

Physical Education Center Digitalization

Course: SE505 Software Project Lab – II

Submitted by

<i>Iftekhar Jamil</i>	<i>Roll: 0802</i>	<i>2015-2016</i>
<i>Mohammad Ibrahim</i>	<i>Roll:0814</i>	<i>2015-2016</i>

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LETTER OF TRANSMITTAL

20th March, 2018

Md. Saeed Siddik

Lecturer

Institute of Information Technology

University of Dhaka

Subject: Submission of Software Requirement specifications of Software Project Lab-2

Dear Sir,

With due respect, we are pleased to submit the complete software requirement specifications for the project 'Dhaka University Physical Education Center Digitalization'. Despite this report may have some limitations for the sake of time constraints we have tried our level best to prepare an acceptable software requirements specifications. Your kind opinion and recommendations will highly be welcomed and we will be obliged of your kind consideration to our mistakes.

Sincerely yours,

Iftekhar Jamil

BSSE802

Mohammad Ibrahim

BSSE814

Supervisor

BSSE 8th batch

Institute of Information Technology

University of Dhaka

Md. Saeed Siddik

Lecturer

IIT, University of Dhaka

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Then we would like to express our heartiest gratitude to all of those who helped us to accomplish the tiresome work of identifying the requirements for the project titled 'Dhaka University Physical Education Center Digitalization'. We would like to specially thank to Md. Saeed Siddik, our supervisor for helping us to gather requirement as well as keeping ourselves connected with the project stakeholders. We would like to thank Mohammad Shahadat Hossain, the main stakeholder of our project for continuously helping us to determining the requirements. Then we want to thank our classmates as well as the students of Dhaka University who expressed their demands as a probable visitors of our website which eventually extremely helped us to determine our final requirements and prepare a reasonable set of normal, expected and exciting requirement.

Finally, we are grateful to the Institute of Information Technology for giving us the opportunity to do a project of great caliber.

ABSTRACT

This document contains the software requirements and specifications for Software Project Lab-2. It contains a detailed depiction of the requirements of our project ‘Dhaka University Physical Education Center Automation’. It includes a scenario-based model, data-based model, class-based model and behavioral model. Using this document as a guide, we are describing the requirements, necessary diagrams, procedures, designs for database and working sequence of our project.

Our project aims at digitalizing the existing workflow of the physical education center of our university. We believe introducing a website will greatly benefit its user to easily deal with different activities such as registration, renewal, information exchange. In this document we have discussed how we have identified and analyzed the problem and demonstrated a plan for our project workflow.

This document will help to make the software according to the demand of the stakeholders.

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CHAPTER 1: INTRODUCTION OF THE PHYSICAL EDUCATION CENTER DIGITALIZATION

1.1 Purpose

This document briefly describes the software requirement analysis of the project ‘Physical Education Center Digitalization’. It specifies the QFD (Quality Function Deployment) of the project. It contains normal, expected and exciting requirements and establishes a requirement baseline for the development of the system. The requirements contained in the SRS are independent, uniquely numbered and organized. The SRS serves as an official means of communicating user requirements to the developer and provides a common reference point for both the developer team and the stakeholder community. The SRS will evolve over time as users and developers work together to validate, clarify and expand its contents.

1.2 Intended Audience

This SRS for the project Dhaka University Physical Education Center Digitalization is intended for several audiences including the users as well as the admins, designers, operator, developers, and testers.

- The admin will use this SRS to ensure that all of his/her intended requirements are covered. It will also enable him/her to specify if further modification in actual project is needed or not.
- The designers will use this SRS as a guideline for creating the system’s design. The designers will continually refer back to this SRS to ensure that the system they are designing will fulfill the customer’s needs.
- The operator will use this SRS to make sure that this project has improved and eased his/her existing workflow.
- The tester will use this SRS to verify that the actual project has meet all the requirements the stakeholders asked for.
- The developers will use this SRS as a basis of developing the project ‘Dhaka University Physical Education Center’. They will need to ensure that all the project requirements have been fulfilled.

CHAPTER 2: INCEPTION OF THE PHYSICAL EDUCATION CENTER DIGITALIZATION

Inception is the beginning phase of requirements engineering. It defines how a software project gets started and what are scopes and nature of the problem to be solved. The goal of the inception phase is to identify concurrent needs and conflicting requirements among the stakeholders of a software project. At project inception, we establish a basic understanding of the problem, the people who want a solution, the nature of the solution that is desired and the effectiveness of preliminary communication and collaborations between the other stakeholders and the software team.

To establish the groundwork we have worked with the following factors related to the inception phases:

- List of stakeholders.
- Recognizing multiple viewpoints.
- Working towards collaboration.

2.1 List of stakeholders

Stakeholder refers to any person or group who will be affected by the system directly or indirectly. Stakeholders include end-users who interact with the system and everyone else in an organization that may be affected by its installation. At inception, a list of people who will contribute input as requirements is elicited. The initial list will grow as stakeholders are contacted because every stakeholder will be asked: “Whom else do you think we should talk to?”

To identify the stakeholders we consulted with assistant director of ‘Dhaka university physical education center’. We considered the following criteria to identify the stakeholders:

1. Who will consume the outcomes of ‘Physical Education Center Digitalization’?
2. Who will provide requirements?
3. Who will use the system?
4. Whose work will affect our project?

We identified the following stakeholders for our project. They are:

1. Administrator (Executive officer)
2. User (Client)
3. Operator
4. Developer

Administrator (Executive officer): The overall system will be handled by an administrator. He/she will play the major part in the maintenance of the website. The admin can add, remove, update team (hall/department) prepare fixtures, approve/deny field reservation. The admin can add another admin or operator in the system.

User (Client): The users will get the update or information from the website. They can also categorize the way to display information. They can view results of past matches, fixtures of upcoming matches, personal profile of players etc.

Operators: The operators are those who are responsible for giving input to the systems. After all the matches the operator will update the score in the database. In case of live matches the operator will have to give input instantly.

Developer: The developer will analyze different stakeholders' viewpoint to meet their demands.

2.2 Recognizing Multiple Viewpoints

Different stakeholders achieve different benefits from the system. Consequently, each of them has a different view of the system. So we have to recognize the requirements from multiple points of view, as well as multiple views of requirements. Assumptions are given below:

Administrator (Executive officer)'s viewpoint:

- ❖ 'Physical Education Center Digitalization' will be user friendly.
- ❖ It will be manipulated by any device.
- ❖ It will not be very expensive.
- ❖ The system should have role based login option.
- ❖ All the information should be preserved in the database
- ❖ The system should have individual player Database
- ❖ Easy interface for making necessary updates

User (Client)'s viewpoint

- ❖ It should be easy to use.
- ❖ The scores should be updated frequently.
- ❖ The system should have scope to personalize(setting favorite teams, players)

Operator's viewpoint

- ❖ The website will be easy to manipulate
- ❖ There should not be enormous input

Developer's viewpoint

- ❖ The project will have well defined requirements
- ❖ 'Physical Education Center Digitalization' Cost will be within budget

2.3 Working towards Collaboration

Every stakeholder has their own requirements. There are some common and conflicting requirements of our stakeholder. That's why we followed the following steps to merge these requirements-

1. Find the common and conflicting requirements
2. Categorize them
3. List the requirements based on stakeholder's priority points
4. Make final decision about requirements

Common Requirements

- ❖ Every user will be provided with personal account.
- ❖ Users will be able to see the fixtures of upcoming matches.
- ❖ Users will get update of match score.
- ❖ Users can apply for field reservation.
- ❖ Users will get the swimming pool information.

Conflicting requirement

- ❖ Only registered member has the privilege to personalize data.
- ❖ All the user can see the individual statistics.
- ❖ Sports in charge from every department will have different user interface and different functionality from other user.
- ❖ Same swimming pool information will be provided to all the users.
- ❖ Forum for description will be provided.

Final Requirements

- ❖ Only registered member has the privilege to personalize data.
- ❖ Guest user will be given a registration form and will be asked to register to enjoy extra features.
- ❖ User will be able to view individual records only if they register to the system.
- ❖ All the user will get update of fixtures.
- ❖ No forum will be provided in the website.
- ❖ Same information for swimming pool will be displayed to all users.
- ❖ Sports in charge will receive an email for sport participation but will view same interface like other users.

2.4 Requirement Questionnaire

We first ask the stakeholder some context-free questions to understand the Physical Education Center Digitization project's overall performance and goals. These questions are mentioned in section 2.1.1. These questions help us to identify the stakeholders of the project. Then we ask our next set of questions to better understand the problem and take stakeholder's opinion about the solution. The final set of question focused on the effectiveness of the communication activity itself.

The Inception phase helped us to establish a basic understanding of the web application, identify the stakeholders who will be benefited if this system becomes automated, define the nature of the system and the tasks done by the system, and establish a preliminary communication with our stakeholders.

CHAPTER 3: ELICITATION OF THE PHYSICAL EDUCATION CENTER DIGITALIZATION

3.1 Quality Function Deployment

Quality Function Deployment (QFD) is the set of methods or processes that transforms normally stated requirements into technical requirements for the software. The main goal of QFD is to generate a technical set of requirements that can be evaluated by the developers and used for the Design and manufacturing of product. It is the process for satisfying the customers by explicitly mentioning the requirements as well as providing a mean of development for the software engineers. We followed this process throughout our project:

3.1.1 Normal requirements:

The requirements which are determined by the direct meeting with the stakeholders are normal requirements. Generally normal requirements are intended to satisfy the primary demands of the customer. Normal requirements for our projects are the following:

- ❖ Allow users to add new account in the website `Dhaka University Physical Education Center`
- ❖ Guest user will be provided with a registration process.
- ❖ Registered user will go through authentication process to log in.
- ❖ Registered user will be provided with personal account containing name, date of birth, gender and phone number
- ❖ User will get the update of fixtures
- ❖ User will be able to get the necessary update of scores.
- ❖ User will be able to apply for field reservation.
- ❖ User will get the information of swimming pool.
- ❖ Anyone can see the individual statistics.

3.1.2 Expected requirements:

The requirements that are not explicitly mentioned by the stakeholders but assumed to be necessary for the stakeholders' satisfaction is known as expected requirements. We have selected the following expected requirements so far:

- ❖ User will be able to select their preferred team, players
- ❖ Registered members can delete existing account
- ❖ Admin can add a new admin in the system.
- ❖ Admin will have the option to add, delete match operators.

3.1.3 Exciting requirements:

These requirements are for features that go beyond the customer's expectations and prove to be very satisfying when present. Following are some exciting requirements of our project.

- ❖ Users will be able to see the live scores of ongoing matches.
- ❖ User will be able to predict for the upcoming matches.

3.2 Usage Scenario of the Physical Education Center Digitization

This website is a tool for the students of Dhaka University to be connected with the activities of Dhaka University Physical Education Center more easily than before. Users can get all the necessary update regarding fixtures, scores and so on. The features of this project are: showing fixture, providing a process to register in the system, maintaining account, providing roll based interface to the users, displaying update of fixtures and scores.

3.2.1 Authentication

Authentication for the ‘Physical Education Center Digitalization’ is required to differentiate the users. A particular user has different personalized data which will be displayed with more priority than rest.

3.2.1.1 Sign up

Sign up is the process for new users to the website. Initially, we will add an admin user to the system. An admin can add another admin or operator to the system. He will provide information (name, username, email, password, user type) of that admin or operator. Another user can sign up to the system by providing information (name, username, email, password). The system will validate the data and the users providing valid data will be registered to the system. The users who are registered to the system will enjoy more privileges over guest (unregistered) user such as favorite player, team, event, prediction.

3.2.1.2 Sign in

This subsystem is associated with the process of giving access to the registered users by matching their entered username and password with the database. Once a user has successfully signed in the system she will see his/her favorite list and can participate in prediction before matches.

3.2.1.3 Sign Out

A can sign out from the system by selecting sign out option. If there are any opened database or file, they will be saved and closed and any opened subsystem will be closed before signing out.

3.2.1.4 Account recovery

This subsystem deals with the matter of claiming of an account by the users who failed to provide necessary information during sign in. The user can require account by delivering partial information of his/her claimed account. In our case, the system will ask the user for email and if email is matched a code will be sent to the email. By entering the code user will be allowed to reset his/her password.

3.2.2 Score update

This subsystem is responsible for regular update of the scores. On each game day an operator will enter the scores into the system. These scores will be inserted in the database. The users will be able to visit the team statistics by selecting the year. For the difference of score format this subsystem is further divided into two modules:

3.2.2.1 Cricket Score

The statistics of the game Cricket will be inserted . The operator will enter these data after each game is played. The system will keep the records individual players so that the user can see the stats of personal achievements over the year.

3.2.2.2 Volleyball score

The score format of volleyball is different from the cricket. So volleyball score is a individual part. In case of volleyball, the operator will enter the final team score and points earned by each individuals which will be recorded as their individual achievement.

3.2.2.3 Hall Annual Sports

All halls organize their annual sports. Operator will enter the winner information and these information will be stored in the database. The first, second and third rankers' information in athletics and other sports will be stored.

3.2.2.4 Fixture Management

This subsystem is associated with maintaining the schedules of upcoming matches. The format of schedule for all types of game is identical, so there is single subsystem regardless of the type of the game. Once the departments/halls ensure their participation in a particular event the operator or admin prepare the fixture and publish it through the website.

3.2.3. Communication

Communication refers to the interaction between the stakeholders of the project 'Physical Education Center Digitalization'. User can communicate with administrator for various purposes and vice versa.

3.2.3.1 Field reservation

This subsystem is for field reservation purpose. Three types of state will be maintained here. These date will be colored red, on which field will be vacant for reservation. If any user want to reserve field, she has to select the vacant days. Then he will submit an application to the authority. These applied date will be colored yellow for two days after apply. If the payment is paid within 2 days admin will reserve these days for that client. The color of these days will be green then. Otherwise these days will be red again after 2 days.

3.2.3.2 Sport participation application

Respective sport committee can send notification to every department or institution to participate in these sport. That notifications will be sent to the chairman or director of these department/institution. Every department/institution will fill a form for participation and submit that to that committee. Reminder notification can also be submitted to any department/institution for form submission.

3.2.3.3 Swimming Pool Management

The users can receive all the information regarding ‘Dhaka University Swimming Pool’. They can apply for the new card, renew existing card through the website and if the payment is completed he/she will be issued a card from the respective office. Payment is out of our project scope, so it will be handled manually.

3.2.4 Live update

For cricket match live score update is an essential thing. There will be 2 types of result showing procedure for cricket match, both result after matches score of ongoing matches. In live show operator will insert information after each ball. These change will also be updated in the database after each ball.

CHAPTER 4 : SCENARIO-BASED MODEL OF THE PHYSICAL EDUCATION CENTER DIGITIZATION

Although the success of a computer-based system or product is measured in many ways, user satisfaction resides at the top of the list. If we understand how end users want to interact with a system, our physical education center digitization software team will be able to characterize requirements and build meaningful analysis and design models properly. Hence, requirements modeling begins with the creation of scenarios in the form of Use Cases, activity diagrams and swim lane diagrams.

4.1 Definition of Use case

A Use Case captures a contract that describes the system behavior under various conditions as the system responds to a request from one of its stakeholders. In essence, a Use Case tells a stylized story about how an end user interacts with the system under a specific set of circumstances. A Use Case diagram simply describes a story using corresponding actors who perform important roles in the story and makes the story understandable for the users.

The first step in writing a Use Case is to define that set of “actors” that will be involved in the story. Actors (such as admin, operator) are the different people that use the system or product within the context of the function and behavior that is to be described. Actors represent the roles that people play as the system operators. Every user has one or more goals when using the system

Primary Actor

Primary actors interact directly to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

Secondary Actor

Secondary actors support the system so that primary actors can do their work. They either produce or consume information

4.2 Use case Diagrams

Use Case diagrams give the non-technical view of the overall system.

4.2.1 LEVEL-0 USE CASE DIAGRAM-PECD

Physical Education Center Digitalization(PECD)

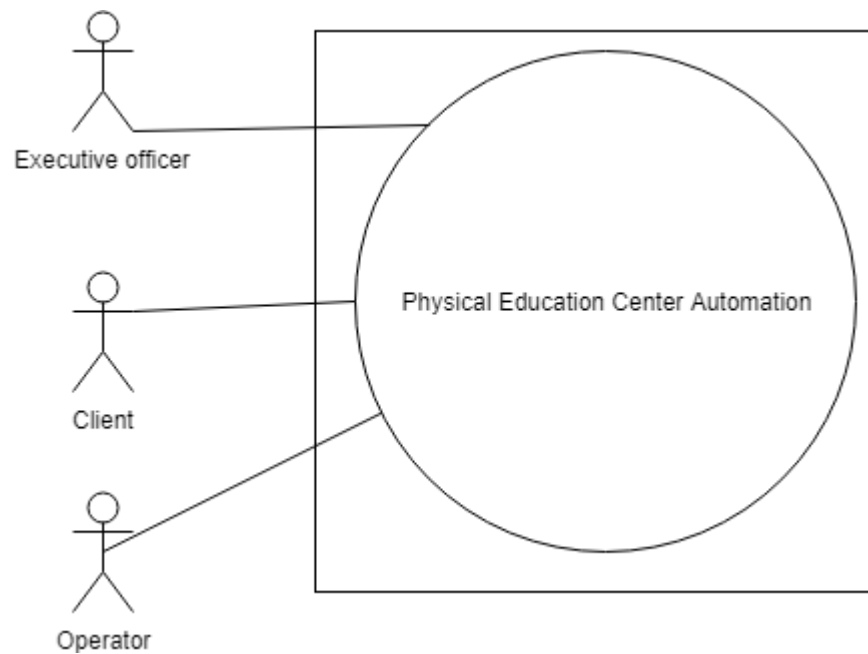


Figure 1: Level 0 use case diagram

Name	PECD
ID	PECD-L-0
Primary Actors	Executive officer, Client
Secondary Actors	Operator

Description of Use Case Diagram Level 0:

After analyzing the user story we found five actors who will directly use the system as a system operator. Primary actors are those who will play action and get a reply from the system whereas secondary actors only produce or consume information.

Following are the actors of PECD

1. Admin (Primary)
2. User (Primary)
3. Operator (Secondary)
4. Database (Primary)
5. Interface (Primary)

4.2.2 LEVEL-1 USE CASE DIAGRAM-SUBSYSTEM OF PHYSICAL EDUCATION CENTER DIGITIZATION

Subsystems of Physical Education Center Digitalization(PECD)

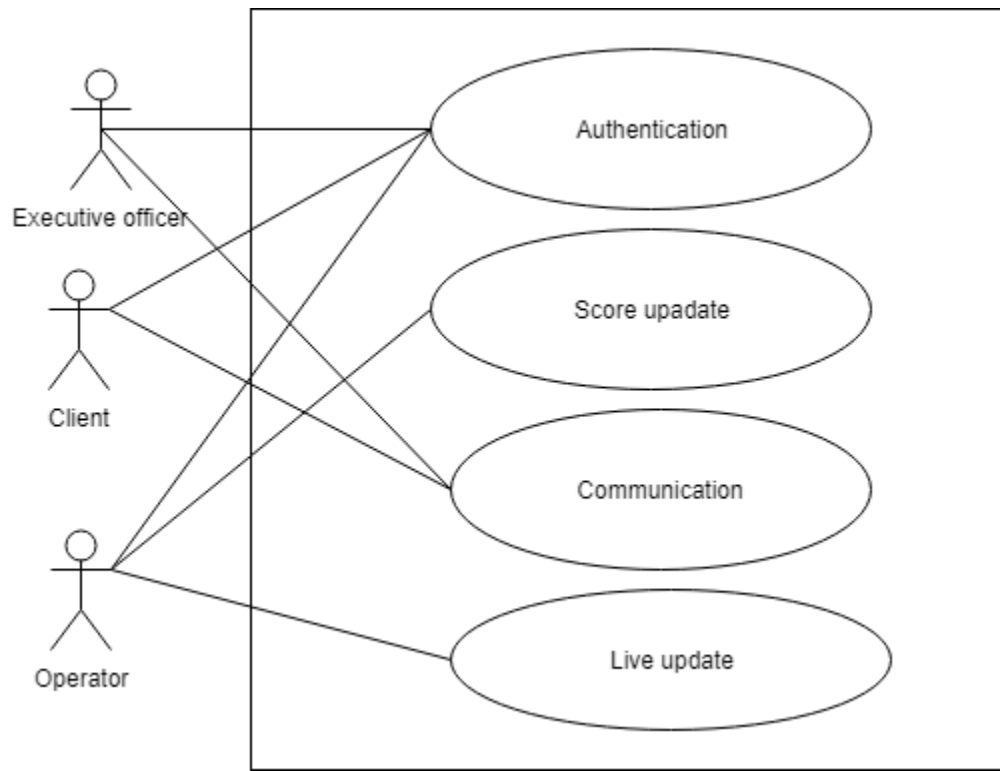


Figure 2: Level 1 use case diagram

Name	Subsystem of PECD
ID	PECD-L-1
Primary Actors	Executive officer, Client
Secondary Actors	Operator

Description of Use Case Diagram Level 1:

There are 4 subsystems of in the PECD. They are:

1. Authentication
2. Score update
3. Communication
4. Live update

4.2.2 LEVEL-1.1 USE CASE DIAGRAM-AUTHENTICATION

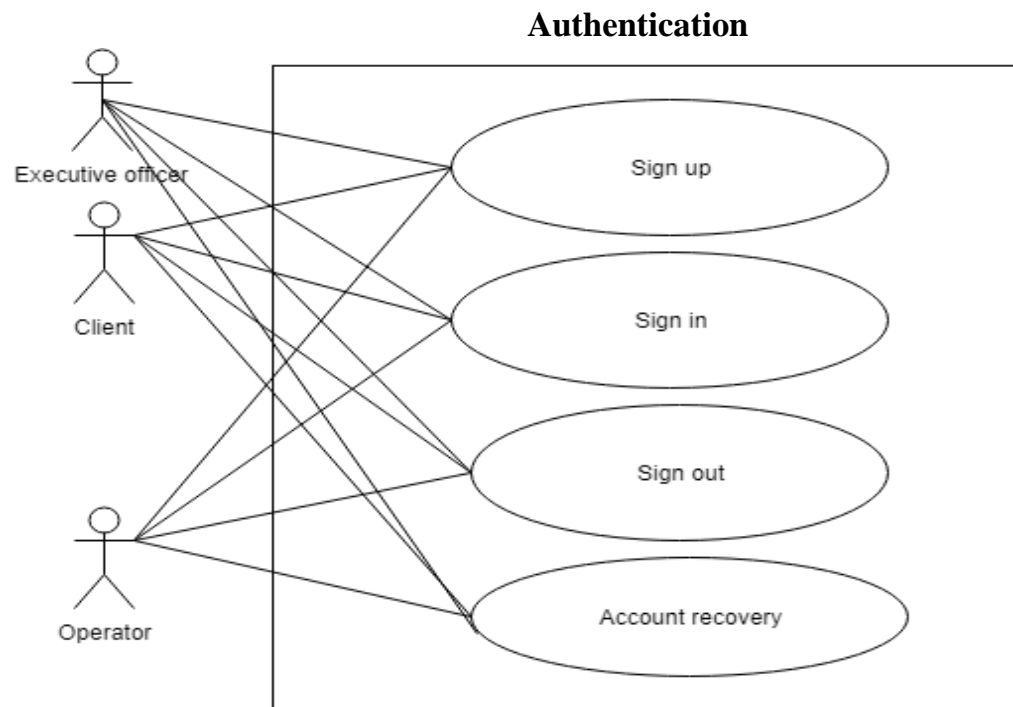


Figure 3 : Level 1.1 use case diagram

Name	Authentication
ID	PECD-L-1.1
Primary Actors	Executive officer, Client
Secondary Actors	Operator

Description of Use Case Diagram Level 1.1:

User registration, signing in and account recovery parts are covered in this part. This part has 4 sub parts-

1. Sign up
2. Sign in
3. Sign out
4. Account recovery

Action reply of Use Case Diagram Level 1.1:

- Action 1: User will provide sign up information
- Reply 1: User will be signed up
- Action 2: User will provide sign in information
- Reply 2: User will be signed in
- Action 3: User will provide account recovery information
- Reply 3: Account will be recovered

4.2.2 LEVEL-1.2 USE CASE DIAGRAM-SCORE UPDATE

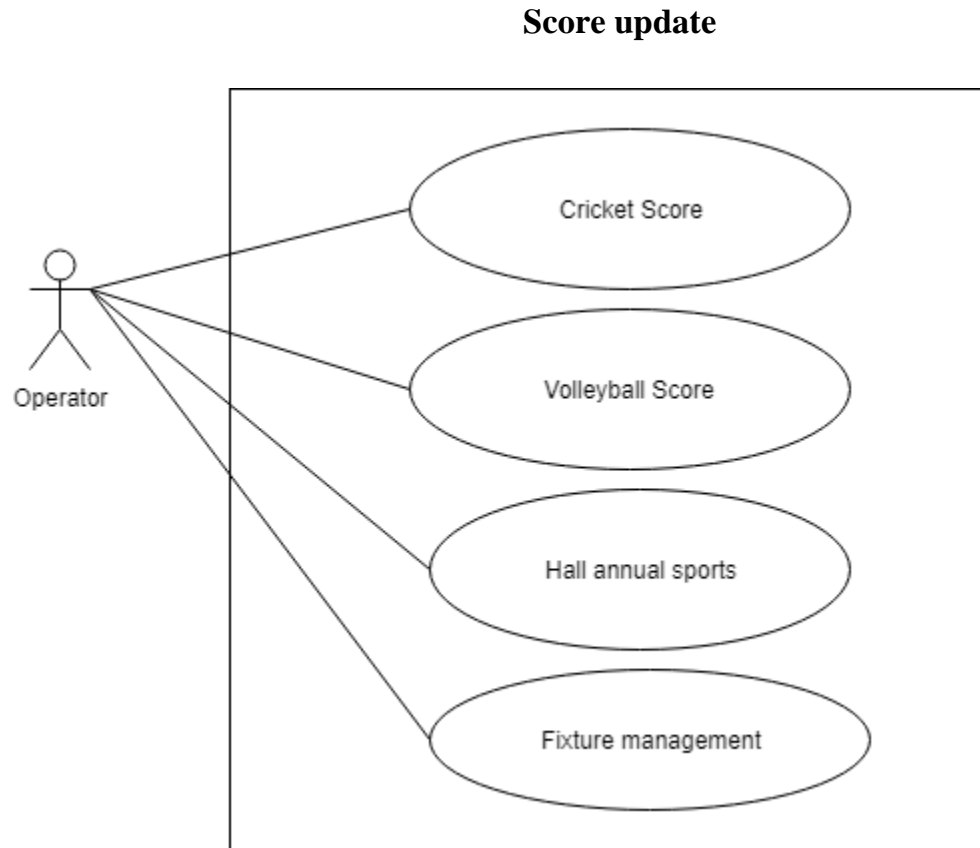


Figure 4 : Level 1.2 use case diagram

Name	Score update
ID	PECD-L-1.2
Primary Actors	N/A
Secondary Actors	Operator

Description of Use Case Diagram Level 1.2:

Score of various games and tournaments are handled through this part. This part has 4 sub parts. They are:

1. Cricket Score

2. Volleyball Score
3. Hall annual sports
4. Fixture management

Action reply of Use Case Diagram Level 1.2:

- Action 1: Operator will insert score of game
- Reply 1: Score will be updated

4.2.2 LEVEL-1.2 USE CASE DIAGRAM-COMMUNICATION

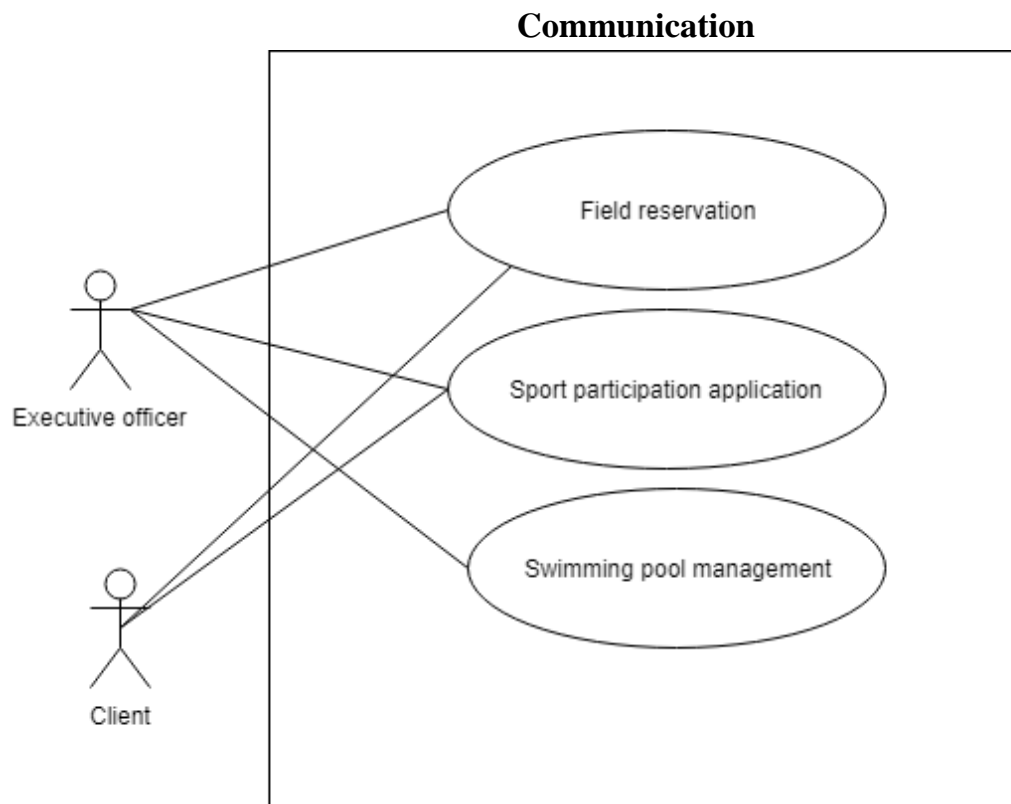


Figure 5 : Level f1.3 use case diagram

Name	Communication
ID	PECD-L-1.3
Primary Actors	Executive officer, Client
Secondary Actors	N/A

Description of Use Case Diagram Level 1.3:

It covers field reservation and the swimming pool part. It can be divided into 3 parts :

1. Field reservation
2. Sport participation application
3. Swimming pool management

Action reply of Use Case Diagram Level 1.3:

- Action 1:User will apply for field reservation
- Reply 1:Admin will approve or reject field reservation
- Action 2: User will fill up field reservation application
- Reply 2:Application will be submitted

4.3 Activity Diagram of PECD

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency.

4.3.1 Activity diagram of System

Activity diagram of system is given below-

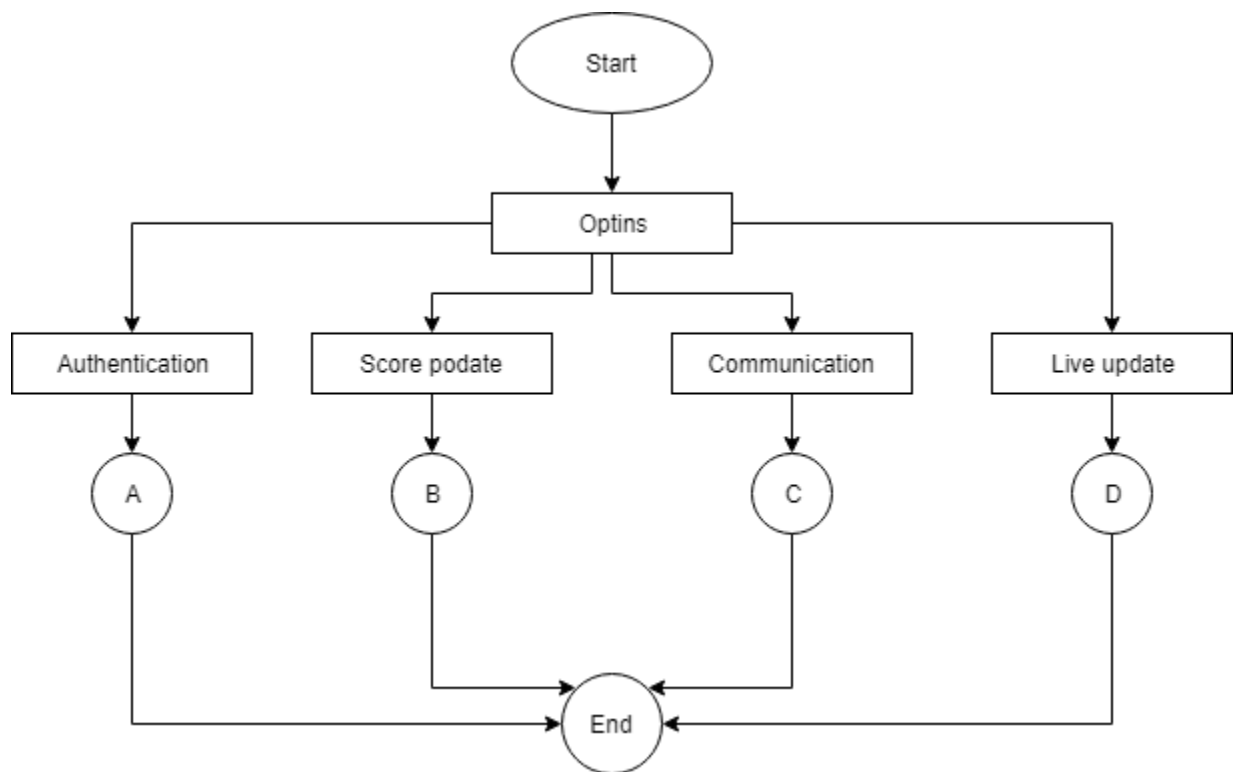


Figure 6 : System Activity diagram

4.3.2 Activity diagram of Authentication

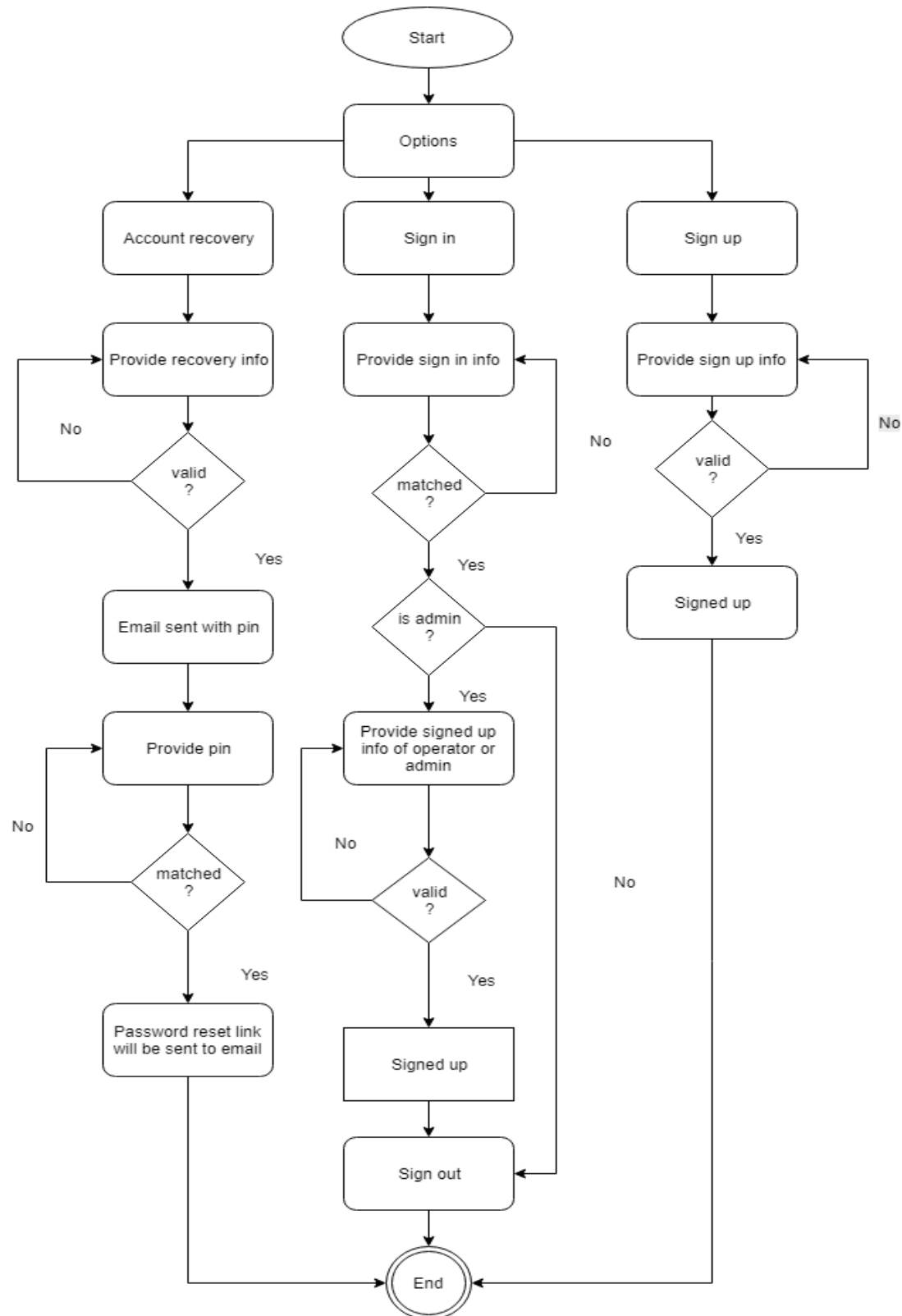


Figure 7: Authentication activity diagram

4.3.3 Activity diagram of Score update

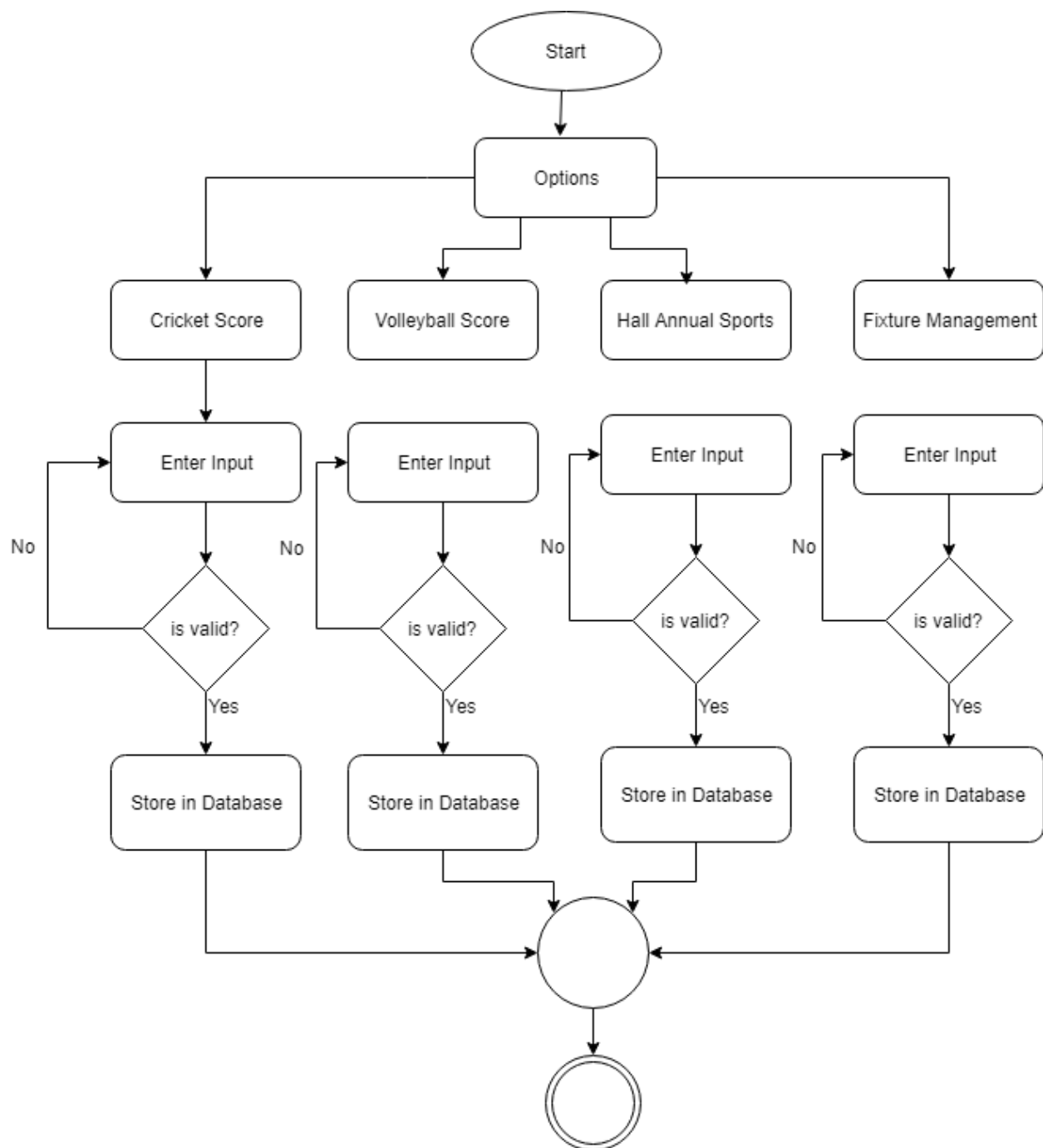


Figure 8: Score update activity diagram

4.3.4 Activity diagram of Communication

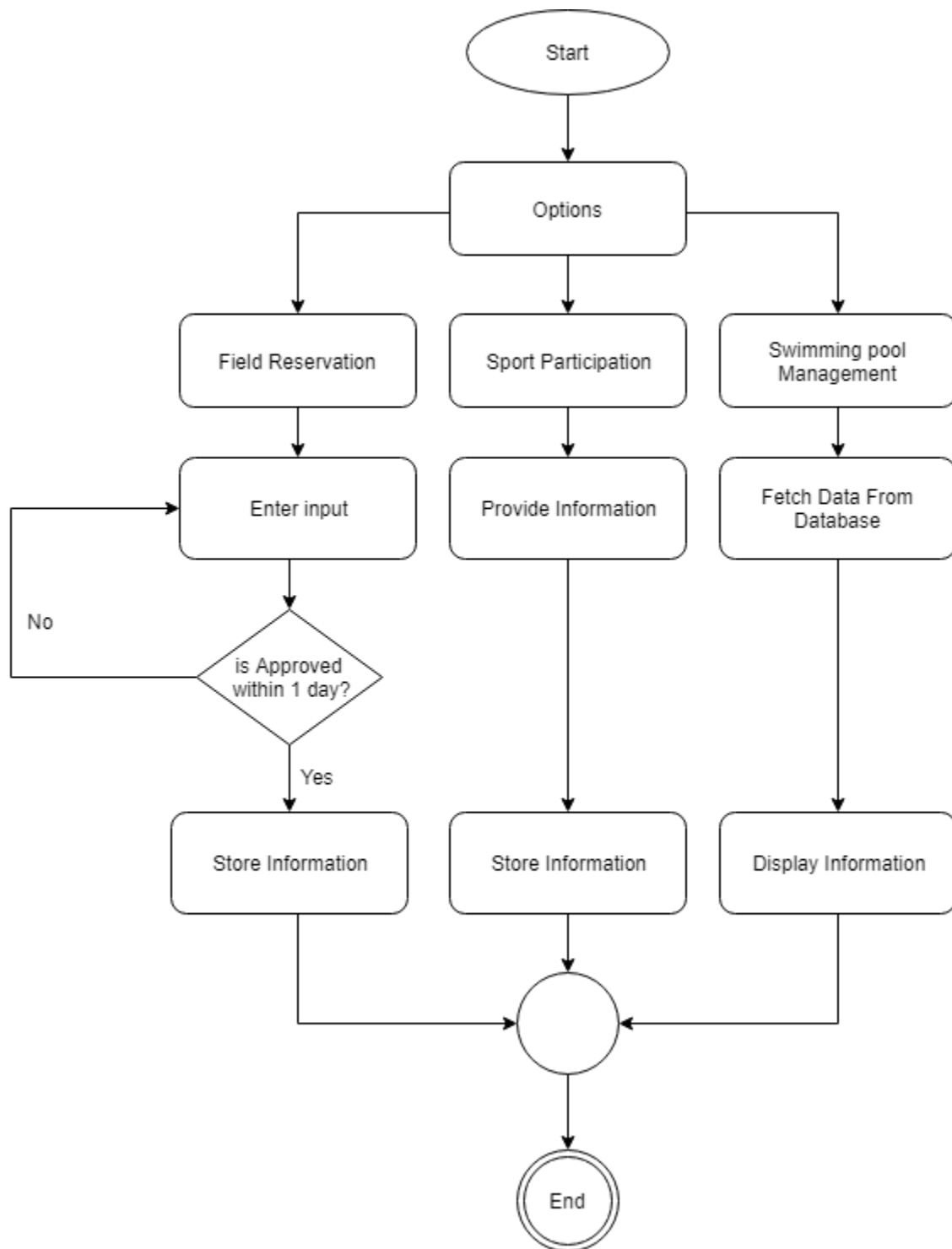


Figure 9: Communication activity diagram

4.4 Swim lane Diagram of PECD

A swim lane diagram is a visual element used in process flow diagrams, or flowcharts, which visually distinguishes job sharing and responsibilities for sub-processes of a business process.

4.4.1 Swim lane Diagram of System

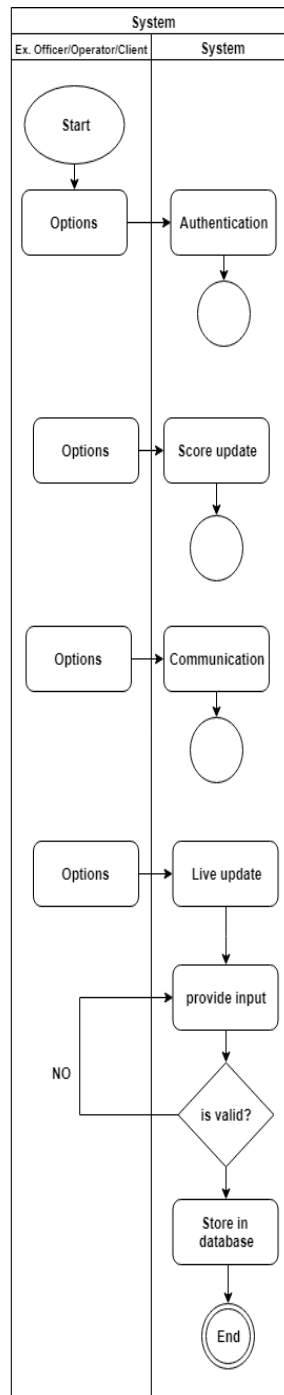


Figure 10 : System swim lane diagram

4.4.2 Swim lane Diagram of Authentication

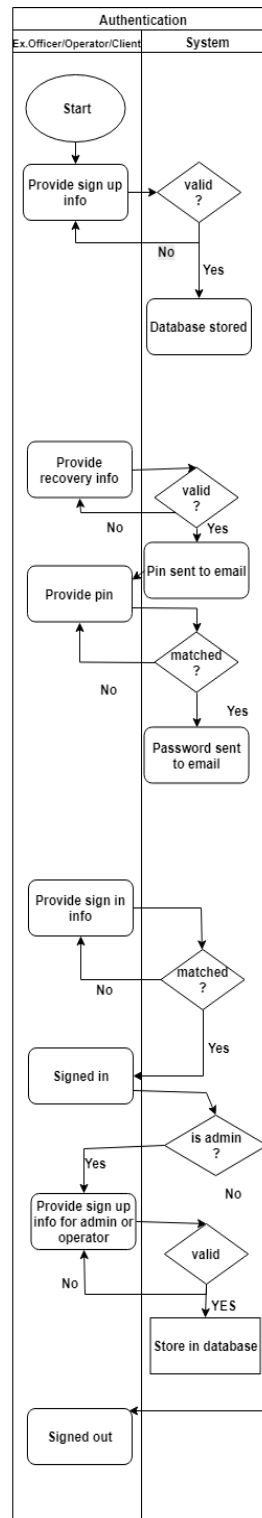


Figure 11 : Authentication swim lane diagram

4.4.3 Swim lane Diagram of Score update

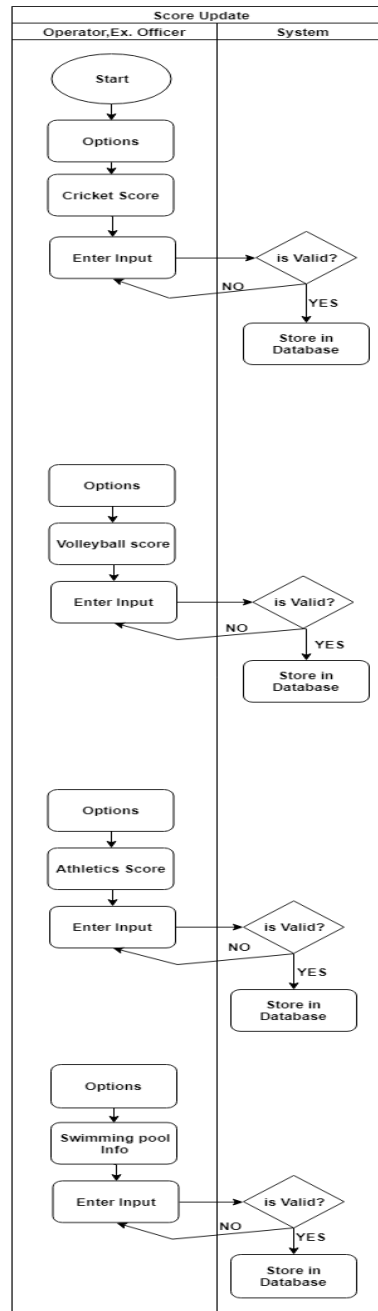


Figure 12: Score update swim lane diagram

4.4.4 Swim lane Diagram of Communication

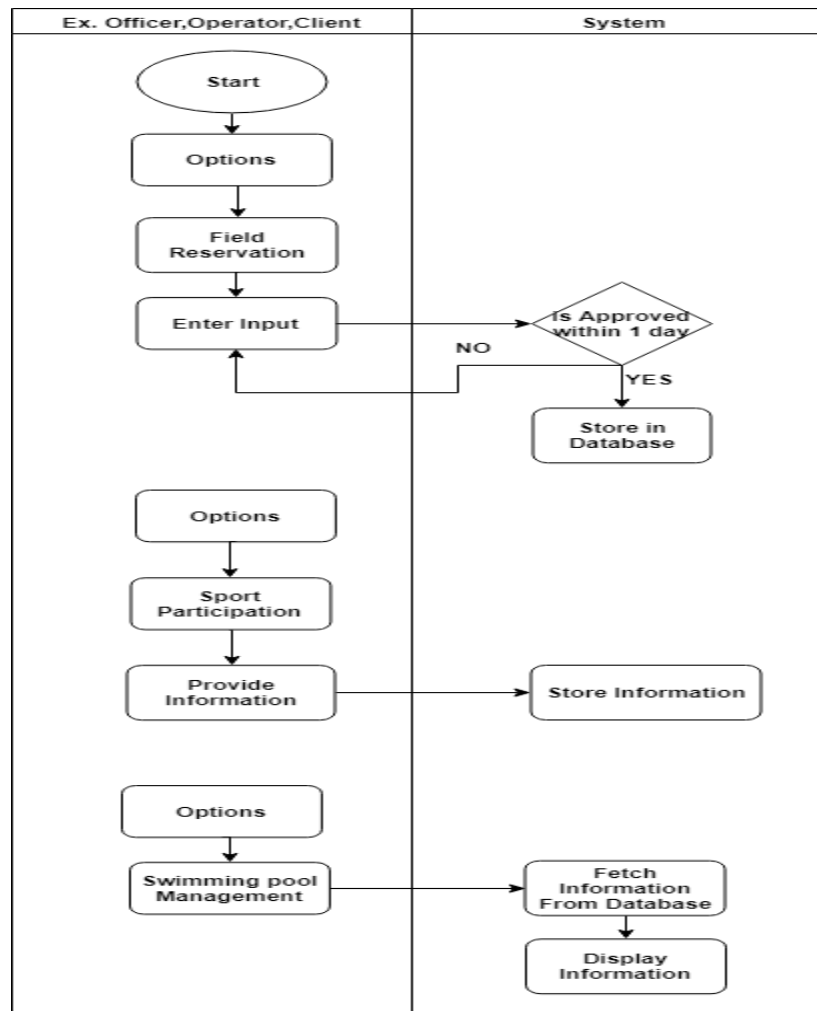


Figure 13: Communication swim lane diagram

CHAPTER 5: DATA-BASED MODEL OF THE PHYSICAL EDUCATION CENTER DIGITALIZATION

5.1 Grammatical Parsing and Analysis

No.	Noun	P/S	Attributes
1	Authentication	S	6-10,36,65-67
2	Client	S	6-10,11,15,65
3	Personalized data	P	-
4	Executive officer	S	6-10,11,15,66
5	Operator	S	6-10,11,15,67
6	Name	S	-
7	Username	S	-
8	Email	S	-
9	Password	S	-
10	User type	P	-
11	Favorite player	P	-
12	Team	S	-
13	Event	P	-
14	Prediction	P	-
15	Card	S	-
16	Payment	P	-
17	Sport committee	P	-
18	Notification	P	-
19	Result	S	-
20	Score update	P	-

21	Field reservation	S	50-52
22	Red	P	-
23	Yellow	P	-
24	Green	P	-
25	Applied date	S	-
26	Schedules	S	-
27	Fixture	S	12,50,61,62
28	Athletics	S	19,40
29	Hall annual sports	S	19,50
30	Individual player	S	6,35,55-57
31	System	P	-
32	file	P	-
33	Database	P	-
34	Subsystem	P	-
35	Statistics	S	-
36	Code	P	-
37	Year	P	-
38	Modules	P	-
39	Point	P	-
40	Ranker	S	-
41	Vacant days	S	-
42	Application	S	-
43	Authority	P	-
44	Committee	P	-
45	Reminder notification	P	-
46	Ongoing matches	P	-

47	Game	P	-
48	Volleyball game	S	12,19,60
49	Cricket	S	12,19,60
50	Date	S	-
51	Hired by	S	-
52	Session	S	-
53	Status	S	-
54	Time	S	-
55	Hall name	S	-
56	Department name	S	-
57	Image	S	-
58	Department	S	30,48,49,56,59
59	Sport in charge email	S	-
60	Tournament name	S	-
61	Match type	S	-
62	Time	S	-
63	Communication	S	-
64	Sport participation application	S	50,54,56,60,61
65	Favorite team	S	-
66	Room number	S	-
67	BCB scorer association id	S	-

Table 1 : Noun parsing table

5.2 Potential Data Objects

After grammatical parsing, we identified the following data objects that may need in our system for information storage.

- 1.Authentication:** name, username, email, password
- 2.Client:** name, username, email, password
- 3.Executive officer:** name, username, email, password
- 4.Operator:** name, username, email, password
- 5.Field :** date, session, hired_by, status
- 6.Fixture:** team, date, match_type, time
- 7.Individual player:** statistics, name, hall_name, department_name, image
- 8.Athletics:** result, ranker
- 9.Hall annual sports:** result,ranker
- 10.Volleyball:** team, result, tournament_name
- 11.Cricket:** team, result, tournament_name
- 12. Department:** departmennname, cricket, volleyball, individual_player, sport_in_charge_email
- 13.Sport participation application:** date, time, math_type, tournament_name,department_name

5.3 Analysis of Potential Data Objects

1. Authentication class data are stored in users, admin and operator data objects so, we can remove it.
2. We need to add user_id, field_reservation_id, fixture_id, player_id, athletics_id, game_id, volleyball_id, cricket_id, department_id
3. As Hall annual sports data are stored in cricket, volleyball, and athletics so, we can remove it.
4. User a general class can be created for Client, Executive officer and Operator
5. As Cricket, Volleyball game can be represented by Team game and Athletics can be represented by Individual game. We can replace these by this two.
6. As team game and individual game both handle the game result so we can add an sport a general class.

5.4 Final Data Objects

The attributes of the final data objects are shown-

SL No	Entity	Attributes
1	User	user_id,name,username,email,password,usertype
2	ExecutiveOfficer	user_id,name,username,email,password,usertype , room_number
3	Operator	user_id,name,username,email,password,usertype , bcb_scorer_assosiciation_id
4	Field	field_reservation_id,date,session,hired_by,status
5	Fixture	fixture_id,team,date,match_type,time
6	IndividualPlayer	player_id,statistics,name,hall_name,department_ name,image
7	TeamGame	sport_id,sport_name,wining_department,losing department,result,tournament_name,man_of_the _math,date,time
8	IndividualGame	sport_id,sport_name,ranker,hall_name,date,time
9	Sport	sport_id,sport_name,date,time
10	Department	department_id,departmennname,sport_in_charge_ email
11	Client	User_id,name,username,email,password, usertype, favorite_player
12	SportParticipationApplication	application_iddate, time, math_type, tournament_name, department_name

Table 2 : Final data object tableTable 3

5.5 Data Object Relationship

The relationship among the data objects are shown-

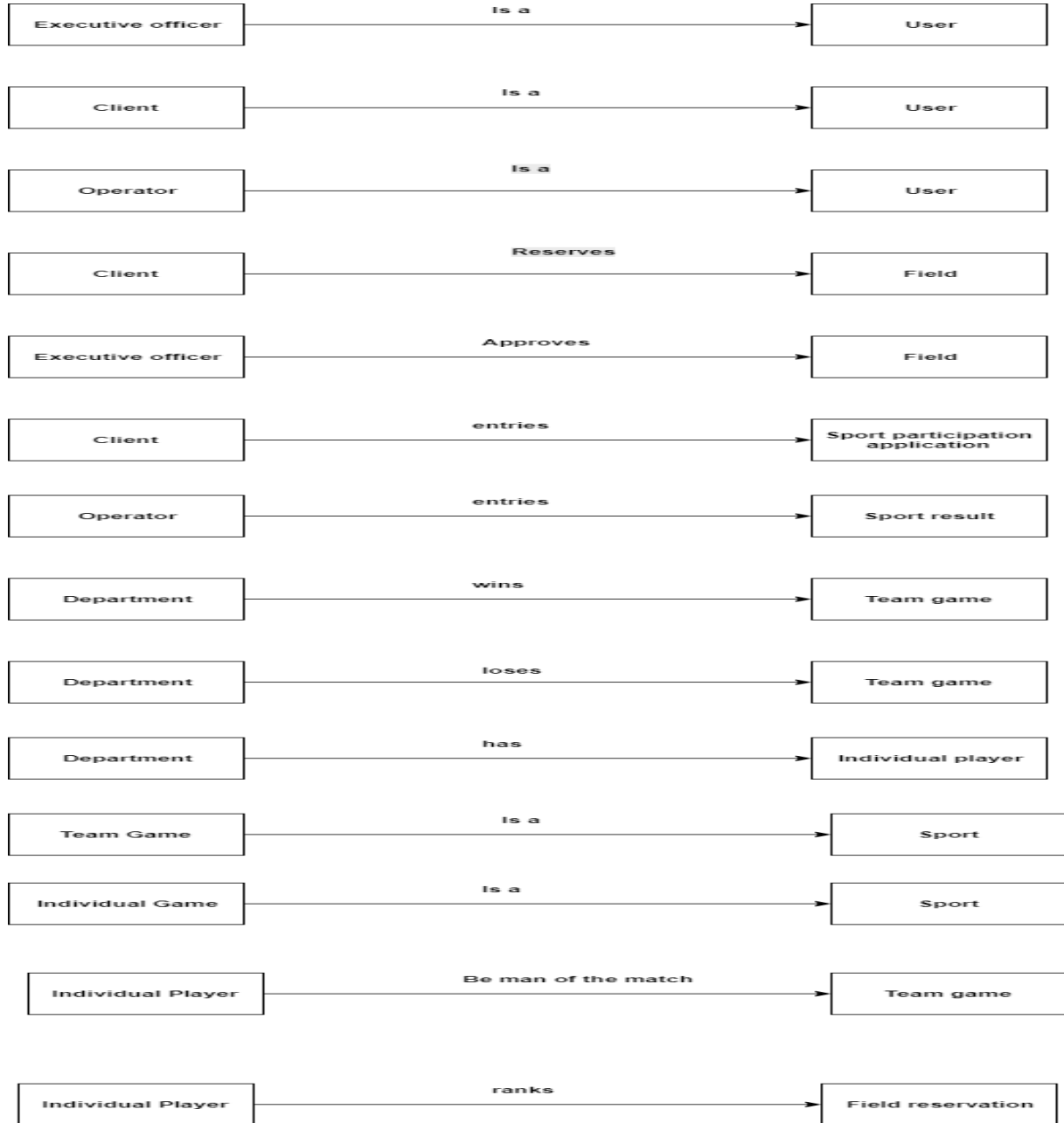


Figure 14: Data relation diagram

5.6 Entity Relation Diagram

An entity-relationship diagram (ER Diagram) is a data modeling technique that graphically illustrates an information system's entities and the relationships between those entities. We have shown the relationship among the entities through this model.



Figure 15 : ER diagram

5.7 Table Translation

From the entity relation diagram, the finalized form of the tables are shown in table-

No	Data Table
1	Executive officer(<u>user_id</u> ,name,username,email,password,usertype,room_number)
2	User(<u>user_id</u> ,name,username,email,password,usertype)
3	Operator(<u>user_id</u> ,name,username,email,password,usertype,bcb_scorer_ assosiation_id)
4	Field(<u>field_reservation_id</u> ,date,session,hired_by,status)
5	Fixture(<u>fixture_id</u> ,team,date,match_type,time)
6	Individual player(<u>player_id</u> ,statistics,name,hall_name,department_name,image)
7	TeamGame(<u>sport_id</u> ,sport_name,wining_department,losing department,result,tournament_name,man_of_the_math,date,time)
8	IndividualGame(<u>sport_id</u> ,sport_name,ranker,hall_name,date,time)
9	Sport(<u>sport_id</u> ,sport_name,date,time)
10	Department(<u>department_id</u> ,departmennname,sport_in_charge_email)
11	Client(<u>User_id</u> ,name,username,email,password,usertype,favorite_player)
12	SportParticipationApplication(<u>application_id</u> ,date, time, math_type, tournament_name, department_name)

Table 4 : Data table

5.8 Schema Tables

1.User		
Attributes	Type	Size
<u>user_id</u>	VARCHAR	6
username	VARCHAR	20
user_type	VARCHAR	20
password	VARCHAR	30
name	VARCHAR	100
email	VARCHAR	80

Table 5: User schema table

2.Executive officer		
Attributes	Type	Size
<u>user_id</u>	VARCHAR	6
username	VARCHAR	20
user_type	VARCHAR	20
password	VARCHAR	30
name	VARCHAR	100
email	VARCHAR	80
room_number	VARCHAR	80

Table 6 : Executive officer schema table

3.Operator		
Attributes	Type	Size
<u>user_id</u>	VARCHAR	6
username	VARCHAR	20
user_type	VARCHAR	20
password	VARCHAR	30
name	VARCHAR	100
email	VARCHAR	80
bcb_scorer_association_id	VARCHAR	80

Table 7: Operator schema table

4.Field		
Attributes	Type	Size
<u>field_reservation_id</u>	VARCHAR	80
<u>hired_by</u>	VARCHAR	100
<u>officer_id</u>	VARCHAR	100
date	VARCHAR	20
session	VARCHAR	30
status	VARCHAR	80

Table 8 : Field schema table

5.Fixture		
Attributes	Type	Size
<u>fixture_id</u>	VARCHAR	6
<u>officer_id</u>	VARCHAR	100
date	VARCHAR	20
team_to_play	VARCHAR	30
match_type	VARCHAR	100
time	VARCHAR	80

Table 9 : Fixture schema table

6.Individual Player		
Attributes	Type	Size
<u>player_id</u>	VARCHAR	6
<u>department_id</u>	VARCHAR	6
name	VARCHAR	20
statistics	INT	6
hall_name	INT	6
department_name	VARCHAR	50
image	VARCHAR	200

Table 10 : Individual schema table

7.Department		
Attributes	Type	Size
<u>department_id</u>	VARCHAR	6
department_name	VARCHAR	20
sports_in_charge_email	INT	6
volleyball_lose	INT	6

Table 11 : Department schema table

8.Team game		
Attributes	Type	Size
<u>sport id</u>	VARCHAR	6
<u>winning_department</u>	VARCHAR	6
<u>losing_department</u>	VARCHAR	6
<u>man_of_the_match</u>	VARCHAR	6
<u>operator id</u>	VARCHAR	6
sport_name	VARCHAR	6
tournament_name	VARCHAR	20
result	VARCHAR	100
winning_department	VARCHAR	6
losing_department	VARCHAR	6
man_of_the_match	VARCHAR	6
date	VARCHAR	20
time	VARCHAR	20

Table 12 : Team game schema table

9.Individual game		
Attributes	Type	Size
<u>sport id</u>	VARCHAR	6
<u>man_of_the_match</u>	VARCHAR	6
<u>operator id</u>	VARCHAR	6
sport_name	VARCHAR	6
date	VARCHAR	20
time	VARCHAR	20

Table 13 : Individual game schema table

10.Sport		
Attributes	Type	Size
<u>sport_id</u>	VARCHAR	6
<u>operator_id</u>	VARCHAR	6
sport_name	VARCHAR	6
date	VARCHAR	20
time	VARCHAR	20

Table 14 : Sport schema table

11.Sport participation application		
Attributes	Type	Size
<u>application_id</u>	VARCHAR	6
<u>client_id</u>	VARCHAR	6
match_type	VARCHAR	6
date	VARCHAR	20
time	VARCHAR	20
tournament_name	VARCHAR	20
department_name	VARCHAR	20

Table 15 : Sport participation schema table

12.User		
Attributes	Type	Size
<u>user_id</u>	VARCHAR	6
user_type	VARCHAR	20
username	VARCHAR	20
password	VARCHAR	30
name	VARCHAR	100
email	VARCHAR	80
favourite_player	VARCHAR	80

Table 16 : User schema table

CHAPTER 6: CLASS BASED MODEL OF THE PHYSICAL EDUCATION CENTER DIGITALIZATION

Class-based modeling represents the objects that the system will manipulate, the operations that will apply to the objects, relationships between the PECD objects and the collaborations that occur between the classes that are defined.

6.1 Grammatical Parsing and Analysis

To identify our analysis class, firstly, we grammatically parsed all the nouns and then categorized them according to general classification and selection criteria. We identified potential class by identifying the nouns from the scenery. Then we compared those with the following criteria whether they matched or not. We noted down the number of the fulfilled criteria at the right column.

6.1.1 Class Identification with General Classification

1. External entities
2. Things
3. Occurrence or events
4. Roles
5. Organizational unit
6. Places
7. Structure

No.	Noun	P/S	Attributes
1	Authentication	S	5,7
2	Users	S	4,7
3	Personalized data	P	-
4	Admin	S	4,7

5	Operator	S	4,7
6	Name	S	-
7	Username	S	-
8	Email	S	-
9	Password	S	-
10	User type	P	-
11	Favorite player	P	-
12	Team	S	-
13	Event	P	-
14	Prediction	P	-
15	Card	S	-
16	Payment	P	-
17	Sport committee	P	-
18	Notification	P	-
19	Result	S	-
20	Score update	P	-
21	Field reservation	S	-
22	Red	P	-
23	Yellow	P	-
24	Green	P	-
25	Applied date	S	-
26	Schedules	S	-
27	Fixture	S	5,7
28	Athletics	S	5,7
29	Hall annual sports	S	-
30	Individual player	S	5,7

31	System	P	-
32	file	P	-
33	Database	P	-
34	Subsystem	P	-
35	Statistics	S	-
36	Code	P	-
37	Year	P	-
38	Modules	P	-
39	Point	P	-
40	Ranker	S	-
41	Vacant days	S	-
42	Application	S	-
43	Authority	P	-
44	Committee	P	-
45	Reminder notification	P	-
46	Ongoing matches	P	-
47	Game	P	-
48	Volleyball game	S	5,7
49	Cricket	S	5,7
50	Date	S	-
51	Hired by	S	-
52	Session	S	-
53	Status	S	-
54	Time	S	-
55	Hall name	S	-
56	Department name	S	-

57	Image	S	-
58	Department	S	-
59	Sport in charge email	S	-
60	Tournament name	S	-
61	Match type	S	-
62	Time	S	-
63	Communication	S	3,5

Table 17 : General Criteria table

6.1.2. Class Identified With Selection Criteria

The nouns having two or more than two were selected from the general classification list. After that step, we compared them with the following criteria list. Those are-

- 1.** Retained information
- 2.** Needed services
- 3.** Multiple attributes
- 4.** Common attributes
- 5.** Common operations
- 6.** Essential requirements

No.	Noun	P/S	Selection Criteria
1	Authentication	S	2,3
2	Users	S	-
3	Personalized data	P	-
4	Admin	S	-
5	Operator	S	-

6	Name	S	-
7	Username	S	-
8	Email	S	-
9	Password	S	-
10	User type	P	-
11	Favorite player	P	-
12	Team	S	-
13	Event	P	-
14	Prediction	P	-
15	Card	S	-
16	Payment	P	-
17	Sport committee	P	-
18	Notification	P	-
19	Result	S	-
20	Score update	P	-
21	Field reservation	S	-
22	Red	P	-
23	Yellow	P	-
24	Green	P	-
25	Applied date	S	-
26	Schedules	S	-
27	Fixture	S	3,4,5
28	Athletics	S	3,4,5
29	Hall annual sports	S	-
30	Individual player	S	3,4,5
31	System	P	-

32	file	P	-
33	Database	P	-
34	Subsystem	P	-
35	Statistics	S	-
36	Code	P	-
37	Year	P	-
38	Modules	P	-
39	Point	P	-
40	Ranker	S	-
41	Vacant days	S	-
42	Application	S	-
43	Authority	P	-
44	Committee	P	-
45	Reminder notification	P	-
46	Ongoing matches	P	-
47	Game	P	-
48	Volleyball game	S	3,4,5
49	Cricket	S	3,4,5
50	Date	S	-
51	Hired by	S	-
52	Session	S	-
53	Status	S	-
54	Time	S	-
55	Hall name	S	-
56	Department name	S	-
57	Image	S	-

58	Department	S	-
59	Sport in charge email	S	-
60	Tournament name	S	-
61	Match type	S	-
62	Time	S	-
63	Communication	S	1,2,3

Table 18 : Selection criteria table

6.2 Preliminary Classes

So, the chosen preliminary classes are-

- Authentication
- Fixture
- Cricket Score
- Volleyball Score
- Athletics
- Individual Player
- Communication

6.3 Verb Identification

Grammatically verbs are parsed with verdict below -

Sl. No	Verbs	P/S
1.	Register	S
2.	Add	S
3.	provide	S
4.	Sign Up	S
5.	Validate	S

6.	Give Access	S
7.	Match Data	S
8.	Show Information	S
9.	Sign Out	S
10.	Show Prompt	S
11.	Claim Account	S
12.	Failed to provide information	S
13.	Ask for email	S
14.	Match Email	S
15.	Participate	P
16.	Match code	S
17.	Reset password	S
18.	Insert cricket data	S
19.	Keeping cricket individual information	S
20.	Store in database	S
21.	Insert volleyball data	S
22.	Keeping volleyball individual information	S
23.	Store volleyball data in database	S
24.	Insert athletics data	S
25.	Keeping athletics individual information	S
26.	Store athletics data in database	S
27.	Insert fixture	S
28.	Display fixture	S
29.	Pay	P
30..	Maintain states	S
31	Select vacant date	S

32.	Submit application	S
33.	Approve application	S
34.	Deny application	S
35.	Send notification	S
36.	Fill	S
37.	Submit	S
38.	Give reminder	S
39.	Insert Swimming pool info	S
40.	Display Information	S
41.	Pay fee	P
42.	Apply for card	S
43.	Renew existing card	S
44.	Insert live data	S
45.	Show live data	S

Table 19 : Verb parsing table

6.4 Attributes and Methods of Preliminary Classes

Analyzing the above table, we have categorized the verbs and convert them into method names. We put them to their respective classes and showed them-

SL No	Preliminary Class	Nouns	Verbs
1	Authentication	name, username, email,password	registerNewUser, addAdmin, provideInfo,validateData,signIn, showUserInfo, signOut, recoverAccount resetPassword

2	Fixture	date match_type,time	insertNewFixture, deleteFixture, editFixture
3	Player Info	CricketStats VolleyballStats AthleticsStats name hall_name department_name	processCricketInfo, processVolleyballInfo, processAthleticsInfo
4	Cricket Score	team result tournament_name	insertCricketScore, deleteCricketScore, updateCricketScore
5	Volleyball Score	team result tournament_name	insertVolleyballScore, deleteVolleyballScore, updateVolleyballScore
6	Athletic	result rank	insertAthleticsScore, deleteAthleticsScore, updateAthleticsScore
7	Communication	date session hired_by status sport_in_charge_email	send email to department,respond field reservation,get field vacant days, show swimming pool info

Table 20 : Attribute and method table

6.5 Analysis of Potential Classes

1. As Cricket Score, Volleyball Score, Athletics has some common behavior and properties. We create a super class Score. These 3 class extend that class
2. As Player info class has much responsibility, we can create 3 different class Cricket stats, Volleyball stats and Athletics stats

6.6 Final Classes

From above analysis, our final classes are:

1. Authentication
2. Fixture
3. Score
 - a. Cricket
 - b. Volleyball
 - c. Athletics
4. Communication
5. PlayerInfo
6. CricketStats
7. VolleyballStats
8. AthleticsStats

6.7 Attributes, Methods, Responsibilities and Collaborative Classes of Final Classes

1. User	
Attributes	Methods
name username email password	register() signIn() showUserInfo() signOut() recoverAccount() resetPassword()
Responsibilities	Collaborator
Registering new users Manage Access	Authentication Authentication

1.a Client	
Attributes	Methods

name username email password favouritePlayer	register() provideInfo() signIn() showUserInfo() signOut() recoverAccount() resetPassword() displayFixture() getFieldVacantDate() displaySwimmingPoolInfo() submitFieldReservationForm() submitSportParticipationForm() submitSwimmingPoolFormForm()
Responsibilities	Collaborator
Registering new users Provide User Information Manage Access Apply for privileges View Fixture	Authentication PlayerInfo, Authentication Authentication Communication Fixture

1.b Executive Officer	
Attributes	Methods
name username email password roomNumber	register() provideInfo() validateData() signIn() showUserInfo() signOut() recoverAccount() resetPassword() insertNewFixture() deleteFixture() editFixture() approveApplication()

Responsibilities	Collaborator
Registering new users Provide User Information Manage Access Fixture management	Authentication PlayerInfo, Authentication Authentication Fixture

1.c Operator	
Attributes	Methods
name username email password bcbScorerAssociationId	registerNewUser() provideInfo() validateData() signIn() showUserInfo() signOut() recoverAccount() resetPassword() insertScore() deleteScore() updateScore() insertCricketInfo() updateCricketInfo() deleteCricketInfo() insertSwimmingpoolInfo() updateSwimmingpoolInfo()
Responsibilities	Collaborator
Registering new operators Provide User Information Manage Access Score Management Notice Management	Authentication PlayerInfo, Authentication Authentication Score Communication

Attributes, methods, responsibilities and collaborative classes of Authentication class are given below-

1. Authentication	
Attributes	Methods

name username email password	registerNewUser() addAdmin() provideInfo() validateData() signIn() showUserInfo() signOut() recoverAccount() resetPassword()
Responsibilities	Collaborator
Registering new users Provide User Information Manage Access	- PlayerInformation -

Table 21 : Authentication class card

Attributes, methods, responsibilities and collaborative classes of Fixture class are given below-

2. Fixture	
Attributes	Methods
date match_type time	insertNewFixture() deleteFixture() editFixture()
Responsibilities	Collaborator
Insertion Deletion Update	CricketScore, VolleyballScore, Athletics CricketScore, VolleyballScore, Athletics CricketScore, VolleyballScore, Athletics

Table 22 ; Fixture class card

Attributes, methods, responsibilities and collaborative classes of Score class are given below-

3. Score	
Attributes	Methods
team tournament_name	insertScore() deleteScore() updateScore()

Responsibilities	Collaborator
Insertion Deletion Update	PlayerInfo PlayerInfo PlayerInfo

Table 23 : Score class card

Attributes, methods, responsibilities and collaborative classes of CricketScore class are given below-

3.a CricketScore	
Attributes	Methods
result	insertScore() deleteScore() updateScore()
Responsibilities	Collaborator
Insertion Deletion Update	PlayerInfo PlayerInfo PlayerInfo

Table 24 : Cricket class card

Attributes, methods, responsibilities and collaborative classes of VolleyballScore class are given below-

3.b VolleyballScore	
Attributes	Methods
result	insertlScore() deletelScore() updateScore()

Responsibilities	Collaborator
Insertion Deletion Update	PlayerInfo PlayerInfo PlayerInfo

Table 25 : Volleyball class card

Attributes, methods, responsibilities and collaborative classes of Athletics class are given below-

5. Athletics	
Attributes	Methods
result rank	insertScore() deleteScore() updateScore()
Responsibilities	Collaborator
Insertion Deletion Update	PlayerInfo PlayerInfo PlayerInfo

Table 26 : Athletics class card

Attributes, methods, responsibilities and collaborative classes of Communication class are given below-

6. Communication	
Attributes	Methods
date session hired_by	sendEmail() getFieldVacantDate() insertSwimmingPoolInfo()

status sport_in_charge_email	displaySwimmingPoolInfo() submitFieldReservationForm() submitSportParticipationForm() submitSwimmingPoolFormForm() respondToFieldReservationForm() respondToSportParticipationForm() respondToSwimmingPoolForm()
Responsibilities	Collaborator
Insertion Display Send notification Approve/deny request	- - - Authentication

Table 27 : Athletics class card

Attributes, methods, responsibilities and collaborative classes of PlayerInfo class are given below-

7. PlayerInfo	
Attributes	Methods
CricketStats VolleyballStats AthleticsStats name hall_name department_name	processCricketInfo() processVolleyballInfo() processAthleticsInfo() showAll()
Responsibilities	Collaborator
Insertion Individual Statistics Display Individual Statistics Update Individual Statistics	CricketScore, VolleyballScore, Athletics CricketScore, VolleyballScore, Athletics CricketScore, VolleyballScore, Athletics

Table 28 : PlayerInfo class card

Attributes, methods, responsibilities and collaborative classes of CricketStats class are given below-

8. CricketStats	
Attributes	Methods

Total_run Total_wickets Economy_rate Best_batting_performance best_bowling_performance	showAllCricketInformation()
Responsibilities	Collaborator
Individual Cricket Statistics Manipulation	-

Table 29 : CricketStats class card

Attributes, methods, responsibilities and collaborative classes of VolleyballStats class are given below-

9.VolleyballStats	
Attributes	Methods
Total_points best_in_a_match	showAll()
Responsibilities	Collaborator
Individual Volleyball Statistics Manipulation	-

Table 30 : VolleyballStats class card

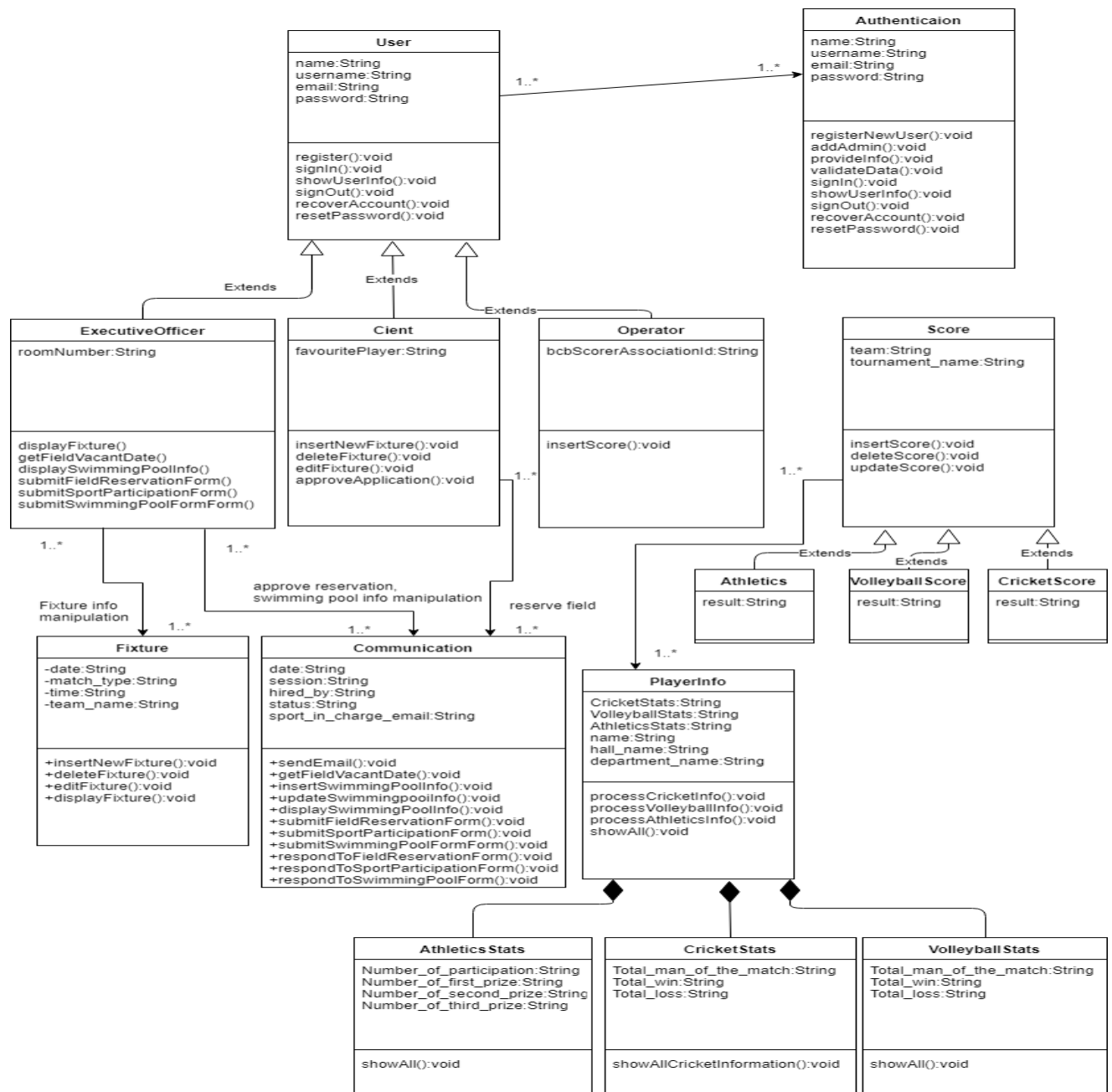
Attributes, methods, responsibilities and collaborative classes of AthleticsStats class are given below-

10. AthleticsStats	
Attributes	Methods
Number_of_participation Number_of_first_prize Number_of_second_prize Number_of_third_prize	showAll()
Responsibilities	Collaborator
Individual Athletics Statistics Manipulation	-

Table 31 : AthleticsStats class card

6.7 Class Diagram

Class diagram is a diagram where dynamics of object interaction and collaboration are represented through UML diagrams and their networks. Here composition, association and inheritance of the classes are shown in the diagram. The notations are-



CHAPTER 7: FLOW-ORIENTED MODELING OF THE PHYSICAL EDUCATION CENTER DIGITIZATION

7.1 Data flow diagram

7.1.1 Level 0 Data Flow Diagram

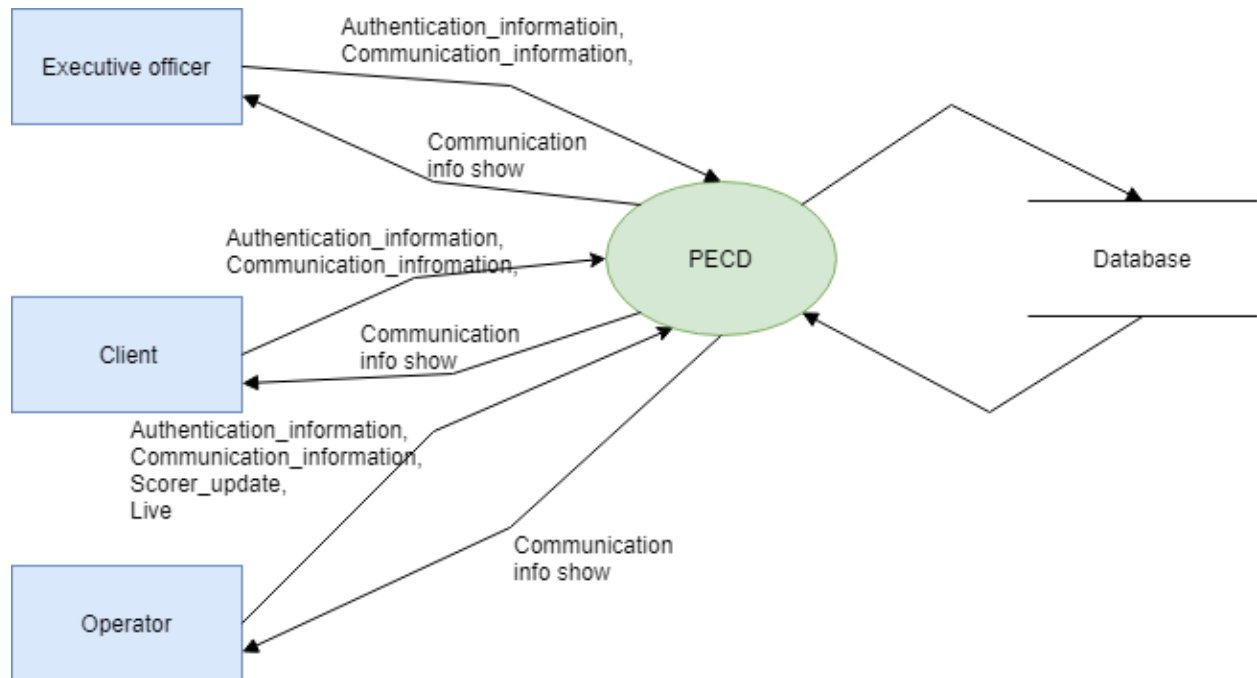


Figure 17: Level 0 data flow diagram

7.1.2 Level 1 Data Flow Diagram

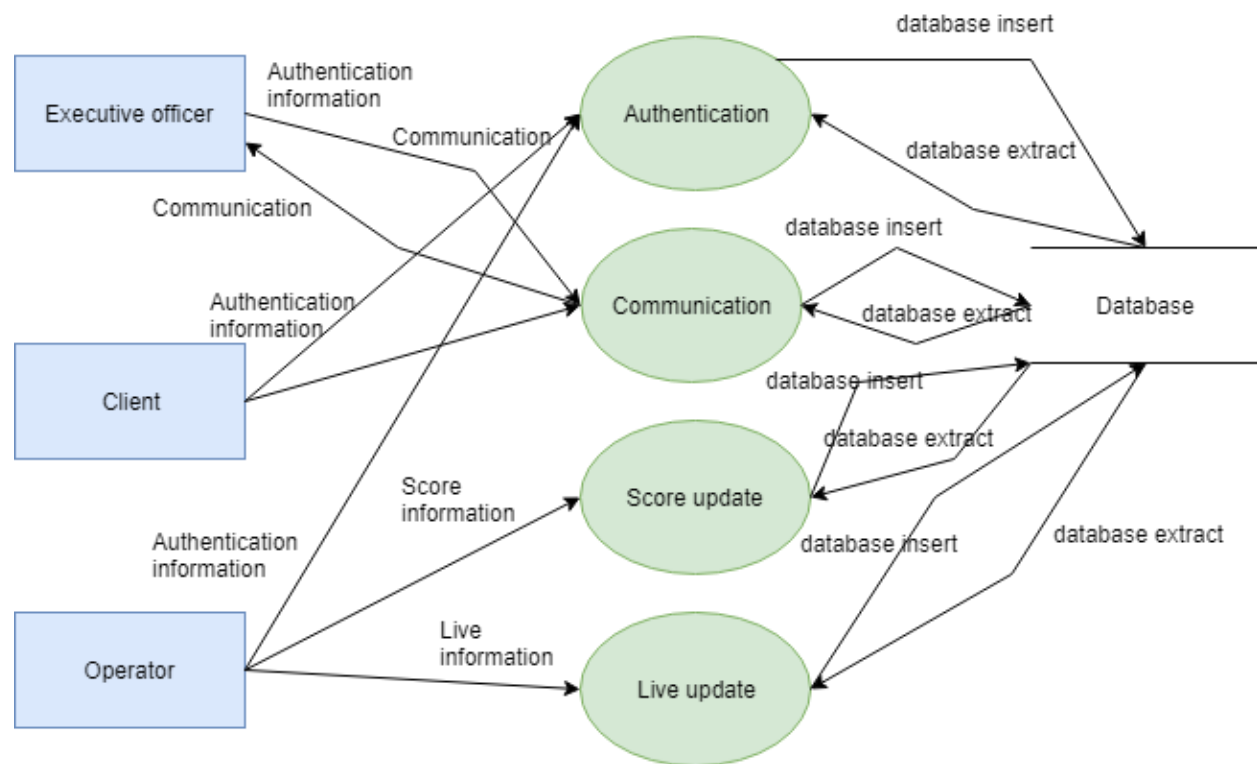


Figure 18: Level 1 data flow diagram

7.1.3 Level 1.1 Data Flow Diagram

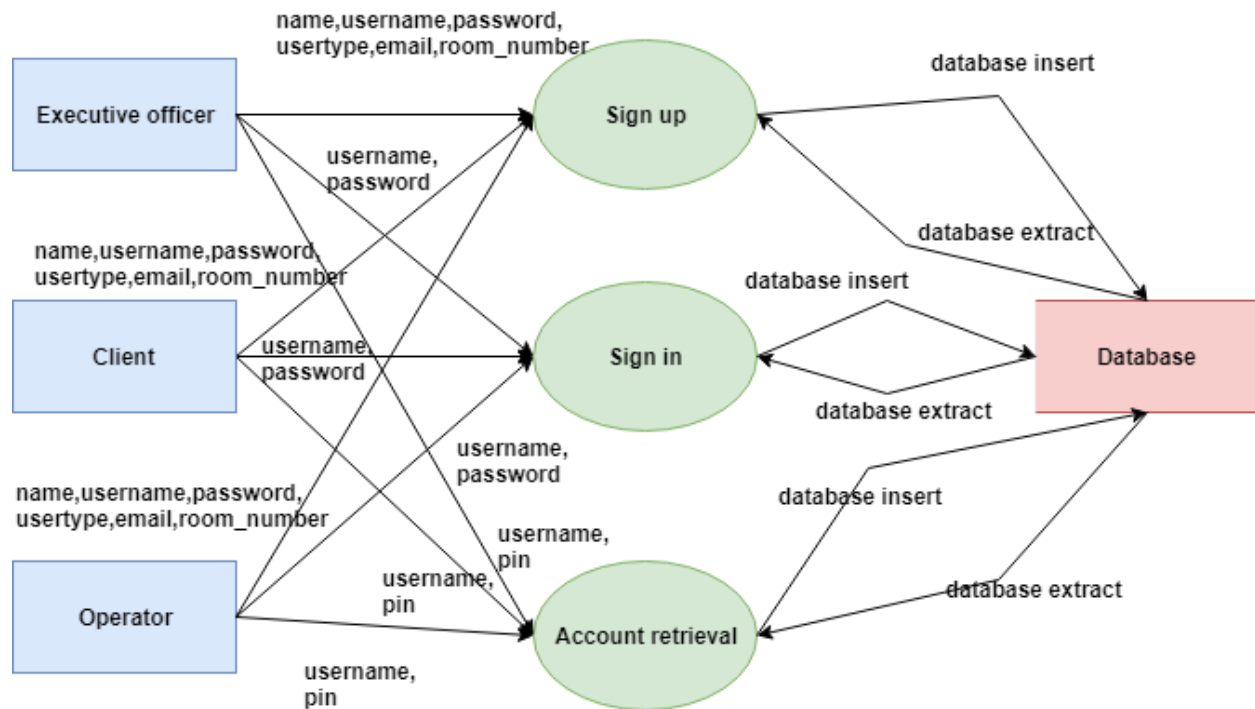


Figure 19: Level 1.1 data flow diagram

7.1.4 Level 1.2 Data Flow Diagram

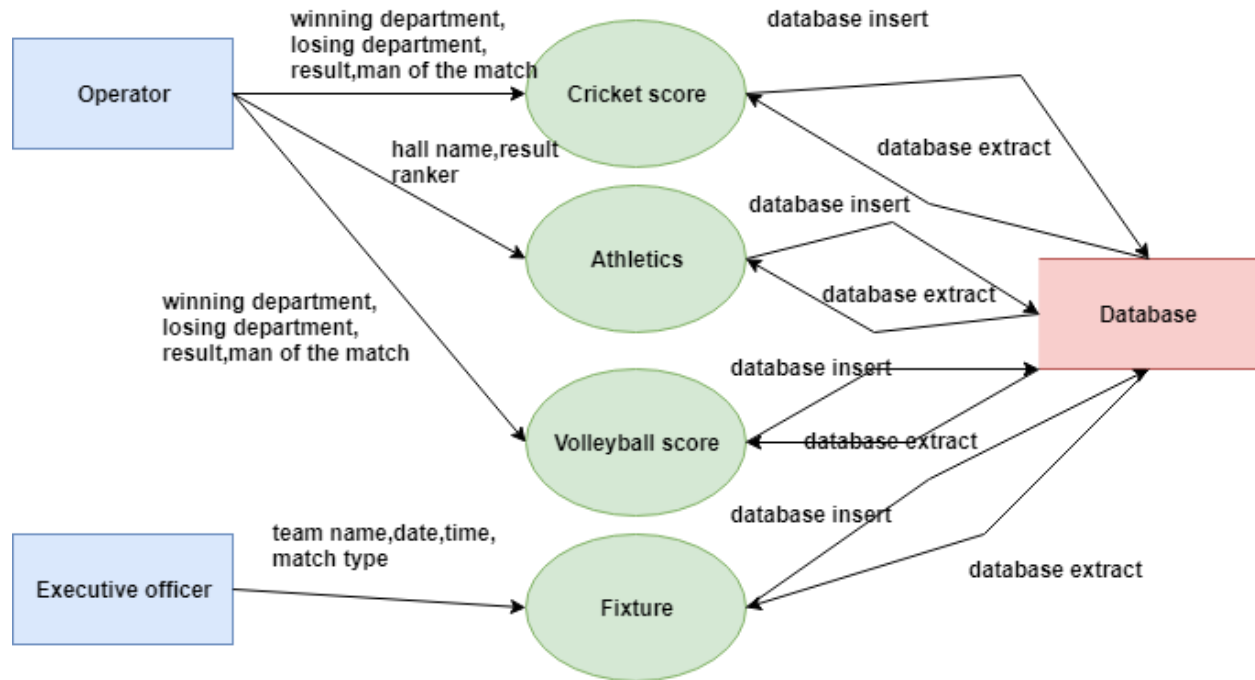


Figure 20: Level 1.2 data flow diagram

7.1.5 Level 1.3 Data Flow Diagram

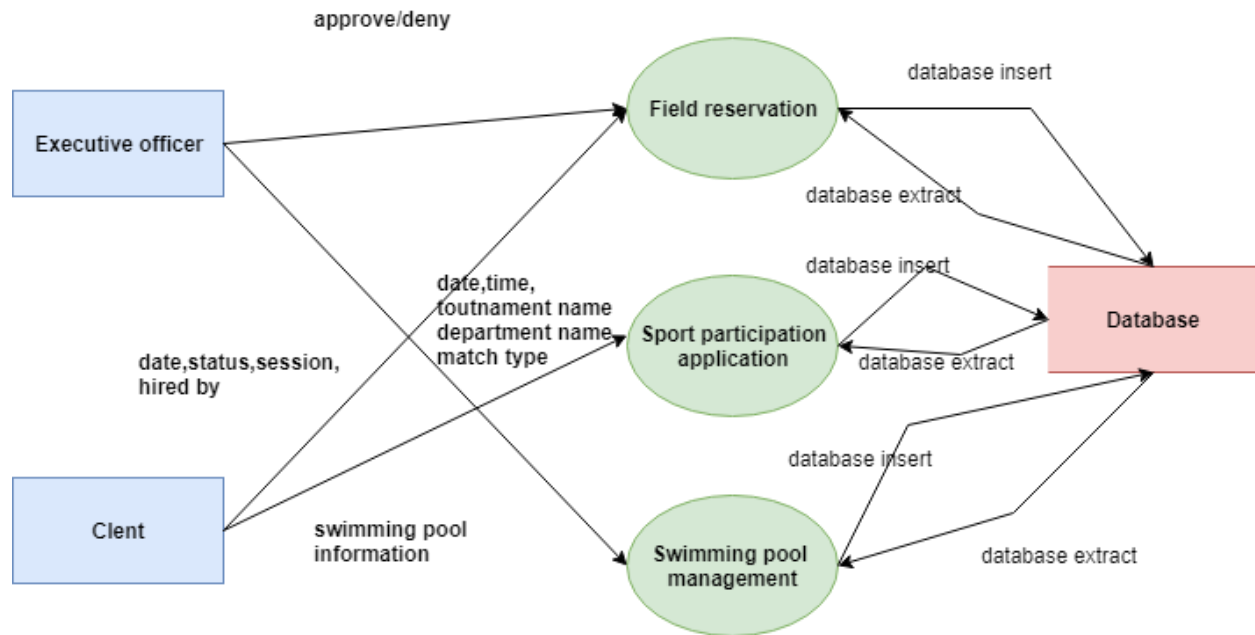


Figure 21 Level 1.3 data flow diagram

CHAPTER 8: SCENARIO BASED MODELING OF THE PHYSICAL EDUCATION CENTER DIGITIZATION

The behavioral model indicates how software will respond to external events. Two different behavioral representations are discussed in this chapter. The first indicates how individual class changes state based on external events and the second shows the behavior of the software as a function of time.

8.1 Event Identification

We have identified all the events of our project. These events are demonstrated in the following table:

SL. No	Event name	Initiator	Collaborators
1.	Enter to the website	Authentication	-
2.	Registration	User	Authentication
3.	Adding admin	ExecutiveOfficer	Authentication
4.	Providing information	ExecutiveOfficer	Authentication
5.	Validating information	Authentication	-
6.	Sign in	User	Authentication
7.	Matching data	Authentication	-
8.	Show information	User	Authentication
9.	Sign out	User	Authentication
10.	Account recovery	User	Authentication
11.	Confirm information	Authentication	Authentication
12.	Reset password	User	-
13.	Insert Cricket Score	Operator	CricketScore
14.	Update Cricket Score	Operator	CricketScore

15.	Delete Cricket Score	Operator	CricketScore
16.	Insert Volleyball Score	Operator	VolleyballScore
17.	Update Volleyball Score	Operator	VolleyballScore
18.	Delete Volleyball Score	Operator	VolleyballScore
19.	Insert Athletics Score	Operator	Athletics
20.	Update Athletics Score	Operator	Athletics
21.	Delete Athletics Score	Operator	Athletics
22.	Manage Fixture	ExecutiveOfficer	Fixture
23.	Display Fixture	Client	Fixture
24.	Maintaining states	ExecutiveOfficer	-
25.	Selecting vacant date	User	-
26.	Submit application	Client	Authentication
27.	Approve/deny application	ExecutiveOfficer	-
28.	Send notification	ExecutiveOfficer	-
29.	Give remainder	ExecutiveOfficer	-
30.	Fill and submit form	Client	Communication
31.	Insert swimming pool info	Operator	Communication
32.	Display swimming pool info	Client	Communication
33.	Apply for new card	Client	-
34.	Apply to renew card	Client	-
35.	Insert live score	Operator	CricketScore
36.	Display score	Client	CricketScore
37.	Insert Cricket Info	Operator	PlayerInfo
38.	Insert Volleyball Info	Operator	PlayerInfo
39.	Insert Athletics Info	Operator	PlayerInfo
40.	Show All Info	Client	PlayerInfo

41.	Display Cricket Info	Client	PlayerInfo
42.	Display Volleyball Info	Client	PlayerInfo
43.	Display Athletics Info	Client	PlayerInfo
44.	Update Cricket Info	Operator	PlayerInfo
45.	Update Volleyball Info	Operator	PlayerInfo
46.	Update Athletics Info	Operator	PlayerInfo

Table 32: Event parsing table

8.2 State Diagram

8.2.1 Client

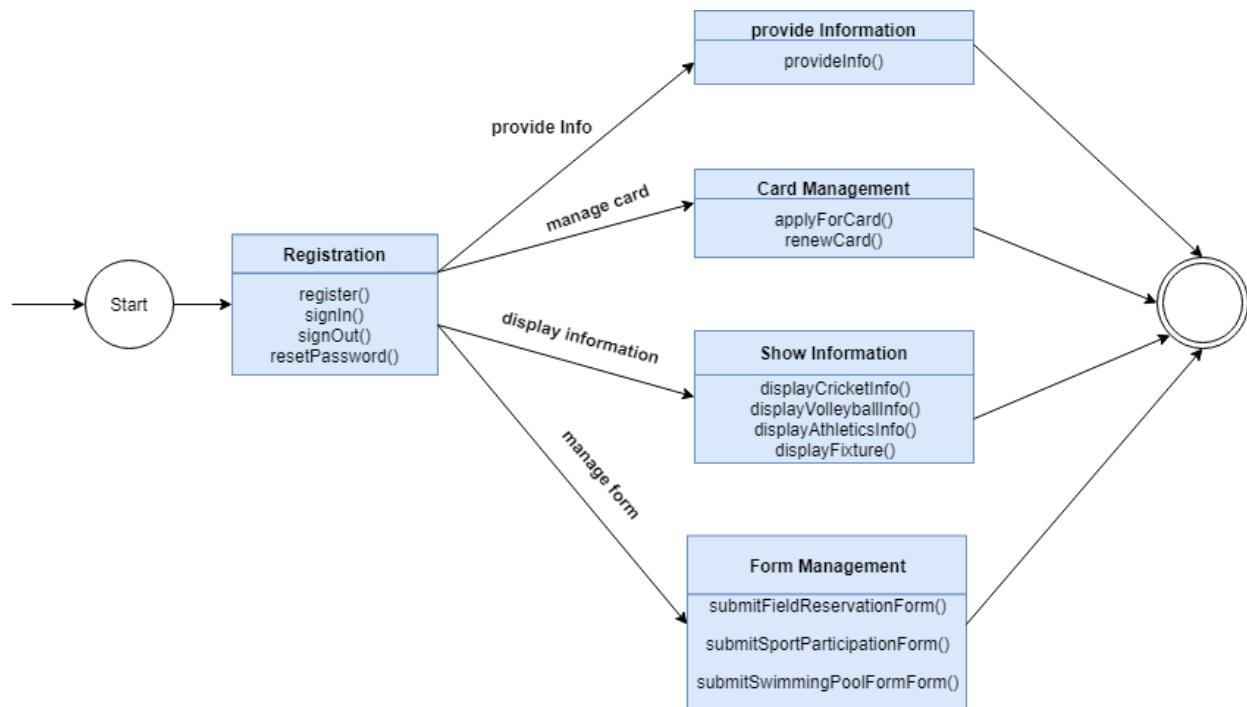


Figure 22 : Client state transition diagram

8.2.2 Executive officer

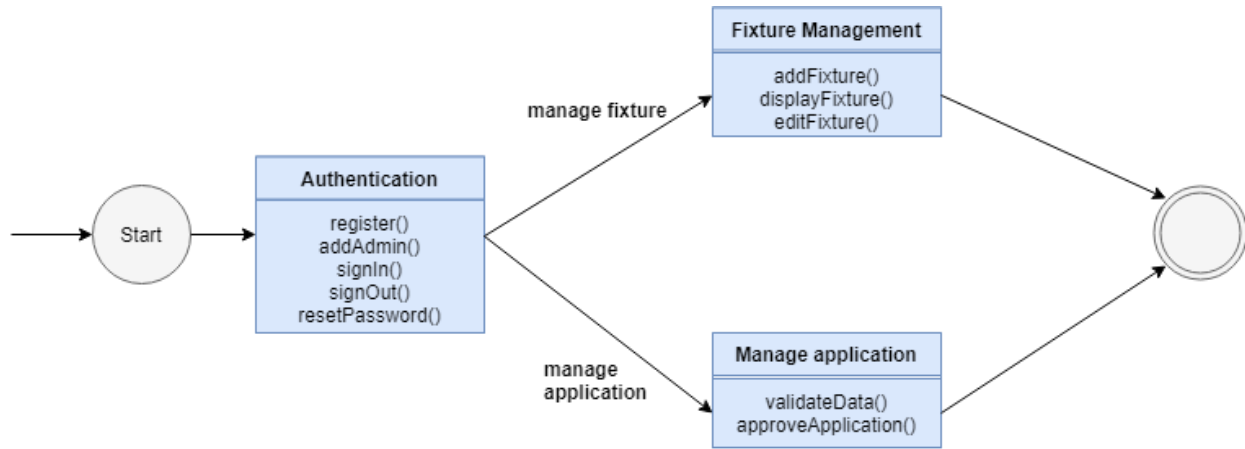


Figure 23 : Executive officer state transition diagram

8.2.3 Operator

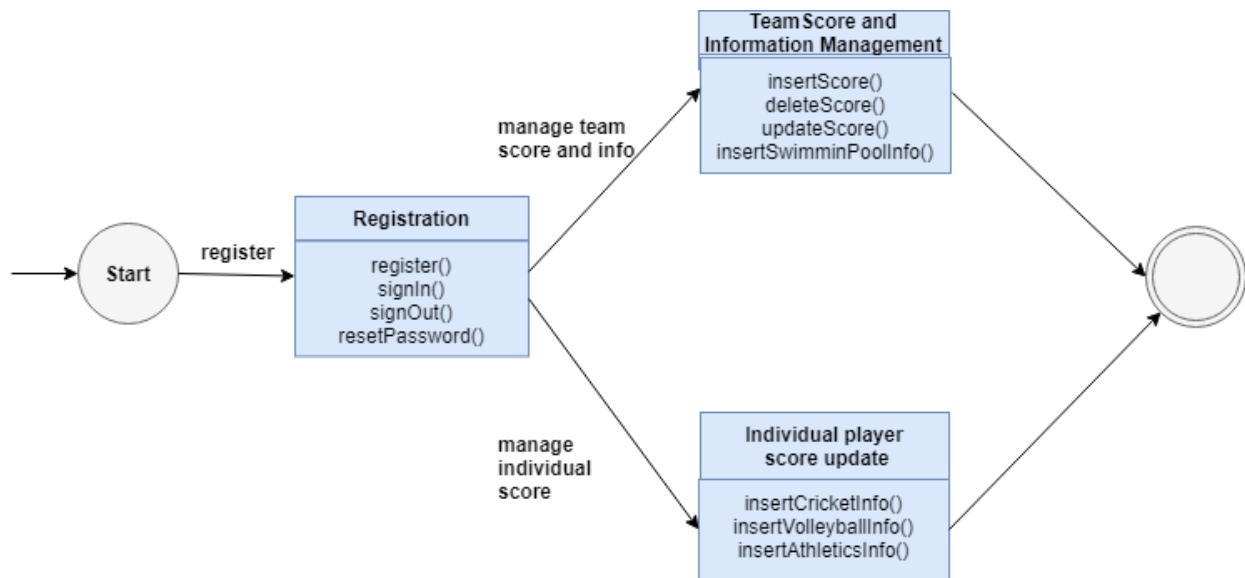


Figure 24 : Operator state transition diagram

8.2.4 Authentication

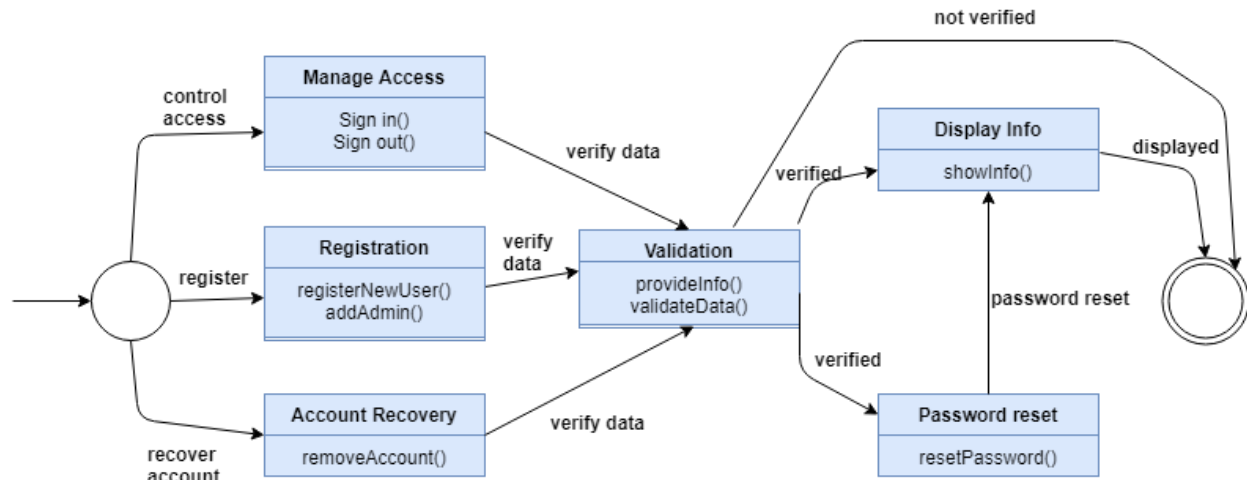


Figure 25 : Authentication state transition diagram

8.2.5 Fixture

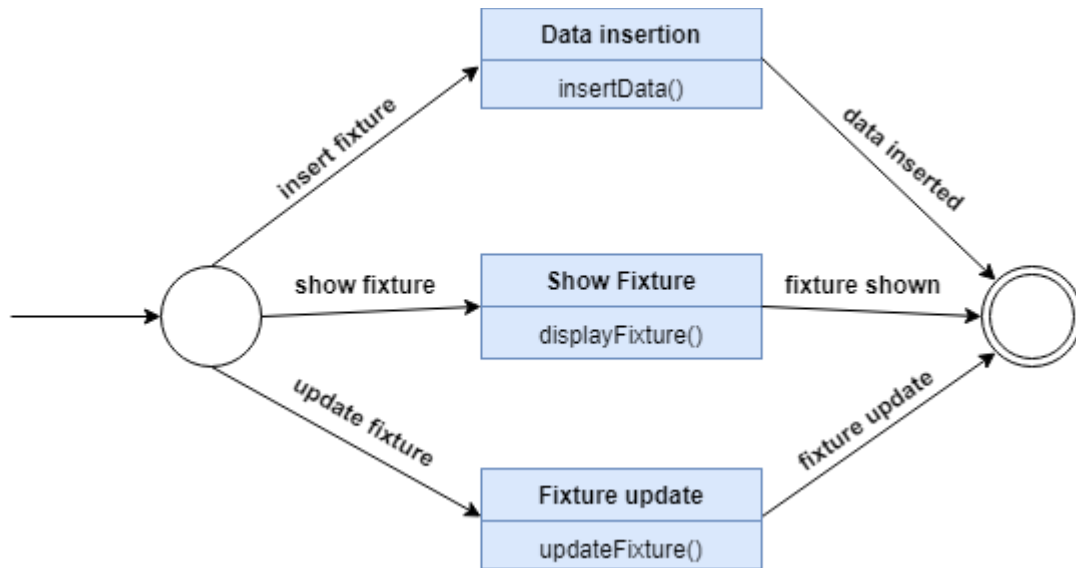


Figure 26 : Fixture state transition diagram

8.2.6 Cricket Score

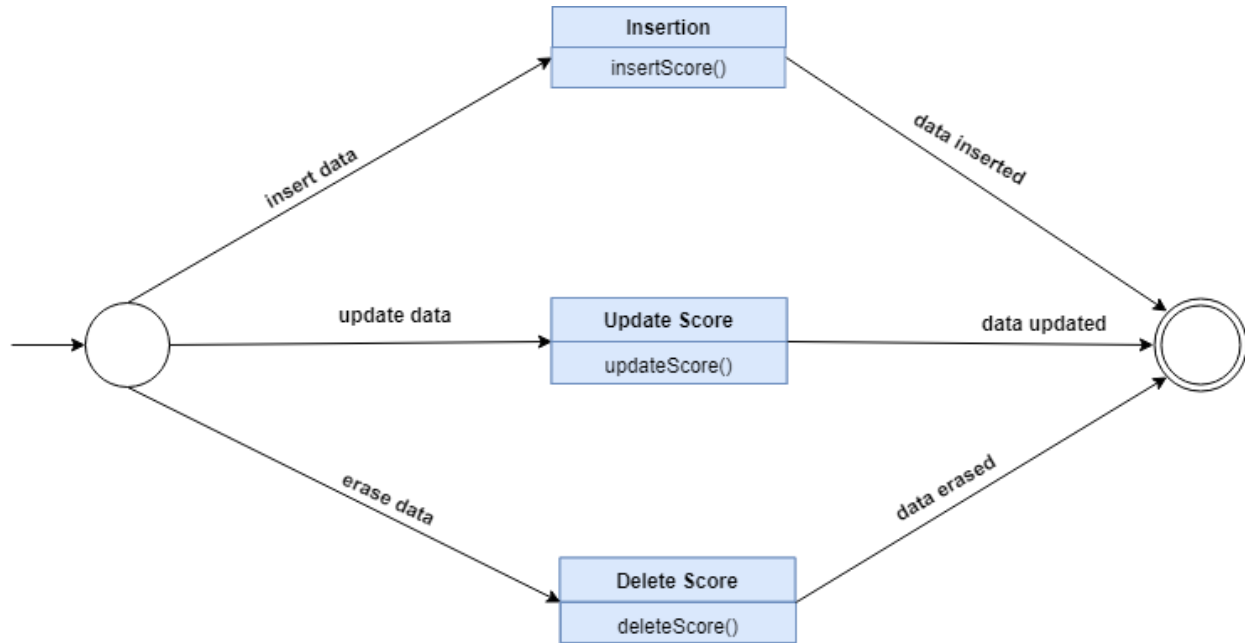


Figure 27 : Cricket Score state transition diagram

8.2.7 Volleyball Score

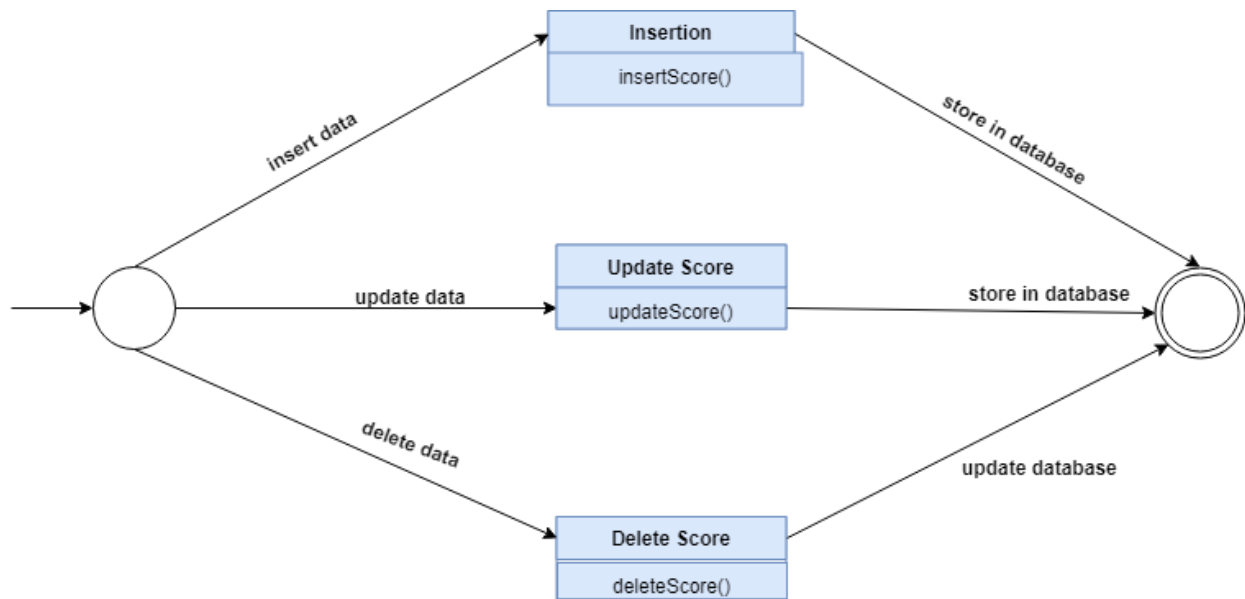


Figure 28 : Volleyball Score state transition diagram

8.2.8 Athletics

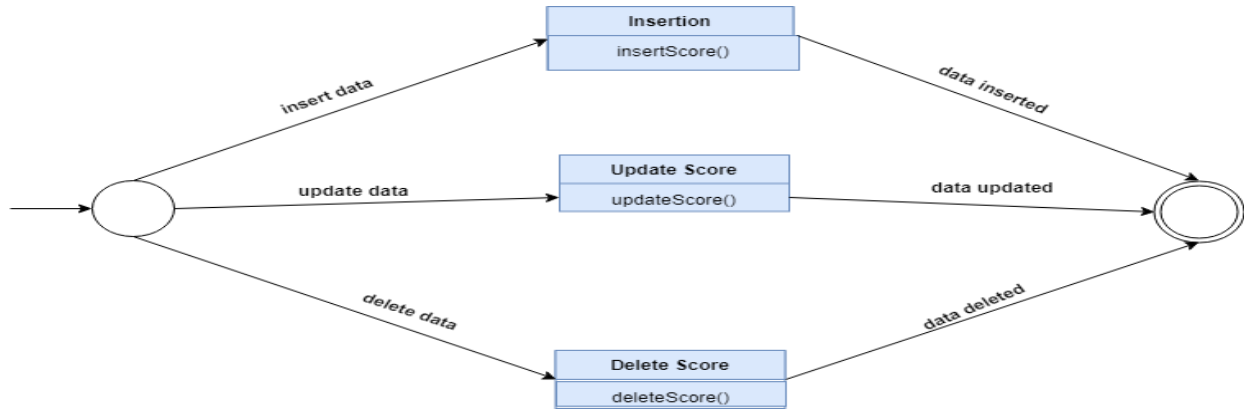


Figure 29: Athletics state transition diagram

8.2.9 Communication

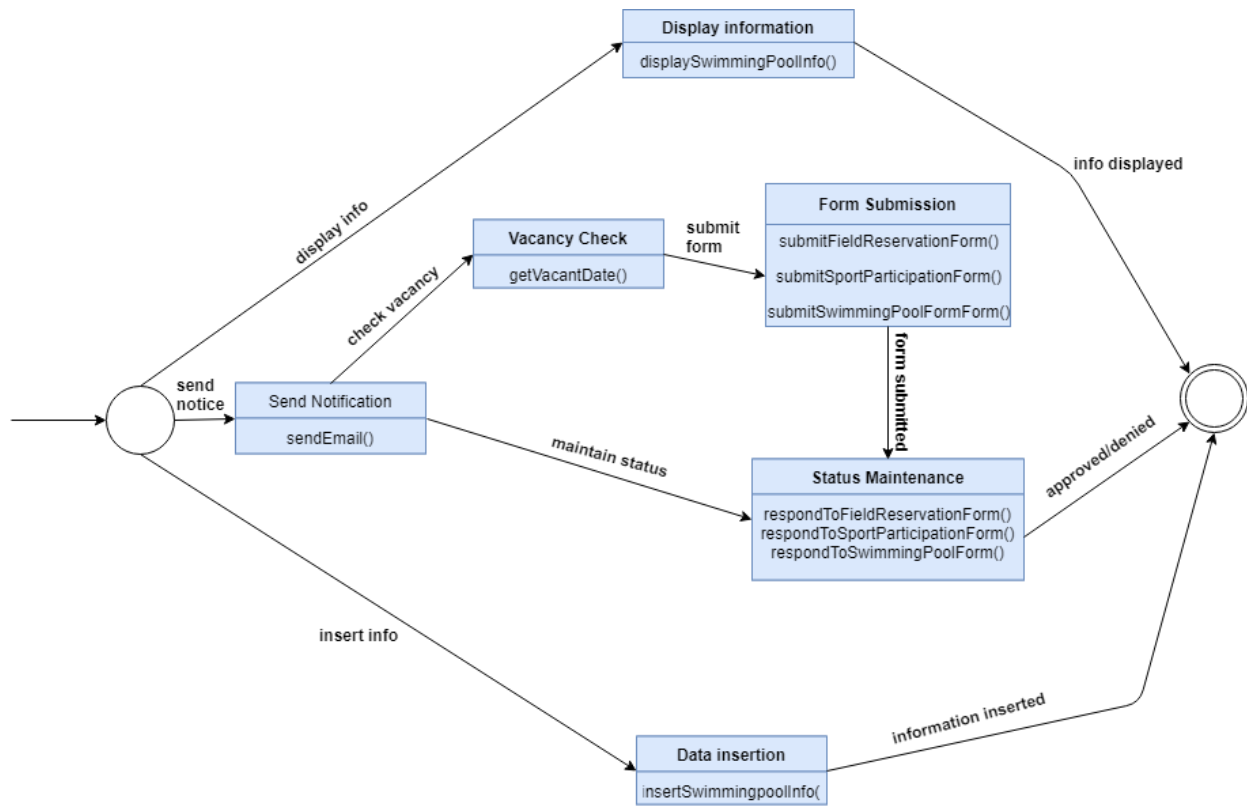


Figure 30 : Communication state transition diagram

8.2.10 Player info

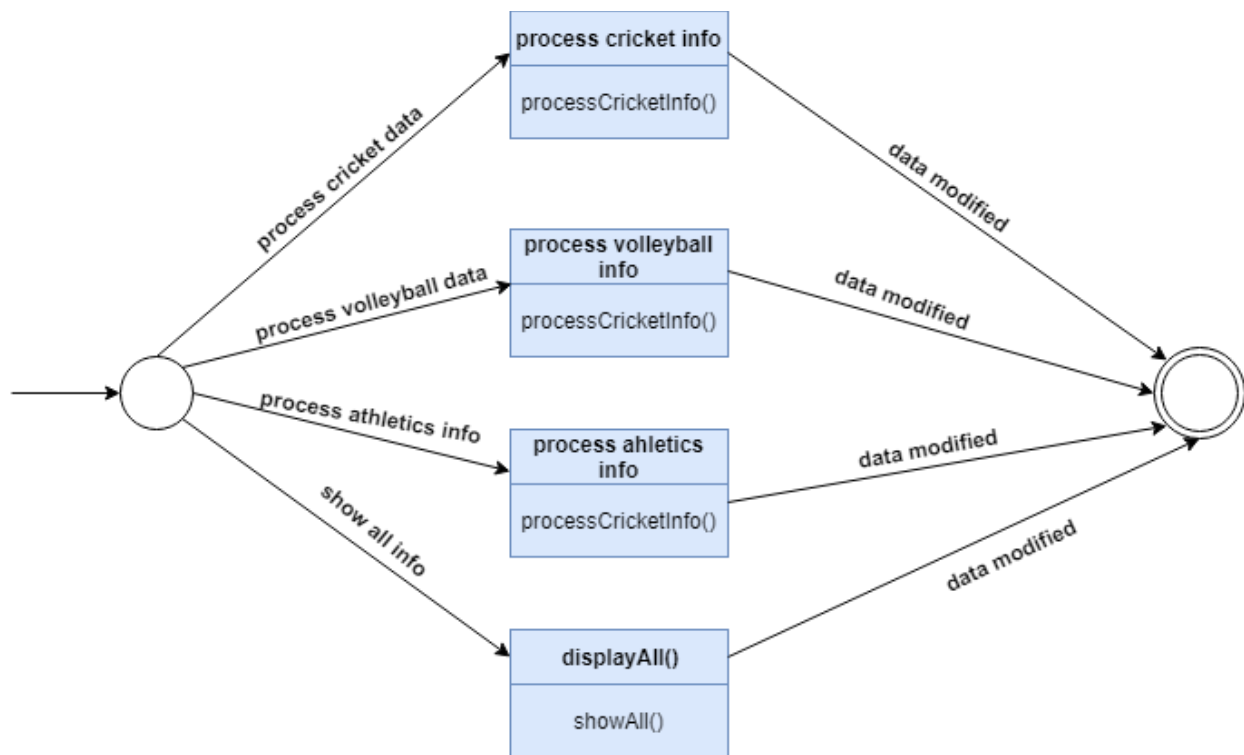


Figure 31: PlayerInfo state transition diagram

8.2.11 CricketStats



Figure 32 : CicketStats state transition diagram

8.2.12 VolleyballStats



Figure 33 : VolleyballStats state transition diagram

8.2.13 AthleticsStats

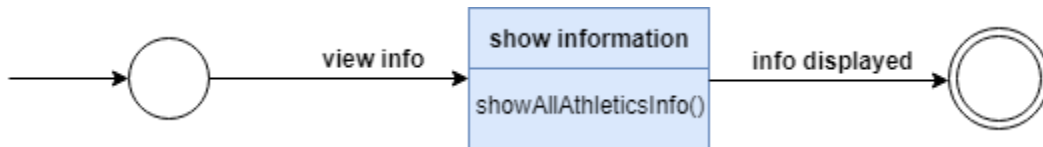


Figure 34: AthleticsStats state transition diagram

8.2.14 Score

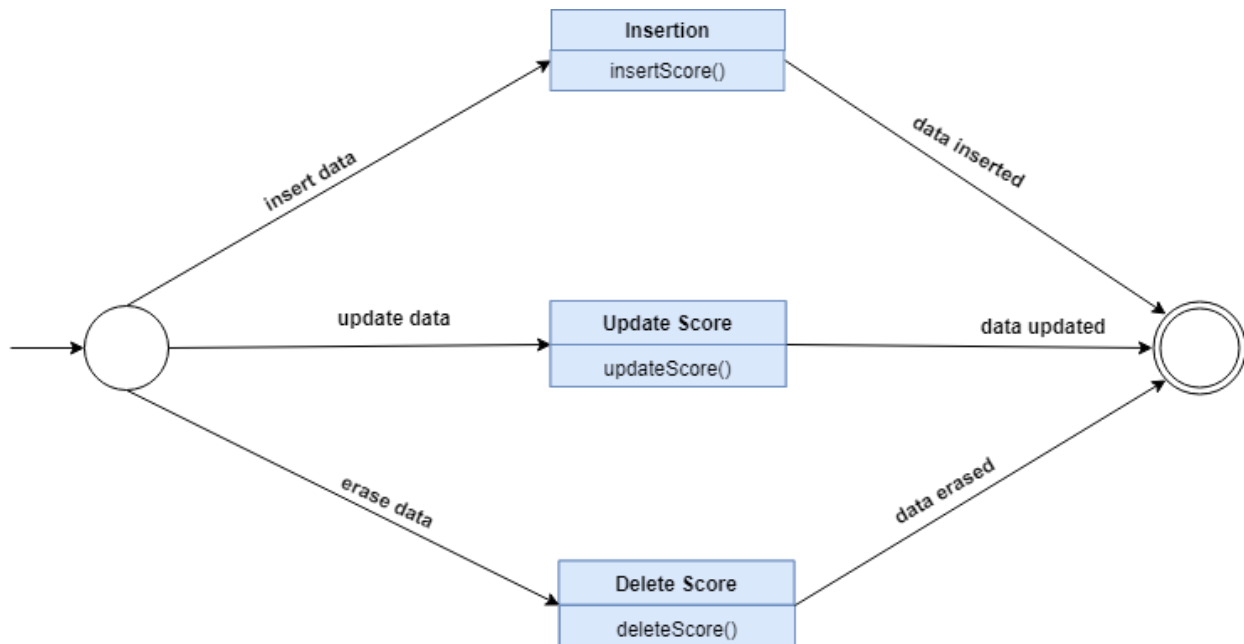


Figure 35 : Score state transition diagram

8.2.15 User

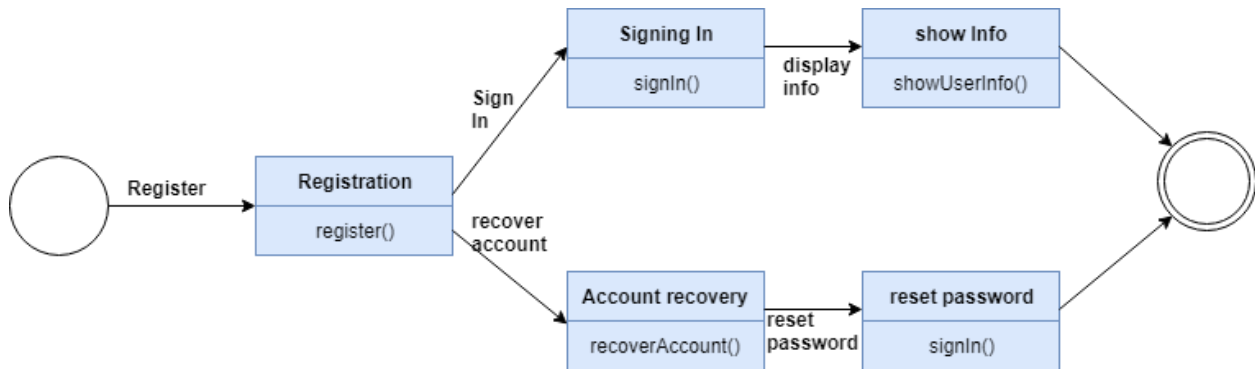


Figure 36 : User State transition diagram

8.3 Sequence diagram

A sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. It is a construct of a message sequence chart. A sequence diagram shows object interactions arranged in time sequence

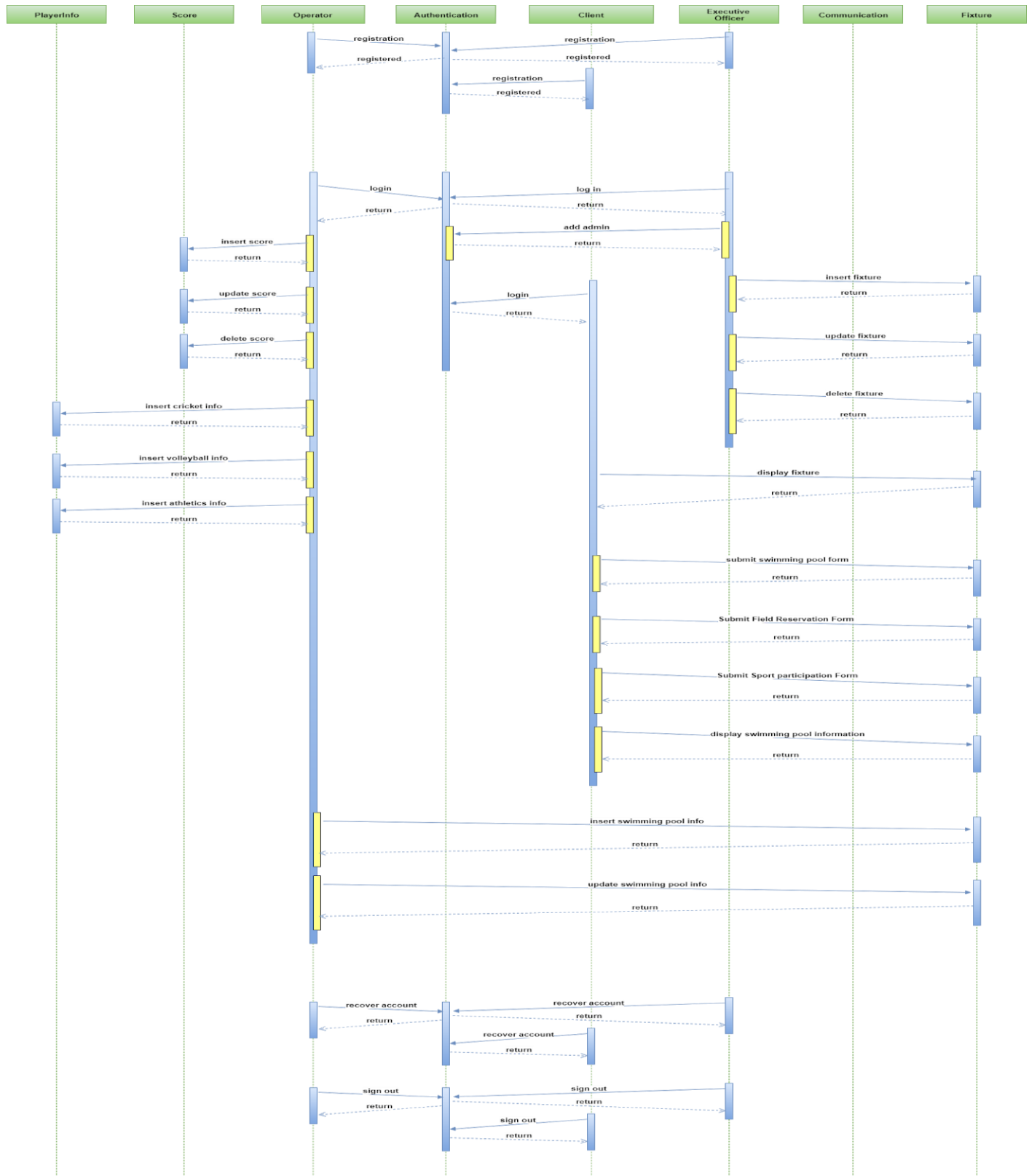


Figure 37: Sequence diagram