Info 3

Laboratory 3

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Lab 4: Sequence Diagrams

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You will continue working with the same group as last lab. BUT: You now switch your scenarios with another team.

Review the scenarios and use cases you received. Do you understand them? If not, ask the other team for clarification and note down in your report any changes that you had to make to them.

Can you identify candidate objects and methods? There are a number of processes that your use case authors should have detailed in their use cases. If they did not include these, you will first have to write additional use cases.

You need to draw sequence diagrams for at least four of the use cases.If you feel like it, you can continue with a sequence diagrams for the additional use cases.

ACTORS noted down by Group-2

Patient: Is the main User of the App. Wants to make appointments for their corona tests, possibly change them and access the results afterwards.
Doctor: Needs to have a schedule for their appointments, a possibility to change them and to input the test results
Administrator: Maintain the System, verify the doctors and manage the patients.

ACTOR added by us (Group-3)

In the exercise sheet of Lab 3, it says that every app needs to have at least one back-end. Adding/changing appointments and login data has to be stored somewhere, also we need to show the interaction between actors and objects in the sequence diagrams so we thought it would be nice to have it.

Database Server: Where the data of the patients and the doctors and their scheduled appointments are stored. Administrators can access the database to perform checks or search for users or doctors.

Received Scenarios by Group-2

Authors: Florian Holzmann, Mohamed Amine Sallami, Robin Kehr, Axel Ferris Adiputro)

1.CONCERNED MOTHER

Preconditions :
Karen is a single mother of three
& wants herself and all of her kids to be tested (just to make sure)
& None of them is showing any symptoms

Sequence of steps :
1. Karen downloads the app
2. On opening the app she is asked to permit the app to use her location
3. She selects yes
4. The app finds and displays the closest testing facility for her
5. She selects "new appointment"
6. A screen appears asking for her name, date of birth, symptoms, home address
and phone number
7. The app calculates the priority of the case and displays a number of free appointments for her to choose
8. She chooses Wednesday may 5th 10:15am
9. repeat steps 1. to 9. for her three children

Postcondition:
She successfully made appointments for herself and all of her children
They get tested and everyone's negative .They lived happily ever after

Changed Postcondition:
The appointments are now made, this is saved in the database server and can now be seen in the app.

2.LATE STAGE PATIENT

Preconditions :
Karl is a man is his early thirties. Karl does not really believe that Covid-19 is a real threat to him. Karl has had a nasty dry cough for a week and high fever for a couple of days. His family urged him to get tested

Sequence of steps :
1. Karl downloads the app
2. On opening the app he is asked to permit the app to use his location
3. He selects no, because he doesn't trust apps
4. A screen appears asking him for his zip code
5. The app finds and displays the closest testing facility for him
6. He selects "new appointment"
7. A screen appears asking for his Name, date of birth, symptoms, home address
and phone number
8. He reluctantly enters his personal information
9. The app calculates the priority of the case and displays a notice that he needs to be tested as soon as possible and shows two appointments
for the same day that were reserved for possible severe cases
10.He selects one of the two appointments

Postcondition :
He gets tested with a quick test and a PCR. He is tested positive and gets hospitalised immediately

Changed postcondition :

Karl has now made an appointment for the same day and is ready to get tested.

3.RESCHEDULE APPOINTMENT FOR PATIENT

Preconditions :
Lily is feeling sick and she wants to check herself but a friend who was supposed to drive her to the hospital could not make it for the appointment. She needs to reschedule.

Sequence of steps :
1. Lily opens the app
2. She selects her appointment
3. She then chooses to change the date of that appointment
4. Lily chooses a different date and time for her appointment
5. The app will ask a confirmation to change the schedule
6. Lily confirms the new appointment
7. The app will send an email to lily for her new appointment´s details

Postcondition :
Lily's appointment is rescheduled to a different date and time

4.CANCELING APPOINTMENT FOR PATIENT

Preconditions :
Ligal had a slight fever and she booked an appointment through the app. A day before the appointment she feels healthy again and she thinks that she doesn't need to get herself checked. She wants to cancel her appointment.

Sequence of steps :
1. Ligal opens the app
2. Choose to cancel the appointment.
3. The app asks Ligal for her reason of cancelling.
4. After Ligal choose her reason, the app gives her a warning that she should get tested anyway.
5. The app then ask for confirmation to cancel the appointment.
6. Ligal confirms.

Postcondition:
Ligal did not get herself checked

Changed postcondition:
Ligal has cancelled her appointment

5.DOCTOR SCHEDULE CHECKING

Preconditions :
Dr. Ross wants to know roughly how many people need his care tomorrow.

Sequence of steps :
1. He opens the app
2. Specify date that he wants to see
3. The app then will list all the appointments for the day

Postcondition:
The doctor can see how many patients he needs to tend for that day

6. RETURNED FROM INFECTED COUNTRY

Preconditions :
Manuel has just returned from an infected Country. He was so worried about the possibility that he was infected. even if he doesn't show any symptoms, he wants to be tested.

Sequence of steps :
1. Manuel downloads the app
2. On opening the app he is asked to permit the app to use his location
3. If (he selects yes) (The app will choose automatically the center)
Else (He will choose the center manually)
4. The app finds and displays the closest testing facility for him
5. He selects "new appointment"
6. A screen appears asking for his Name, date of birth, symptoms, home address, phone number, (if 3 is NO : the Test center)and blank for extra information (chronic disease, if the person contacted infected persons ..) and whether it is an adult attending or a child
7. if(the person attending is a child) ask for the personal information of one of the parents
8. Else move on to the next screen
9. The app treats the given information and displays a notification that informs Manuel that he should stay home and don't go outside for the next 14 days.
10. Manuel closes the notification and now the appointments are available but the
first bookable option is after two weeks.

11. Manuel was so upset and booked the first available appointment.
12. The appointment is successfully booked and a confirmation email sent to Manuel.
13. The confirmation email contains all the needed information for a person in
quarantine with the green number below if anytime Manuel doesn't feel good.
14. Manuel activates the link of confirmation and reads all the information.

Postcondition:
Manuel has successfully made an appointment. It can now be seen in the app. He now has all the information that he needs with the numbers he should call for an emergency.

7. ABSENT DOCTOR

Preconditions:
Peter is a great Doctor. He was hard working the last months without pause or breaks. All these affect Peter's health. He didn't feel good when he woke up today. So he decided to stay home so he should cancel all his appointments for today.

Sequence of steps :
1. Peter opens the app
2. The app shows him all the appointments ordered by days
3. He selected today's date by keeping his finger on the date for seconds
4. The display shows now a list of multiple options (send email to patients, shift appointments, cancel appointments ..)
5. He selected cancel appointments.
6. The application checks
If (another Doctor is available in his or another center in the city for today){
7. the new Doctor will replace Dr.Peter today.
} else {
8. The application calculates the possibility to arrange Dr.Peter's appointments with other Doctors with the minimum delay possible.
}
9. The app sends emails and notifications to the concerned Doctors and Patients to inform them about the recent changes.
10.A confirmation shows on Peters screen that he is free now from any appointments for today.

Postcondition :
Dr.Peter now can take the day to repose.
All patients kept their appointments in approximately the same time

8. SHIFT APPOINTMENTS

Preconditions :
Dr.Anna received an emergency without an appointment today. She will not be available at the time of her appointments. She decided to shift her appointments.

Sequence of steps :
1. Dr.Anna opens the app
2. The app shows her all the appointments ordered by days
3. She selected today's date by keeping her finger on the date for seconds
4. The display shows her now a list of multiple options (send email to patients, shift appointments, cancel appointments ..)
5. She selected shift appointments.
6. The app shows her a new page with a time form (00:00) in the middle
7. The app asks her by how much she wants her appointments to be shifted
8. She selected +30:00
9. A confirmation shows that all her appointments for today are shifted 30 minutes back
10. The app sends emails and push notifications to all the patients whose appointments have been shifted

Postcondition :
All the appointments are now shifted and the patients are informed.

9. SIGN UP AS A DOCTOR

Preconditions :
Dr.Michael works in a Test Center. He has just heard about the application that will be used to arrange appointments. So he needs to make an account in the app. Michael received a code from his testing centers administrator Michael should be a Doctor. Michael should work in a Center.

Sequence of steps :
1. Dr.Michael downloads the app.
2. He opens the app.
3. He has to choose between “Register as a doctor” or “Register as a client”
4. He chooses “Register as a Doctor”
5. He inputs the code that he got from his centers administrator earlier that day to verify that he is a real doctor
6. He needs to input his personal data (Name, Date of birth, email, the center he works in, his password ..)
7. He needs now to choose a password and its confirmation.
8. He taps on "register".
9. He receives a confirmation email.
10.He activates the link he received.
11.He opens his account in the app

Postcondition :
Dr.Michael can now use the application to check his appointments, cancel, shift them, or send emails to his patients.

10. FEEDBACK

Preconditions :
Simon was tested for SARS-COV-2 in a testing center. Everything worked very well for him and he liked the service of the app and the employees in

the center so he decided to give his feedback.Simon should have an account.

Sequence of steps :

1. Simon opens the app.
2. His account is opened with his data shown up and his passed test and its result
3. He chooses the " feedback tab"
4. Now he has the possibility to choose to give his note to the services from 1 to five stars
5. He selects 5 stars
6. He taps the messages blank
7. He writes a message to thank all the employees who made the process successful
8. He submits his feedback by tapping send.
9. His feedback is successfully sent to the administrators of the app.

Postcondition:

Simon has successfully sent his feedback. The administrator has now received the Feedback.

11. BAN A PATIENT'S ACCOUNT

Preconditions :

John has made 3 appointments and didn't go to any of them. The Doctors have reported the absences of John. Robert is an administrator. Robert detected the reports of doctors.

Sequence of steps :

1. Robert opens the website of the app's administration in the browser
2. He types his login data
3. He searched for John's account through his reported email
4. Robert has now several options to choose for John's account
5. He chooses "ban account"
6. He taps the blank of the cause
7. He typed "repeated absences of scheduled appointments"
8. He submits his decision.

Postcondition:

Now John is Banned. He cannot change anything in his account.
John can not make new appointments.

12. SEND RESULTS

Preconditions :

Sarah took a test in a center a few hours ago. Sarah has an account.
Dr.Michael is the direct Doctor of Sarah who took the sample for her.

Sequence of steps :

1. Dr. Michael was informed that Sarah's test was negative
2. Dr. Michael opens the app
3. He searched in his appointments by name
4. He finds Sarah's appointment.
5. He selects "Add result"
6. He chooses "SARS-COV-2 TEST: NEGATIVE"
7. He taps "Send"

Postcondition:

An email will be be sent to Sarah's email (the one linked to the app) tells her that her results are available.
The results will be shown in Sarah's app for that appointment.

Received Use Cases by Group-2:

Authors: Florian Holzmann, Mohamed Amine Sallami, Robin Kehr, Axel Ferris Adiputro)

Name of the use case	**PATIENT REGISTRATION**
Summary	A new patient creates an account
Actors involved	Patient
Basic sequence of steps	1. Patient downloads the app 2. On opening, the app patient is asked to permit the app to use her location 2.a if the patient accepts, the center will be chosen automatically 3. The app finds and displays the closest testing center 6. A screen appears asking for her name, date of birth, home address, phone number and whether it is an adult attending or a child 7. The app generates an account activation email and sends it to the patient 8. The patient activates his account
Extension points	2.b If the patient doesn't accept, he will choose the center manually
Preconditions	Patient should have Internet connection The application is available to download
Postconditions	The patient can now use the app and make an appointment

Name of the use case	**MAKE AN APPOINTMENT**
Summary	A patient makes an appointment at a test center
Actors involved	Patient , Doctor and administrator
Basic sequence of steps	1. Patient opens the app 2. The patient selects "new appointment" 3. A screen appears asking for her symptoms 4. The app calculates the priority of the case and displays several free appointments for her to choose from 5. The patient chooses an appointment
Extension points	
Preconditions	Patient has installed the app and has internet connection.
Postconditions	The patient has made an appointment, which is stored in the database and the patient can now see the scheduled appointment in the app.

Name of the use case	**RESCHEDULE PATIENT APPOINTMENT**
Summary	The patient changes the date of his appointment at the test center
Actors involved	Patient , Doctor and administrator
Basic sequence of steps	1. The patient opens the app 2. patient logs in 3. The patient selects an upcoming appointment 3. The patient chooses to change the date of her appointment 4. The patient chooses a different date and time for their appointment 5. The app will ask a confirmation to change the schedule 6. Patient confirms the new appointment

Extension points	
Preconditions	Patient must have an account, installed application and internet connection Patient must have an appointment
Postconditions	The patient's appointment is now changed

Name of the use case	**CANCELING PATIENT APPOINTMENT**
Summary	The patient cancels his appointment at the test center
Actors involved	Patient , Doctor and administrator
Basic sequence of steps	1. The patient opens the app 2. Patient logins 3. The patient chooses to cancel his appointment 4. The app asks the patient for her reason for canceling 5. The app gives the patient a warning 6. The app asks for confirmation to cancel the appointment 7. Patient confirms
Extension points	
Preconditions	Patient must have an account, installed application and internet connection Patient must have a scheduled appointment
Postconditions	The patient's appointment is now cancelled, the appointment is no longer present in the database. The scheduled appointment can’t be seen in the app anymore.

Name of the use case	**DOCTOR SCHEDULE CHECKING**
Summary	Doctor checks his appointments
Actors involved	Doctor and Administrator
Basic sequence of steps	1. The doctor opens the app 2. The doctor logins with doctor account 3. The doctor specifies the date that he wants to see 4. The app then will list all the appointments for the day
Extension points	
Preconditions	The doctor must have an account in the application, the installed application and internet connection
Postconditions	Doctor's appointments were checked

Name of the use case	**DOCTOR CANCELING APPOINTMENT**
Summary	the doctor cancels his appointment but the patients will have their visit at about the same time
Actors involved	Doctor , Patient and administrator
Basic sequence of steps	1. The doctor opens the app 2. The app shows the doctor all the appointments ordered by days 3. the doctor selected today's date 4. The app shows now a list of multiple options 5. He selects "cancel appointments".
Extension points	

Preconditions	The doctor must have an account in the application, the installed application and internet connection
Postconditions	Doctor's appointments were resend to other doctors

Name of the use case	**SHIFT APPOINTMENTS**
Summary	The doctor shifts all his appointments selected by the same period
Actors involved	Doctor , Patient and administrator
Basic sequence of steps	1. The Doctor opens the app 2. The app shows them all the appointments ordered by days 3. The doctor selects the appointment one by one or by date 4. The display shows the doctor a list of options 5. The doctor selects shift appointments 6. The app asks the doctor how much to shift the appointments by 7. The doctor confirms his modifications 8. The app notifies all users whose appointments have been shifted
Extension points	
Preconditions	The doctor must have an account in the application, the installed application and internet connection
Postconditions	Doctor's appointments were shifted by a specified amount

Name of the use case	**DOCTOR REGISTRATION**
Summary	the doctor creates an account in the application
Actors involved	Doctor and administrator
Basic sequence of steps	1. The doctor downloads the app. 2. The doctor opens the app. 3. The doctor chooses to register as a doctor 4. The doctor enters a code he got from his centers administrator to verify that he is a real doctor 5. The doctor needs to fill in the form 6. The doctor needs now to choose a password and its confirmation. 7. The doctor taps on "register". 8. The doctor receives a confirmation on his email. 9. The doctor activates the link he received.
Extension points	
Preconditions	The Doctor should have Internet connection The application is available to download The Doctor works in a test-center.
Postconditions	The doctor has an account

Name of the use case	**SEND FEEDBACK**
Summary	The patient can give Feedback in a Form
Actors involved	Patient, Doctor and administrator
Basic sequence of steps	1. The patient opens the app. 2. The patient chooses the " feedback tab" 3. The app gives the patient the possibility to rate the services from one to five stars and to write a message 4. The patient gives his rating 5.a. if the patient wants to send a message , the patient writes a message in a textfield 6. The patient submits his feedback
Extension points	7.b. If the patient doesn't want to send a message , ignore.
Preconditions	The patient must have an account, an installed application and an internet connection (and an opinion)
Postconditions	The patient's feedback is given to the administrator

Name of the use case	**BAN PATIENT**
Summary	The administrator blocks the patient from performing new operations on his account
Actors involved	Administrator, patient, database
Basic sequence of steps	1. The administrator opens the website of the app's administration in the browser 2. The administrator typed his login data 3. The administrator searched for patient's account through his reported email 4. The administrator chooses the wanted account 5. The administrator clicks on "ban account" 6. The administrator writes the cause. 7. The administrator submits his decision.
Extension points	
Preconditions	Patient’s account should be reported for breaking the rules.
Postconditions	Patient’s account is banned from using the application.

Name of the use case	**SEND RESULTS**
Summary	The doctor sends test results to a patient
Actors involved	Doctor , patient and administrator
Basic sequence of steps	1. The doctor was informed about a new test result 2. The doctor opens the app 3. The doctor searched in his appointments by name 4. The doctor finds the concerned patient. 5. The doctor selects "Add result" 6. If (the result of the test is positive)

	6.a He chooses "SARS-COV-2 TEST: POSITIVE" 7. He taps "Send"
Extension points	6.b If the result of the test is negative. He chooses "SARS-COV-2 TEST: NEGATIVE"
Preconditions	The doctor already has an account in the app and he has internet connection. A patient has already taken a test at the center.
Postconditions	The patient now has information about the result of his/her test.

Thoughts about the given scenarios:

1. Postcondition needs change
2. A step is missing between 4 and 5 (about zip code), postcondition should be changed
3. All good
4. Postcondition should be changed
5. All good
6. Looks like just a general use of the app? Nothing about returning from a country in the steps etc.. It is basically a bigger version of nr. 1&2. Manuel is never getting asked if he came home from an infected country.
7. All good
8. All good
9. Doesn't really fit the app choice? Postcondition should say he is now assigned as a doctor that can be contacted from the app
10. All good
11. All good
12. All good

Side Thoughts:

- The app never asks the patients to put in their email while the app is needing those emails in many use cases to work with it.
- shiftApponitment() and cancelAppointment() should be in the hands of the administrator (administrator as a secretary)
- in a case of a sick or not available doctor: the doctor should never move to different centers, it should always be the patients that get a notice that they should go to different places(like in real life)
- in the "send Results" USE-Case how does the doctor get a notification for a new result (**A: e-mail**)
- Database was never an actor in Use cases. It is a little bit challenging to understand how the group thought that the backend part will work. However, it is necessary to create a correct sequence diagram. We had to add Database as an actor and think about the processes that flow behind the app functionality.

After reading through the scenarios and Use Cases, we decided to note down all the functions(methods) that were detailed in them.

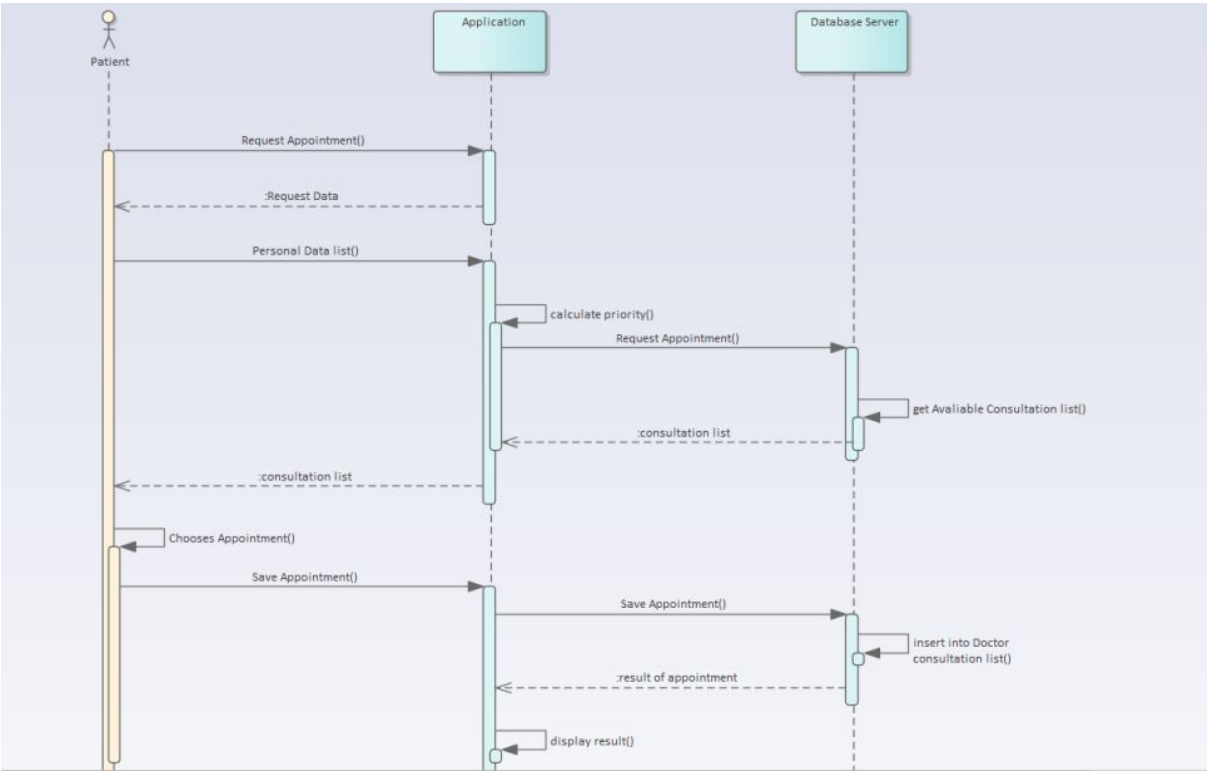
Functions

- **App can get your location**
- **IF first time user**
    - choose between registerAsDoctor() or registerAsPatient()
        - registerAsDoctor() Data: doctor verification code, personal Data (name, birth, email, his working center, password …), includes typical user confirmation check via e-mail
- **Database(centralized)**
    - App has a list and location of the testing centers
    - App has a list for all the patients
    - App has a list for all the Doctors
    - App may have one database per center
- **Patient login functions**
    - newAppointment();
        - getName(), getDateOfBirth(), getSymptoms(), getHomeAdress(), getPhoneNumber();
        - calculatePriorityOfCase();
        - showResult() + showAppointment();
        - Patient selects one of the two shown appointments and gets it while the appointment is saved in the database of the center
    - changeAppointment();
        - switchTime(); + switchDate();
        - confirmChange();
        - sendMail
    - giveFeedback(); (aka google)
- **Doctor login functions**
    - seeAppointments(); shows all appointments ordered by date
    - manageAppointments();
        - addResult(); negative or positive reply (for corona) and sending it to the patient **Sending per e-mail perhaps?**
        - sendEmailToPatients();
        - shiftAppointments(); e-mail to all concerned patients
        - cancelAppointment(); automated system to shift patients to another doctor or (if no doctor avaliable) other center
- **Administrator login functions**
    - enter the patient database list

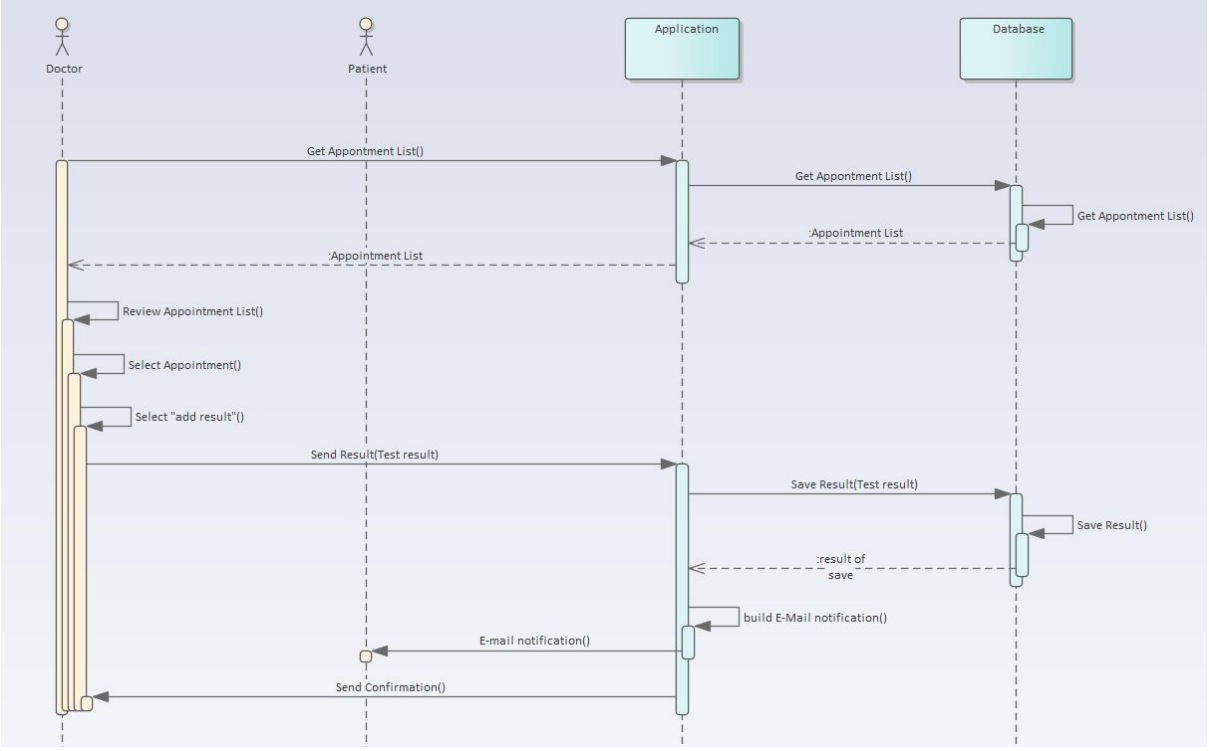
- banAccount() includes reason for the ban

Sequence Diagrams

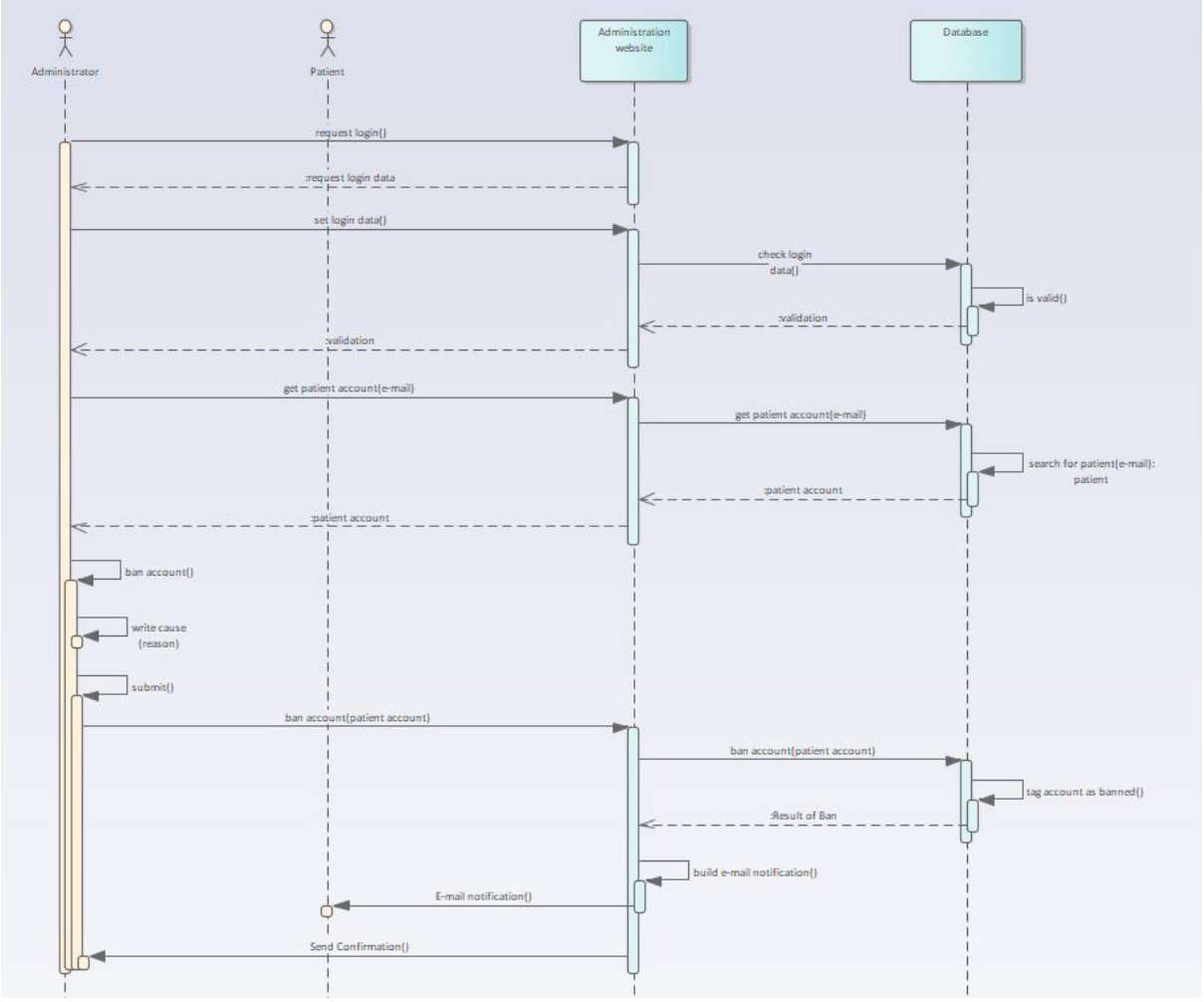
Sequence Diagram for Use Case: Make an appointment



Sequence Diagram for Use Case: Send Result

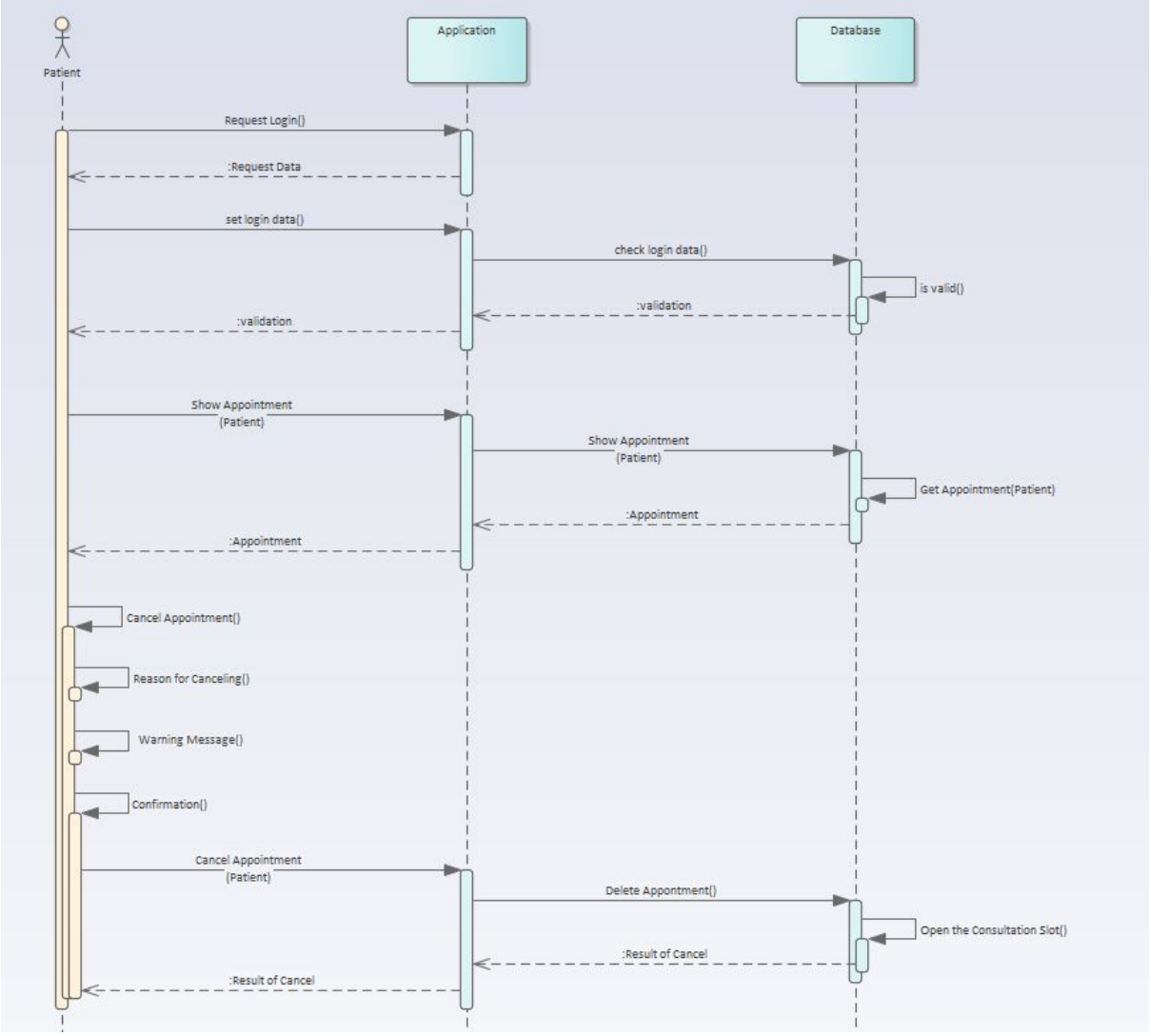


Sequence Diagram for Use Case: <u>Ban Patient</u>



Sequence Diagram for Use Case:

Canceling Appointment for Patient



Reflection:

Niklas Lengert: This would have been a pretty easy exercise if we could have worked with our own idea/project but swapping with a different group was pretty challenging though that is probably always going to be the case when swapping projects with a different group. What I took from this lab was how different even groups of only four people work on a certain task and how they interpret some aspects of the same project differently but the most important part is that they often see faults or lets say problems in your project that you often do not see. Drawing the Sequence Diagrams was not that challenging, it still helped a lot with understanding the steps the application has to take though.

Pavel Tsvyatkov: This exercise reminds me of when we swapped projects with other groups before. This time it was also interesting, because we could see how the other group had described their scenarios and use cases. We were able to talk about, to make sure we understand them correctly and discuss them in our group. Even though it's not our own work, I think it's still very beneficial for us. We will most likely have to read and understand other people's work more often than actually writing something ourselves, so this kind of exercise is always helpful. I also liked working on the sequence diagram and seeing the different ways to note down the object interactions.

Nataliia Azarnykh:

I like this exercise, because it let me reflect on use cases we previously wrote and notice strong and weak sides of our own report. Probably fixing another group's report was easier than writing your own cases, and that makes sense, because critique is always easier than creating something. The whole exercise remind me how important it is to let your colleagues to check and review your work (and remind me of code review). During this exercise I had to ask myself several times "what if they right and we wrong". The report is easy to understand, very good structured. These use cases would look amazing in a customer presentation. From the developer point of view, there could be more specifications about the backend side (database).

Robin Jaspers:
This exercise was another good way for self reflection about what we did at our own Use Cases. The other group have some nice approaches that are completely different from our work. This raised the level to get into their system by another level because in some way i thought more about our approach. Half of the time needed we spend reading and trying to understand what this other system is supposed to do. Still, understanding code would need more time so its better getting into UML.

Time spent on the exercise:

Reviewing Scenarios: 2-3 hour
Reviewing Use Cases: 2 hour
Writing notes about scenarios and use cases: 10 min
Writing down the functions detailed in them: 1 hour
Working on sequence diagrams: 2-3h