security measures to unify users' medical records across different facilities. This guarantees that the data is both accessible and protected against unauthorized access or breaches.

Lab7

3. Project activities

This Lab provides a deep insight into the importance of requirement modeling in the software industry. It will enable you to learn the tool (Rational Rose, Star UML...), which makes the process of requirement modeling easy to understand and implement. Requirements modeling allow making it easier to capture, communicate, track, analyze, verify, validate, view, and manage the hundreds of hierarchical and interrelated engineering requirements necessary for large and/or complex systems.

1. Give the use cases diagram of your project.



2. Complete the needs analysis of your project by describing the scenarios of use cases diagram

U/C1: Log in

Scope: system

Level: log in to system

Primary Actor: user

Precondition: validity of the account.

Stakeholders and Interests:

system

Scenario UC1:

1-The user Create an account

2- The system verifies the validity of the account

UC2: Create an account

Scope: system

Level: create an account

Primary Actor: user

Precondition: the user has provided the required information

Stakeholders and Interests:

system

Scenario UC2:

1. The user initiates the process by clicking on the "Create Account" button.
2. The system generates a unique verification code and sends it to the user's provided email address.
3. The user then checks their email inbox.
4. On the registration page, the user enters the verification code.
5. The system verifies if the entered code matches the generated code.
6. If the codes match, the system proceeds to create the account successfully.

UC3: book appointments

Scope: system

Level: user books an appointment

Primary Actor: user

Precondition:

1-The user must have access to the SafeHealth application.

2-available appointment for reservation.

Stakeholders and Interests:

system

Scenario UC3:

1. The user can browse and select from the available appointments provided by the system.
2. The user must choose a suitable date and time from the available options.
3. The user has the option to select a preferred doctor from the available choices. If no choice is made, the system will automatically assign a doctor for the appointment.
4. To complete the booking process the user must proceed to payment where they will be able to see if there's any discounts available.

UC4: Choose testing methods

Scope: system

Level: user chooses a testing method

Primary Actor: user

Precondition:

1-The user must have access to the SafeHealth application.

Stakeholders and Interests:

System

Scenario UC4:

1. After logging in, the user accesses the testing section.
2. The app displays the available testing methods for the user to choose from.
- 3a. If the user selects the 'order home kit' method:
 - 1 - The user proceeds with providing delivery details.
 - 2 - The app presents a payment invoice, allowing the user to view available discounts.
 - 3- The user receives the home kit, utilizes it, and can recheck the app as needed.
- 3b. If the user selects the 'take online symptoms assessments' method:
 - 1- The user navigates to the test section and identifies which symptoms align with their condition.
 - 2- After the system analyzes the user's responses, the user can navigate to view the test results and check their outcome.

UC5: send reminders and alerts

Scope: system

Level: sending appropriate appointments reminders and outbreaks alerts

Primary Actor: System

Precondition: The user must have access to the SafeHealth application.

Stakeholders and Interests:

user

system

Scenario UC5:

- 1- The system will schedule a notification to remind the user of their scheduled appointment 24 hours in advance.
- 2- The system will notify users of appointments availability when updated.
- 3- The user will receive the notification and have the option to reschedule or cancel scheduled appointments if necessary.
- 4- In the event of an outbreak, the system will send alerts to users, providing guidance on how to prepare for such situations.

UC6: View appointments

Scope: system

Level: users can view scheduled appointments

Primary Actor: user

Precondition:

1-The user must have access to the SafeHealth application.

Stakeholders and Interests:

system

Scenario UC6:

- 1- The user can view their past and upcoming appointments and manage them.

UC7: send feedback

Scope: system

Level: users can discuss their concerns and submit feedback

Primary Actor: user

Precondition:

The user must have access to the SafeHealth application.

Stakeholders and Interests:

Admins

system

Scenario UC7:

- 1- The user can access the "send feedback" section within the SafeHealth application to discuss concerns and request support from administrators.
- 2- Administrators receive, manage, and provide feedback to the user, addressing their concerns and providing assistance as needed.

UC8: View test results

Scope: system

Level: users can view their test results

Primary Actor: user

Precondition:

- 1-The user must have access to the SafeHealth application.

Stakeholders and Interests:

system

Scenario UC8:

- 1- The user has the option to view their previous test results in the system.
- 2- If the user has a recent test result available, they will be presented with educational content related to that specific result. Additionally, they may be advised to book an appointment if necessary.

UC9: Reporting and Analytics

Scope: system

Level: admins tracking users' performance on the app to mentor it.

Primary Actor: admin

Precondition:

admin should have access to users' data.

Stakeholders and Interests:

Investors

system

Scenario UC9:

- 1- Admins can generate reports and perform data analysis to gain insights into system usage, user behavior, and overall application performance. which can be used for decision-making, identifying areas for improvement, and optimizing the system.

UC10: Maintaining appointments.

Scope: system

Level: Appointment control and management.

Primary Actor: admin

Precondition:

1-The admin has proper access and control privileges.

2-The admin has access to an accurate schedule containing information about all upcoming appointments.

Stakeholders and Interests:

user

system

Scenario UC10:

- 1- The admin performs regular maintenance of appointments, including updating and managing details such as doctor assignments and dates.
- 2- Users can view the list of available appointments and choose from them based on their preferences.

Lab8

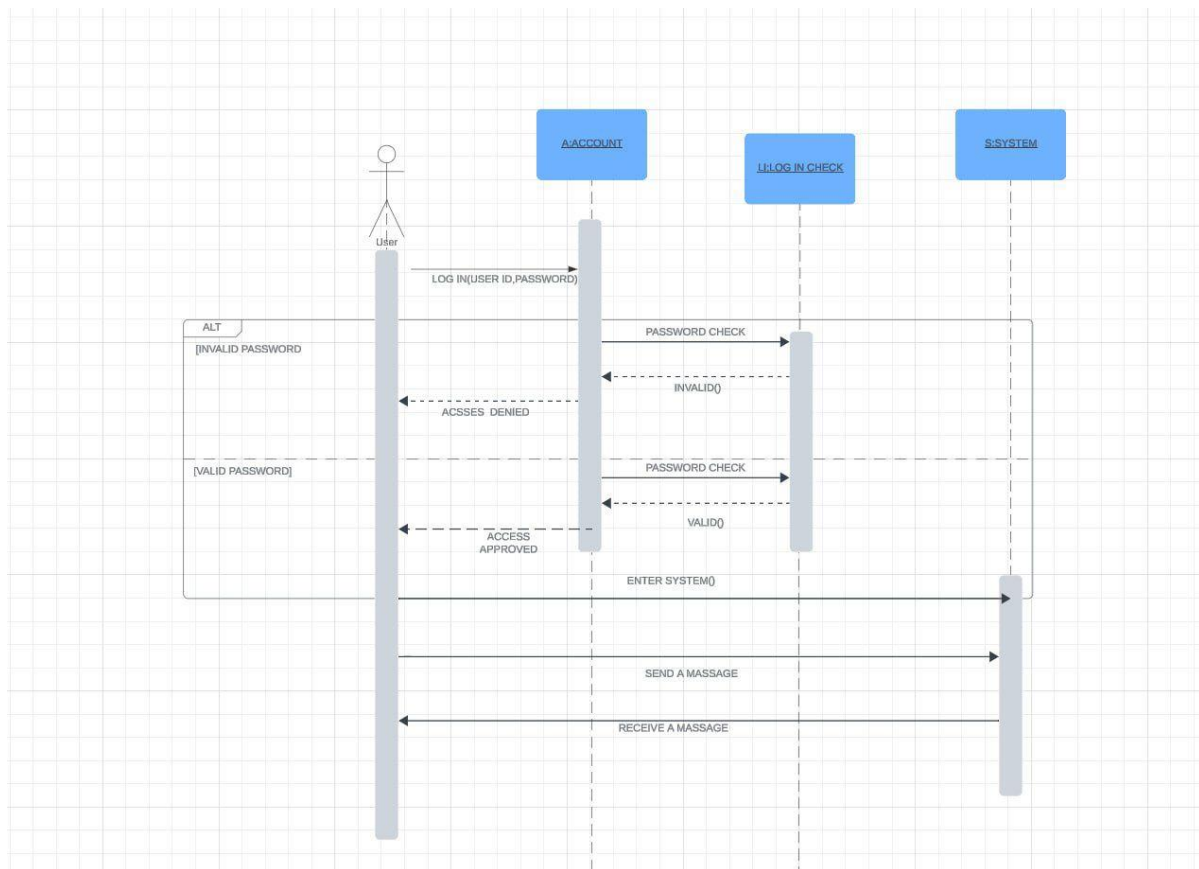
1. Give the Sequence Diagrams of your project.

Sequence Diagram Document

The Sequence Diagram Document should contain the following information:

- A sequence diagram for each Use case of your system.
- A brief description on the symbols used in the sequence diagram.
explaining the reason for the usage of that symbol.
- A brief description on the flow of each event in each sequence diagram.

Log In: (Lama)



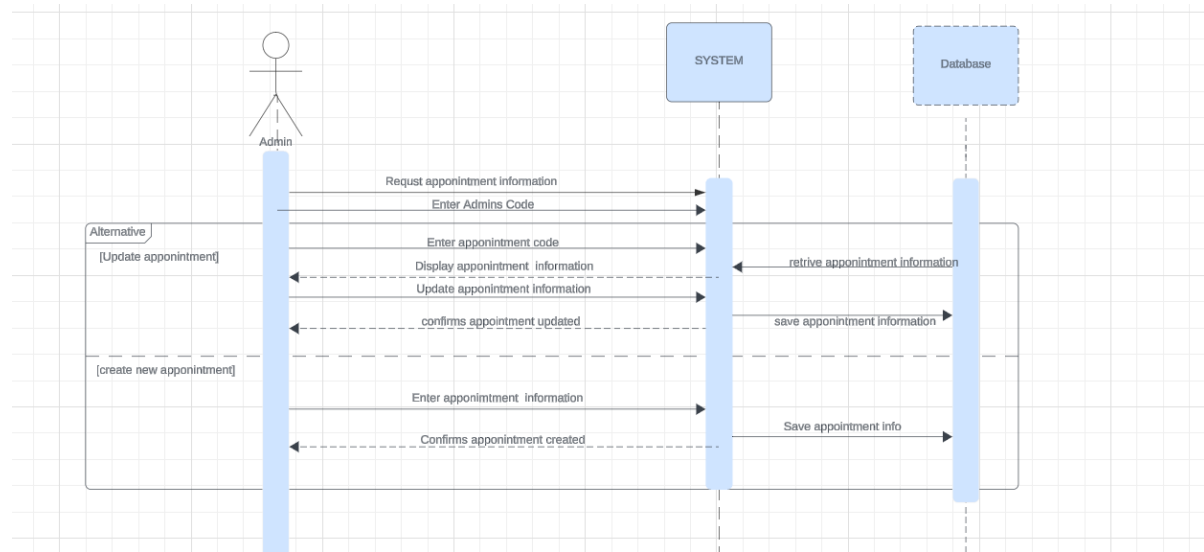
Symbol Descriptions:

The user is shown as the actor in the sequence diagram. Each square represents an object that the user interacts with. Dashed arrows signify feedback, and arrows show interactions between the user and the objects. Prior to being able to engage with the chat by sending messages or receiving them, the user will attempt to log in using his user ID and password. The account will then verify these and either approve or deny access to the conversation.

Description:

The user is shown as the actor in the sequence diagram. Each square represents an object that the user interacts with. Dashed arrows signify feedback, and arrows show interactions between the user and the objects. Prior to being able to engage with the chat by sending messages or receiving them, the user will attempt to log in using his user ID and password. The account will then verify these and either approve or deny access to the conversation.

Maintaining appointments: (Lama)



Symbol Descriptions:

Admin: Represents the system Administrator who initiates the request.

System: Represents the system that handles the request. It retrieves the appointment details, allows the admin to modify the appointment information, update the appointment in the system, store the updated details in the database, and add new appointments.

Database: represents the storage system where appointment information is stored.

Event flow:

The administrator initiates a request to modify an existing appointment.

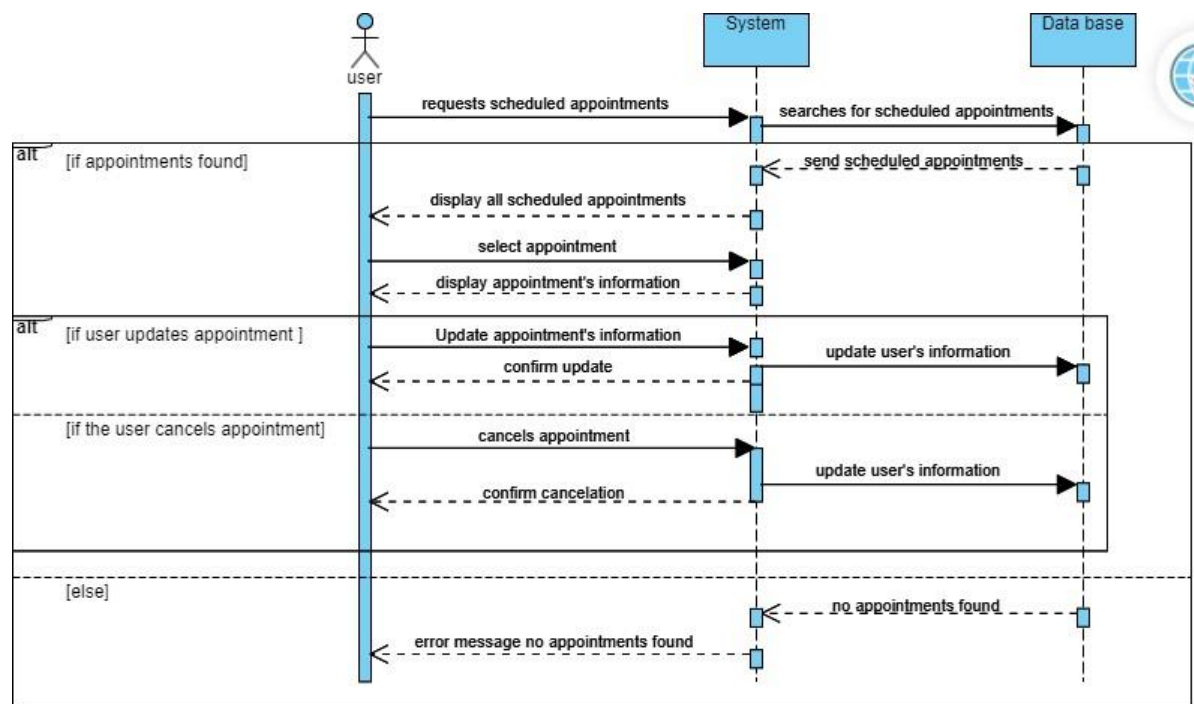
The system retrieves appointment details from the database, including information such as appointment time, location, and purpose.

The administrator edits the appointment details, such as changing the appointment time

The system updates the appointment in the system with the modified details to ensure data consistency.

The system notifies the user of the success of updating the appointment, making sure that the changes are saved.

View appointments: (Renad)



Symbol Descriptions:

Actors: The User refers to the individual who has requested to view their scheduled appointments.

The System: represents the Safe Health system that handles these requests. The System is responsible for presenting the User with their scheduled appointments if there is any.

The Database: serves as the repository for storing user information.

The Alternative Box: denotes the different outcomes and corresponding System responses.

Flow of events:

The user requests scheduled appointments from the System.

The System requests the user's scheduled appointments from Database.

If appointments found:

The Database sends a message back to the System containing the search results.

The System displays all the user's scheduled appointments to the user.

If the user wishes to update their appointment:

The user updates the appointment information, such as time, date, and doctor to their preferred details.

System updates the user appointment information in the database.

The system confirms the update to the user.

If the user wishes to cancel an appointment:

The user cancels the appointment.

The system updates the user appointment information in the database.

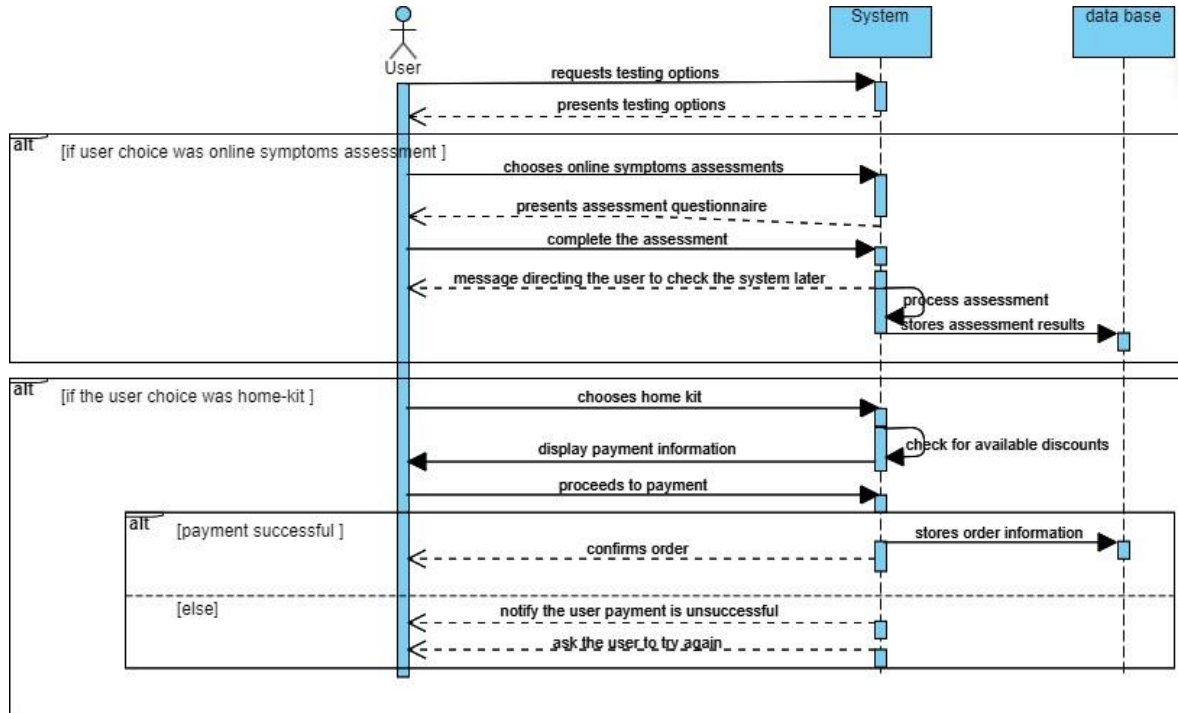
The system confirms the cancelation to the user.

If no appointments found:

The Database sends a message back to the System, indicating that no appointments were found.

The System sends a message to the user, indicating that no appointments were found.

Choose testing method: (Renad)



Symbol Descriptions:

Actors: The User refers to the individual who has requested to view the available testing methods.

The System: represents the Safe Health system that handles these requests. The System is responsible for presenting the User with the testing options and responding accordingly based on the chosen path.

The Database: serves as the repository for storing user information.

The Alternative Box: denotes the different outcomes and corresponding System responses based on the User's selected method.

Flow of events:

The User initiates the process by requesting to view the available testing options.

The System presents the User with two testing options: online symptoms assessment or home test kit.

If the User chooses the online symptoms assessment:

The System presents the User with an assessment questionnaire.

The User completes the assessment.

The System instructs the User to check back later for their results.

The System processes the assessment and stores the results in the database.

If the User chooses the home test kit:

The System checks for any available discounts.

The System displays payment information to the User.

The User proceeds with the payment.

If the payment is successful:

The System stores the order information.

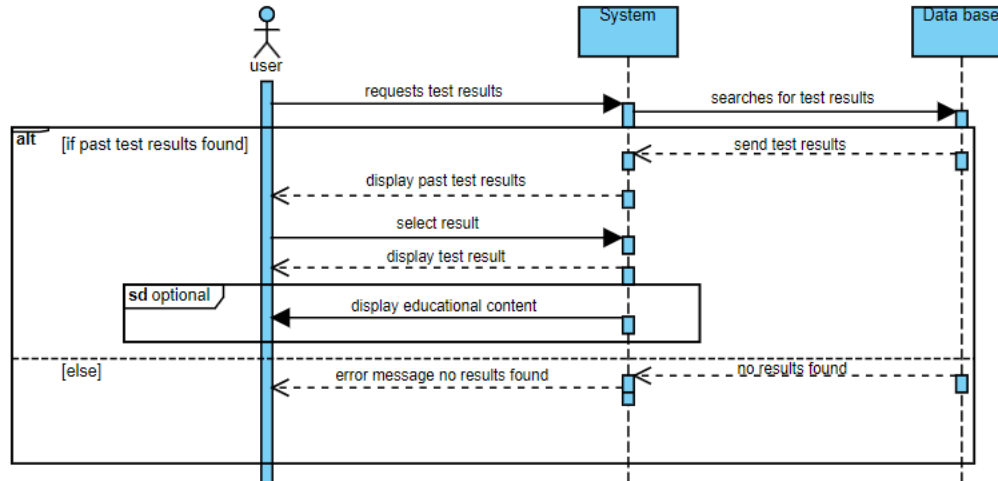
The system confirms the user's order.

If the payment is unsuccessful:

The system notifies the user.

The system asks the user to try again.

View test results: (Renad)



Symbol Descriptions:

Actors: User - Refers to the person who requested to view their test results.

System - Refers to the Safe Health system that processes these requests. The system will look for the user's results in the database. If results are found, it will display them and may also offer additional educational content, like tips for improving heart health if the test results indicate high cholesterol. If no results are located, the system will inform the user.

Database - Represents the repository where test results are stored.

Alternative Box - Represents the different outcomes depending on whether the system finds results or not, with each path outlining how the system will respond in these cases.

Optional Box - Represents an additional scenario where the system provides educational content to the user, which is not mandatory. This content may include information to increase awareness and advice for the user, tailored to their test results.

Flow of Events:

The user requests test results from the System.

The System looks for test results in the Database.

If past test results are available:

The Database responds to the System with the found test results.

The System shows the past test results to the User.

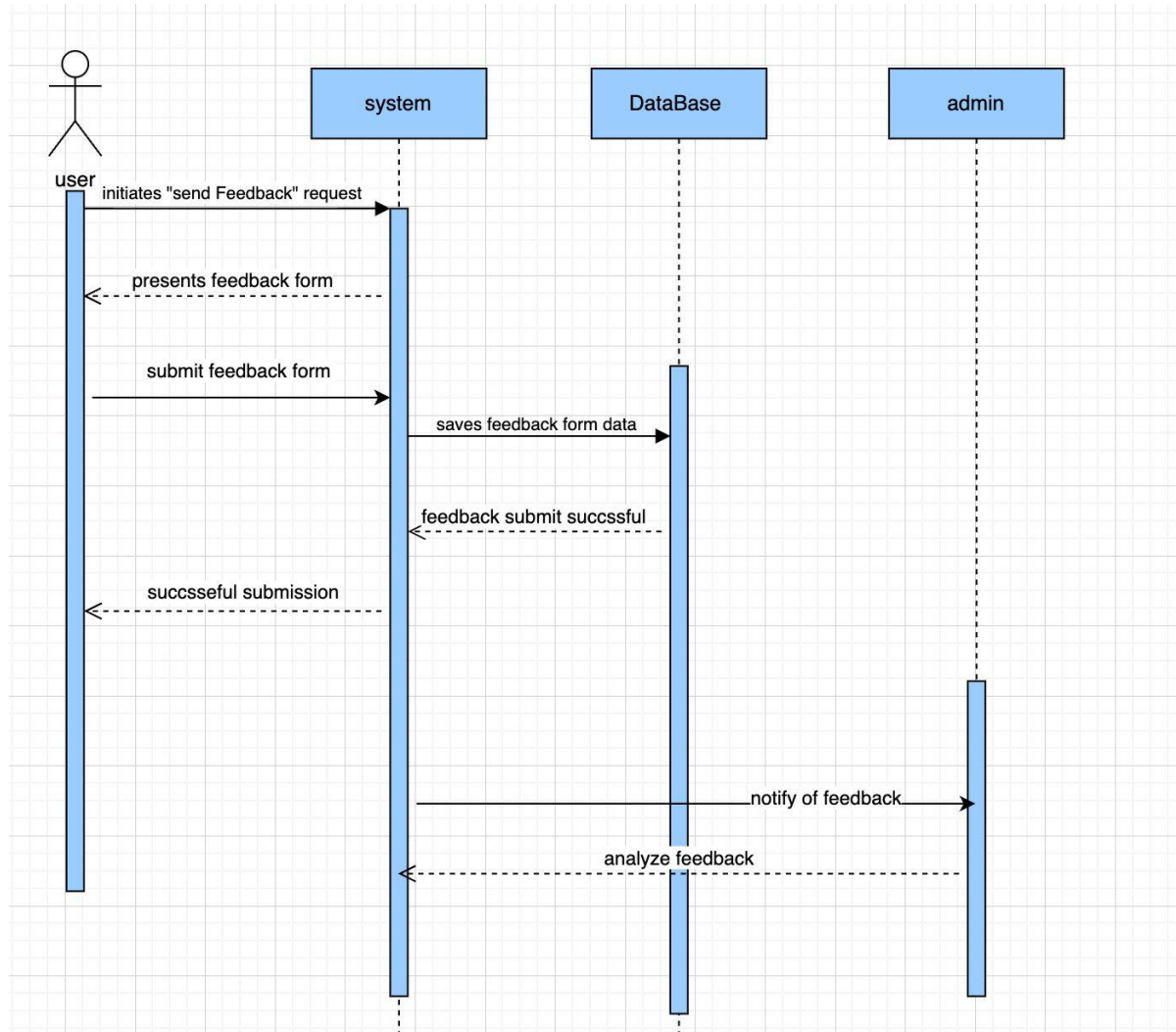
Optionally, the system can offer the user educational content depending on their recent test results.

If no past test results are found:

The Database sends a response to the System indicating that no results were found.

The System sends an error message "no results found" to the User.

Send feedback: (Dana)



Symbol Descriptions:

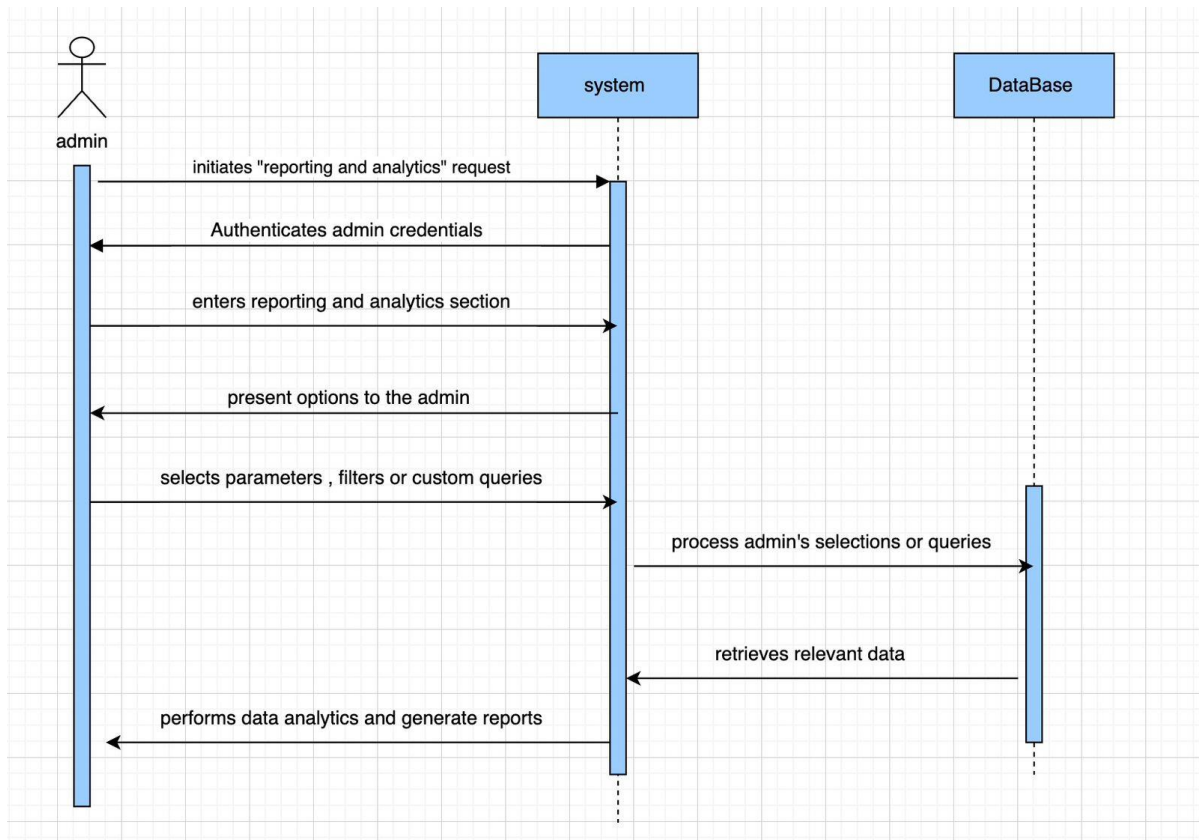
- User:** Represents the patients who initiates the "Send Feedback" request by accessing the feedback form on the system's Application.
- System:** Represents the system that handles the "Send Feedback" use case. It presents the feedback form to the user, processes the completed form, and notifies the user of the successful submission.
- Database:** Represents the storage system where the feedback data is stored.

Flow of Events:

1. The user initiates the "Send Feedback" request by accessing the feedback form on the system's Application.
2. The system presents the feedback form to the user, allowing them to provide their feedback.

- 3.The user completes the feedback form, providing the necessary details.
- 4.The system processes the feedback form data, performing any necessary validations or computations.
- 5.The system stores the feedback data in the database for future reference.
- 6.The system notifies the user of the successful submission of their feedback.

Reporting and analytics: (Dana)



Symbol Descriptions:

- Admin:** Represents the system administrator who initiates the "Reporting and Analytics" request. The admin has privileged access to advanced reporting and analysis features.
- System:** Represents the system that handles the "Reporting and Analytics" use case. It authenticates the admin's credentials, presents reporting and analytics options, processes the admin's selections or custom queries, retrieves relevant data from the database, performs advanced data analysis, and generates reports or visualizations.
- Database:** Represents the storage system where the relevant data for reporting and analytics is stored.

Flow of Events:

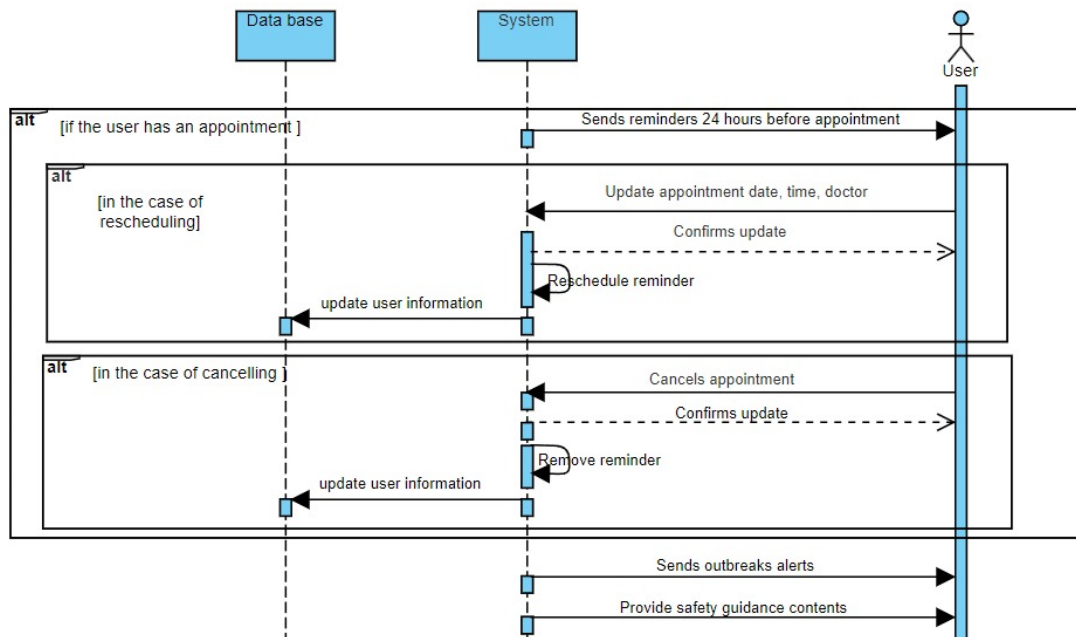
- 1.The admin initiates the "Reporting and Analytics" request.
- 2.The system authenticates the admin's credentials to ensure authorized access.
- 3.The admin enters the reporting and analytics section of the system.
- 4.The system presents reporting and analytics options to the admin, providing them with various parameters, filters, or custom query capabilities.
- 5.The admin selects the desired parameters, applies filters, or enters custom queries to specify the data they want to analyze.

6.The system processes the admin's selections or queries, validating and interpreting them to determine the required data operations.

7.The system retrieves the relevant data from the database based on the admin's selections or queries.

8.The system performs advanced data analysis techniques and generates reports or visualizations based on the retrieved data.

Receive Notifications: (Abrar)



Symbols Used:

System: Represents the system's role in the sequence.

User: Represents the user's interactions within the sequence.

Database: Represents the system's role in the sequence.

Alt Frame: Shows alternative paths based on conditions; used here for the condition of rescheduling or cancelling an appointment .

Flow Description:

In the case of user having appointment:

- Sends reminders 24 hours before appointment: this indicates that the user's appointment is already in the system, and the reminders are sent 24 hours in advance.

In the case of users appointment rescheduling:

- Update appointment date, time, doctor: the user could possibly like to reschedule the appointment, therefore user will enter the new appointments' information to reschedule it.

- Confirms update: The system confirms the updates made by the user to the appointment.

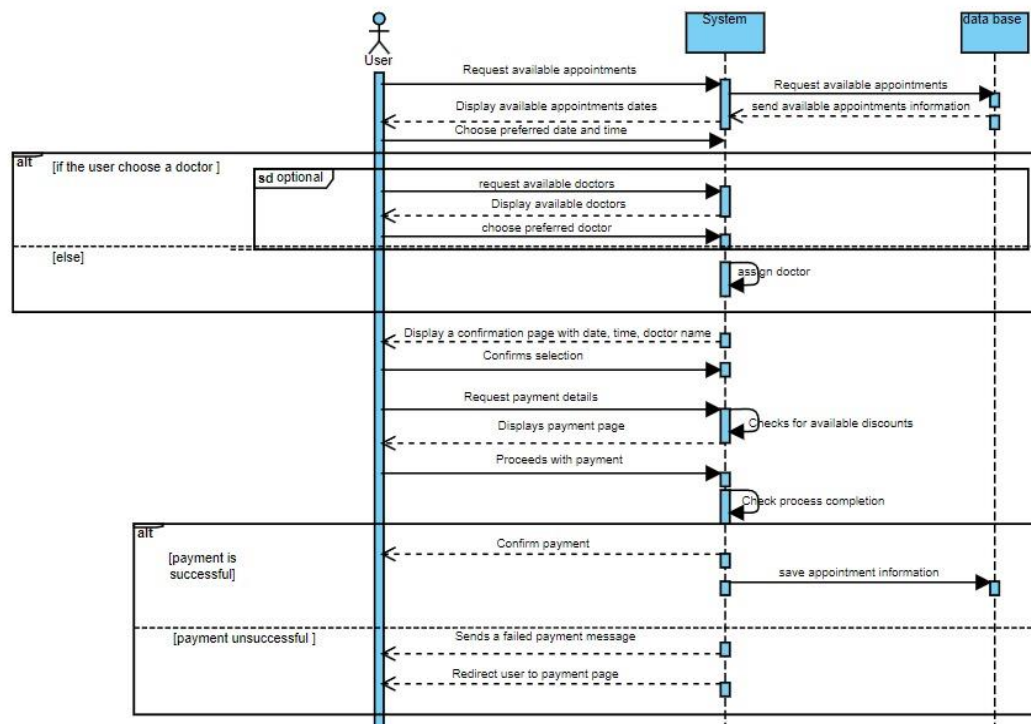
- Reschedule reminder: If the appointment is rescheduled, the system schedules a new reminder based on the updated appointment time.

- Update user information: the system will update the user information inside the database.

In the case of users appointment cancelling:

- Cancels appointment: Alternatively, if the user chooses to cancel the appointment, this step represents that action.
- Confirms update: system confirms user's cancellation.
- Remove reminder: Following a cancellation, the system removes any set reminders related to the appointment.
- Update user information: the system will update the user information inside the database.
- Sends outbreak alerts: The system notifies all users about any virus outbreaks.
- Provide safety guidance contents: The system also offers safety and health guidance related to the outbreak.

Booking appointments (Abrar)



Symbols Used:

System: Represents the system's role in the sequence.

Database: Represents the system's role in the sequence.

User: Represents the user's interactions within the sequence.

Alt Frame: Shows alternative paths based on conditions; used here for the condition of rescheduling or cancelling an appointment.

Flow Description:

•**Request available appointments:** User initiates process by requesting information about available appointments in the system.

•**Request available appointments:** at the same time the system will fetch the appointments information from the database.

•**Send available appointments information:** the database will send it to the system.

•**Display available appointments dates:** system will respond by showing a page with available appointment date and time to user.

•**Choose preferable date & time:** The user selects their preferred date and time from the options provided.

If the user requests a specific doctor:

- Request available doctors:** user could optionally prefer to choose a specific doctor for the appointment, so they will ask for the available doctors information.
- Display available doctors:** The system will display the available doctors based on the selected date to the user.
- Choose a preferred doctor:** the user can choose a specific doctor.

Else: If the user skips choosing a doctor

- Assign a doctor:** If the user decides not to choose a specific doctor, the system automatically assigns a doctor if the user skips the selection.
- Display a confirmation page with date, time, doctor name:** The system will pursue to display a page with the details of the appointment.
- Confirms selection:** User confirms the selection upon the confirmation page.
- Request payment details:** User will request payment details to pay for the appointment.
- Checks on available discounts:** System will check if the user is eligible for discounts.
- Displays payment page:** the system will sum the total and apply discounts if found.
- Proceeds with payment:** The user will now be entering payment and information to pay.
- Check process completion:** the system will check the completion status of the payment process.

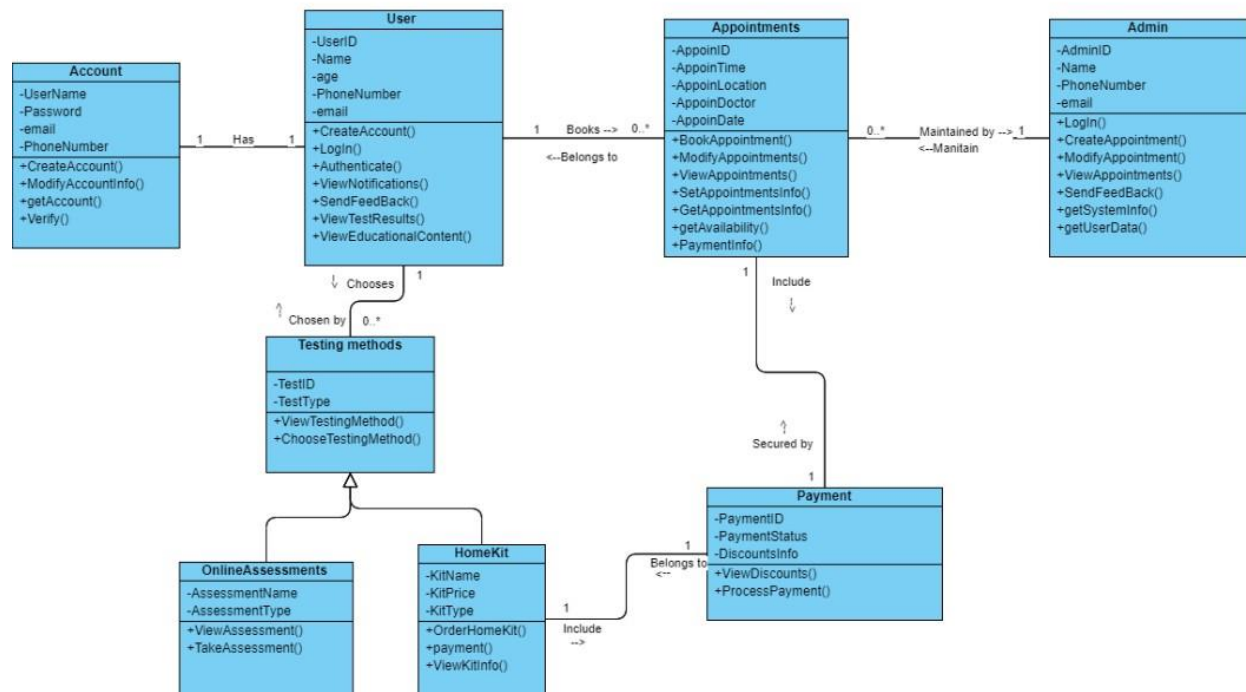
In the case of successful payment:

- Confirm payment:** once the payment is successfully transferred, the system will confirm it.
- Save appointment information:** the system will place the details of the users' appointment in the database.

In the case of a failed payment:

- Sends a failed payment message:** other wise if it fails, then it will send a failed message.
- Redirect user to payment page:** after the message the user will be directed to the payment page again to redo the paying processing steps.

Lab9



- Identify the entity classes.
- To understand the relationships between these classes.
- Identify dependency, hierarchy and associativity between these classes.

Entity Classes

The entity classes in the class diagram are:

- User
- Account
- Appointments
- Admin
- Testing methods
- Online Assessments
- Payment
- HomeKit

Relationships

- **Association:** An association is a general connection between classes. In this class diagram, there are several associations between classes. For example, the User class associates with the Appointments class. This means that a User can have many

Appointments. Another example is the association between the Appointments class and the Admin class. This association shows that an Admin can maintain Appointments.

- **Inheritance (Hierarchy):** Inheritance is a relationship between classes where one class (the child class) inherits the properties and methods of another class (the parent class). The class diagram you sent does not show any inheritance hierarchies.

Class Analysis Document

The class analysis document should contain the following information:

- A brief description on what does one understand by Class Analysis

In software design, *class analysis* involves identifying, categorizing, and organizing classes within a software system based on their attributes and methods. It's a fundamental step in object-oriented design, aiding in modeling the software and defining its structure. The aim is to create a blueprint that mirrors real-world or conceptual entities through classes, specifying their functions and interactions. This analysis facilitates data encapsulation and modularization, thus improving the system's maintainability and scalability.

- **A brief description on types of Analysis Classes.**

Types of Classes Analyzed

Class analysis typically identifies various types of classes:

1. *Entity Classes*: Represent main objects within the application's domain, often corresponding to tangible entities like users or products.
2. *Boundary Classes*: Facilitate interaction between system actors and the software system, managing communication with the outside world.
3. *Controller Classes*: Govern the flow of the application, handling business logic and ensuring proper interactions between entity and boundary classes.

- **Identify all the Analysis Classes for your problem statement and briefly describe their purpose.**

Analysis Classes for our problem:

1. **Account:** Manages user credentials and personal details, enabling users to create, modify, and verify their account information.
2. **User:** Central to the system, handles tasks such as account management, authentication, and accessing various services.
3. **Appointments:** Manages scheduling and appointment-related functions such as booking, modifying, and viewing appointments.
4. **Admin:** Controls administrative functions like appointment creation, user data modification, and system feedback retrieval.
5. **Testing methods:** Offers various testing methodologies for user selection.
6. **Payment:** Handles payment transactions, including processing payments and managing payment statuses.
7. **Online Assessments:** Manages online assessments, allowing users to view and take tests.
8. **HomeKit:** Manages home testing kits, including ordering, payment, and viewing kit information.

These classes collectively structure the software system, defining responsibilities, managing data, and facilitating interactions between different components.

Closing summary:

The SafeHealth project endeavors to tackle the hurdles individuals encounter in accessing healthcare services, aiming to enhance convenience and accessibility. Through the development of an application facilitating remote diagnosis and online communication with healthcare providers, along with discounted fees, the project endeavors to streamline healthcare access.

Interviews conducted by the project team uncovered prevalent issues such as the inconvenience of traditional doctor visits, leading to a desire for online consultations and non-urgent tests. Transportation challenges to hospitals were also recognized. Key features like a user-friendly scheduling system and appointment reminders, particularly tailored for the elderly, were highlighted as essential for ease of use.

In essence, SafeHealth seeks to revolutionize the healthcare experience by harnessing technology to cater to the specific needs and preferences of users. By providing online consultations, self-diagnosis tools, and simplified appointment management, the project aims to enhance the efficiency and efficacy of healthcare delivery, ultimately ensuring timely and high-quality services for all.

Work division:

We embraced a collaborative approach through group discussions, fostering an environment conducive to open dialogue where each member could articulate their preferences and address concerns. Task allocation was followed by individual execution, subsequent discussion, and task rotation for thorough review and refinement.

Every member worked on every part of the project except creating the sequence diagrams.