



Faculty of Engineering and Technology

Computer Science Department

SNATS: SPORT NUTRITION AND TRAINING SYSTEM

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Introduction

FitnessPro is a venue for social, and health activities that emphasizes sports, exercise, and other physical activities it is considered a top-notch exercise facility housed in a 4000 m² building, has been around for 6 years, providing gym and fitness services in addition to other sports like swimming, boxing, Muay Thai, bodybuilding, and so on. The facility serves out around 500 people of various ages and genders in the workout center. Some of the subscriptions are specifically designed for kids of 5 years and older.

After studying the TOR you presented carefully, we now have a vision that with no doubt FitnessPro is growing into a much bigger and more successful facility regarding sport, health, and social activities.

We are now fully aware of the problems and pitfalls FitnessPro is currently facing regarding its software and managing system, that is the current system operated is an out-dated desktop app for memberships managing in addition of an Excel sheets for accounting and employees managing, and we can sum it up as following:

1. Lacking the ability to create new memberships.
2. Current system does not support creating promotional memberships (Limited offers, discounts, etc..).
3. Lacking the feature of creating schedules of exercises and food programs for members by their trainers.
4. Lack the feature of tracking the whole lifecycle of members in the center.
5. Lacking the support of intersection of memberships (taking into consideration that some memberships can intersect and some not).
6. Excel sheets are used by trainers in the measuring room to keep track of member's weight on regular bases and taking height measurements.
7. Accountants also use excel sheets to track members' payment, center's expenses , payrolls, etc ...
8. The information is scattered in Excel sheets and the desktop app which makes generating reports for management purposes very hard and inefficient.
9. Members and staff are notified about everything verbally, which is unprofessional and misleading.
10. Does not support canceling memberships.
11. No direct connection between trainers and members about daily activities.

Thus we can now present our vision of a new era in your facility:

1. The software contains different users according to their roles.
2. Create or cancel memberships with well structured and unified data.
Supporting different activities your facility provides. Also supporting all kinds of memberships(discounts, promoshin memberships, intersection memberships, ... etc), (under 12 years old can not create a membership in gym

activities, only swimming, boxing and muay thai, also their accounts are managed by a parent or a guardian).

3. Manager should be able to register a new employee to the system (trainer, receptionist)
4. Each member has a scheduling feature that could be accessed and edited by a trainer with the ability to give feedback from the member.
5. The members have to check-in when they arrive at the facility by QR-code scanning machine, where the member enters the system.
6. Tracking members by checking each task on schedule, in addition to smart fitness tracking bracelets for tracking each member's vitals during activities.
7. Regular checks (for weight , height, ... etc) are submitted to the system in each member's profile.
8. All financial processes are stored and managed within a database connected to the systems.
9. The system supports sending notifications about anything related to the member.
10. Supporting the assignment of each member his own locker in the locker room.
11. Training machines are recorded in the system to easily check for maintenance or status.
12. The system supports the feature to create a community with its members and within between members.
13. New members are provided with simple software tutorials when entering the web software for the first time.
14. A member shall be able to send feedback to the manager.
15. A manager shall be able to view a members' feedback.

We know that this is a big investment for FitnessPro, choosing our team to implement this vision that we both share, will guarantee the uniqueness and advancement FitnessPro needs in the industry, taking in consideration the experience our team provides in the industry.

System Features

1. The software contains different users according to their role, each is given an ID number generated by the software :
 - a) Management : can access members and employees information (personal information and schedules), can access financial information (payment for members, payroll for employees, expenses for the facility), view the machines information.
 - b) Trainers : access to their own schedule, and create/ edit members schedules(exercise or nutrition), access members that he/ she trains, access the machines information.
 - c) Receptionist : can create/ cancel membership, can view trainers schedules, can view check-ins and check-outs in the facility, can access cash/cheques payment for members, can book a locker and take payment for it, making a discount for members of the same family.
 - d) Member : can view their schedules , can check their daily activities, can view their profile and regular measurements, and can view their trainer's schedule.
2. Create or cancel memberships :
 - a) The system should be able to show a new interface that contain two choices (either 12 years and above or less than 12 to 5 years)
 - b) When clicking the 5-12 form, a new interface with a registration form that contains the information of the parent or guardian (name, relative relation, number, email), also the information of the child(name, DOB, gender, medical conditions - if existed- , if he/she any relative in the gym).
 - c) When clicking the the 12 and above form, a new interface with a registration form that contains the information of the member(name, gender , DOB, number, email , medical conditions- if existed-, if he/she any relative in the gym)
 - d) After that a new interface is shown that contains all activities provided for the member (5-12 : swimming, boxing , muay thai and for 12 and above : all activities including gym), with the ability for management employees to add or cancel an activity (limited membership, limited activity , discounts.... etc).
 - e) After choosing activities a new interface is shown, showing the facility terms and policies and personal responsibility of the member , after clicking agree , an interface containing payment method is shown and the member must choose a payment method (paypal , visa card , cash, cheques) (choosing visa card or paypal the software provide field for card / paypal number.

- f) Only a reception employee can cancel a membership, by entering the member's ID, Also can freeze a membership upon payment delay (freeze means the member can no longer check-in the gym) .
3. Each member when clicking the schedule is provided with an interface containing a weekly schedule that is arranged by their trainer, the same goes for their nutrition schedule that is also arranged by their trainer after taking their weight, height, and taking in concentration any existing medical conditions in both schedules.
 4. On the first visit each member from 12- above category has to register using QR-code which is added to their information, for future visits upon arrival members must check-in using QR-codes given previously, and their IDs appear for the reception employee.
 5. Each visit members have the ability to check their exercises when done on the schedule, also the gym provides a fitness tracking bracelet that will keep the member informed about their vital signs (blood pressure, pulse, oxygen level ,... etc).
 6. each member has the feature to monitor their height and weight which are taken manually and recorded by their trainer.
 7. Management has UI which contains (members' financial statutes, employees' salaries, other expenses) connected to a database well defined and ordered.
 8. When the membership is almost expired the system notify the member, or in the case for the time for a regular check, or general announcement.
 9. The system provides the receptionist with the lockers each assigned a number, when a member books a locker from the receptionist their ID's appears next to the locker's number.
 10. System has the feature to record machines statuses by trainer, and viewed by manager(s) to monitor maintenance.
 11. All members enrolled in the same activity or sport, are provided with a chat room within the system so it will create a community for this exercise.
 12. The system will be easy to use, which implies that new users(members) do not need any time training to use the web page also (they're provided with simple tutorials on their first time logging in) , and the employees(reception, trainer, management) training time will not exceed two hours.
 13. The layer including payment method will have more security than the other features(lock transaction).
 14. The manager should be able to add a new trainer/Receptionists after he accepts them to be part of his gym. As he should take their full name, id, age, gender, and their qualifications as a degree or training, and he should enter the new employees' data with addition to his salary as a new trainer/Receptionists in the system

Software development process

Our team will be working with you according to the SCRUM development process, which consist of treating major portions of the software we'll be providing separately delivering each portion to you finished and ready to implement, In conjunction with providing you with prototypes to ensure that the development and process is going according to plan, we choose this approach because we are dealing with an MIS software so an incremental development and delivery will guarantee you meeting the requirements you need to run the facility, also prototyping will allow to test and see how will the system working involving many interfaces and how it will service different ages that use it.

Use-case Diagram

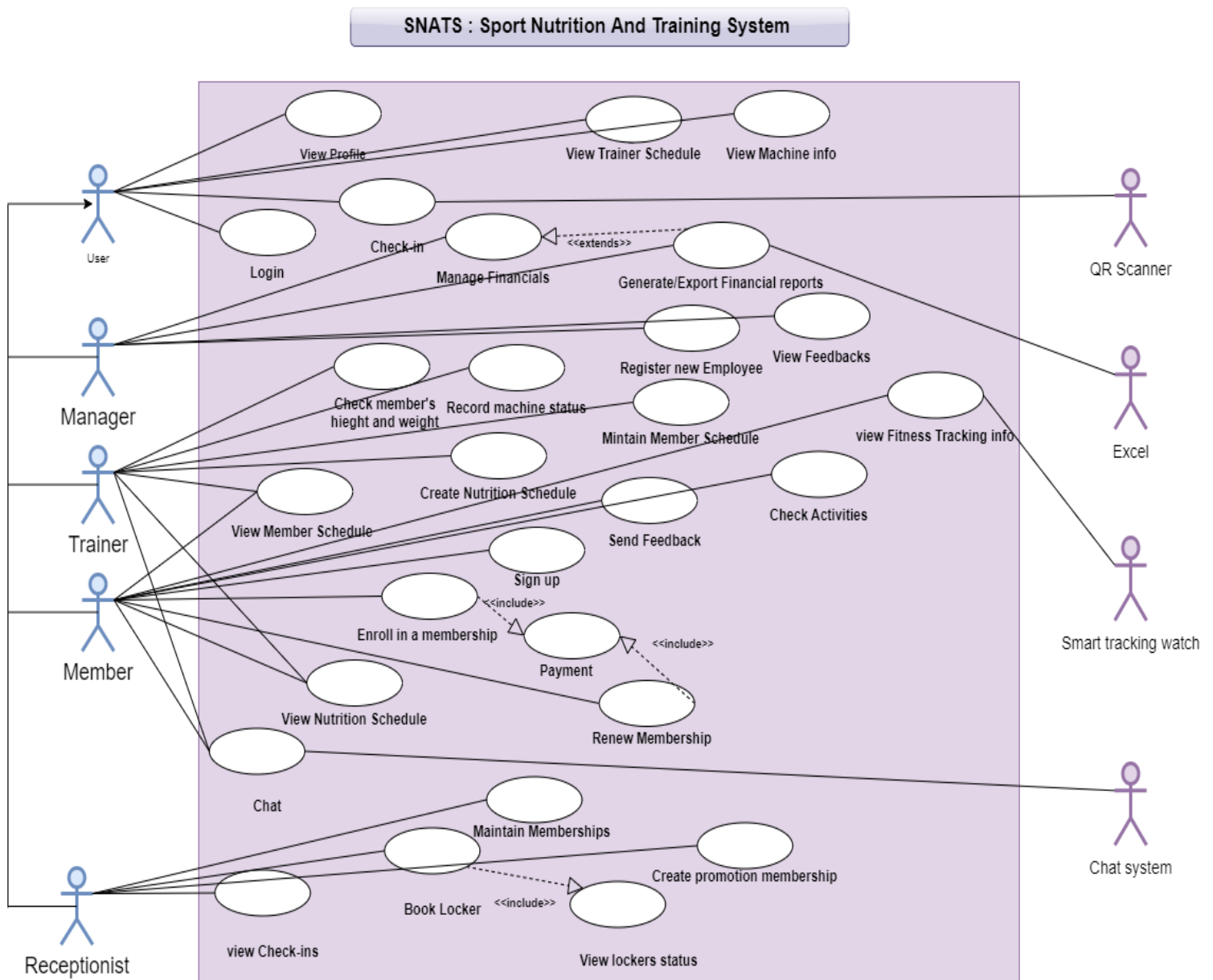


Figure (1) : Use Case Diagram

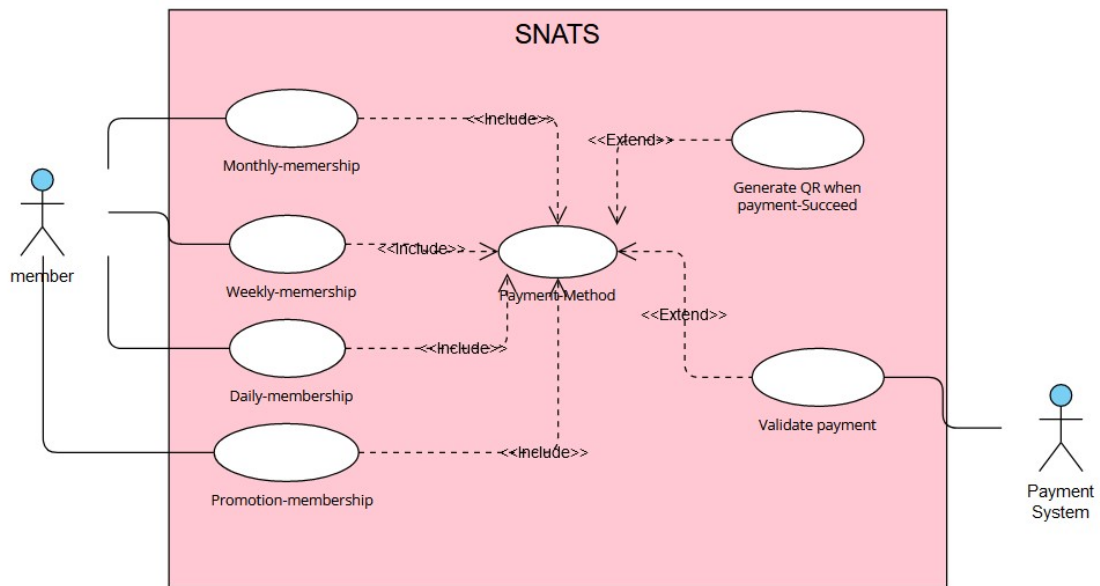


Figure (2) : Enroll 2nd Level Use Case

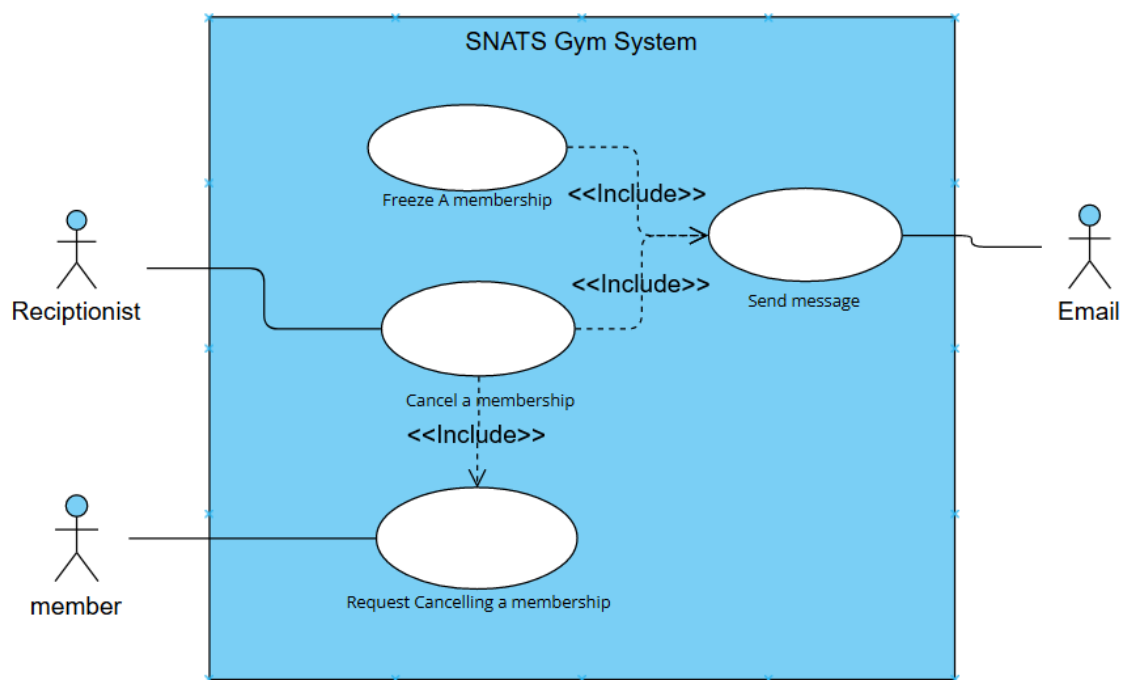


Figure (3) : 2nd Level Maintain Membership Use Case

Use-cases Brief Description

A) Actors:

- **User:** the user entity in the use case diagram is an inheritance of all kinds of users, this indicates that the functions a user can interact with is a function that is available for any user that is extended from this entity within the system, to avoid complicity in the diagram.
- **Manager:** Along with the functions any user can do, a manager should be able to view financials and manage finances in the system.
- **Trainer:** Along with the functions any user can do, a trainer should be able to check/record member's height & weight, record machine status, edit member schedule, and view member schedule.
- **Member:** Along with the functions any user can do, a member can view schedule, register, and view fitness tracking info.
- **Receptionist:** Along with the functions any user can do, a receptionist should be able to cancel a membership, book a locker, and view check-ins.
- **QR scanner:** it's an external system connected to our software, the QR scanner should be able to Scan a QR and associate it with the user upon entry.
- **Smart tracking watch:** it's an external system connected to our software, the watch should be able to read and record fitness tracking info.
- **Excel:** it's an external system connected to our software, manager can generate or/and export financial reports to it.
- **chat system** it's an external system connected to our software, the member can be communicate with trainer

B) Use-cases:

1. **Sign up** : The process by which a new user creates an account within the system
2. **Payment**: Members can choose the method of payment they desire, to complete the registration in the gym, this includes (Cash, Visa Card, paypal , or cheques).
3. **Login**: All users should be able to login into the system with an ID and a password.
4. **View Profile**: All users can view their own profile after logging in to the system.
5. **Check-in**: All users should check-in upon arrival to the system using a QR scanner machine.
6. **View trainer schedule**: All users are provided with the ability to view a trainer's schedule.
7. **View machine information**: All users in the system can view machine information, this means if the machine is down or not.
8. **Manage financials**: A manager should be able to manage all finances related to the facility, including payrolls, members payments, salaries(raises, or others), expenses.
9. **Generate/Export financial reports**: A manager should be able to generate financial reports and export them to excel sheets for further processing.
10. **Register a new employee**: A manager should be able to register a new employee to the system whether it's a trainer or receptionist.
11. **Check member's height and weight**: A trainer should be able to record a member's height and weight, this means adding them to the member's profile.

12. **Record machine status:** A trainer shall be able to record a machine status in the system, this means if it's working or needs maintenance.
13. **Maintain member schedule:** A trainer shall be able to edit / create a member's training schedule, this means specifying the activities.
14. **View member schedule:** a member shall be able to view their training schedule along with the trainer incharge of them.
15. **View fitness tracking information:** A member shall be able to view their fitness tracking information which is being read and recorded by the smart fitness watch.
16. **Maintain membership:** A receptionist shall be able to maintain a membership, this includes two cases where the receptionist can either cancel a membership upon member request or freeze a membership due to payment delay.
17. **Book locker:** A receptionist shall be able to book a locker for a member or a trainer in the gym using the system.
18. **View locker status:** A receptionist shall be able to view all locker status in the gym before booking a new one to see if it's either free or occupied.
19. **View check-ins:** A receptionist shall be able to view all check-ins, their names.
20. **Chat:** A member shall be able to chat with their trainer and other members.
21. **Create a nutrition schedule:** A trainer shall be able to create a nutrition schedule for the members they're training.
22. **View nutrition schedule:** A member shall be able to view their nutrition schedule
23. **Send Feedback:** A member shall be able to send any feedback they feel necessary to the services provided, the feedbacks are stored.

- 24. **View Feedbacks:** A manager shall be able to view feedback submitted by members.
- 25. **Enroll in a membership:** A member shall be able
- 26. **Renew membership:** A member shall be able to renew their existing memberships.
- 27. **Create promotion membership:** The receptionist shall be able to post special offers and special deals memberships.

Use-case/Requirement Analysis

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17: Book locker: A receptionist should be able to book a locker for a member or a trainer in the gym

- 17.1: first the receptionist must sure if member or a trainer on the system by taking their ID ,enter the id to the system , system should show a message indicating if the ID valid or not and show the type of ID (member or a trainer)
- 17.2: the system should allow receptionist to view the lockers status (this done by include view locker status use case) , locker status include: available or not , their locations in the gym
- 17.3: system should allow the receptionist to select a locker to reserve by entering the ID for a member or a trainer and number of day reservations. The system should prevent the receptionist from reserving a locker that is already booked.
- 17.4: The system must make a calculation to calculate the cost of the reservation according to the number of days and show the amount in a message.
- 17.5: After paying the amount by the member , the receptionist gives him the key of the locker and the reservation will be completed.
- 17.6 : The system should be scalable , with the ability to handle an increasing number of users and locker reservation over time (Non Functional).
- 17.7: The system should be able to handle a large number of locker bookings concurrently with good performance . (Non Functional).

3:Login: Login is a process in which a user enters their login credentials (such as an ID and password) in order to access a system. This process is typically

used to verify the identity of the user and to ensure that only authorized users are able to access the system

- 3.1: The system should allow users to enter their login credentials (ID and password) in order to access the system.
- 3.2: The system should verify the entered credentials and allow the user to log in if they are correct.
- 3.3: The system should prevent users from logging in if their credentials are incorrect or if their account has been frozen.
- 3.4: The system should allow users to reset their password if they have forgotten it. By using their phone number .
- 3.5: The system should have a secure login process, with appropriate measures in place to protect user data and prevent unauthorized access to the system.(Non Functional)
- 3.6: The system should have a user-friendly login interface, with clear instructions and easy-to-use controls. (Non Functional)
- 3.7: The system should have good performance and responsiveness during the login process, even if a large number of users are attempting to log in concurrently.(Non Functional)

16:Maintain membership : the receptionist should be able to see information about members payments and Subscription period for members , and upon late payment he should freeze the account of membership .

In addition to canceling the account of membership upon member request.

- 16.1: .Receptionists should be able to view a list of memberships.
- 16.2: Receptionists should be able to select a membership to cancel or freeze.
- 16.3: Receptionists should be able to specify a reason for canceling or freezing a membership.
- 16.4: The system should update the membership status to reflect the cancellation or freeze.

Non-functional requirements:

- 16.5: The system should be secure and prevent unauthorized access to membership information.
- 16.6: The system should be able to handle large numbers of membership records efficiently.
- 16.7: The system should be able to handle multiple requests to cancel or freeze memberships simultaneously.
- 16.8: The system should provide an intuitive and easy-to-use interface for receptionists to manage memberships.

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5:Check-in: upon arrival at the fitness club, a user should be able to check-in his entry to the gym by having to scan a QR code on the QR reader, as he would have gotten a QR code upon participating to a certain sport provided by the Fitness-Club, which should be saved into the gym's database and checked if valid or not.(UR)

System Requirements:

- 5.1: All users should be able to check-in using QR-code at arrival to the gym.
- 5.2: System should recognize the user's QR-code in a reasonable amount of time where it should be able to recognize him in an estimated time of 2 seconds at worst case, as well as being able to give a notification for the receptionist, if this QR wasn't recognized as soon as it doesn't find the entered QR on the database, which should take about 2.5 seconds at most, so that the receptionist has to deal with that customer by coming up to him.
 - 5.2.1: for members QR, a member should enter his QR-code into the QR reader and when he enters it, a receptionist should get a notification about the entered customer, as his full name, id, and when this member's subscription ends.
 - 5.2.1.1: If a member's subscription is over, then the receptionist needs to freeze his subscription and confront that member.
 - 5.2.2: for employees QR, when an employee enters the gym and checks in using his QR, his enter time, date and id should be recorded into his personal-profile, since it'll be used by the system later to calculate his salary and can be seen by the manager.
- 5.3: QR should be reliable as it should not take more than 2 seconds to response to the user, with addition to being able to record check ins by employees and members when a disconnection error appears with the data-base, and should be able to upload those check ins as the connection is re-established with the data-base.
- 5.4: QR should be secured as it's one of the most secure way to enter check-ins since a QR-code can be generated uniquely for each member.
- 5.5: QR must be easy to use as it can be used by any member with different age groups which is already established with QR since it only needs you to show a picture to the reader.

5.6: upon QR-reader break-downs, as they might appear upon un-expected conditions, done by the users of the system, such as spilling liquids on it, which cannot be controlled by us, the receptionist must take order in check-in process by taking the users IDs which should make him able to check-in for them.

5.7: As an alternative if users QR wasn't recognized, and his subscription was valid, then he can check in using user-id, which then through-out this process a notification well be sent to the receptionist to notify him about the error.

Note: security and usability are dependent on the QR reader type, so we should recommend some good choices for the client.

8: Manage Financials: A manager should be able to manage all financial issues within the system, where he gets to see expenses, employees' salaries, in-comes from members, and make raises to different employees. (UR)

System Requirements

8.1: The manage financials should be easy to use for the manager as it would have different UI's for calculating expenses, and managing salaries, and it would each employees' salary calculated based on his daily income times the day's he had attended which all will be recorded when an employee has checked-in, as it would show all these information to the manager on a separate page, which he can then Generate/Export Financials record from it to Excel sheets, where he can then manage those finances in the way he wants.

8.2: the manage financials should be secured and reliable as the only user who will be able to fully access this page is the manager, all other users are restricted from accessing it, and it should be reliable as it would have all information recorded locally, into a hard-disk and each time a change happens it uploads the information on the data-base, and it should contain a back-up locally of the most previous records, if a change is needed to be undo.

10: Register new employees: A manager should be able to register new employees after taking their names, data of birth, ID's and assigning them to a part of the gym based on their certifications, or training parts, as well as adding their training-certificate to their personal page, so it can be seen by the members, with addition to assigning them their hourly-wage or monthly salary,

which then can be added to the system both locally and added to the data-base system. (UR)

System Requirements:

- 10.1: Registering a new employee should be easy since it asks the manager to enter all needed information before accepting to add the new employee to the system, which consists of which part are they going to work at (body-building, Muay Thai, swimming...etc.), as well as taking all their personal information such as full name, personal ID's and qualifications, as well as assigning that new employee a new ID for the gym and give him a QR-code for later check-ins.
- 10.2: The registration of a new employee should be secured since it's restricted upon all other users and can only be accessed by the manager since before adding a new employee a manager should be asked to enter his id and password, even if he's already logged-in.
- 10.3: The registration process shouldn't take more than 2 seconds after an employee's information is fully entered.
- 10.4: The system should be able to work even when disconnected from data-base servers where it uses local storage to store all new employees and it uploads all changes to the systems' database as soon as connection is re-established

In-case of data-base connection: Connection is secured and reliable as the most estimated time to re-establish connection is around 15-30 minutes, and disconnections are estimated to happen only once in a month.

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13:Sign up:

UR1: Users should only be able to register as a member. Only then can the member be allowed to use the system to perform all the functions of the system which include: booking gym workouts, paying, providing feedback, communicating with the trainer, etc. After registration, the member will be able to log in using their unique member name and password.

UR2: Once the member is registered, he should be able to use the system according to the privileges provided by the system. The member enjoys special privileges that are granted to him in order to achieve the goals of the sports training.

SR: The system allows users to register as a member. For all of them, the system will collect information including: ID number, full name, gender, date of birth, email, phone number, unique member name and password for the system (with confirmation).

- The system must also collect information related to the health of the member, the sports exercises available to him, and the diets appropriate to the age of the member.
- The password must be at least 8 characters long.

The system automatically sends an email to confirm the registration.

14:Payment:

UR: Members must be able to pay for the workouts they are enrolled in. The system asks the user to choose the preferred payment method that the system offers. These include payment through a bank account, online bank Payeer, Paypal, and Visa card.

SR: The system must enable the member to make payments for the gym they are registered with through the following main methods.

- The system calculates the price according to the training period. So you should check this first.
- For payments through bank transfers, the system must ask the member to provide payment history, bank account information, and amount to be transferred (must be verified).
The commercial account number and name are default for all payments through the system.
- For payments by credit card, the system must ask the member to provide his/her name on the card, card number, expiration date (MM/YY) and security code.

- To pay through Paypal or the electronic bank Payeer, the system requires the member to provide information to these two sites.
- The system must be connected to the bank/company associated with the chosen payment method. The bank/company will check the validity of the entered card/account and whether the balance is sufficient for the transaction.
- In case of insufficient balance or invalidity of the card/account, the system will inform the member of this error and the transaction will be canceled. Cancellation means refund.

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14:View Member Schedule: This functionality consists of allowing the members to view their schedules, when clicking to view schedule members should see a new interface that within present their schedule regarding the activities they have along the week or month as their trainer decides, this includes all services the facility provides such as gym, muay thai, boxing, ect..

- 14.1:All members should be able to use this functionality along with the trainer(s) assigned to them.
- 14.2: The system response time after clicking the (view my schedule) should be fast, no longer than 2 seconds (worst case)
- 14.3:the schedule should include all appointments, tasks, and other scheduled items for the user
- 14.4: The system should allow members to view their schedule in the form of a calendar or list of appointments
- 14.5:The system shall display the schedule in a clear and easy-to-understand manner, especially because the facility actually has a group age of 12-years and above.
- 14.6:The user shall have the ability to filter the schedule by date range, type of appointment, or other relevant criteria.
- 14.7:The user shall also have the ability to print or export the schedule if necessary.

15: View fitness tracking information: A member can view their fitness tracking information which is being read and recorded by the smart fitness watch, and also data is synchronized and added to the members' profiles, This requirement is useful for a variety of purposes, such as helping users to monitor and improve their fitness levels, track their progress towards specific goals, and motivate themselves to stay active.

- 15.1: Each user is provided with a smart fitness tracking watch upon each check-in (and they have to return it upon leaving), by scanning a QR code that the watch provides, it will automatically open a browser page that demand an ID and a password, witch will link the readings of the watch to a particular member.
- 15.2:The user should be able to see their progress over time, including data such as their workouts, distance walk or run (on the

machines), calories burned, heart rate, oxygen level, and other relevant metrics.

15.3: The user should also be able to view their fitness goals and track their progress towards achieving those goals.

15.4: The system should display the fitness tracking information in a clear and easy-to-understand format, such as graphs, charts, or lists.

15.5: The system should provide the user with statistics and graphs about (monthly or weekly) reading.

15.6: The user should have the ability to filter the information by date range, type of activity, or other relevant criteria.

15.7: This functionality should be effective, efficient, and user-friendly, this means it must have the following non-functional requirements:

15.7.1: Performance: The system must present fitness monitoring data promptly, with little latency or delay, this also includes the synchronization of data and reading between the system and the smart watch every 3 minutes to ensure that the system is recording the right data.

15.7.2: Reliability: The system shall accurately display the fitness tracking information as recorded by the device.

15.7.3: Usability: The system shall present the fitness tracking information in a way that is intuitive and easy for the user to understand and interact with.

The non-functional requirement is mostly dependent on the smartwatch type, so we should recommend some good choices for the client.

Class Diagram

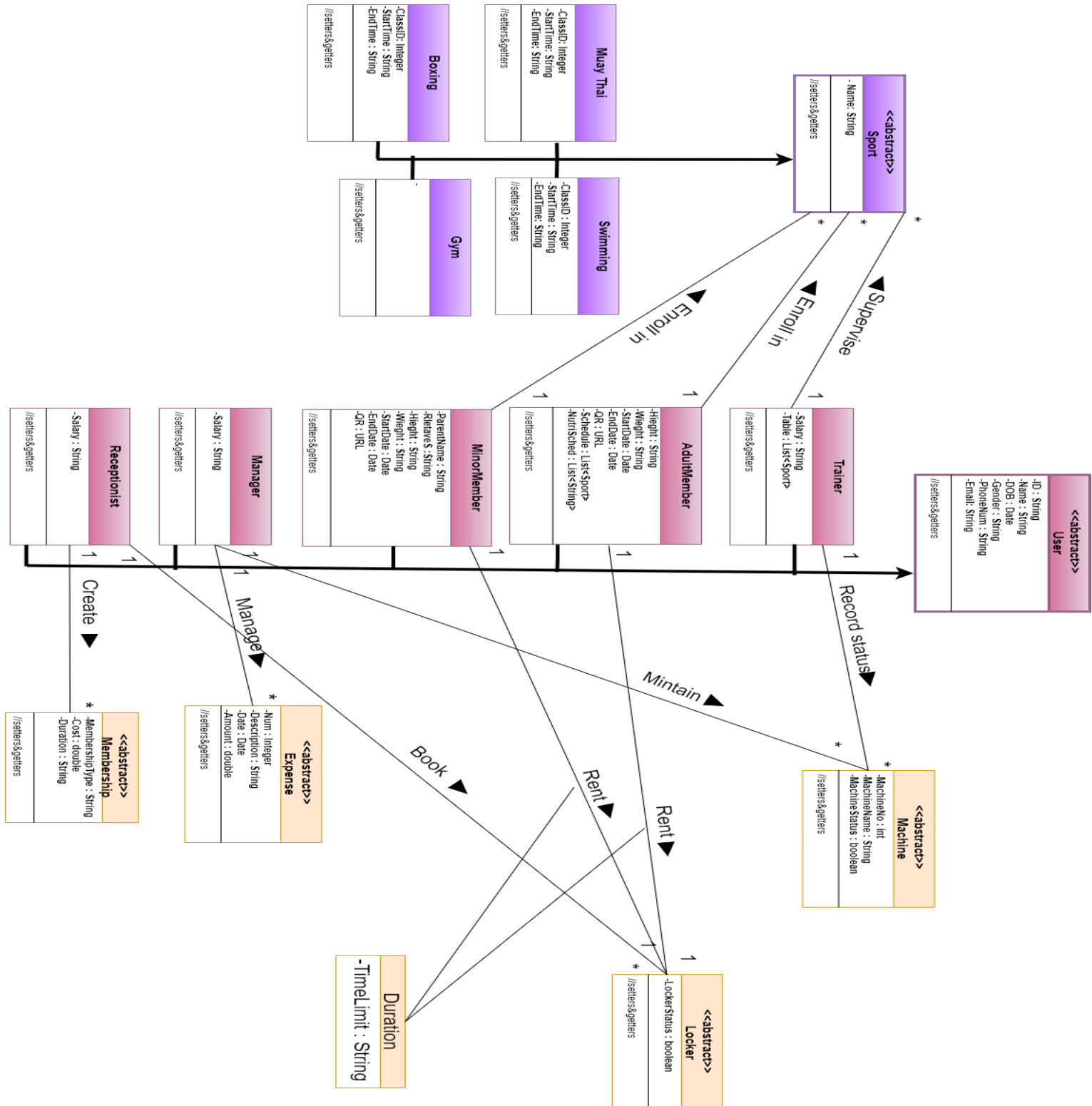
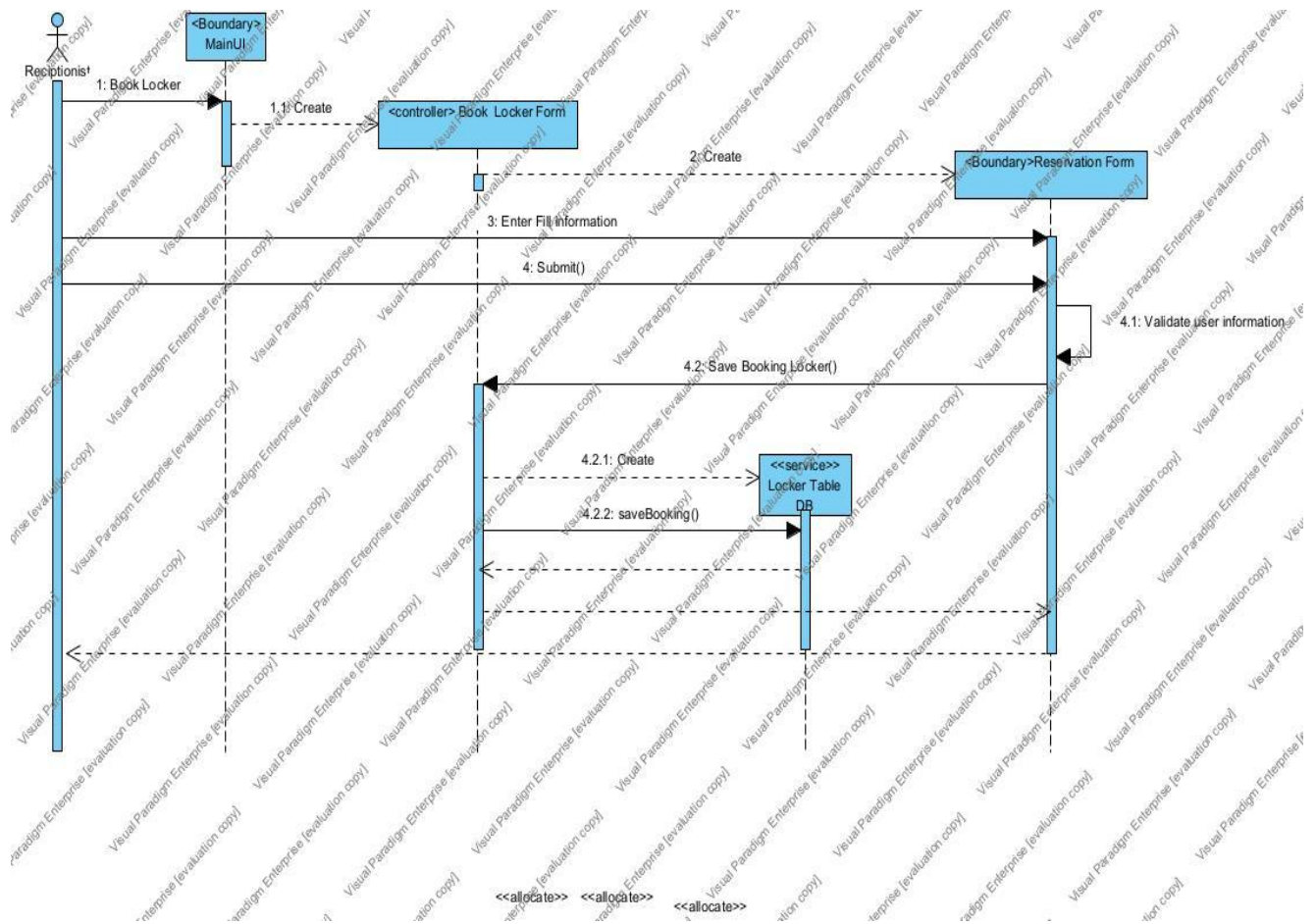


Figure (4) : Class Diagram

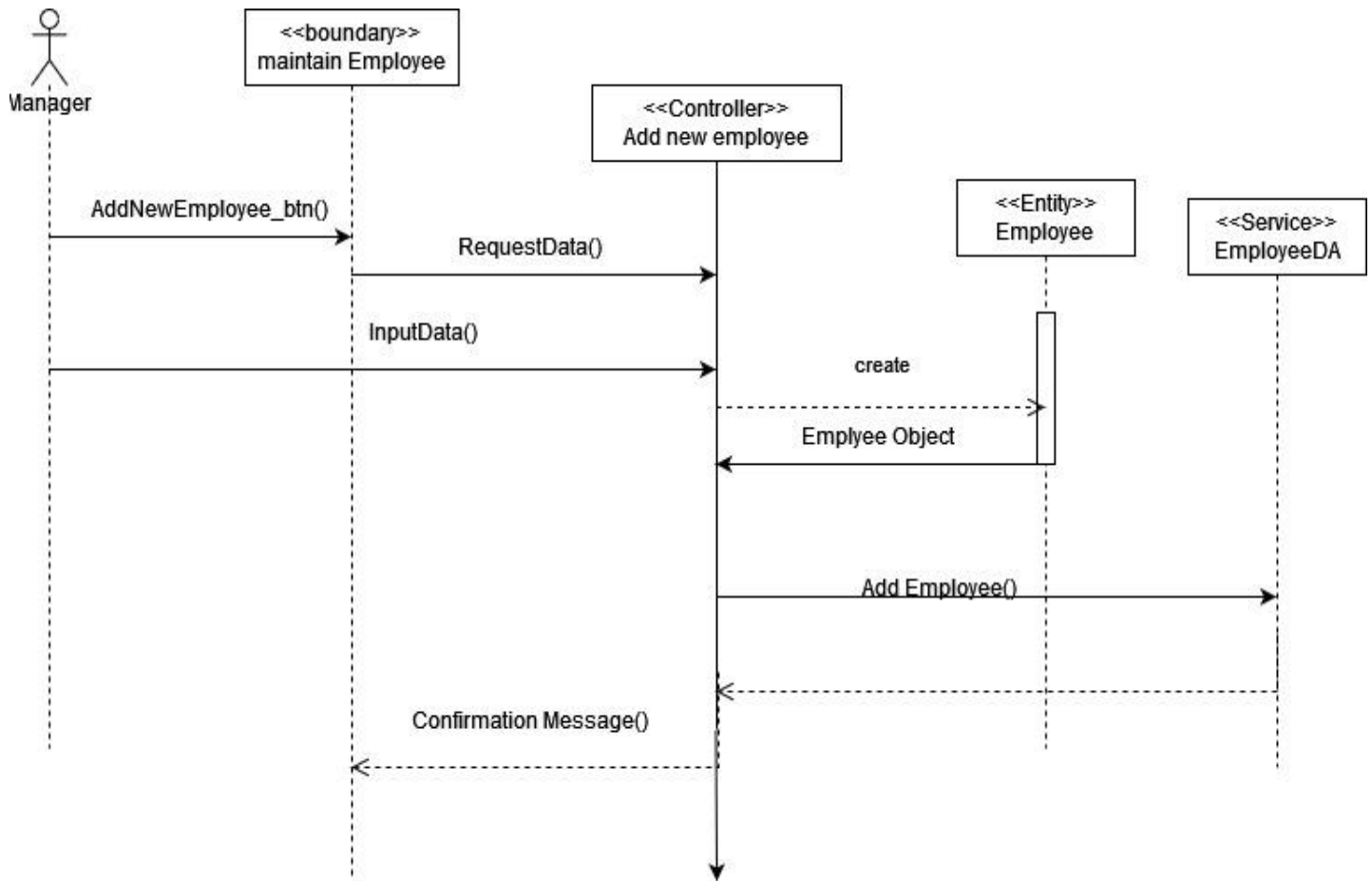
Sequential Diagrams

Hazem Ewidat : (Book Locker)



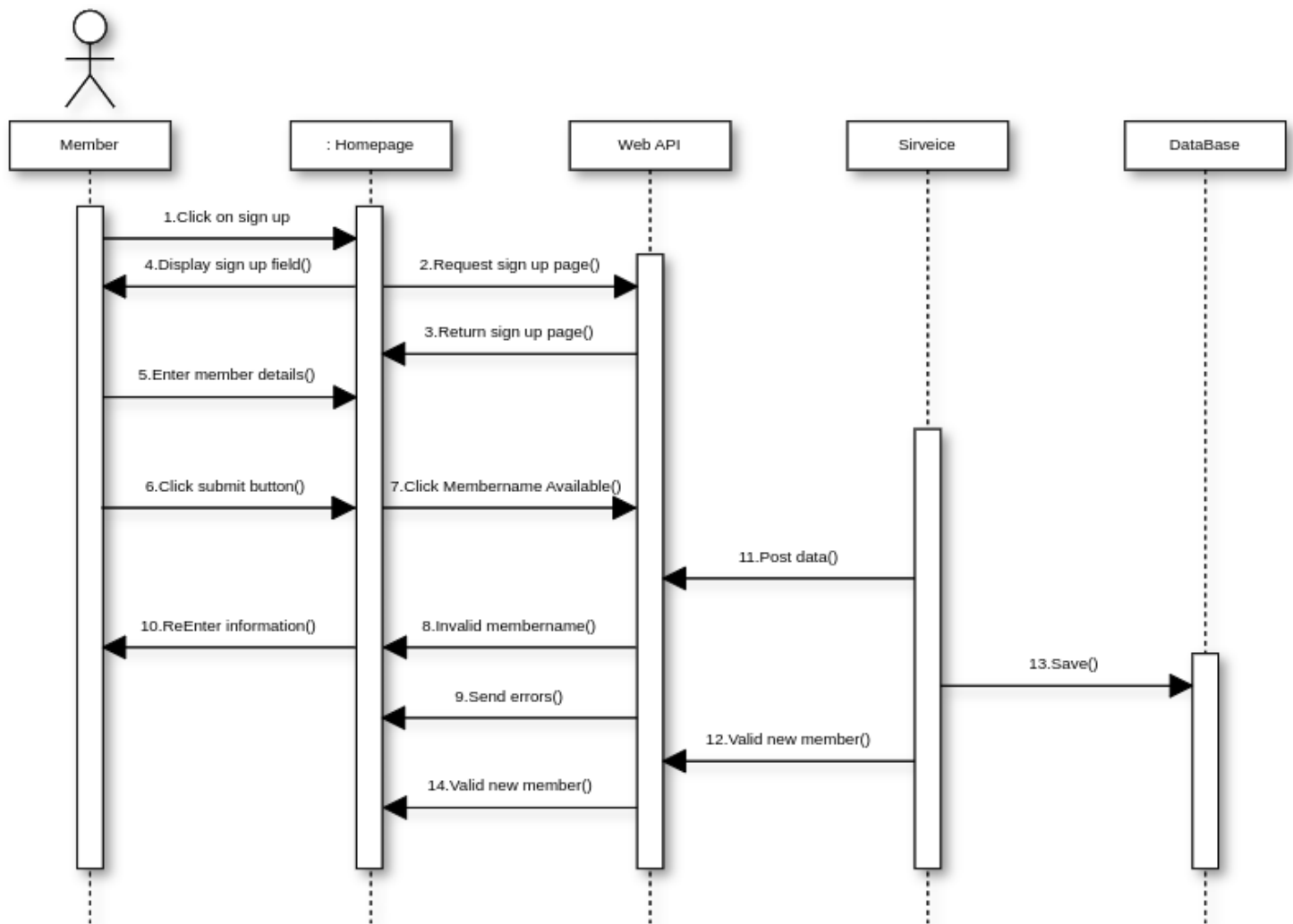
Figure(5) : Book Locker Sequential Diagram

Lutfi Qasem: (Add a New Employee)



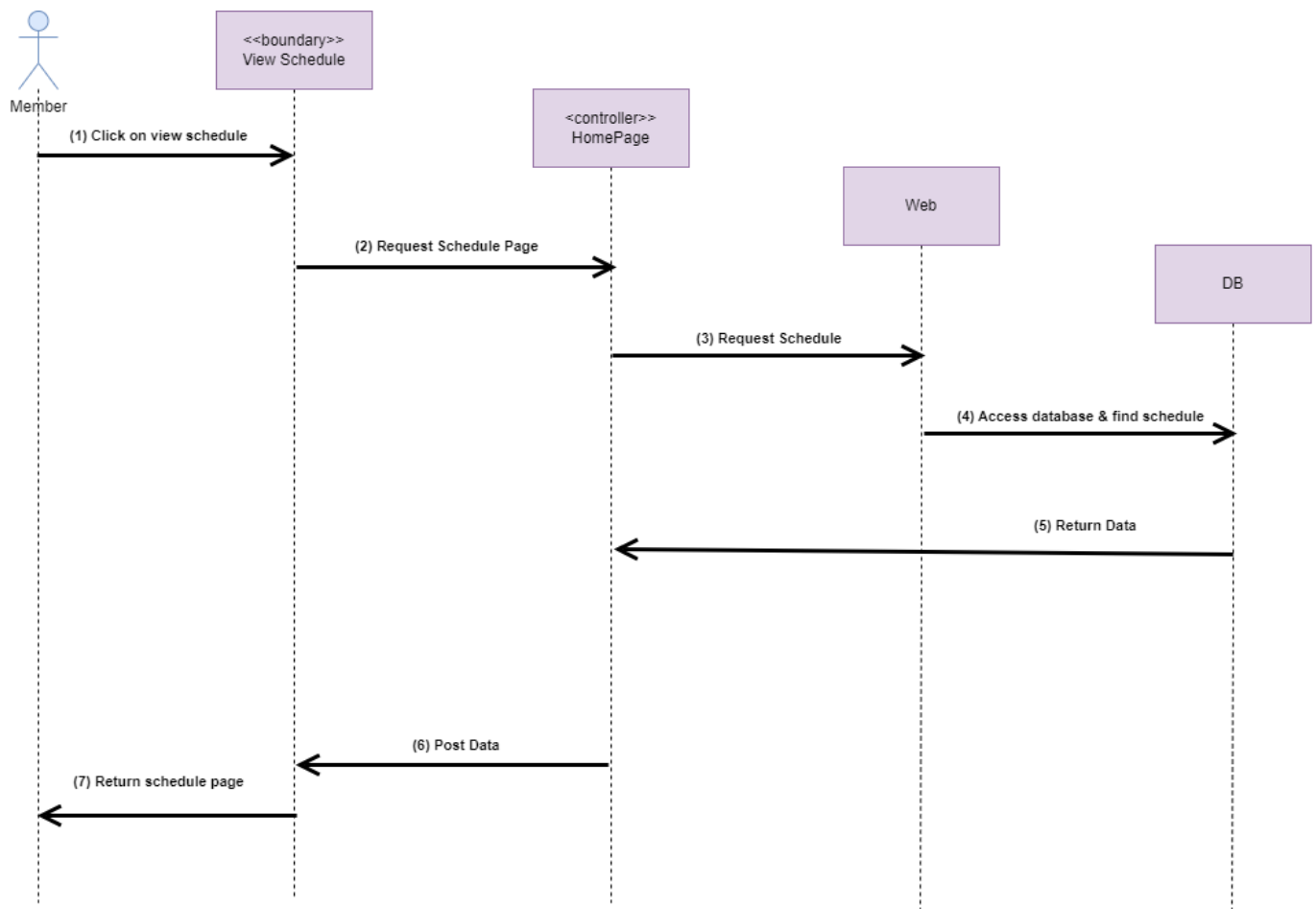
Figure(6) : Add a new employee Sequential Diagram

Hussian Awad : (Sign up)



Figure(7) : Sign-up Sequential Diagram

Shatha Taweel : (View Schedule)



Figure(8) :View Schedule Sequential Diagram