



SPORTIZZA

Group Project I
SCS 2202
CS Group 19



Information provided in this project report is unique & confidential to its proposed software platform; anyone reading this project proposal agrees not to disclose any of the business information in this proposal without any permission from the CS Group 19.

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*There are no specific client for this project and it's a startup idea.

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1) Introduction to Project

1.1 Problem Statement

Currently, when making a booking to a sports arena, customers have to go through so much hassle by making calls to a significant number of sports arenas and check whether they have that particular time slot available in their sports arena and if not, what are the other time slots available. Perhaps, the customers must make another call to confirm the booking a few days prior.

To be more specific, these are the main issues faced by both the customers as well as sports arenas:

- No method to search the sports arenas around.
- No method to check the available time slots of a sports arena without giving a call to the sports arena.
- No method available to check the details, facilities available before using the facility.
- Sports arenas are experiencing issues due to sudden booking cancellation by the customers.
- Sports arenas to receiving any revenue for the bookings which were not utilized but made the bookings.
- No easy method for the sports arenas to emergency booking cancellations.

1.2 Proposed Solution

Therefore, we aimed at these issues and proposed a software-based solution namely “Sportizza” which would allow the customers to search the available sports arenas for a particular timeslot and make the booking then and there without making a single call. Additionally, the sports arena would also receive a guaranteed payment made on their allocated bookings. Some more added functionalities would also be included such as a rating system for the sports arenas, booking sharing to the other colleagues via social media, etc. Similar systems are available in other countries like Oman, India, Ireland, UK, etc.

1.3 Business Process

Our ultimate goal is to host this platform as the best solution for the users who find and make booking sports arenas. Maintenance is important for a web site to be a trading platform over time. Hosting, maintenance, and other maintenances shall be the direct costs involved. This platform shall gain revenue mainly by charging a 5% royalty fee for every booking happen through our Sportizza Platform and additionally, Sports Arena's are charged for any advertisements placed on the site and also for any sophisticated data analytics reports based on the requirement. This income should be sufficient to cover the costs of maintenance of the platform in the future.

1.4 Uniqueness of Our Project

In the current context, there is no such similar platform in Sri Lanka to connect them with the sports arenas to get their bookings done. With the increased concise on health-concerned lifestyle among Sri Lankan population, demand for the sports arenas is also on an upward trend.

Additionally, group members of this project themselves are facing this issue in their day-to-day life. That's also one of the main motivations for our group to select this issue and propose a workable solution as responsible undergraduates from the University of Colombo School of Computing (UCSC).

2) Project Goals & Objectives

The ultimate project goal of carrying out this project is to provide a convenient and efficient mechanism for the potential customers to make bookings for sports arenas while supporting the sports arenas to operate effectively when it comes to booking handling related services and providing effective business insights for the sports arenas to operate competitively within the industry.

Over the long term, as a next step, we also have plans to expand the scope of the platform by adding more partners such as sports equipment merchants, sponsors for sports events, etc. However, due to resource constraints, those aspects won't be covered under the currently proposed project.

Increased conciseness on living a healthy life with adequate exercises is on an upward trend from the recent years. As Sri Lankans, we also have a tendency in moving towards a more healthy nation. As a part of the long-term vision “Hope of building a healthy nation” we are planning to develop this Sports Arena booking platform Sportizza to get more of the populations to use the existing sports arena resources within the island.

Additionally, we aim to achieve the following objectives in our journey:

- Simple User Interface for the users.
- Make the sports arena booking procedure more convenient for the customers.
- Providing the above-mentioned sports arenas to improve their current facilities.
- Providing analytics to the sports arenas to take managerial decisions.

3) Scope of the project

This section provides an overview of what areas shall be specifically covered by Sportizza platform and what areas shall be out of its scope. There are mainly 6 users who shall be using the system.

3.1 Main Users

1. Admin
2. Visitor
3. Customer
4. Manager
5. Administration Staff
6. Booking Handling Staff

3.2 In Scope - Main functionalities

The areas that are specifically handled by the system include:

- Registration and authentication.
- Search for sports arenas.
- Make bookings.
- Provide ratings to sports arenas.
- Share booking confirmation to colleagues via social media.
- Sports arena listing in the platform.
- Analytics generation for sports arenas.
- Payment processing for sports arenas.

3.3 Out of Scope

The areas that are not specifically handled by the system include:

- Discounts on booking time slots.
- Booking rescheduling.
- Advertising of open tournaments organized by the sports arena.
- Booking timeslots with coaches.
- Sports equipment merchandising.

3.4 Flow of events in the current context

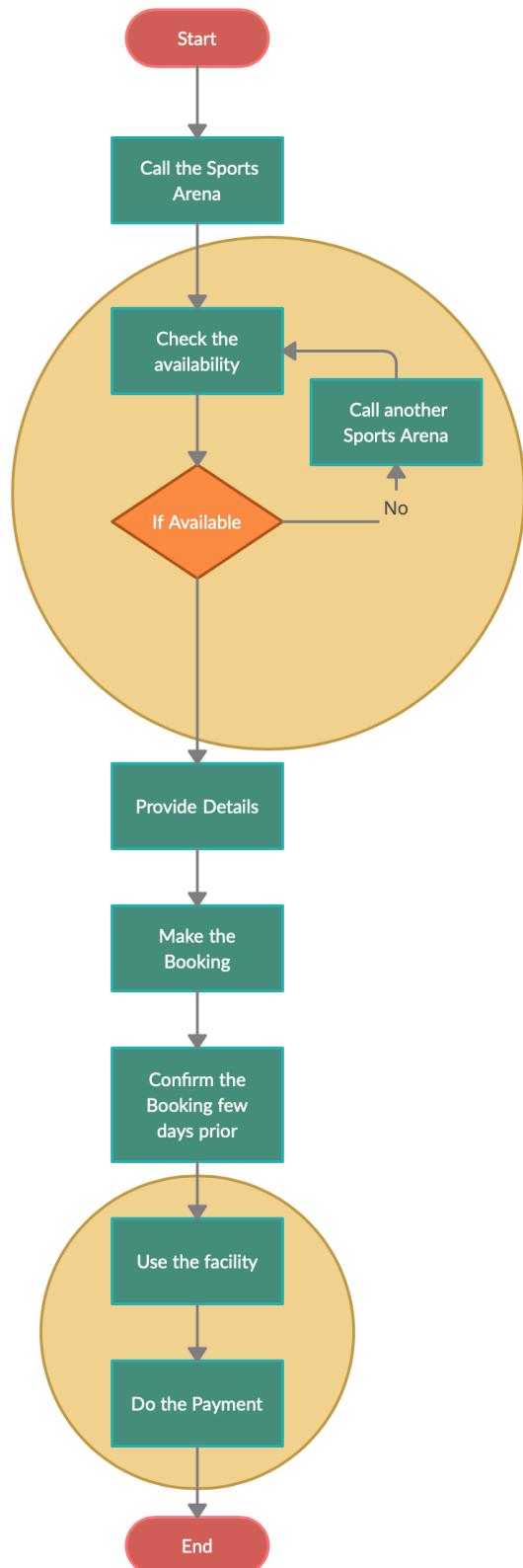


Figure 1: Current flow

Represents the critical operations of the overall process.

As mentioned earlier, the current sports arena booking system is a bit inconvenient for the customers as well as the sports arenas. The below elaboration includes how the process happens in the current context as per figure 1, without the Sportizza platform.

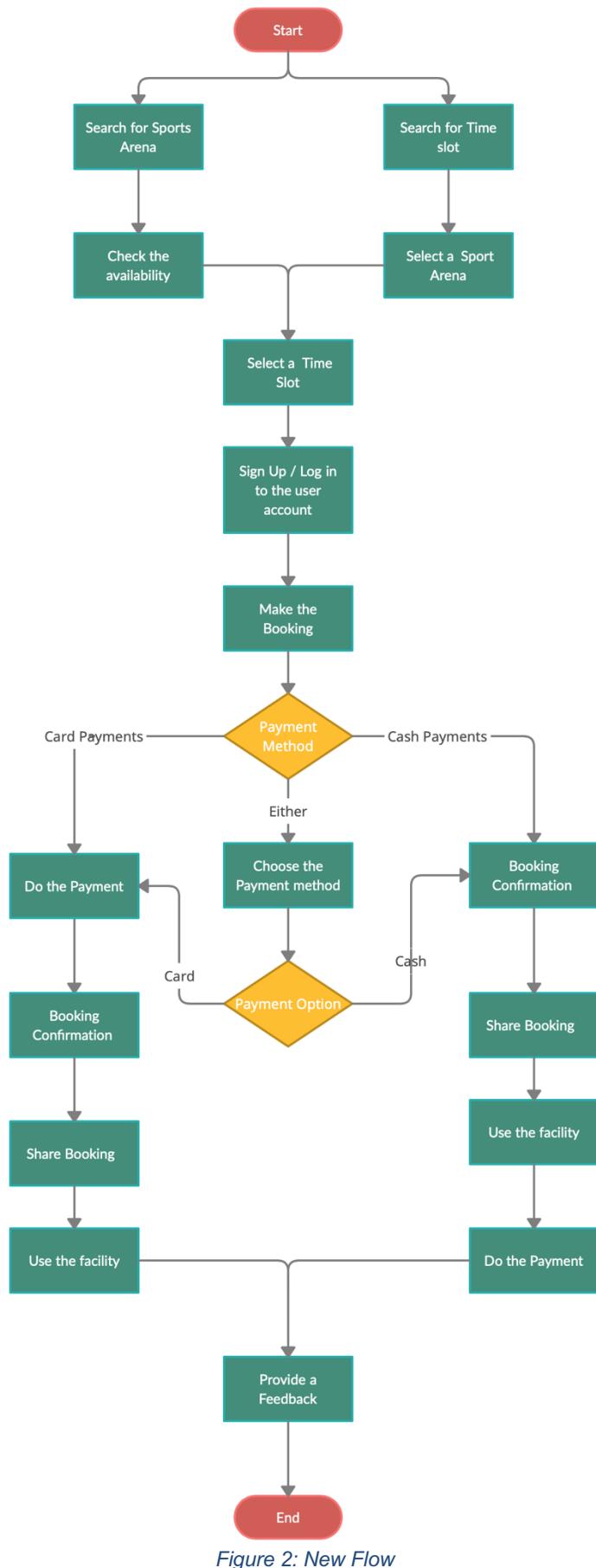
Firstly, the customer should call a sports arena and check whether it is available on the customer's required time slot. If it's available from the first call, the customer was lucky and he just has to make one more call to the sports arena at a later stage in a normal scenario.

However, in most cases, the customer has to make few more calls to other sports arenas and check the availability if the previous sports arena is not booked.

For the instance, let's assume that a customer finds out an available sports arena for their required time slot after going through so much hassle. Then the customer has to provide their NIC number, name and mobile number when making the booking. Furthermore, the customer has to again give a call to the sports arena and confirm their bookings 3 days prior.

From the sports arena's perspective, they would receive the corresponding payment only after the customer using the facility. There are scenarios where the sports arena couldn't make any revenue as some customers have cancelled their bookings at the last minute and some customers haven't used the facility for their booked time and ultimately all these events lead to loss of revenue and resources for the sports arena. That's just a gist of how the current process happens in the practical environment.

3.5 Flow of events with Sportizza



With the introduction of the Sportizza Platform, we expect the process to be smoother and more convenient for both the customer and the sports arena.

Firstly, the customer can book a time slot in 2 main methods as per figure 2. The customer has the option to search for a particular sports arena and selects a time slot or the customer can search for a timeslot and select a sports arena. After this stage, the customer is getting the option to select a required time slot to proceed with the booking.

One of the most critical aspects of our system is that anyone with an internet connection and a mobile device or a personal computer could search for the available time slot irrespective of whether they want to make a booking or not. However, only a logged-in customer would be able to proceed with the next stage, which is to make a booking via our platform.

When considering the payment option, Sportizza provides the authority for the sports arena to decide whether they accept cash payments, card payments or both. Only the card payments would be handled by our platform by incorporating the service of a third-party payment gateway.

After a successful payment process, the customer would receive a booking confirmation

which could be shared with the customer's colleagues who would be using the facility with him for that particular time slot. For the sports arenas that accept only cash transactions, Sportizza would send the same booking confirmation message to the customers and the customers could show that booking confirmation to the sports arena's administration staff and make the payment for that booking. Thus, the risk of the cash payments is totally out of Sportizza responsibility.

The above-mentioned Sportizza is also allowing the customers to provide feedback on the sports arena after each booking so that the sports arena could keep on improving their service and provide a high-quality service to the customers from the next time onwards.

4) Project feasibility

4.1 Technical Feasibility

In order to complete the project on time and meet the agreed deliverables, we have planned to use the following technologies such as HTML, CSS, PHP and JavaScript as our implementation techniques. All IDEs used for development are free and open source.

Laptops and desktops required to carry out the development with the relevant hardware requirements are owned by the group members.

Integrated Development Environments:

- XCode
- Visual Studio Code

Tools & Utilities:

- XAMPP & MAMP
- Version management- GitHub
- Draw.io – UMLs & diagrams
- JIRA - To manage tasks among group members
- Adobe Illustrator- logo making
- Workbox – To offline caching in the Progressive Web Application
- Microsoft Office 365 (Student edition provided free for university email)
- Grammarly -Free edition to eliminate grammar mistakes
- Google Lighthouse – To audit the System

Hardware:

- Personal laptops
- Routers

All the above-mentioned resources are easily usable within our knowledge limits.

Hence the project is technically feasible.

4.2 Operational Feasibility

Firstly, for the proposed platform to be operationally feasible, all the identified functional requirements should be included in the software. Most importantly, the system should increase the convenience of the customers as well as the ground management staff for this system to be operationally feasible.

In order to use the system, there are certain aspects that have to be fulfilled by the users. They are as follows:

- Users (Manager, Administration Staff from sports arena and the customers) should have a medium knowledge in IT and English.
- A mobile device is required to access the platform.
- If the sports arena's manager and administration staff could have personal computers or laptops, it would be easier for them to carry out their operations via the proposed platform.

Affordability Vise, the ground sports arena is charged only 5% of each booking from the platform and if any other extra statistical reports are requested, they would get charged an additional fee depending upon the content requested. Customers won't bear any fee throughout the process.

Additionally, one of the main aspects considered when developing this platform is to have a user-friendly interface including convenient navigation, performance, and mobile compatibility so that users can easily access the application using their smartphones.

By considering all these aspects, it's clear that our proposed system is operationally feasible.

4.3 Legal & Ethical Feasibility

The proposed system shall contain large databases of sensitive user data such as the bank details of the sports arena management and payment details of the customers. We have to protect our databases from unauthorized intruders and also guarantee the user's privacy and confidentiality. As a remedy, we are planning to add all our privacy policies to our user agreement as per GDPR privacy laws. Hence the customers can read the agreement document before entering their data into our databases.

A hierarchically based login mechanism is to be used in the system so that only the relevant authorized users can view the data available to them. As an example, the booking handling staff would find only a limited number of features than the administration staff of the sports arena.

For online payments, the support of a third-party payment gateway is being used. Since it's a trusted software that has already processed over Rs 1 billion worth of transactions, it's safe to assume that all the transactions could be done with trusted, standardized payment providers over a secured connection.

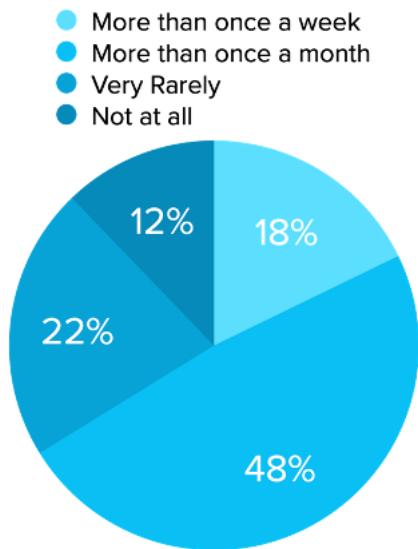
In order to complete the proposed project, we are planning to use many open-source applications services. We have to be concerned about their guidelines and agreements.

Hence, our system is legally and ethically feasible.

4.4 Social Feasibility

We have performed a survey to identify the impact and the intensity of this issue for society by using a google response form. As of now, we have received a total of 155 responses. Below are a few of the analytics which we derived from the responses we received:

Frequency of visiting a sports arena



The pie chart in figure 3 depicts the frequency of a regular person visiting a sports arena. As per the survey, 18% of the average population visits a sports arena more than once a week and 48% visits a sports arena more than once a month. This means that more than 66% of the population visits a sports arena at least every month. This highlights the frequency of people visiting a sports arena. Hence, it is clear that our proposed solution would be effective for the society.

Figure 4: Frequency of visiting a sports arena

As per the figure 4, 47% of the customers make the booking by visiting a sports arena and 39% make the booking over the phone. With our proposed platform all the costs incurred on making a booking would be zero for the customers and the customers would be able to make the booking at any time in the day. But in the current context, if the customers are making the booking, they can make the booking only during the working hours of the sport arena. Hence, this statistic also signifies the importance of Sportizza.

Method of making a booking

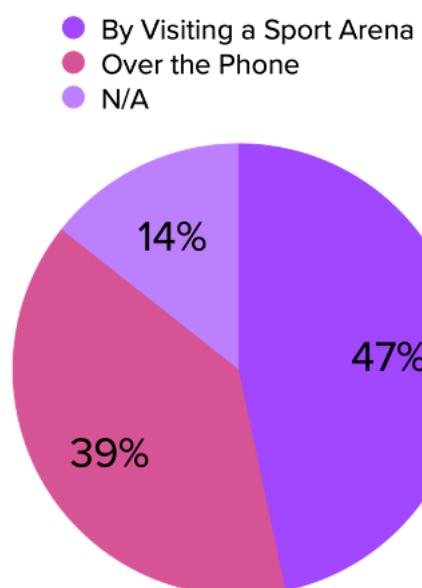


Figure 3: Method of making a booking

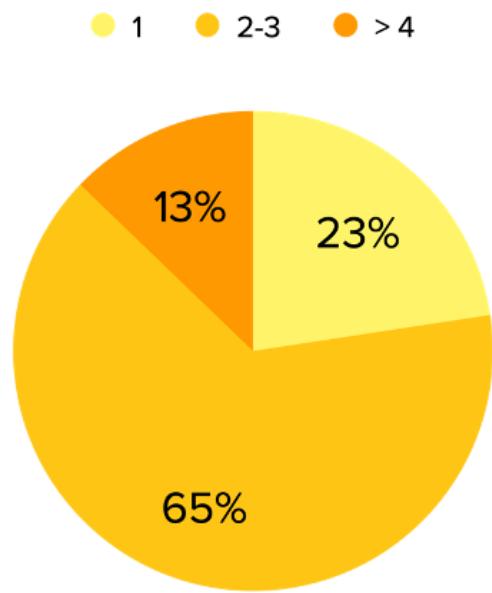
Avg. no. of calls made per booking

Figure 5: Avg. no. of calls made per booking

Pie chart with Average number of calls made per booking depicts that 65% of the customers are making around 2-3 calls only to the sports arena during their booking process. This may include the first call to check the availability and the second calls to make the booking and may be third call to confirm the booking 3 days prior. Also, 13% of the population have to sometimes make more than 4 calls per one booking. Most of the time, this may be when the sports arena cancels the booking due to emergencies. For all these issues, we are proposing one hassle free system for the

Acceptability of the proposed platform

- Yes
- No
- Maybe

Furthermore, we have also asked the population whether they would like an application which would cater them as a solution for the above issues. So, 73% of them responded as "Yes" and 26% responded as "Maybe". Therefore, it is clear that the proposed solution is socially feasible.

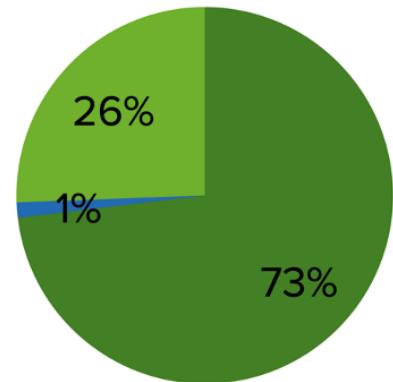
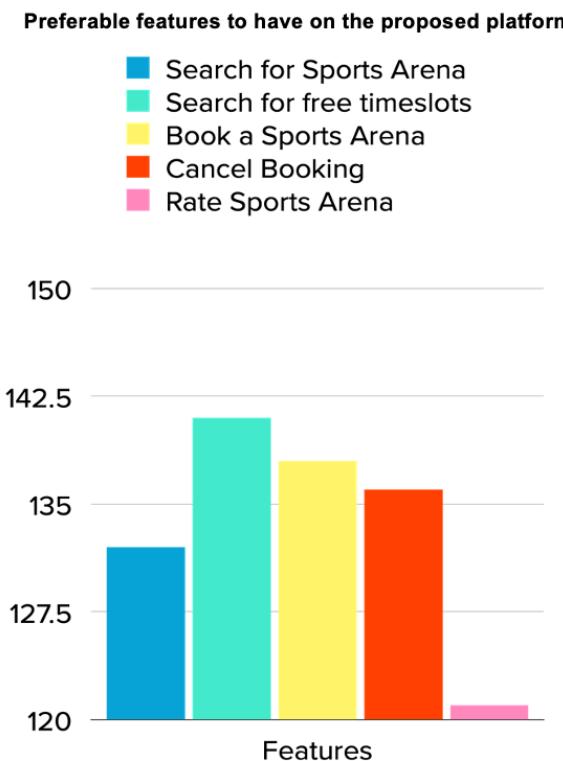


Figure 6: Acceptability of the proposed platform



Additionally, we have collected responses on the preferable features to have on our application. Highlight of this statistic is that more than 140 people out of the total responses of 156 would like to have the search for free timeslot feature and more than 135 would like to have book a sports arena feature and booking cancellation features in our platform.

Figure 7: Preferable features to have on the proposed platform

*On a special note, these statistics might not be accurate when it comes to rural areas as the responses were collected mostly from the urban and sub-urban population of Sri Lanka.

After considering all these facts, it's clear that our system is socially feasible.

4.5 Economic Feasibility

Since Free & Open-Source Software are used for development, it won't cost anything related to the development.

When deploying the system, the cost of hosting the web application or for any other hardware equipment would be ideally nil as we are planning to use the Free tier of "Amazon Web Services" (AWS) to deploy the system. Eventually, once the user base grows, the system would be updated to the paid versions which would depend upon the user base.

For payment gateway, we are planning to use the "PayHere" sandbox and it's also freely available at the moment.

Therefore, our system is economically feasible

4.6 Schedule Feasibility

The time duration allowed for this project is 10 months. All the work has been divided among the 4 group members and it's anticipated to finish our project by the end of March 2021. Below is the Gantt chart prepared with respect to our project.

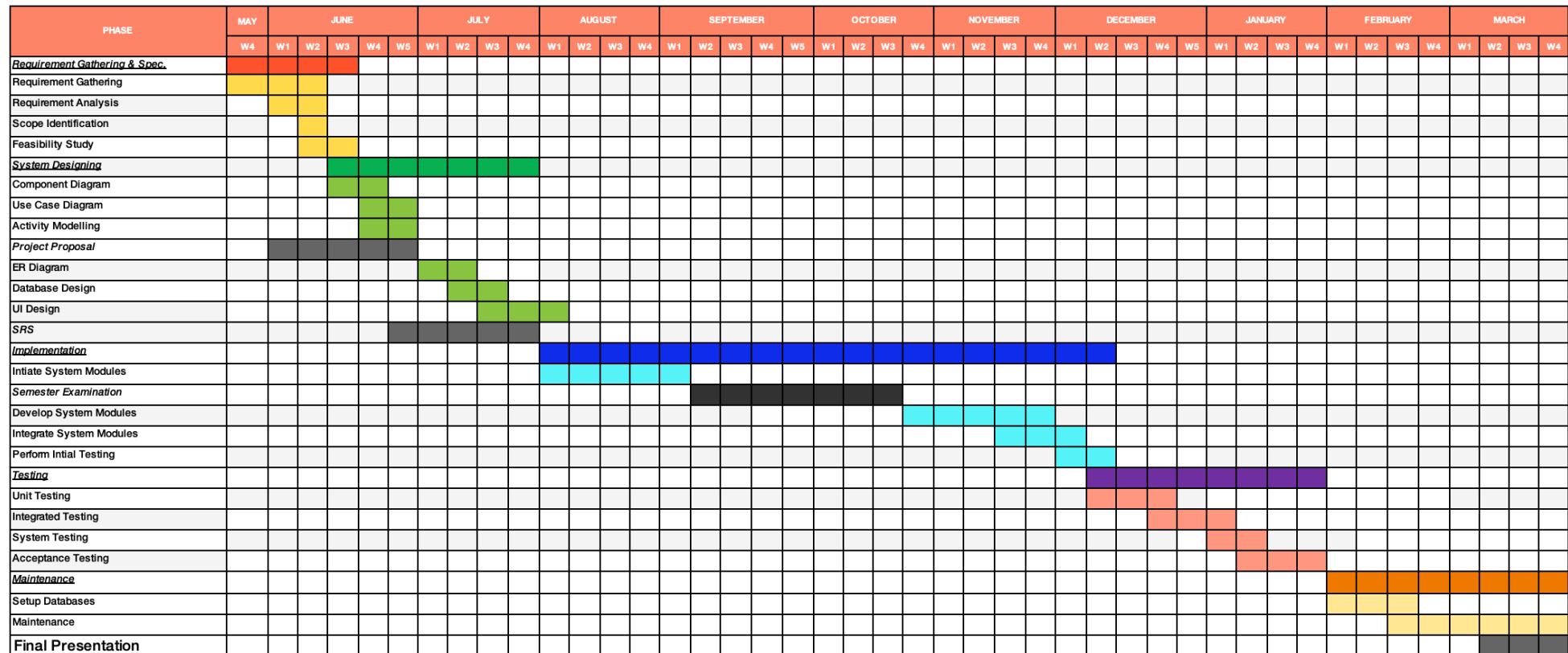


Figure 8: Gantt Chart

- Number of individual work hours (per week) = 10h
- Number of work hours as a team (per week) = 40h
- The estimated number of weeks = 30
- The estimated total of man-hours = 1200h
- Risk buffer = 240h
- Budgeted Time = 1440h

Below is a screenshot of the JIRA board which we are using to breakdown the work of the project.

SPORTIZZA board

The JIRA board is organized into three columns:

- TO DO 3 ISSUES** (Left Column):
 - sequence customer (Status: To Do, Assigned to PL, Last updated by MW, Last viewed by JD)
 - sequence management (Status: To Do, Assigned to MW, Last updated by JD, Last viewed by PL)
 - Er Mapping (Status: To Do, Assigned to MW, Last updated by PL, Last viewed by MW)
- IN PROGRESS 3 ISSUES** (Middle Column):
 - Software architecture part 1 (Status: In Progress, Assigned to PL, Last updated by JD, Last viewed by MW)
 - Software architecture part 2 (Status: In Progress, Assigned to MW, Last updated by PL, Last viewed by JD)
 - ER Diagram (Status: In Progress, Assigned to MW, Last updated by PL, Last viewed by JD)
- DONE 15 ISSUES** (Right Column):
 - Logo creation (Status: Done, Assigned to JD, Last updated by MW, Last viewed by JD)
 - Proposal (Status: Done, Assigned to JD, Last updated by MW, Last viewed by JD)
 - Requirements (Status: Done, Assigned to JD, Last updated by MW, Last viewed by JD)
 - Component diagram (Status: Done, Assigned to JD, Last updated by PL, Last viewed by JD)

At the bottom left of the board, there is a '+ Create issue' button.

Figure 9: JIRA Board

5) Deliverables of the project

- Progressive Web Application (PWA).

Progressive Web Application, where users can create their accounts and log in to the system. All the roles in the system can interact with the system through the web application.

- User manuals for the sports arenas with screenshots attached.

Containing all the instructions, the user manual shall be provided to all the sports arenas that are getting listed themselves on our platform.

- Software Requirement Specification (SRS).

Including the problem background, objectives to be achieved upon completion, feasibility study, scope, functionality and quality attribute and design specifications illustrated with various diagrams.

6) Project Constraints and Limitations

- Through the proposed platform, only the registered users would be allowed to make a booking and for that, every customer should have an available mobile phone number for verification processes.
- Since the authority to choose the payment option is fully granted to the sports arena's manager and the administration staff, any issues involved with the cash payments aren't handled and not taken responsibility by the Sportizza platform.
- Also, the customers are not allowed to reschedule their bookings. Instead, the customers could cancel their current booking, if permitted by the guidelines and make a new booking. Customers would receive their refunds within the next 14 days.
- Some other additional features such as providing discount codes by sports arenas to attract customers advertise the sports tournaments organized by the customers and offering a facility to connect customers with relevant coaches are not currently considered under the project due to resource constraints.
- Furthermore, government-controlled sports arenas which don't allow the customers to book their facilities per a required time slot couldn't be booked via the Sportizza platform.

- One last limitation of this project would be that we are using the waterfall model to carry out this project as the requirements are stable enough and the industry itself is quite stable over the long term. On the flip side, the use of the waterfall model limits our team from providing frequent deliverables and it would ultimately increase the overall risk of arriving at the most relevant project by the time of deployment. However, we would always be willing to do any changes whenever required even though we use the waterfall model as a framework to structure the timeline of our project development.

7) Requirements of the project

7.1 Functional Requirements

There are six main actors in the system,

- Visitor
- Customer
- Manager of the sports arena
- Administration staff of the sports arena
- Booking Handling staff of the sports arena
- Admin

Functional requirements according to the actors in the proposed system are stated below:

1. A visitor has the following functional requirements:

- Search for sports arenas – User shall be able to search for sports arena by inputting a date, location and the sport category or else by directly inputting the sports arena name.
 - Ask help/ support desk – User shall be able to request any help from the system admin by shooting a message from the Ask help section in the system.
2. A customer has the following functional requirements:
- Sign up – User shall be able to Sign up for a customer account and maintain their profile to make bookings in the future.
 - Login/ Logout – User shall be able to login and logout whenever they required. User shall be able to use the functionalities of a visitor without logging into the system from their user account.
 - Edit profile details – User shall be able to edit their profile details including the username, mobile number, etc.
 - Search for sports arenas – User shall be able to search for sports arena by inputting a date, location and the sport category or else by directly inputting the sports arena name.
 - Book sports arena – User shall be able to book (reserve) a timeslot of a particular sports arena for a particular date.
 - Do a payment – User shall be able to do card payments to receive the booking confirmation if the sports arena allows only card payments for the customers. For cash payments' this functional requirement is not essential.
 - Share booking via social media – User should be able to share the received booking confirmation via social media to the colleagues or the family who visit the sports arena with.
 - Rate sports arenas and provide reviews – User should provide a star-rating out of 5 stars and also s a review about the sports arena facilities after using the facility.
 - Create my sports arenas list – User should create their favorite sports arena list in their profile so that the user can directly click a sports arena out of it and check for the sports arena and make the booking.
 - Cancel booking – User shall cancel the booking 72 hours before the start time of the booking timeslot. If paid for the booking by card, refund will be provided to the customer within next 14 days.
 - View my bookings – User should view their bookings inside their profiles including the past bookings made on sports arena.
 - Ask help/ support desk – User shall be able to request any help from the system admin by shooting a message from the Ask help section in the system.
3. The manager of the sports arena has the following functional requirements:

- Register (Sign up) for an account – User shall apply to register a sports arena in the platform. User shall also receive one account for the sports arena after manual verification of the sports arena by the system admin.
- Login/ Logout – User shall be able to login and logout whenever they required. User shall be able to use the functionalities of a visitor without logging into the system from their user account.
- Edit profile details – User shall be able to edit their profile details including the username, mobile number, etc.
- Generate reports – User shall be able to generate monthly analytical reports with respect to the bookings of the sports arena and the corresponding revenue breakdowns.
- Choose payment method – User shall be able to choose the payment method of the sports arena (Cash payments or card payments or both). Sportizza is not bearing any risk involved with the cash transactions.
- Process cash transactions – User shall be able to enter the cash transactions related to the bookings made on cash payment method.
- Reply to customer feedbacks and queries – User shall be able to reply to customer feedbacks with respect to that sports arena.
- Booking slots manually – User shall be able to book timeslots on behalf of the customers who visit the sports arenas to make bookings.
- View bookings – User shall be able to view all the bookings by selecting a date.
- Update timeslot status – User shall be able to update future timeslot's status whether they are available or not. However, user is only allowed to update the timeslots which have not yet being booked by any customer. If it's already booked, then emergency booking cancellation shall come into effect.
- Emergency booking cancellations – User shall be able to cancel the existing bookings due to emergency (unavoidable) issues.
- Ask help/ support desk – User shall be able to request any help from the system admin by shooting a message from the Ask help section in the system.

4. Administration Staff of the sports arena has the following functional requirements:

- Register (Sign up) for an account – User shall apply to register a sports arena in the platform. User shall also receive one account for the sports arena after manual verification of the sports arena by the system admin.
- Login/ Logout – User shall be able to login and logout whenever they required. User shall be able to use the functionalities of a visitor without logging into the system from their user account.
- Edit profile details – User shall be able to edit their profile details including the username, mobile number, etc.
- Choose payment method – User shall be able to choose the payment method of the sports arena (Cash payments or card payments or both). Sportizza is not bearing any risk involved with the cash transactions.
- Process cash transactions – User shall be able to enter the cash transactions related to the bookings made on cash payment method.
- Reply to customer feedbacks and queries – User shall be able to reply to customer feedbacks with respect to that sports arena.
- Booking slots manually – User shall be able to book timeslots on behalf of the customers who visit the sports arenas to make bookings.
- View bookings – User shall be able to view all the bookings by selecting a date.
- Update timeslot status – User shall be able to update future timeslot's status whether they are available or not. However, user is only allowed to update the timeslots which have not yet being booked by any customer. If it's already booked, then emergency booking cancellation shall come into effect.
- Emergency booking cancellations – User shall be able to cancel the existing bookings due to emergency (unavoidable) issues.
- Ask help/ support desk – User shall be able to request any help from the system admin by shooting a message from the Ask help section in the system.

5. Booking Handling Staff has the following functional requirements:

- Login/ Logout – User shall be able to login and logout whenever they required. User shall be able to use the functionalities of a visitor without logging into the system from their user account.
- View bookings – User shall be able to view all the bookings by selecting a date.

6. Admin has the following functional requirements:

- Login/ Logout – User shall be able to login and logout whenever they required. User shall be able to use the functionalities of a visitor without logging into the system from their user account.
- Remove sports arenas – User shall be able to remove the sports arena account as well as its respective user accounts if the sports arena don't abide by the terms and conditions of Sportizza.
- Remove customers - User shall be able to remove the sports arena account as well as its respective user accounts if the sports arena don't abide by the terms and conditions of Sportizza.
- Remove negative feedbacks after assurance by the sports arena – User shall be able to remove the negative feedbacks on the sports arenas from the platform after the sport arena assuring the changes have been made as requested by the customers.
- Help & support
- Generate System Reports – User shall be able to generate the system related reports such as the number of active users, amount of network traffic driven to the platform, etc.
- Provide solutions to the other users – User shall be able to reply to the other users' issues and any requests come through Ask Help option.

7.1.1 Component Diagram

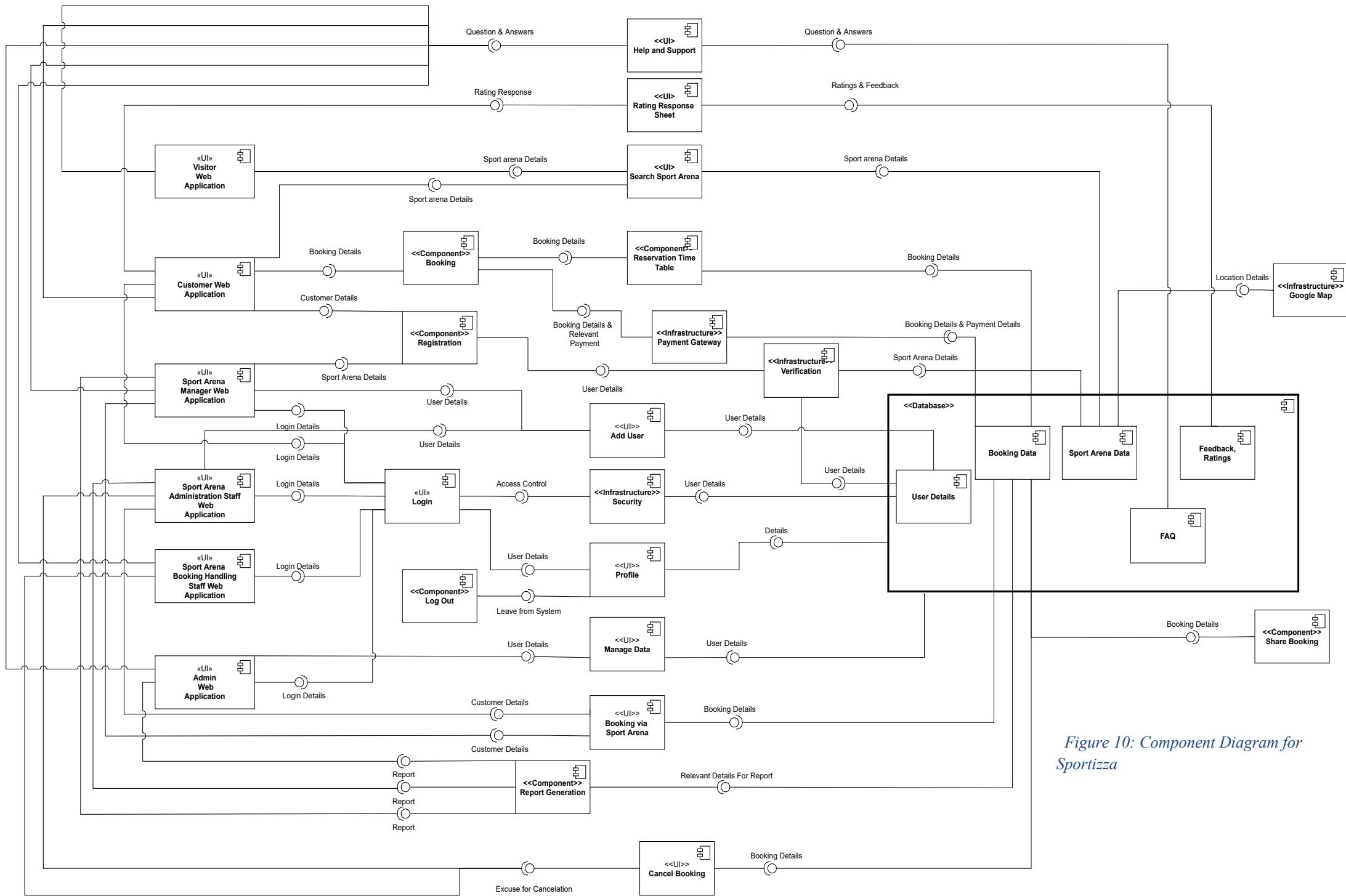


Figure 10: Component Diagram for Sportizza

The below table includes a summary of the component diagram.

Name	Type	Required Interfaces	Provided Interfaces
1. Visitor Web Application	«UI»	<ul style="list-style-type: none"> • Search Sport Arena • Help and Support 	
2. Help and Support	<>UI>	<ul style="list-style-type: none"> • FAQ 	<ul style="list-style-type: none"> • Visitor Web Application • Customer Web Application • Sport Arena Manager Web Application • Sport Arena Booking Handling Staff Web Application • Admin Web Application
3. Rating Response Sheet	<>UI>	<ul style="list-style-type: none"> • Customer Web Application 	<ul style="list-style-type: none"> • Feedback, Ratings
4. Search Sport Arena	<>UI>	<ul style="list-style-type: none"> • Sport Arena Data 	<ul style="list-style-type: none"> • Visitor Web Application • Customer Web Application
5. Customer Web Application	«UI»	<ul style="list-style-type: none"> • Search Sport Arena • Help and Support 	<ul style="list-style-type: none"> • Booking • Rating Response Sheet • Login • Registration
6. Booking	<>Component>>	<ul style="list-style-type: none"> • Customer Web Application 	<ul style="list-style-type: none"> • Reservation Timetable • Payment Gateway
7. Reservation Timetable	<>Component>>	<ul style="list-style-type: none"> • Booking 	<ul style="list-style-type: none"> • Booking Data
8. Google Map	<>Infrastructure>>		<ul style="list-style-type: none"> • Sport Arena Data

9. Registration	<<Component>>	<ul style="list-style-type: none"> Customer Web Application Sport Arena Manager Web Application 	<ul style="list-style-type: none"> Verification
10. Payment Gateway	<<Infrastructure>>	<ul style="list-style-type: none"> Booking Booking Data 	
11. Verification	<<Infrastructure>>	<ul style="list-style-type: none"> Registration 	<ul style="list-style-type: none"> Sport Arena Data User Details
12. Sport Arena Manager Web Application	«UI»	<ul style="list-style-type: none"> Help and Support Report Generation Booking via Sport Arena 	<ul style="list-style-type: none"> Registration Add User Login
13. Add User	<<UI>>	<ul style="list-style-type: none"> Sport Arena Manager Web Application Sport Arena Administration Staff Web Application 	<ul style="list-style-type: none"> User Details
14. User Details	<<Database>>	<ul style="list-style-type: none"> Verification Add User 	<ul style="list-style-type: none"> Security
15. Booking Data	<<Database>>	<ul style="list-style-type: none"> Reservation Timetable Booking via Sport Arena 	<ul style="list-style-type: none"> Payment Gateway Report Generation Cancel Booking
16. Sport Arena Data	<<Database>>	<ul style="list-style-type: none"> Verification Google Map 	<ul style="list-style-type: none"> Search Sport Arena
17. FAQ	<<Database>>		<ul style="list-style-type: none"> Help and Support
18. Feedback, Ratings	<<Database>>	<ul style="list-style-type: none"> Rating Response Sheet 	

19. Share Booking	<<Component>>	<ul style="list-style-type: none"> • Booking Data 	
20. Sport Arena Administration Staff Web Application	«UI»	<ul style="list-style-type: none"> • Booking via Sport Arena • Report Generation • Cancel Booking 	<ul style="list-style-type: none"> • Login • Add User
21. Login	«UI»	<ul style="list-style-type: none"> • Profile • Sport Arena Manager Web Application • Customer Web Application • Sport Arena Booking Handling Staff Web Application • Admin Web Application 	<ul style="list-style-type: none"> • Security
22. Security	<<Infrastructure>>	<ul style="list-style-type: none"> • User Details • Login 	
23. Sport Arena Booking Handling Staff Web Application	«UI»	<ul style="list-style-type: none"> • Help and Support • Cancel Booking 	<ul style="list-style-type: none"> • Login
24. Log Out	<<Component>>		<ul style="list-style-type: none"> • Profile
25. Profile	<<UI>>	<ul style="list-style-type: none"> • User Details • Sport Arena Data • Feedback, Ratings • FAQ • Log Out 	<ul style="list-style-type: none"> • Login
26. Manage Data	<<UI>>	<ul style="list-style-type: none"> • User Details • Sport Arena Data • Feedback, Ratings 	

		<ul style="list-style-type: none"> • FAQ • Log Out • Admin Web Application 	
27. Booking via Sport Arena	<<UI>>		<ul style="list-style-type: none"> • User Details • Sport Arena Administration Staff Web Application • Sport Arena Manager Web Application
28. Report Generation	<<Component>>	<ul style="list-style-type: none"> • User Details 	<ul style="list-style-type: none"> • Admin Web Application • Sport Arena Administration Staff Web Application • Sport Arena Manager Web Application
29. Cancel Booking	<<UI>>	<ul style="list-style-type: none"> • User Details 	<ul style="list-style-type: none"> • Sport Arena Booking Handling Staff Web Application • Sport Arena Administration Staff Web Application
30. Admin Web Application	«UI»	<ul style="list-style-type: none"> • Report Generation • Help and Support 	<ul style="list-style-type: none"> • Login • Manage Data

7.1.2 Use Case Diagram

Use Case Diagram Assumptions:

- For every sports arena, 3 user account types are privileged namely Manager, Administration Staff and Booking Handling Staff with respective levels of privileges to operate the sports arena's day-today activities.
- When verifying a sports arena, the admin has to manually verify the details from the sports arena manager or the administration staff and also should do background checks about the details of the sports arena.
- Cash payments are not handled via the Sportizza platform.
- Once a booking is cancelled, refund fee for the customer would be provided after 14 days.

*Due to the complex nature of our system, it is not possible to divide into sub-systems and draw separate use case diagrams based on users. Hence, one comprehensive use case diagram has been drawn.

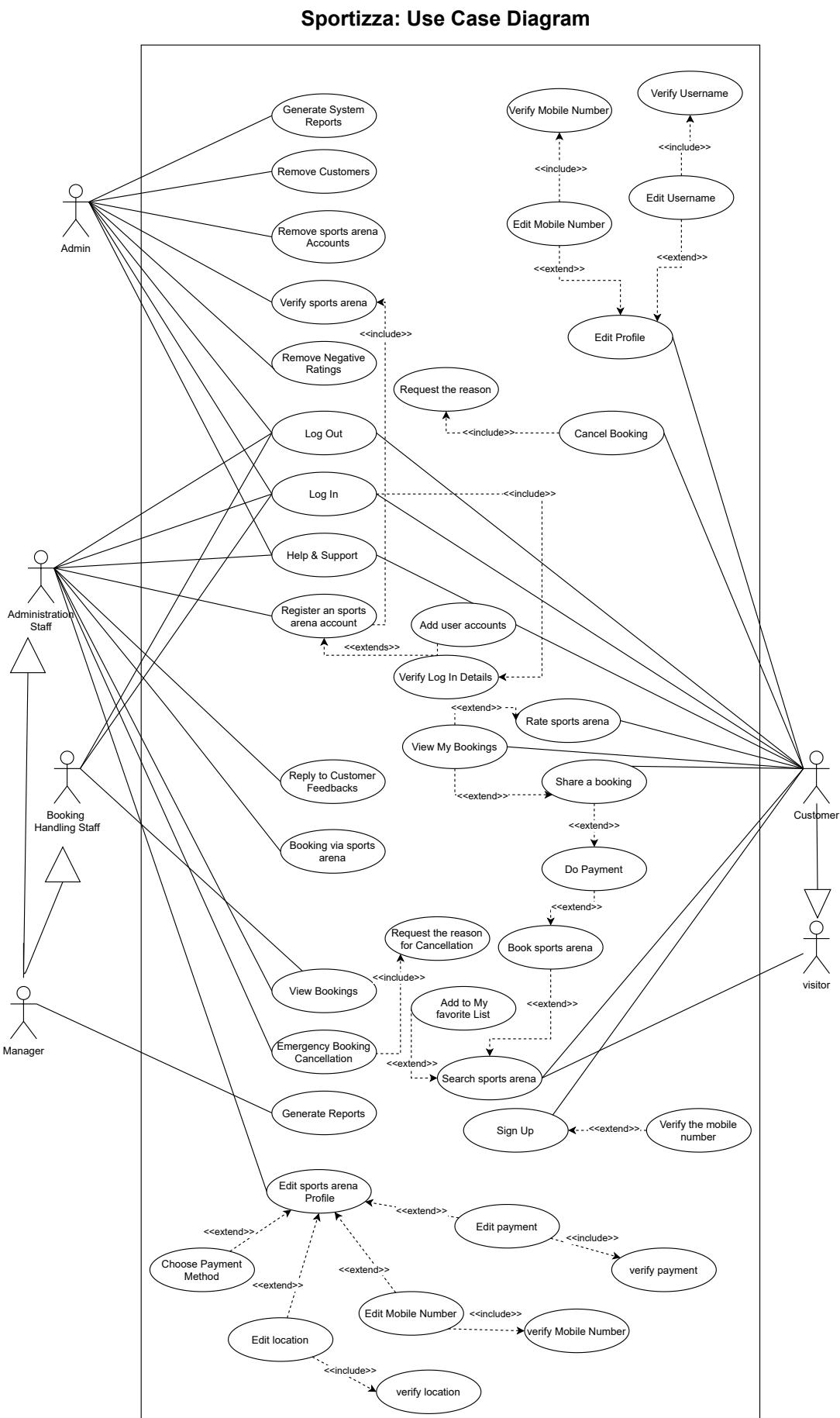


Figure 10: Use Case Diagram for Sportizza

7.1.3 Use Case Descriptions

Use-Case Name	Sign Up for Customer Account
Use-Case ID	01
Summary	The user can create their profiles.
Actors	Visitor
Pre-Conditions	The user must visit the platform.
Course of Events	<ol style="list-style-type: none">1. The user enters the relevant personal details including the mobile number.2. Verify the mobile number with a verification code.3. Activate the user account.
Exceptions	If the mobile number entered is invalid, or already has an account with the mobile number, then the user has to try again.
Post-Conditions	The user gets redirected to his/her account.

Use-Case Name	Login
Use-Case ID	02
Summary	User can login to the system
Actors	Customer, Book Handling Staff, Administration Staff, Manager, Admin
Pre-conditions	<p>User must have an account</p> <p>User must not be currently logged into the system</p>
Course of Events	<ol style="list-style-type: none"> 1. User clicks the relevant login icon 2. User submits a form displayed with username and password. (For sports arena, they should enter the sports arena name too). 3. System checks whether the username and hash password provided matches with those in the database 4. Start a session
Exceptions	If the credentials entered are invalid, an error message pops up
Post-conditions	User shall be logged into the system under the relevant privilege.

Use-Case Name	Edit profile
Use-Case ID	03
Summary	The user can edit profile details
Actors	Customer.
Pre-Conditions	The user must be currently logged into the system.
Course of Events	<ol style="list-style-type: none">1. Go to my profile and select the details the user wants to change.2. If it's a username, check the availability of the new username.3. If it's a mobile number, verify the mobile number via a system generated code.4. If it's a password, verify the password.
Exceptions	If the user can't verify, the user can try again.
Post-Conditions	If process successful Display "Edit profile is successful"

Use-Case Name	Search for Sports Arena
Use-Case ID	04
Summary	The user can search for sports arenas and available time-slots.
Actors	Visitor, Customer.
Pre-Conditions	The user must visit the platform.
Course of Events	<ol style="list-style-type: none">1. Enter the Sports Arena name.2. Enter filters such as category, sports arena, date and perform the search.3. Display the matched results.4. Select the preferable time slots.5. Check the available facilities of the sports arena.
Exceptions	Alternatively, can enter the name of the sports arena and search too. The user can select a sports arena and view additional details of that particular sports arena. Furthermore, a user can add a sports arena to my favorite list.
Post-Conditions	The user can book a required time slot(s) if it's a customer.

Use-Case Name	Booking sports arena.
Use-Case ID	05
Summary	The user can book a sports arena.
Actors	Customer.
Pre-Conditions	The user should be logged in to the search window of the site.
Course of Events	<ol style="list-style-type: none">1. The user can view the available time slots.2. The user can select a booking slot.3. The user can confirm booking.4. If the sports arena requires card payments, the system shall redirect the user to the payment gateway. (Cash payments are handled after using the facilities).5. User's mobile shall receive an SMS with the booking details.
Exceptions	
Post-Conditions	After booking a slot, if the sports arena allows only card payments, the user shall get directed to the payment gateway. Else, the user can share the booking details with the friends via social media.

Use-Case Name	Do Payment
Use-Case ID	06
Summary	The user can perform a payment to confirm the booking.
Actors	Customer.
Pre-Conditions	The user should select an available time slot.
Course of Events	<ol style="list-style-type: none"> 1. The customer enters the relevant card details. 2. Relevant amount gets transferred to the system's account. (Every two-weeks, all due amounts are credited to the sports arenas' accounts.) 3. The customer receives a notification "payment successful".
Exceptions	The transaction might get declined if the card details are invalid or due to insufficient balance. Also after 2 minutes, the payment window gets expired (Timed out).
Post-Conditions	The user shall get the option to share the booking details with friends via social media.

Use-Case Name	Share booking
Use-Case ID	07
Summary	The user can share a booking via social media.
Actors	Customer
Pre-Conditions	The user should have made a booking via the site.
Course of Events	<ol style="list-style-type: none">1. The user could select the share option respective to the booking.2. Alternatively, the user can click to share my booking after successfully completing a payment with the respective booking.3. The user can select the respective social media platform and share it with the relevant parties.
Exceptions	Sharing might get declined if a valid social media account doesn't exist.
Post-Conditions	The user gets redirected to his/her account.

Use-Case Name	Cancel Booking
Use-Case ID	08
Summary	The user can cancel booking and must enter the reason for cancelling reason
Actors	Customer.
Pre-Conditions	User must be currently logged into the account Booking must have at least three days (72 hours) for the booking day before cancellation.
Course of Events	<ol style="list-style-type: none"> 1. User can select the booking from my booking list 2. Click cancel booking icon 3. Enter the reason for cancellation 4. System sends a verification code 5. Enter verification code 6. Display refund information 7. System changes the booking slot an available time slot.
Exceptions	If the user couldn't enter a valid verification code, the user can try again. If it's a cash transaction, no refund is made.
Post-Conditions	If process successful Display "cancel booking is successful". If not successful display "You are not allowed! You have passed the cancellation period".

Use-Case Name	Rate Sports arena
Use-Case ID	09
Summary	The user can provide a rating to a sports arena.
Actors	Customer
Pre-Conditions	The customer should have done a booking for a particular sports arena and the customer should have used its service.
Course of Events	<ol style="list-style-type: none"> 1. After the finish time of the booked time slot, the site pop up with a feedback sheet. 2. If clicked the cancel button at that time, the user can alternatively view his/her past bookings over my bookings segment in their profile and select the rating option from the booking. 3. The user can click and provide a star-rating. 4. Optionally, the user can enter any feedback too. 5. The user could submit the feedback or alternatively cancel the option.
Exceptions	
Post-Conditions	Customer rating shall get added to the sports arena's profile and to the average rating of that sports arena.

Use-Case Name	Help & Support
Use-Case ID	10
Summary	After an administration staff, manager or a customer posts an issue, the admin shall follow the issue and shall provide necessary solutions.
Actors	Administration Staff, Manager, Customer, Visitor, Admin
Pre-Conditions	A complete and reasonable issue must be available.
Course of Events	<ol style="list-style-type: none">1. The user can post their issues if it's not answered on the site under FAQs.2. The user gets notified that the question is successfully posted.3. Admin shall get notified about the posted issue.4. If it's a new complaint, generate a complaint reference number.5. System sends the complaint reference number.6. Admin shall provide necessary solutions.7. The user shall get notified with the solution for their issue.
Exceptions	If any such similar issue is not available under the FAQs, Admin can add the questions to the FAQs depending on the relevance.
Post-Conditions	The issue shall be marked as answered.

Use-Case Name	View My Bookings
Use-Case ID	11
Summary	Customer can view their bookings through their profile.
Actors	Customer
Pre-Conditions	The user must be logged in to the system.
Course of Events	<ol style="list-style-type: none">1. User can go my profile.2. Select My bookings.
Exceptions	
Post-Conditions	The user shall get directed their profile once the back button is clicked.

Use-Case Name	Register a Sports Arena account
Use-Case ID	12
Summary	Authorized people from a particular sports arena can create their respective sports arena's profiles.
Actors	Administration Staff, Manager, Admin
Pre-Conditions	The user must not have a listed sports arena with the same name and address under the same category.
Course of Events	<ol style="list-style-type: none"> 1. User enters the details of the sports arena including name, address of the sports arena, category of sport(s), equipment availability, other facilities, payment option, etc. 2. Submit the application. 3. Admin clicks on the applied sports arena application. 4. Contact the sports arena. 5. Verify the sports arena via Google Maps and other methods. 6. Accept the sports arena account if successfully verified. 7. List the account on site. 8. User has the option to add user accounts to the sports arena account.
Exceptions	If sports arena's details aren't properly verified, quit the process, and notify the applicants. Applicants could try again.
Post-Conditions	The user shall get notified once the sports arena is listed on the site after the manual verification process and shall get re-directed to the homepage.

Use - case Name	Edit Sports Arena Profile
Use - case ID	13
Summary	User edits the details, pictures, and features(facilities) in the profile.
Actors	Manager, Administration Staff
Pre-conditions	The user must be currently logged into Edit Window in the system.
Course of Events	<ol style="list-style-type: none">1. Select the Detail to want to change2. Change the detail3. Verify the validity of the detail4. Save and end the session5. User receives successful notification
Exceptions	If the changing detail is not valid, then the user can try with a different value. If the user going to change the sports arena address, that cannot be done and get a notification to delete the profile and create a new profile.
Post-conditions	User gets redirected to the sports arena profile.

Use - case Name	Make Bookings via Sports Arena
Use - case ID	14
Summary	The user can book a time slot manually.
Actors	Manager, Administrations Staff
Pre-conditions	<p>The user must be currently logged into the system.</p> <p>The time slot must be free.</p>
Course of Events	<ol style="list-style-type: none">1. View Booking slots.2. Select the time slot.3. Enter the customer details.4. Get the payment (optional).5. Book the time slot.6. Send the Notification.
Exceptions	If the time slot is not free, the booking cannot be done.
Post-conditions	User gets redirected to the sports arena profile.

Use - case Name	View Booking
Use - case ID	15
Summary	The user views the bookings.
Actors	Manager, Administrations Staff, Booking handling Staff
Pre-conditions	The user must be currently logged into the system.
Course of Events	<ol style="list-style-type: none">1. Select view Bookings.2. Filter the Bookings (optional).3. Generate the Booking Table.
Exceptions	
Post-conditions	User gets redirected to the sports arena profile.

Use - case Name	Emergency Booking Cancellation
Use - case ID	16
Summary	The User cancels the booking, because of an emergency
Actors	Manager, Administration Staff
Pre-conditions	The user must be currently logged into the System.
Course of Events	<ol style="list-style-type: none">1. Go to bookings2. Select the Time period / Date.3. Select the Booking.4. Enter the reason for Cancellation.5. Cancel the Bookings.6. When canceling the booking, send a notification to the customers.
Exceptions	If the reason is not submitted, the booking cancellation cannot be done.
Post-conditions	User gets redirected to the sports arena profile. Remove the sports arena from the search listings for that particular time period.

Use - case Name	Reply Customer Feedbacks
Use - case ID	17
Summary	The user reply to the feedback of the customers.
Actors	Manager, Administration staff
Pre-conditions	<p>The user must be currently logged into the system.</p> <p>There should be a valid feedback.</p>
Course of Events	<ol style="list-style-type: none"> 1. Go to the customer feedbacks 2. Select the relevant feedback 3. Reply to the feedback
Exceptions	
Post-conditions	User gets redirected to the feedback page.

Use - case Name	Generate Reports
Use - case ID	18
Summary	The ground manager can get the reports
Actors	Manager
Pre-conditions	The user must be currently logged into the System.
Course of Events	<ol style="list-style-type: none"> 1. Select the relevant time period. 2. Select the statistics. 3. Obtain the generated reports.
Exceptions	
Post-conditions	User gets redirected to the sports arena profile.

Use-Case Name	Process Transaction
Use-Case ID	19
Summary	User can confirm cash payment
Actors	Administration Staff, Manager
Pre-conditions	<p>There should be a booking made on cash payment</p> <p>User must be logged into the system</p>
Course of Events	<ol style="list-style-type: none">1. User should go to profile and view bookings2. Filter bookings with cash transactions3. Save the booking4. A popup appears to confirm the transaction5. If yes, then display transaction successful
Exceptions	
Post-conditions	The booking details table gets updated

Use-Case Name	Update Time Slot Status
Use-Case ID	20
Summary	User can update time slots.
Actors	Administration Staff, Manager
Pre-conditions	There should be an existing time slot.
Course of Events	<ol style="list-style-type: none">1. User views the booking slots and selects one or more slots2. Click update time slots3. A pop-up appears to confirm the process4. If yes, end the session
Exceptions	If there is a booking available on any selected time slot, trigger 'Emergency Booking Cancellation' process.
Post-conditions	The selected time slots will be displayed as unavailable in the system.

Use-Case Name	Remove Negative Ratings
Use-Case ID	21
Summary	Admin can remove negative ratings of the sports arena
Actors	Admin
Pre-conditions	Admin must be currently logged into the system. A sports arena should have negative reviews.
Course of Events	1. User checks on the negative reviews of the sports arena. 2. User contacts sports arena to inform them. 3. Wait until the changes mentioned are done. 4. After confirmation, remove the ratings
Exceptions	If the changes are not made within the requested time period, then blacklist the sports arena.
Post-conditions	

Use-Case Name	Remove Sports Arena Account
Use-Case ID	22
Summary	Admin can remove sports arenas
Actors	Admin
Pre-conditions	<p>There should be an existing sports arena account.</p> <p>The user should be logged in to the system.</p> <p>The sports arena account should be blacklisted.</p>
Course of Events	<ol style="list-style-type: none">1. View complaints of a Sports Arena.2. If the sports arena is in blacklist, remove the account.3. Admin clicks on the sport arena profile.4. Remove account.5. Notify the sports arena.
Exceptions	If the sports arena is not in blacklist, notify the sports arena without removing.
Post-conditions	The sports arena would be removed from the system

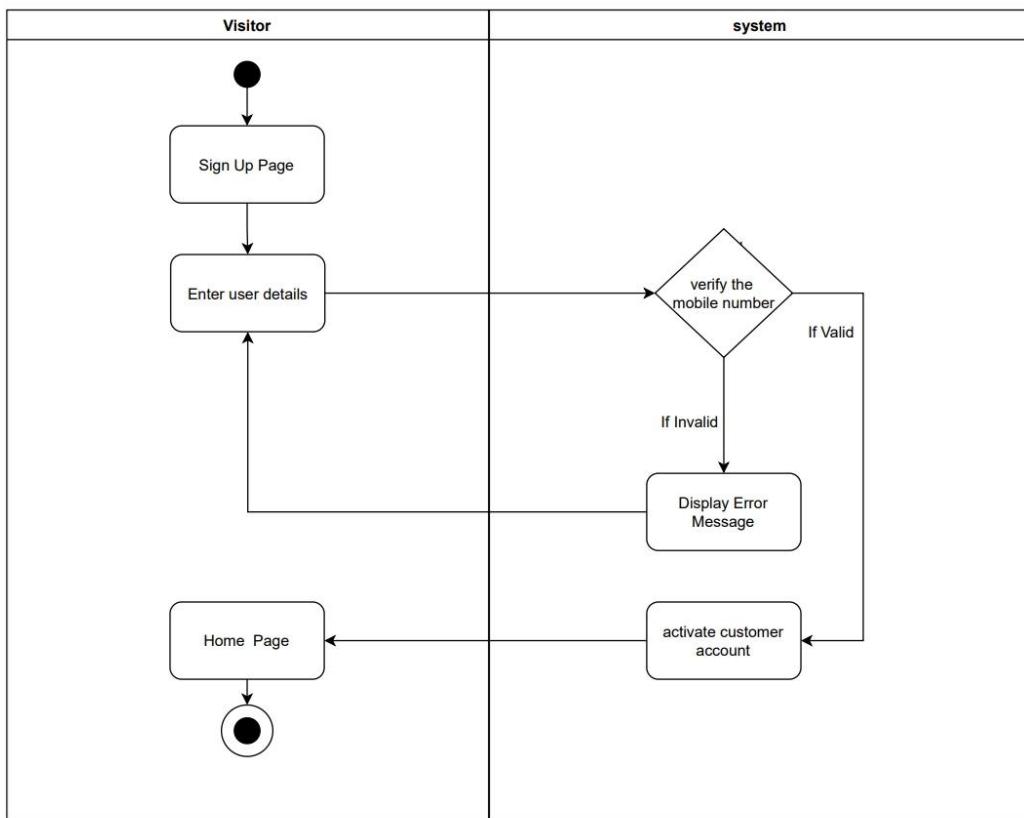
Use-Case Name	Remove Customers
Use-Case ID	23
Summary	Admin can remove customer accounts
Actors	Admin
Pre-conditions	A customer not abiding by the terms & conditions.
Course of Events	<ol style="list-style-type: none"> 1. Admin clicks on the customer account to be removed. 2. Remove the customer account. 3. Notify the customer via an SMS.
Exceptions	
Post-conditions	Removed customer would no longer be a customer of the system.

Use-Case Name	Logout
Use-Case ID	24
Summary	User can log out of the system
Actors	Customer, Book Handling Staff, Administration Staff, Manager, Admin
Pre-conditions	User must be currently logged into the system.
Course of Events	<ol style="list-style-type: none"> 1. User clicks the logout icon 2. A pop-up appears to ensure logout 3. End the session
Exceptions	If the process is cancelled, system redirects user to the current page.
Post-conditions	User is logged out of the system

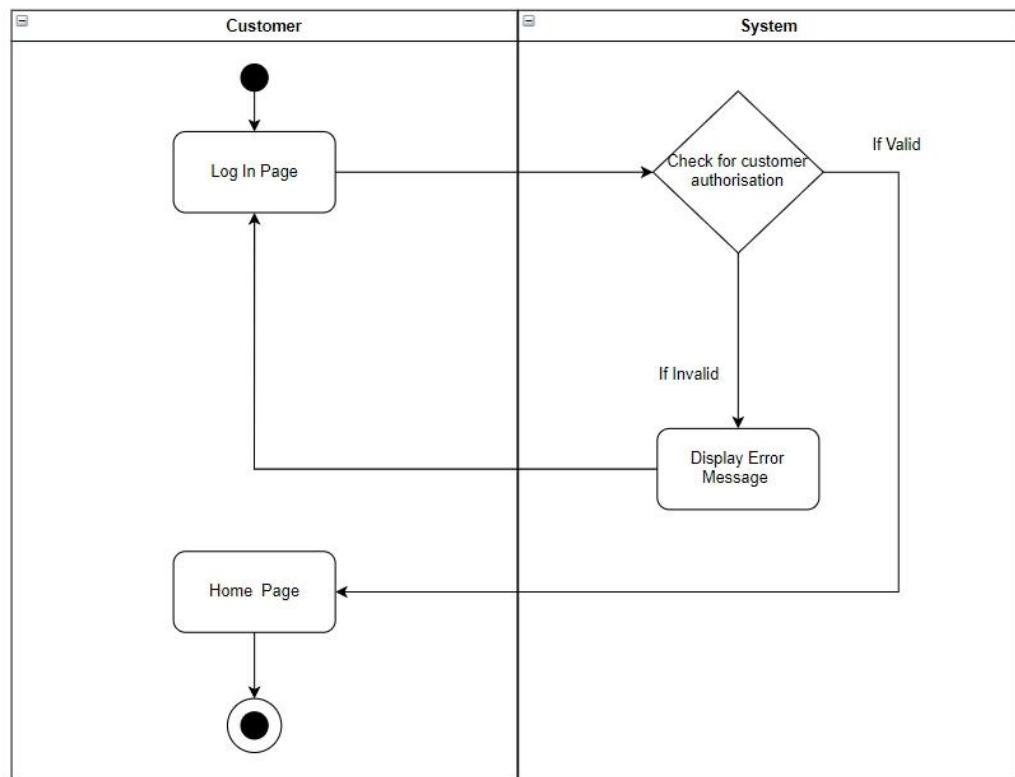
Use-Case Name	Generate System Reports
Use-Case ID	25
Summary	User can generate system related reports.
Actors	Admin
Pre-conditions	User must be currently logged into the system.
Course of Events	<ol style="list-style-type: none">1. User goes to his/her profile2. Select type of report to be generated3. Click the generate report icon4. System generates and displays the report.
Exceptions	
Post-conditions	User gets redirected to the profile.

8.1.3 Activity Diagrams

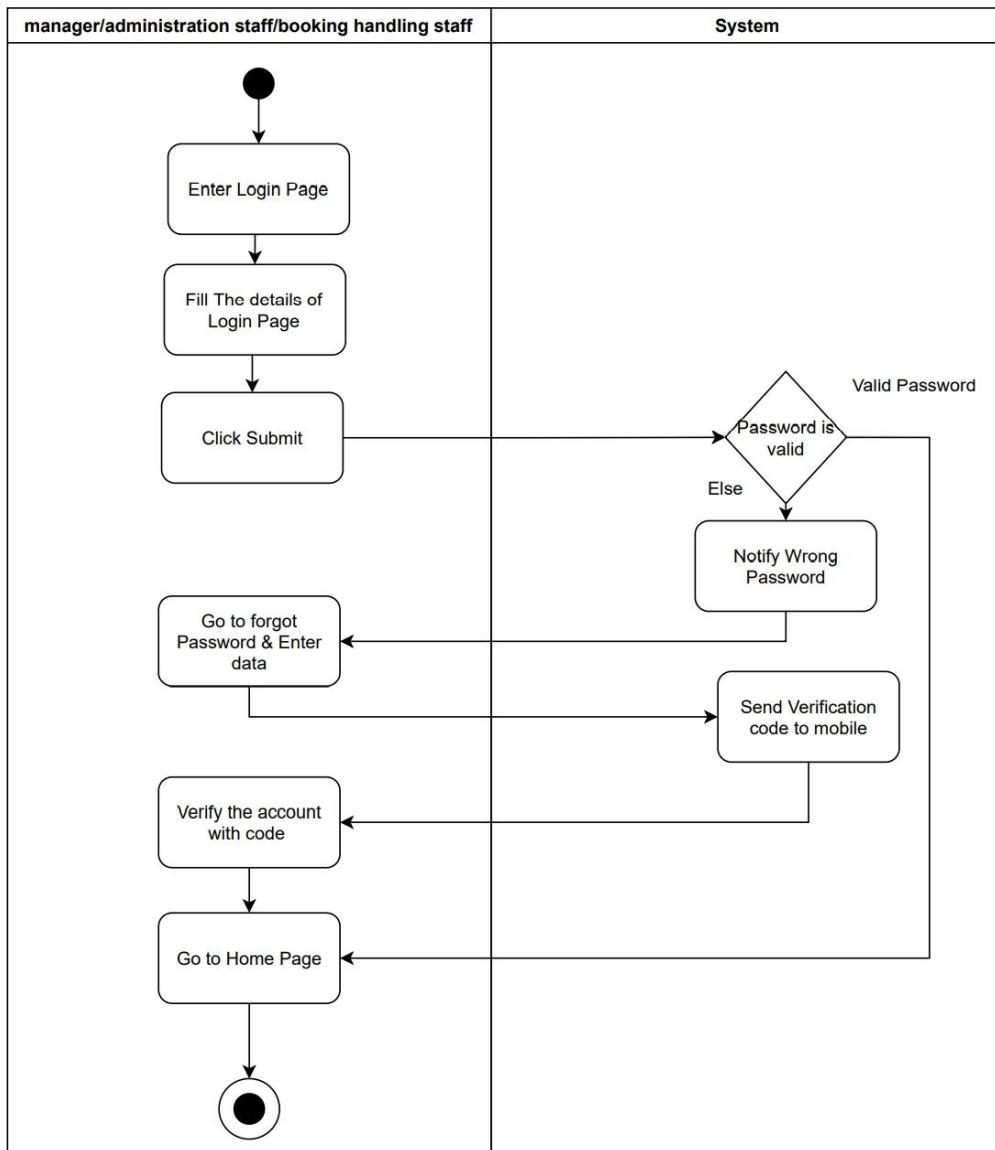
1. Signup For Customer Account



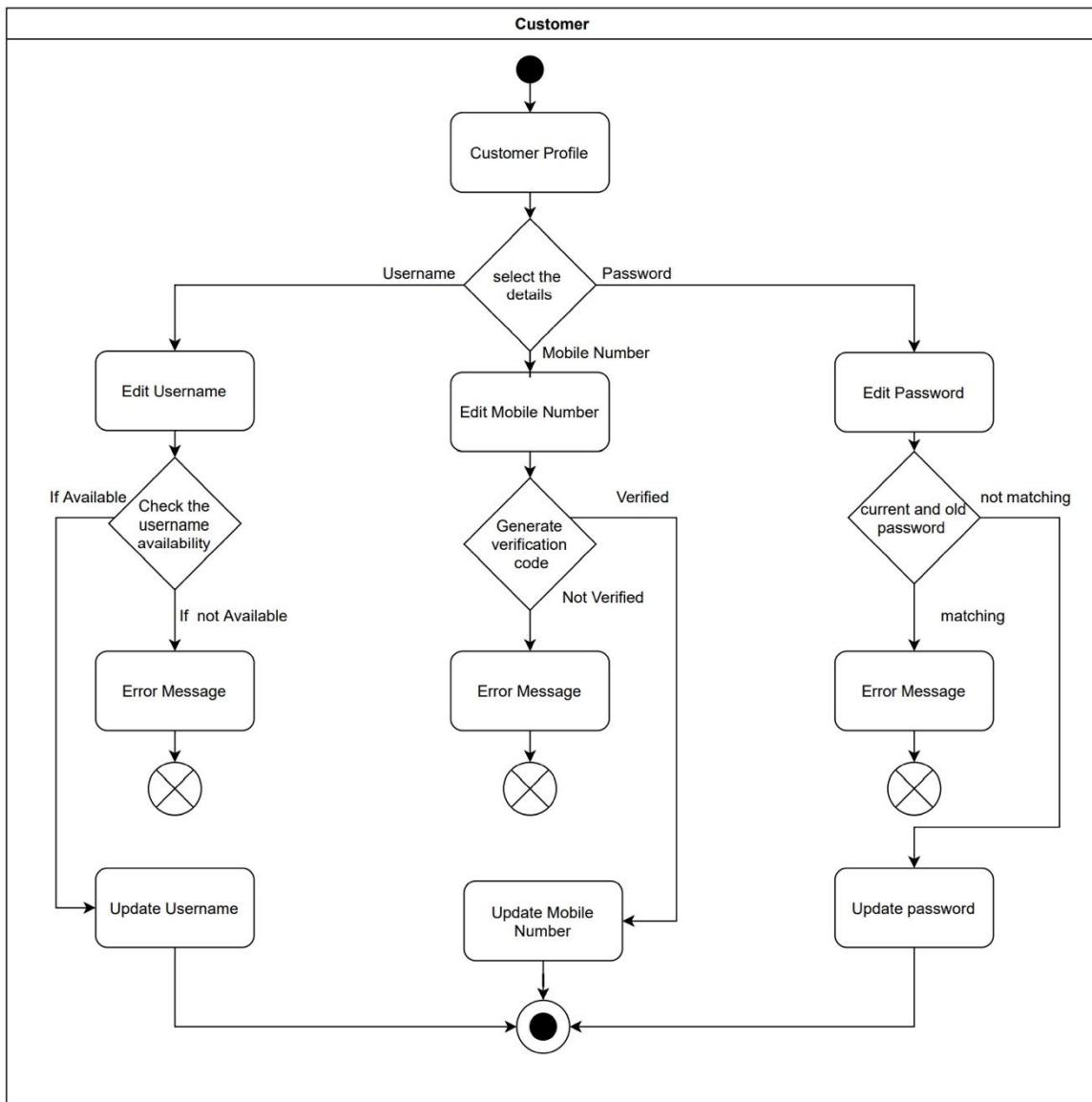
2 (I). Customer Login Process



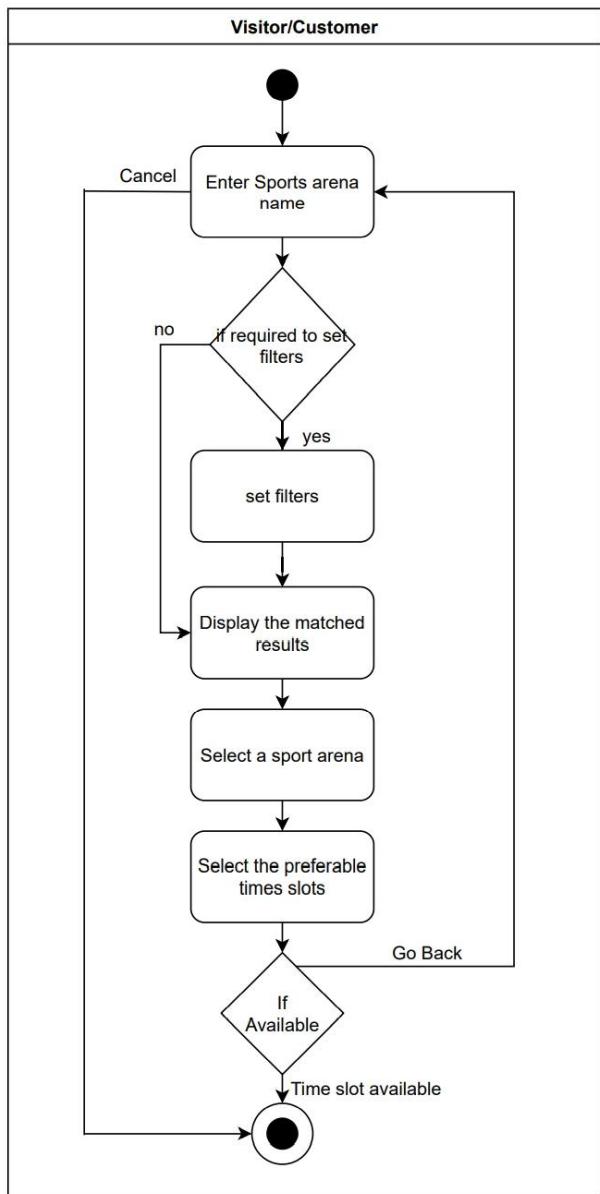
2 (II). Sport Arena Login Process



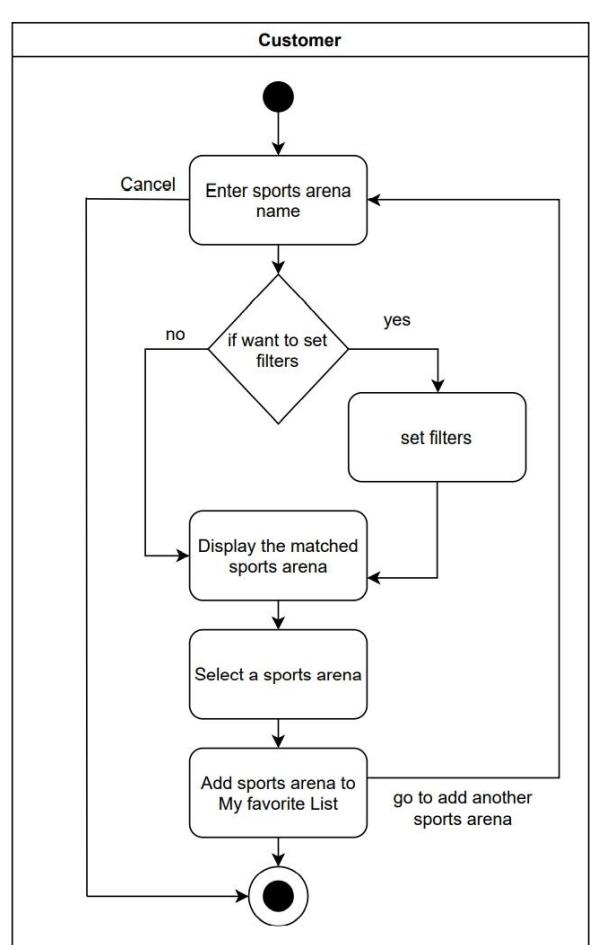
3. Edit Customer Profile:



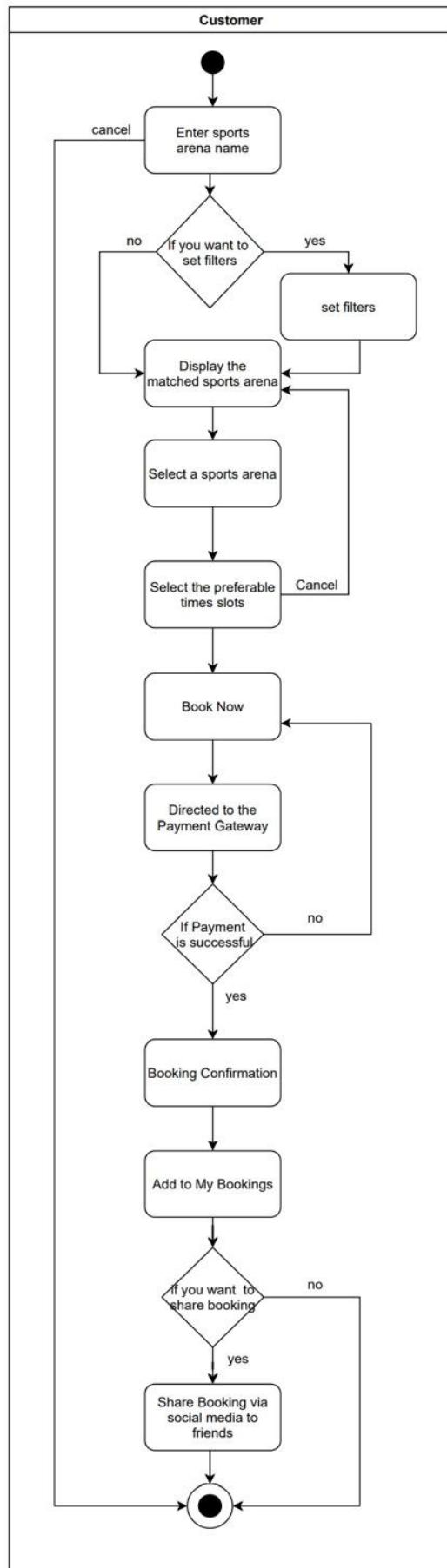
4 (I). Search for Sports arena



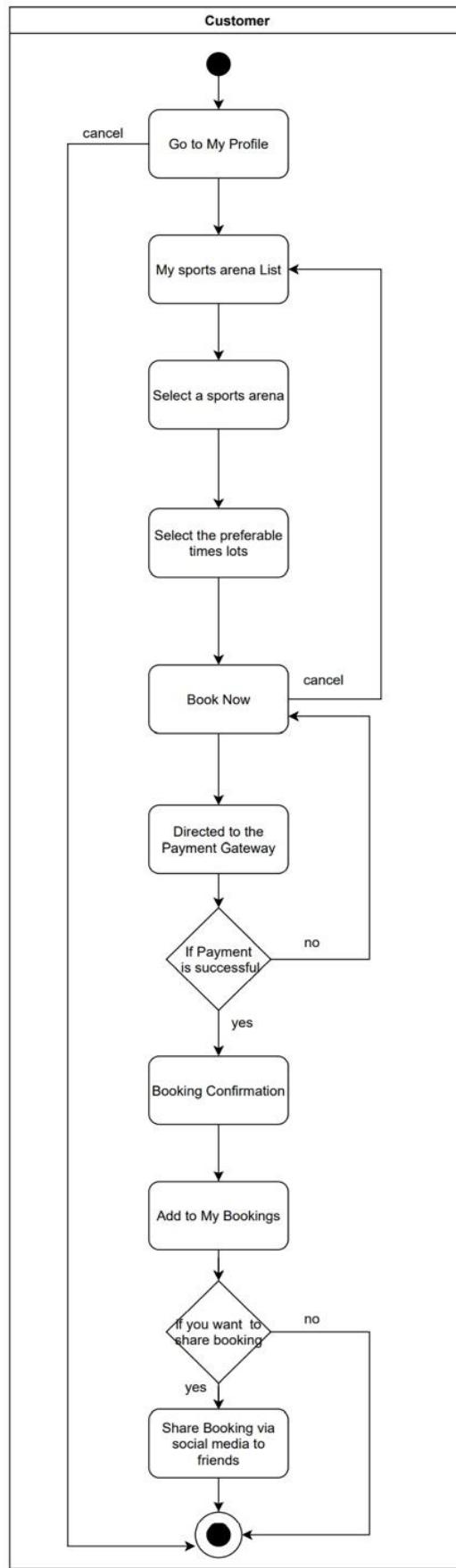
4 (II). Add to My favorite List



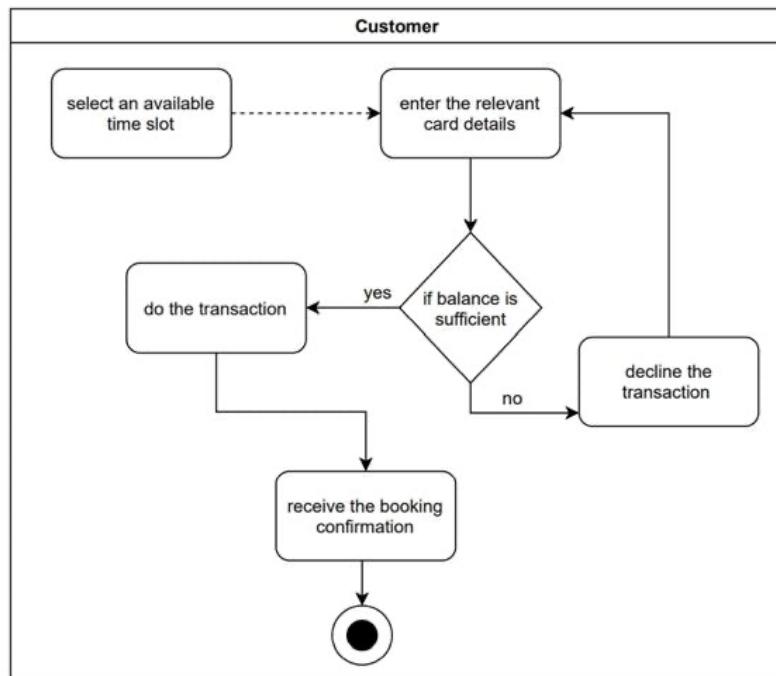
5. Book a sports arena (Method I)



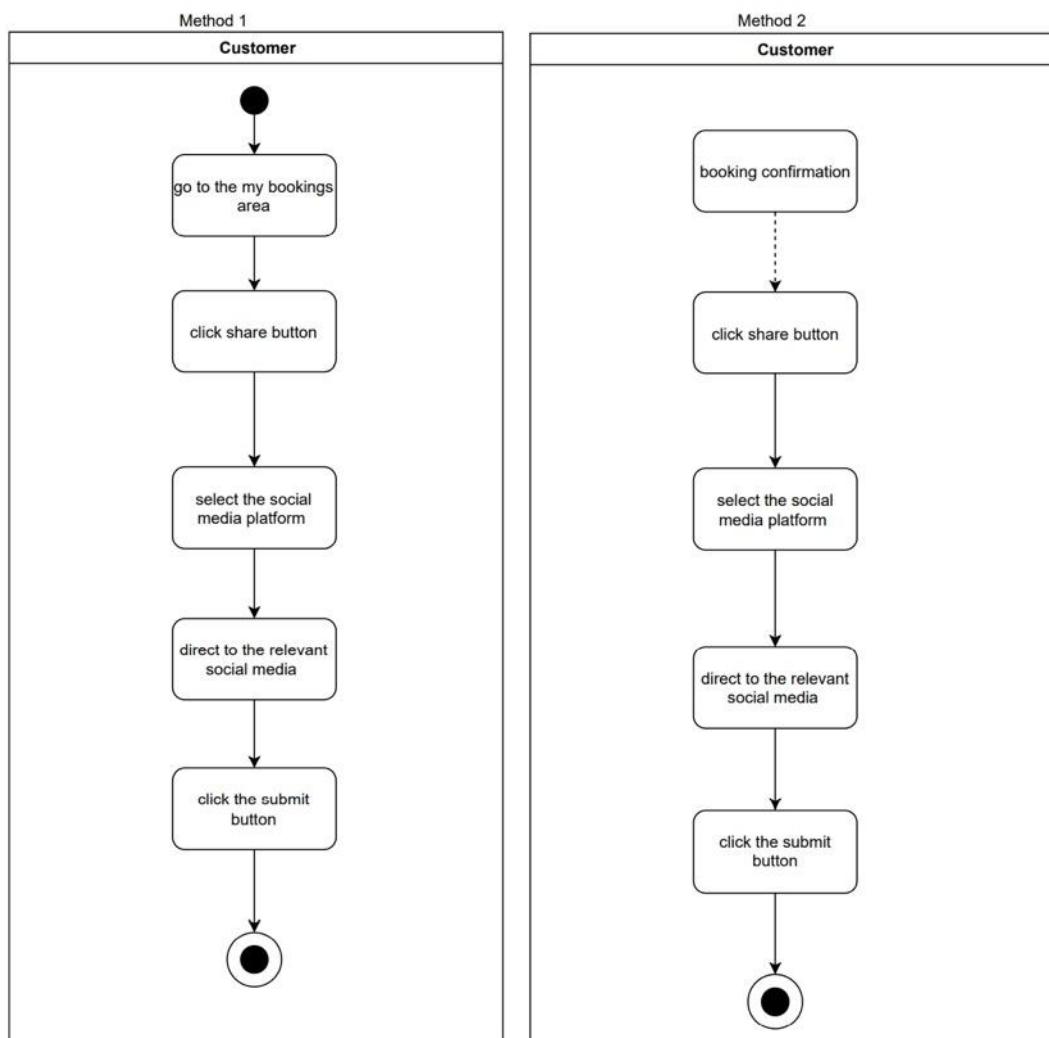
5. Book a sports arena (Method 2)



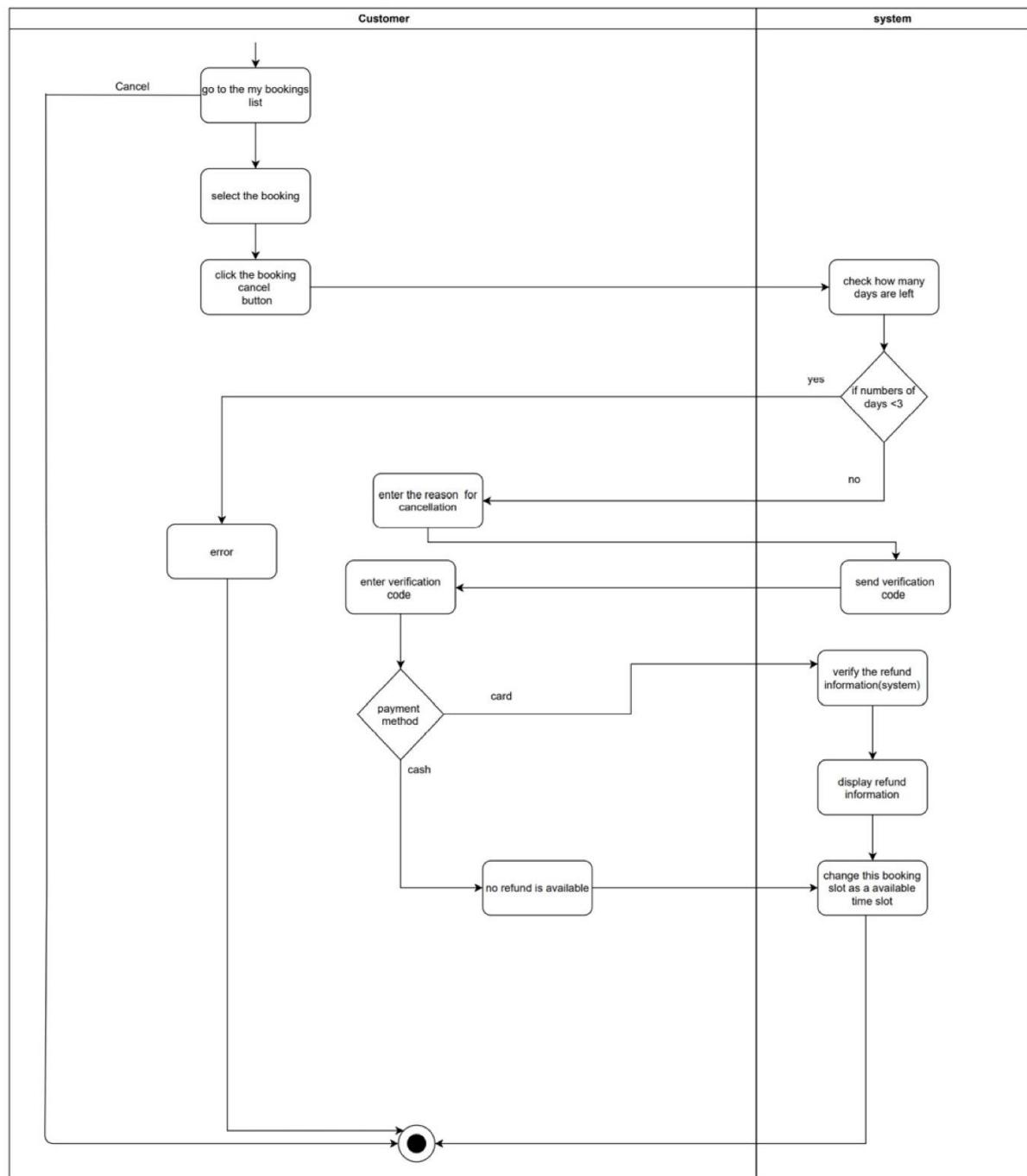
6.do payment



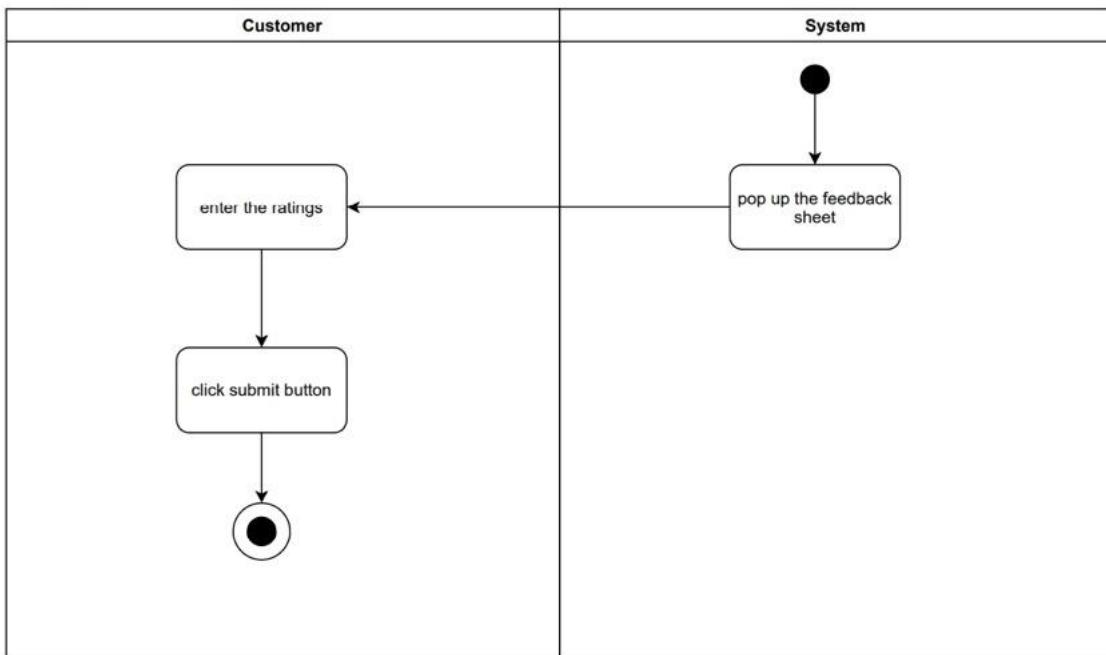
7. Share booking via a social media



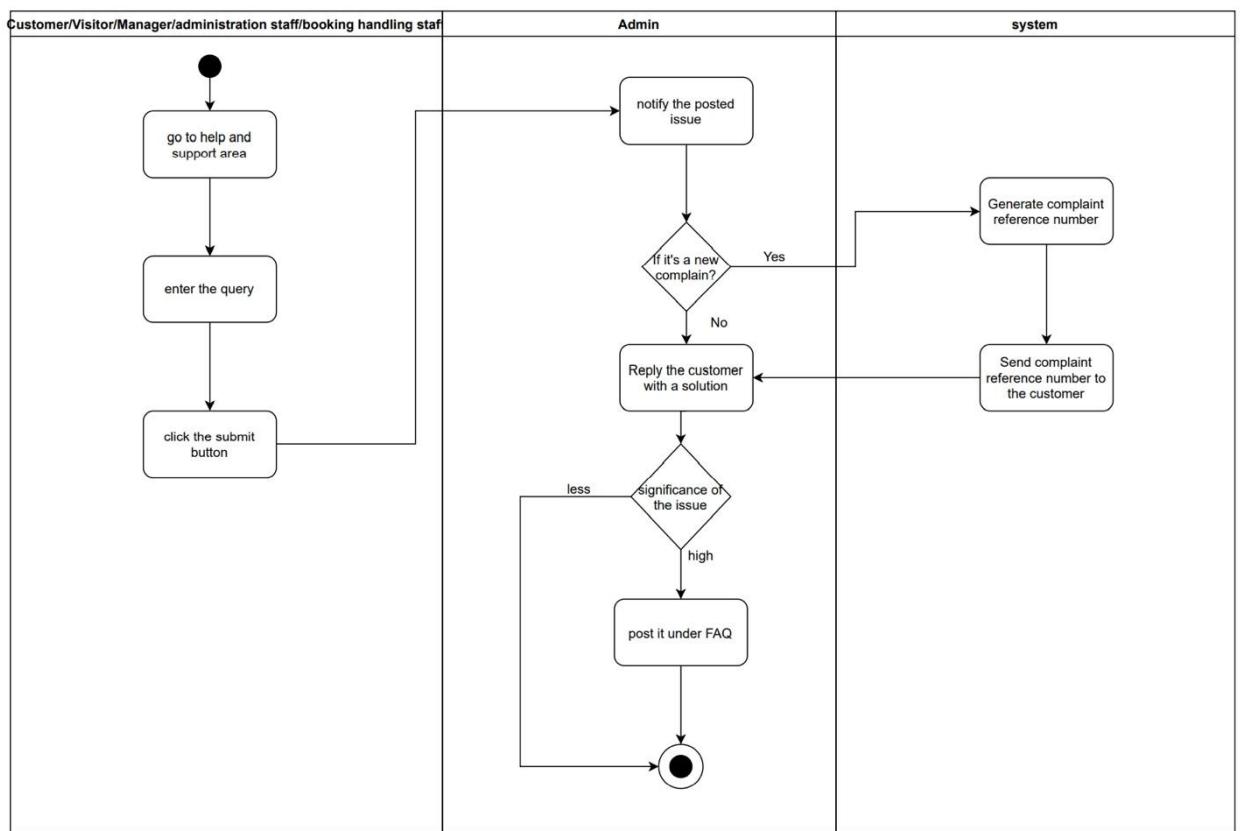
8. Cancel Booking



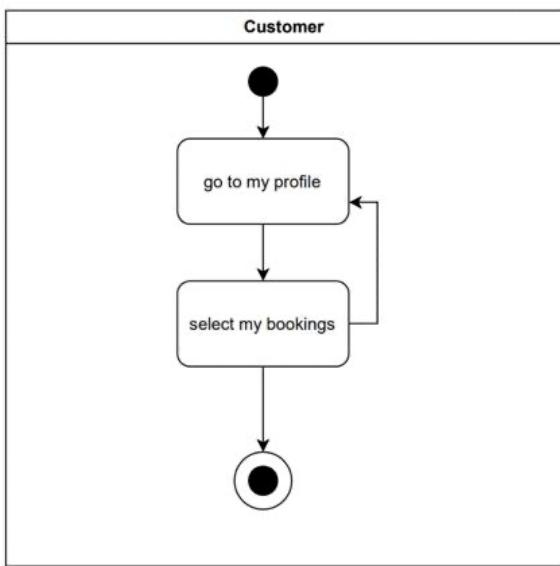
9. Rate sports arena



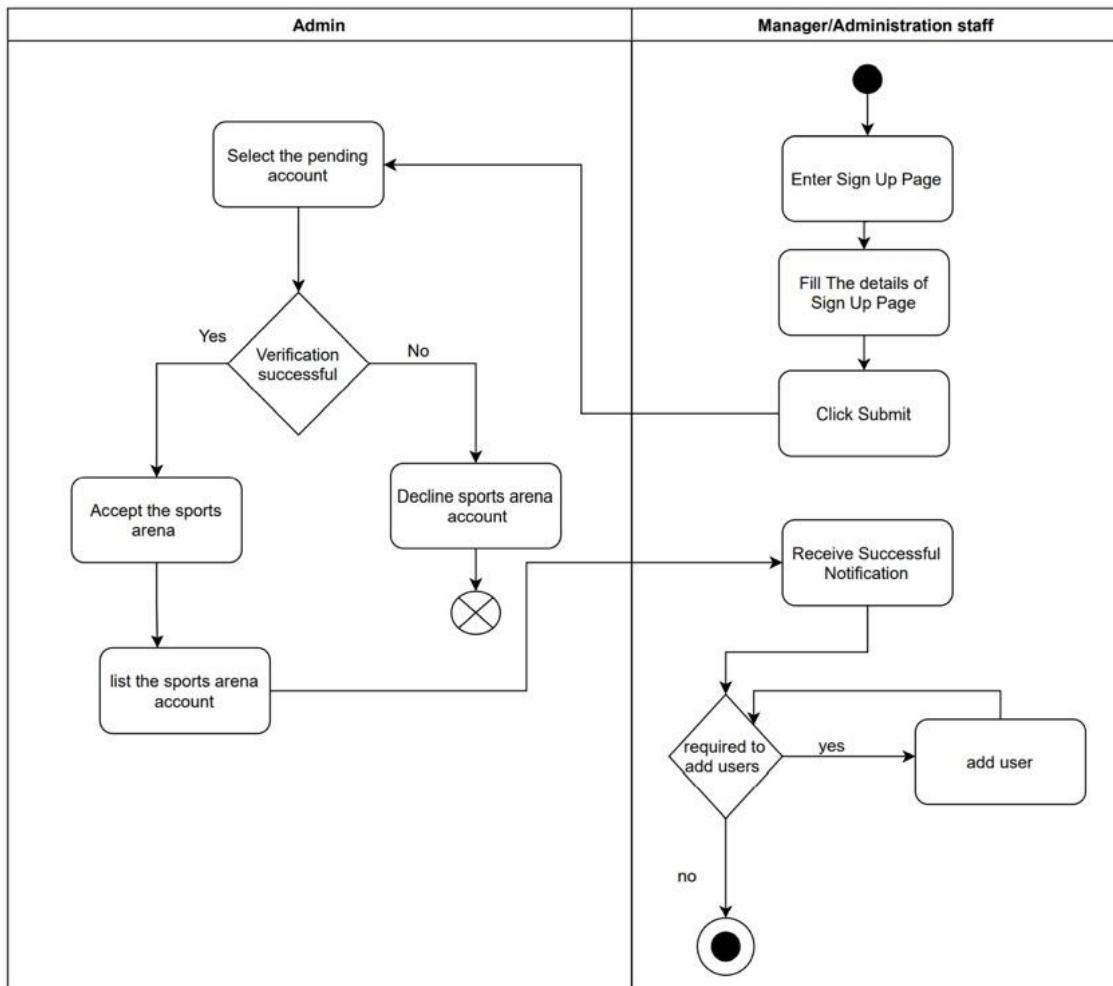
10. Help & support



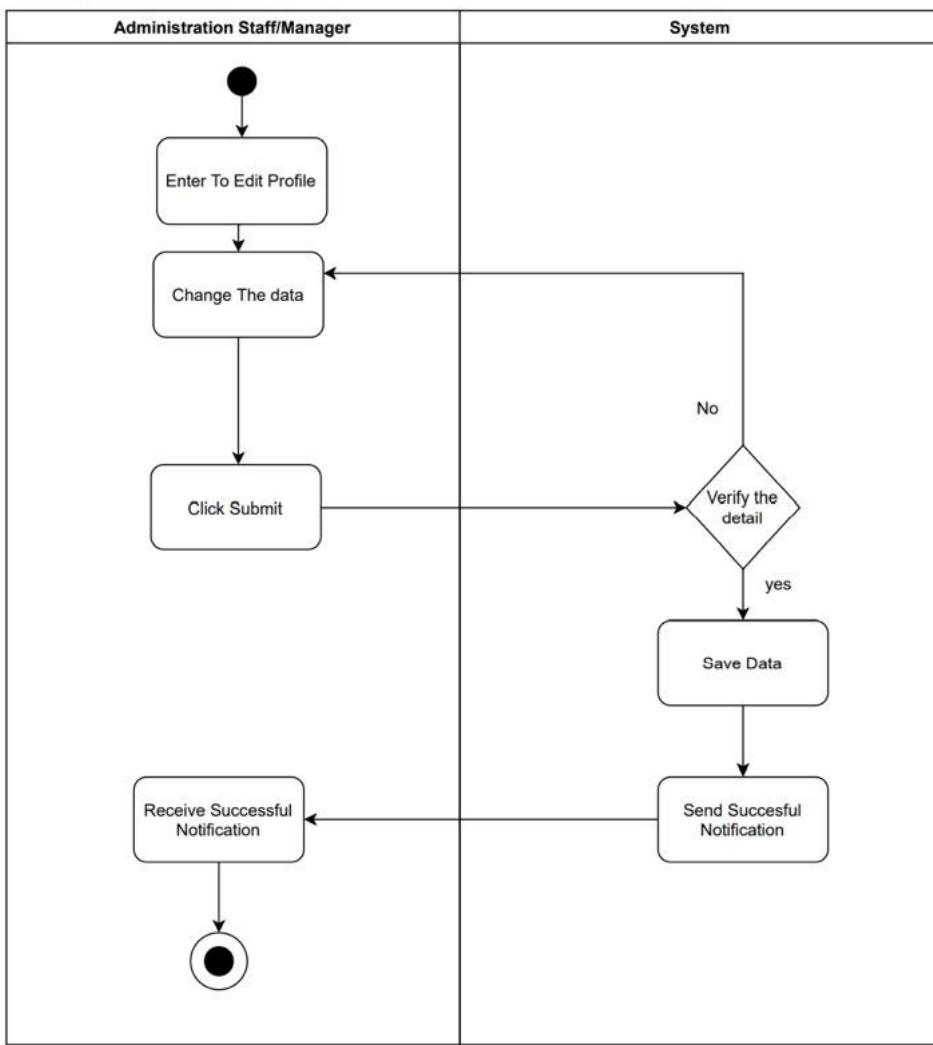
11. View my bookings



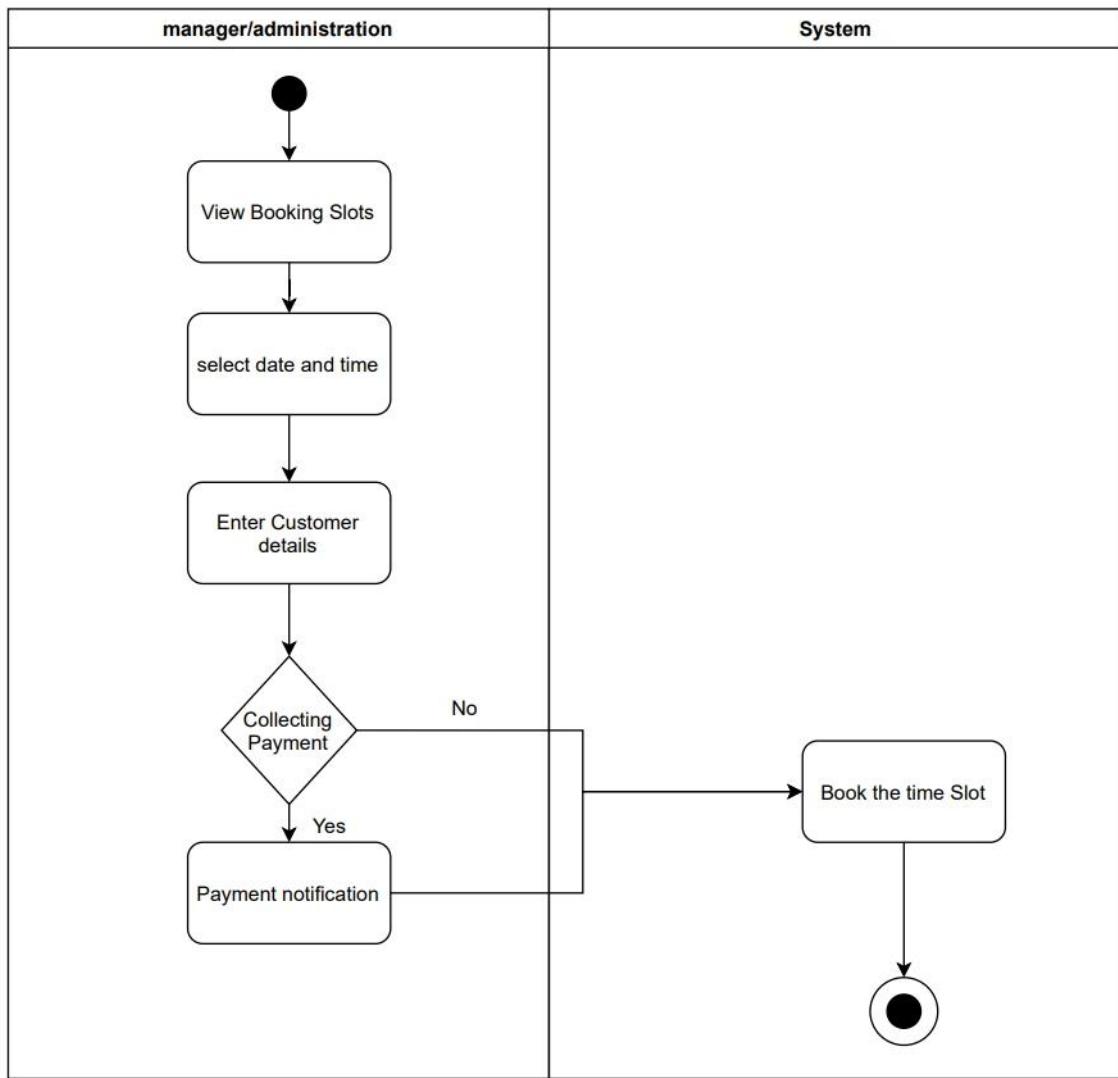
12. sports arena Registration



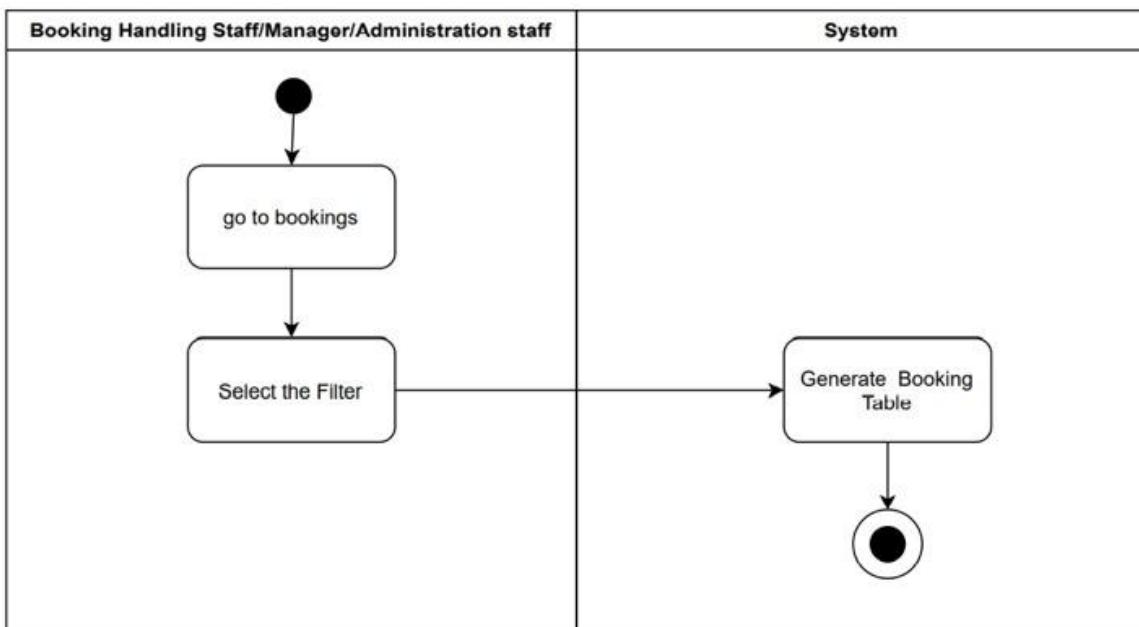
13. Edit Sports Arena Profile



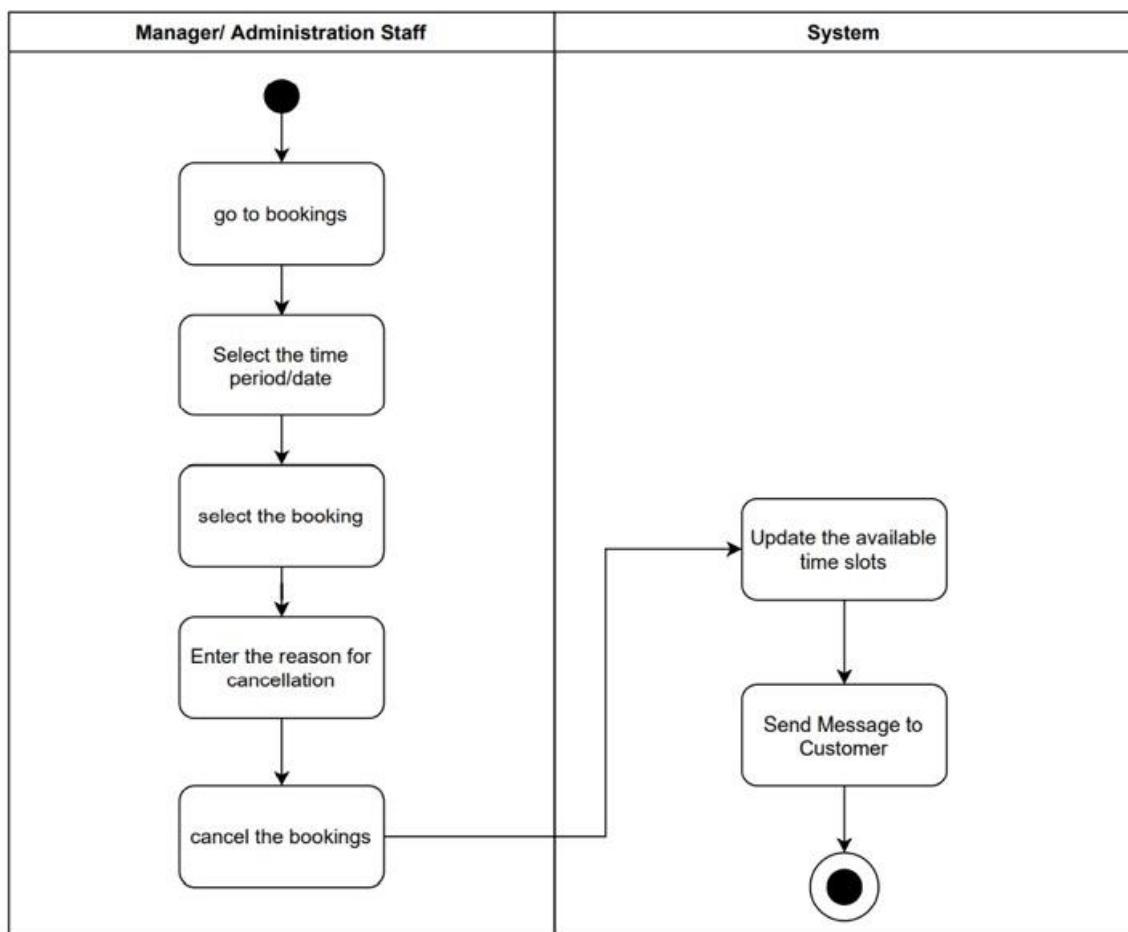
14. Makes Booking via sports arena



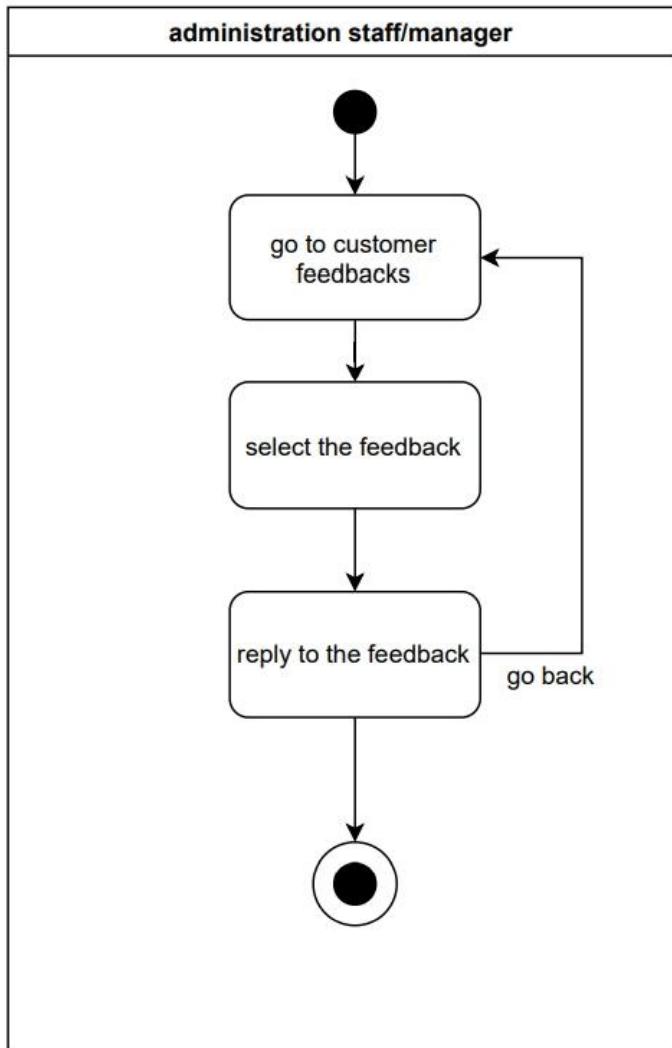
15. View Bookings



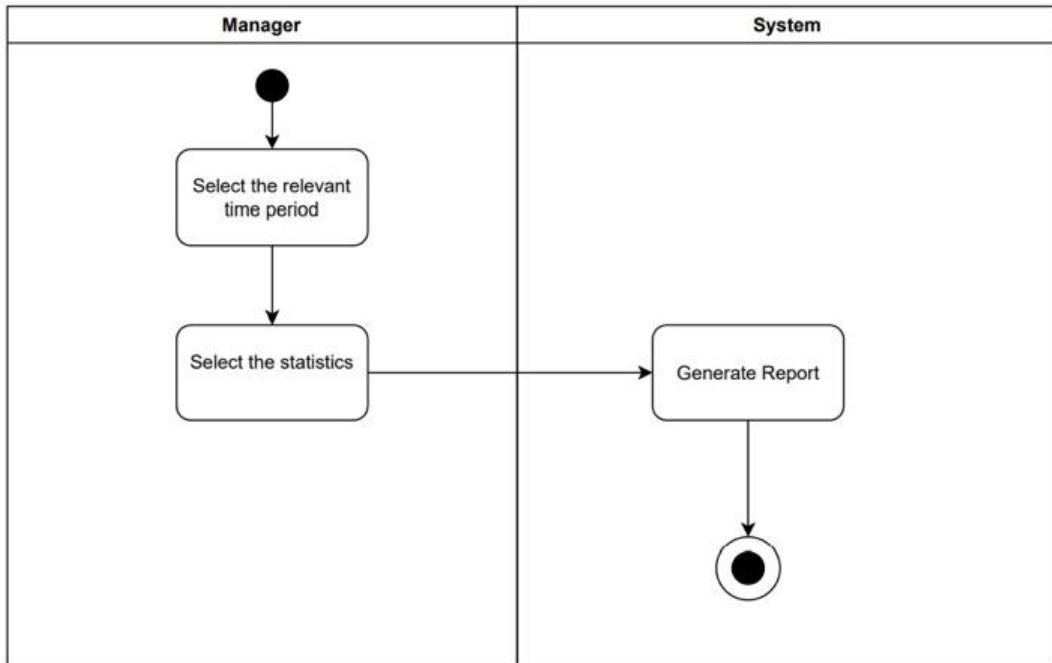
16. Emergency Booking Cancellation



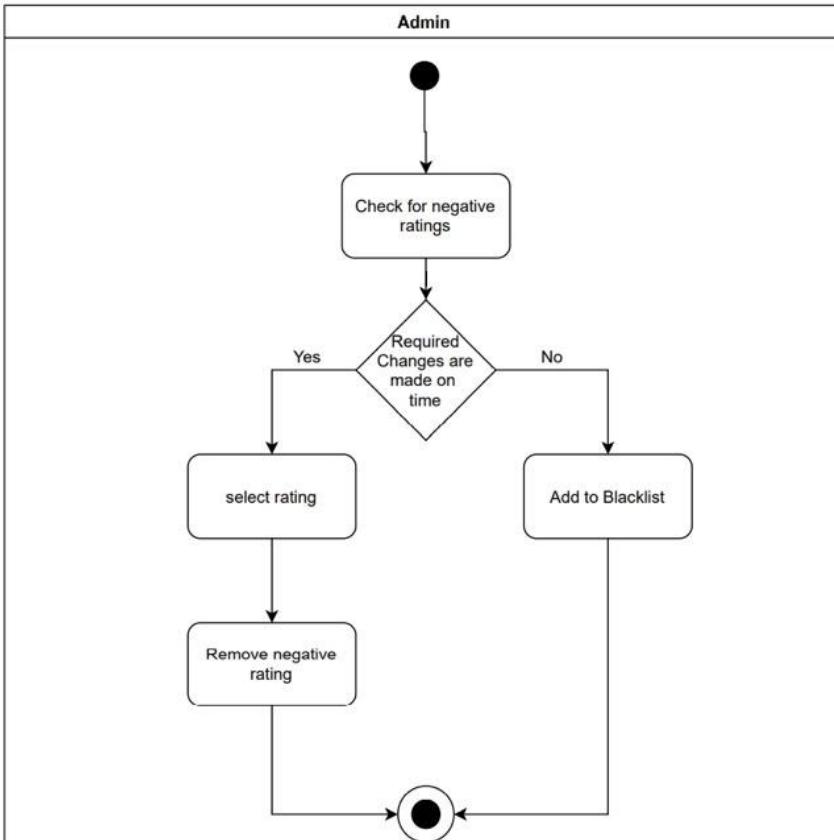
17. Reply to customer feedbacks



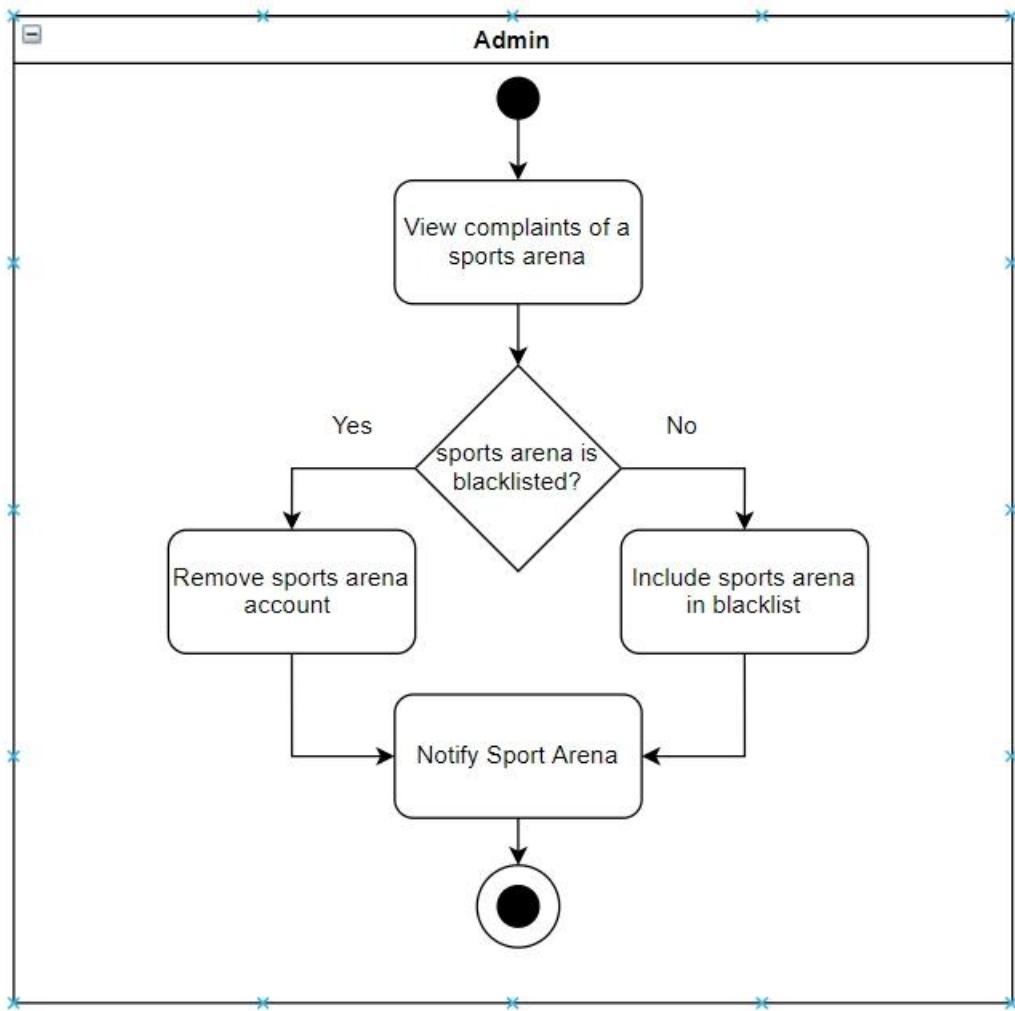
18. View Monthly report



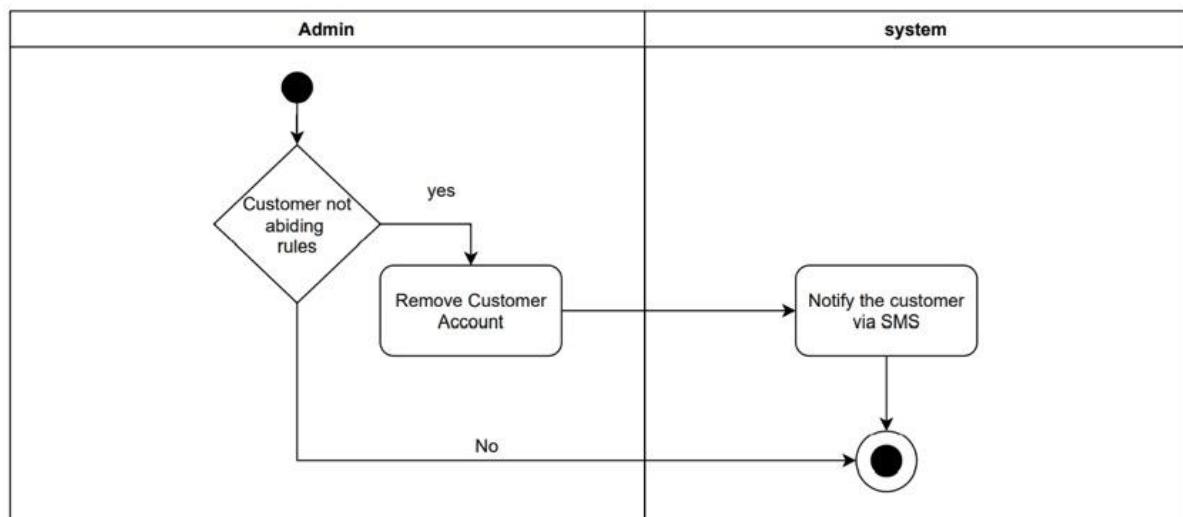
19. Remove negative ratings



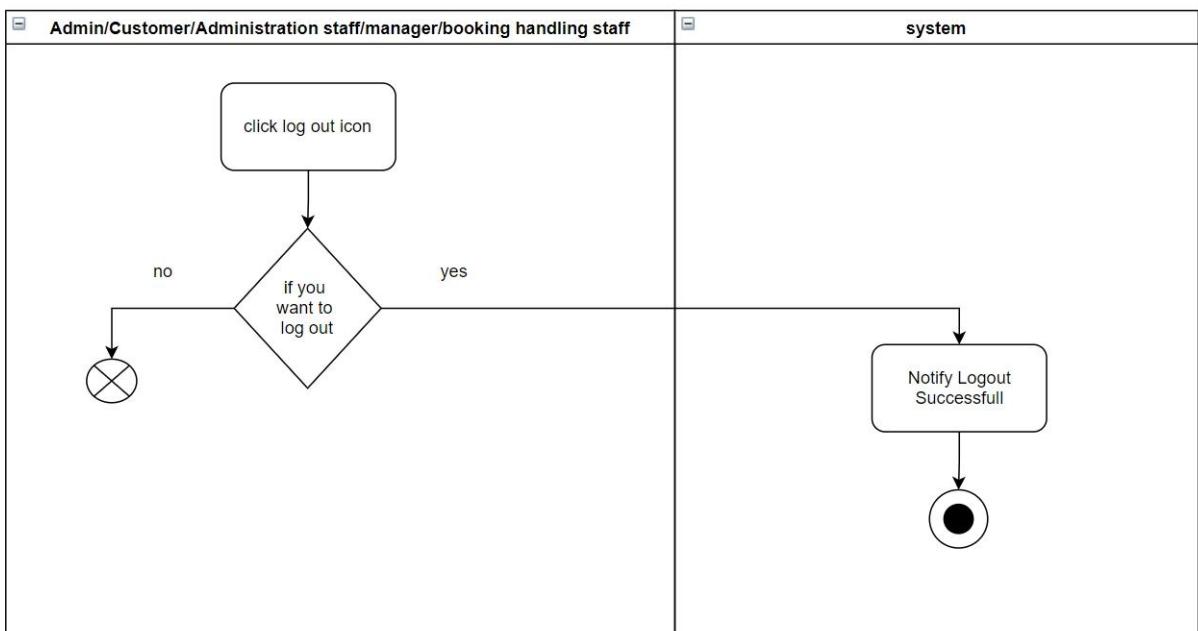
20. Remove sports arena Account



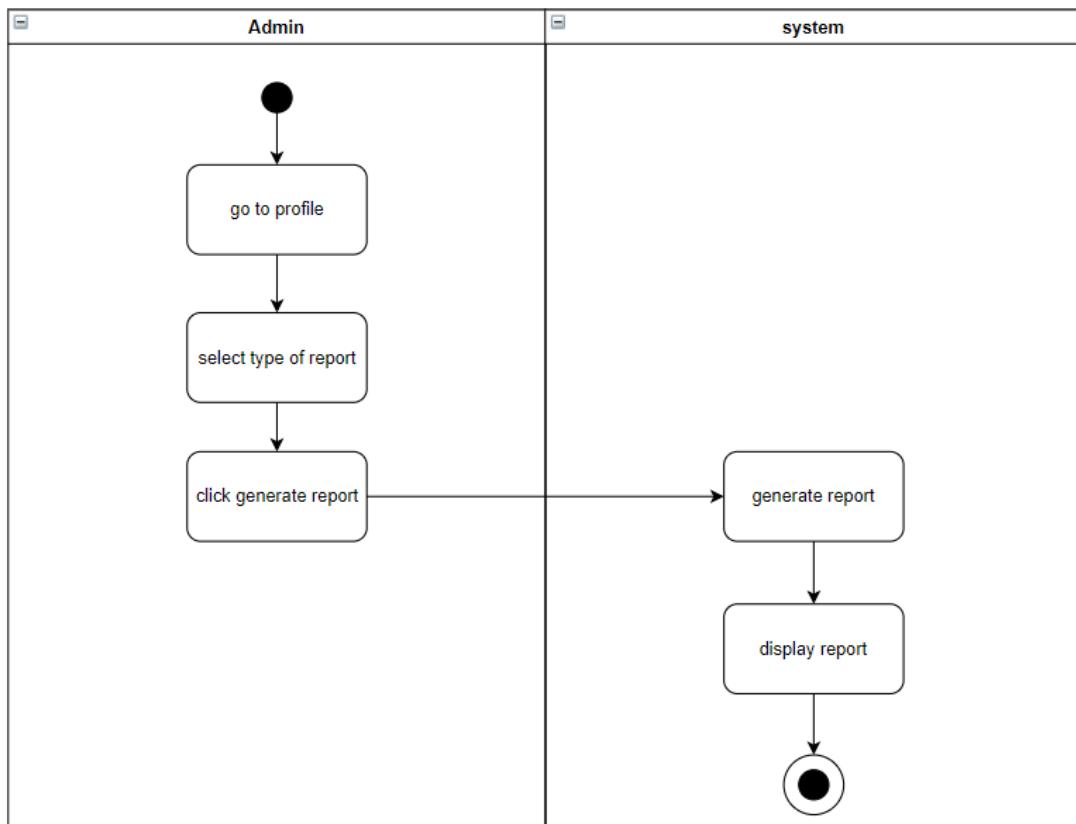
21. Remove customers



22.log out



23.Generate System reports



7.2 Quality Attributes

7.2.1 Security

Since security plays a vital role on our platform, we are planning to secure it as much as possible. These are some of the techniques that we are going to use, to improve our security.

- Hierarchical based login system with access controls to prevent unauthorized access from the sports arena's end.
- For Login scenarios, Hash user authentication details are used (sha128).
- The system's back-end servers shall only be accessible to authenticated administrators.
- For the payment, the processing of sensitive information such as card credentials and account details are stored securely.

7.2.2 Availability

Our system should be available at all times, except during the system maintenance period and system downtime period. Thus, the users can access the platform via a web browser with a mobile device or a personal computer or rather a laptop. In case of hardware corruption, backups of the database are retrieved from the server and saved by the system administration. Hence, our platform would be ideally $24 * 7$ available.

7.2.3 Modifiability

We are planning to achieve the maintainability of the web application by enhancing the source code readability. Because in the future, maybe the programmers who wrote a particular piece of code, shall not be available for maintenance of the system. Enhancing the readability shall make it easier to maintain the system for anyone. Using the best coding practices such as commenting, using meaningful identifier/function names and using consistent indentations are our targets. And also, we are planning to develop components of the system independent from each other as much as possible. So, whenever someone wants to modify the system, it would be much easier because it shall not affect the entire architecture.

On the flip side, there can also be situations where our system is not scalable and modifiable with the growing user base. In such scenarios, we would go for a new system which could handle all the required level of facilities and infrastructure.

7.2.4 Performance

The platform is a progressive web application. Hence the platform is loaded on top of a web browser. Therefore, the initial load time of the platform would depend upon the internet connection strength. Furthermore, it could also depend upon the device used by the user.

Also, the system should not crash when too many users are performing searches simultaneously and making booking simultaneously. We shall be using the Amazon Web Services platform to automatically change the specifications of the servers to adhere to the traffic load.

7.2.5 Testability

Every system should be able to test for errors. When carrying out unit testing, integration testing and user acceptance testing every piece of code and every piece of design should be able to test. Testing can be conducted at different phases such as during the design time, development time and during deployment time. In order to achieve testability, we are planning to use class structures, comments along with the code structures and develop independent system module components.

7.2.6 Usability

Since the user base contains customers as well as sports arenas, they would prefer simple and easy to use user Interfaces that would give them a better understanding of the system and make the system easy to use.

Furthermore, we have a separate feature called the “Help & Support” feature which is available for any user to post their questions and the system admin would provide solutions to those issues and would add them to the FAQs section if those asked questions are not covered in the current FAQ list. Also, the system has navigation bars, meaningful icons and tools that enhance the user-friendliness of the system.

8) Technologies

8.1 Front-end development of the web application

HTML5, CSS3, and JavaScript (JS).

One of the main reasons for using the above technologies for our project work is that we are not allowed to use other frameworks which can be incorporated in developing software. However, these frontend technologies such as HTML, CSS and JS still supports a wide range of web browsers in mobile devices as well as laptops and personal computers. Since we have both the sports arenas as well as the customers as our users in our platform, we have chosen this software over the other software.

8.2 Back-end development of the web application

PHP and MySQL.

A few of the most critical reasons for our group to choose these technologies over the other substitutes such as Java programming language is that it's easy to learn and extremely flexible when it comes to programming. Furthermore, it also provides us with easy integration and compatibility over devices. MySQL is mainly used in this system due to its scalability and higher performance than the other substitutes.

8.3 CASE tools for the system development process.

Draw.io, Workbox, git, GitHub, X

Draw.io is used to draw the online diagrams and share them among the group members. Since the group members are individually working on their area without having dependencies, version controlling with GitHub is more convenient for the group to carry out their project. Workbox software from google development is to be used to build our progressive web application for offline caching.

*We have chosen the above technologies for our project as we are not allowed to use any frameworks.

9) Project Timeline

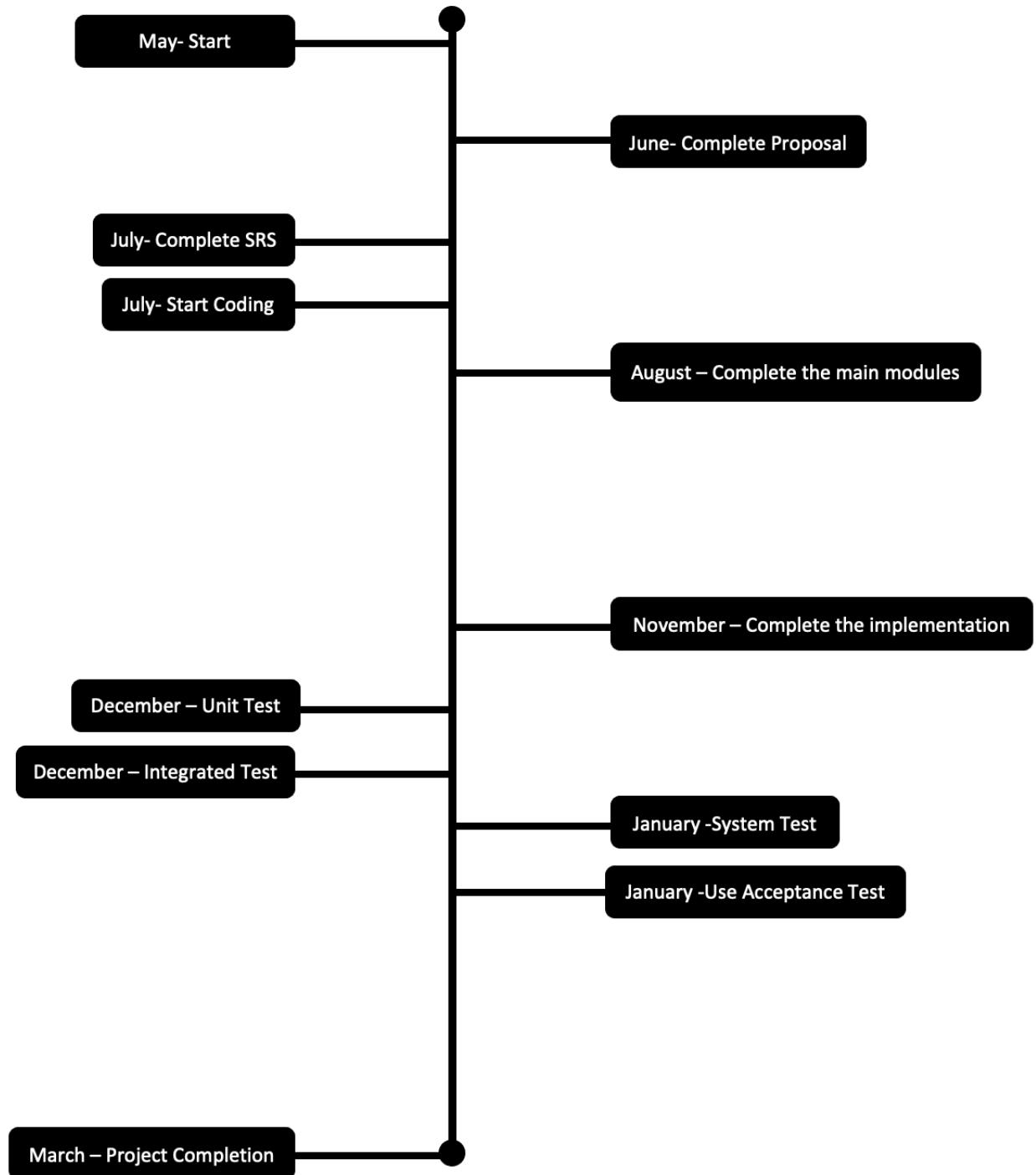
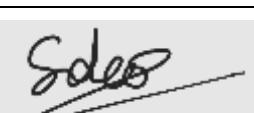


Figure 11: Project Timeline of the project

*Gantt of the project is attached under the schedule feasibility section.

10) Declaration

We as members of the project titled “Sportizza”, Certify that we will carry out this project according to the guidelines provided by the coordinators and supervisors of the course as well as we will not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university. To the best of our knowledge and brief, the project work will not contain any material previously published or written by another person or ourselves except where due reference is made in the text of appropriate places.

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