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## ***Foul Application***

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Project Submitted in Partial Fulfillment for the Degree of B.Sc. in "Information Management"

Spring-2023

## Declaration

We Nwara Aljoufi, Yomna Alagily, and Bedour Alsaiari being members of final year project group number 374, declare that this report contains only work completed by members of our group except for information obtained in a legitimate way from literature, company or university sources. All information from these other sources has been duly referenced and acknowledged in accordance with the University Policy on Plagiarism.

Furthermore, we declare that in completing the project, the individual group members had the following responsibilities and contributed in the following proportions to the final outcomes of the project:

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<sup>1</sup> Write down your responsibilities in the project

<sup>2</sup> Must add to 100%

## **Acknowledgment**

First and foremost, We would like to present our deepest gratitude to Almighty ALLAH for bounties and blessings for giving us the ability to finish this project. Then, we would like to express our special thanks to T.Sarah Aleid and our supervisor Dr.Hend for her time and efforts she provided throughout the year.To our families; our parents; brothers and sisters for their unlimited support and encouragement to keep us going.

# **Abstract**

Nowadays, Technology has reached unprecedented levels in terms of speed, minimize effort and the ever-increasing number of users, Also technology can be exploited to improve lives in multiple ways. Our project is a mobile application which links football enthusiasts to the nearby facilities, providing an easiest way to practice football.

The users can find a clear list and grid view of hours to schedule their booking and can view field availability and the location's details. The application allows users to invite other players, set up teams, and chat with friends using a convenient mobile interface and finally make everything reachable just by one click.

## **Keywords:**

Mobile Application, Football Field,Booking Process,Internet of Things.

## **Abstract (in Arabic)**

في الوقت الحاضر، وصلت التكنولوجيا إلى مستويات غير مسبوقة من حيث السرعة وتقليل الجهد والعدد المتزايد باستمرار من المستخدمين، حيث يمكن استغلال التكنولوجيا لتحسين الحياة بطرق متعددة. مشروعنا عبارة عن تطبيق في الهاتف المحمول يهدف إلى ربط عشاق كرة القدم بالمنشآت المجاورة، مما يوفر أسهل طريقة ممكنة لممارسة هذه الرياضة حيث يمكن للمستخدمين العثور على قائمة واضحة لعرض الساعات المتاحة لجدولة حجزهم ويمكنهم التحقق من توفر ملعب متاح وتفاصيل الموقع القريب منهم باستخدام واجهة محمولة وملائمة، وأخيراً جعل كل شيء ممكناً الوصول إليه بنقرة واحدة فقط.

## List of Abbreviations

API	Application Programming Interface
ERD	Entity Relationship Diagram.
GUI	Graphical User Interface
HTML	HyperText Markup Language
IoT	Internet Of Things
JSP	JavaServer Pages
LAMP	Linux,Apache,MySQL,PHP
QR	Quick Response code
SDK	Software Development Kit
WBS	Work Breakdown Structure

# Table of Contents

<i>Declaration</i> .....	<i>iii</i>
<i>Acknowledgments</i> .....	<i>vi</i>
<i>Abstract</i> .....	<i>v</i>
<i>Abstract(in Arabic)</i> .....	<i>vi</i>
<i>List of Abbreviations</i> .....	<i>vii</i>
<i>Table of Contents</i> .....	<i>viii</i>
<i>List of Figures</i> .....	<i>x</i>
<i>List of Tables</i> .....	<i>xi</i>
<b>خطأ! الإشارة المرجعية غير معرفة.</b>	
1	خطأ! الإشارة المرجعية غير معرفة.
1.1	خطأ! الإشارة المرجعية غير معرفة.
1.2	خطأ! الإشارة المرجعية غير معرفة.
1.3	خطأ! الإشارة المرجعية غير معرفة.
1.4	خطأ! الإشارة المرجعية غير معرفة.
1.5	خطأ! الإشارة المرجعية غير معرفة.
1.6	خطأ! الإشارة المرجعية غير معرفة.
1.7	خطأ! الإشارة المرجعية غير معرفة.
1.8	خطأ! الإشارة المرجعية غير معرفة.
1.9	خطأ! الإشارة المرجعية غير معرفة.
1.10	خطأ! الإشارة المرجعية غير معرفة.
2	22
2.1	خطأ! الإشارة المرجعية غير معرفة.
2.2	خطأ! الإشارة المرجعية غير معرفة.
2.3	خطأ! الإشارة المرجعية غير معرفة.
2.4	خطأ! الإشارة المرجعية غير معرفة.
3	خطأ! الإشارة المرجعية غير معرفة.
3.1	خطأ! الإشارة المرجعية غير معرفة.
3.2	خطأ! الإشارة المرجعية غير معرفة.
3.3	خطأ! الإشارة المرجعية غير معرفة.
3.4	خطأ! الإشارة المرجعية غير معرفة.
3.4.1	خطأ! الإشارة المرجعية غير معرفة.
3.4.2	خطأ! الإشارة المرجعية غير معرفة.
3.5	خطأ! الإشارة المرجعية غير معرفة.
3.6	خطأ! الإشارة المرجعية غير معرفة.

3.6.1	خطأ! الإشارة المرجعية غير معرفة.
3.6.2	خطأ! الإشارة المرجعية غير معرفة.
3.6.3	75
3.6.4	خطأ! الإشارة المرجعية غير معرفة.
3.7	خطأ! الإشارة المرجعية غير معرفة.
<b>4</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
4.1	50
4.2	50
4.3	51
4.4	54
4.5	54
4.6	55
4.7	56
<b>5</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
5.1	58
5.2	58
5.2.1	58
5.2.2	63
5.2.3	65
5.2.4	66
5.3	67
5.4	70
<b>6</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
6.1	72
6.2	72
<b>References</b>	<b>..... 14</b>
<b>Appendix</b>	<b>..... 15</b>
<b>A.</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
<b>B.</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
<b>C.</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>
<b>D.</b>	<b>خطأ! الإشارة المرجعية غير معرفة.</b>

# List of Figures

Figure 1: Project Timeline.....	10
Figure 2: Structure of QR code.....	16
Figure 3: Application Icon.....	16
Figure 4: Login Interface.....	16
Figure 5: Home Page.....	16
Figure 6: Survey Question 1.....	22
Figure 7: Survey Question 2.....	22
Figure 8: Survey Question 3.....	23
Figure 9: Survey Question 4.....	23
Figure 10: Survey Question 5.....	24
Figure 11: Survey Question 6.....	24
Figure 12: Survey Question 7.....	25
Figure 13: Survey Question 8.....	25
Figure 14: Use Case Diagram.....	26
Figure 15: Application Icon.....	31
Figure 16: Welcome Screen.....	32
Figure 17: Start Screen.....	32
Figure 18: Sign in.....	33
Figure 19: Verify Page.....	33
Figure 20: Login Page.....	34
Figure 21: Home Screen.....	34
Figure 22: Field info.....	35
Figure 23: QR code Screen.....	35

Figure 24: User Profile.....	36
Figure 25: Architectural Design.....	36
Figure 26: Class Diagram.....	37
Figure 27: Sequence diagram for Create Account.....	37
Figure 28: Sequence diagram for Login.....	38
Figure 29: Sequence diagram for Specify time.....	38
Figure 30: Sequence diagram for Book Seat.....	39
Figure 31: Sequence diagram for Send Suggestion.....	39
Figure 32: Sequence diagram for React to Suggestion.....	40
Figure 33: Sequence diagram for Change Field Status.....	40
Figure 34 : ER diagram.....	41
Figure 35: Time code.....	54

# List of Tables

Table 1: Team Responsibilities.....	10
Table 2: Comparison Table Of Related Works.....	17
Table 3: Use Case Description for Create Account.....	26
Table 4: Use Case Description for Login.....	26
Table 5: Use Case Description for Specify time.....	27
Table 6: Use Case Description for Book seat.....	27
Table 7: Use Case Description for Send Suggestion.....	28
Table 8: Use Case Description for React to Suggestion.....	29
Table 9: Use Case Description for Change Field Status.....	29
Table 10: Player's table.....	42
Table 11: Admin's table.....	42
Table 12: Suggestion table.....	42
Table 13: Seat table.....	42
Table 14: Field's table.....	42
Table 15: QR Code table.....	42
Table 16: Signup Page.....	50
Table 17: Login Page.....	50
Table 18: Verification Code.....	51
Table 19: Setting Page.....	51
Table 20: Field Information.....	52
Table 21: Choosing Time.....	52
Table 22: Database Comparison.....	53

Table 23: Class Name's table.....	53
Table 24: Libraries table.....	53
Table 25: Signup Unit Testing.....	58
Table 26: Login Unit Testing.....	59
Table 27: Choose Time Unit Testing.....	60
Table 28: Send Suggestion Unit Testing.....	60
Table 29: Reservation Page Unit Testing.....	61
Table 30: Edit Profile Unit Testing.....	61
Table 31: QR Code Unit Testing.....	62
Table 32: Reservation Process Integration Testing.....	63
Table 33: Scanning QR Code Integration Testing.....	64
Table 34: User Acceptance Testing.....	65
Table 35: Signup Test Case.....	66
Table 36: Mobile Number Test Case.....	67
Table 37: Barcode Scanner Test Case.....	68

## **Chapter One: Introduction**

# **1 Introduction**

## **1.1 Introduction**

Today, technology has improved the standard of living of the people to a great extent and has given a new dimension to the development of the country and the world. And the number of people using technology especially the applications which is the most important and useful resource to the users increasing of the rapid development. At the same time, technology has also helped people in assessing their mental and physical capacity. Because that football-lovers get tired of hassle of searching fields to play football or calling to book a field and get no answer, Our project is seeking to provide a service that serve those people by designed an application in suitable way to found nearby football facilities in their area and locate them on the map , Also has a grid view menu to choose the time, after the user get booked successfully he can easily go to the desired field and scanning the QR code to verify the user was the same as the one who made the reservation, after verified the authentication and authorization the Arduino will trigger a LED green light that indicate approval and user can access the field and play the match. The rest of this chapter will discuss Problem definition of the project moving to present the Project Scope then talk about the local and global impact after that will introduce the Aims and Main Objectives of the project then we will present An Alternative solution with the Project Timeline which Specify the responsibilities of each team member and estimated time for each phase, after that briefly explain each Chapter in Report Structure. Finally, the summary is given by mentioned the importance of the problem we are studying.

## **1.2 Problem Definition**

Ideally, it would be good for people who love to play football in their free time to find available and closer pitches to them, with effortlessly and less time. However, in reality with the increase of interest of many people in ball sports, people are required to come to the location for checking if the field is available or not to play with the team that playing football in that time which will take lots of time and effort. Our Project shows a potential solution to a mobile application named “Foul” in resolving a problem above that happens

in society especially in football sports. To handle the problem by a feature that will be available in our application helping the user to request and check a field online and provide a real-time and flexible schedule so that the user could change the time that already booked, users no longer have to physically visit the field and check if there is more place available for them to play. When he actually goes to the field he shows and scan the QR code which allows quick and easy entry to the match. By scanning the code it takes less than a minute so it manages match attendance, And with the difficulties to implement our project in real life because of the equipment cost we are going to use the Arduino which will be a convenience solution to program and design the project without the need for technical expertise. And with this solution people would be interest in having a healthy lifestyle by playing a football sport.

### **1.3 Local Impact**

The Foul application will help locally people who like to spend their time playing football and to eliminate the hassle of the pre-game arrangements with short time and less effort to book a spot of football game easily. Also, to enhance the reach games and customer experience. One could easily manage their booking details with the best field “Foul” application solution. Our application will take the headache out of organizing the game of football for sports enthusiasts. It makes the team and field management actually fun and enjoyable.

### **1.4 Global Impact**

The project will be very effective in any community as a large group of the society are football-lovers. Help them to streamline the entire process of searching for the right field and save their time.

### **1.5 Project Scope**

Deliverables:

- Book a spot in the team.
- Chat with teammates.
- Display the field status weather it's full or not.
- Invite friends.
- View available locations.
- View available spots.
- Penalty for not showing up.

Non-goals:

- Not able to book for 24 hours.
- No paid booking
- No personal court available

## 1.6 Aims and Objectives

- Insure the application compatibility with all operating systems.
- To develop a user-friendly interface for the app that allows users to easily navigate and book football pitches and facilities.
- To provide a customer service system that is available 24/7 to address any queries or complaints.
- To create a platform for football clubs and facilities to advertise their services and attract more customers.
- To provide a range of features and functions to make the booking process easier and more efficient.
- To ensure that all bookings are secure, and that user data is protected.
- To continuously monitor and improve the app to provide the best user experience.

## 1.7 Alternative Solutions

- For our first solution, there was an entry gate with a barcode scanner for users. The barcode is scanned, and then the gate is opened automatically for the user to enter because of the high cost of the scanner devices and the gates will not be applied to.
- The second solution is the presence of a security guard at the gate, but the security guard will not accept to be present in the place all day with a small salary, and the financial cost will increase when there are shifts between two security guards.

## 1.8 Project Timeline



*Figure 1. Project Timeline*

Figure 1 shows Timelines that displays of events arranged in chronological order. It's an overview of important events, a detailed agenda or itinerary, or a schedule of activities that conveys information such as milestones, due dates, and ongoing tasks for our project work.

### **1.8.1 Team Responsibilities**

Task	Nwara	Bedour	Yomna
<b>Initiation</b>			
Determine the project objectives	P	R	P
<b>Planning</b>			
Define problem statement	P	P	R
Define Scope	P	P	R
<b>Analysis</b>			

Gather information	R	P	P
Define requirement	R	P	P
<b>Design</b>			
ER diagram	P	R	P
System interface design	P	P	R
<b>Implementation</b>			
System programming	P	R	P
System testing	R	P	P
<b>Closing</b>			
Deliver final report	R	P	P
Prepare the presentation	P	P	R

*Table 1 Team Responsibilities*

Table 1 above shows the identification of responsibilities and tasks for each team member and members participation in each task. "R" stands for Responsible; "P" stands for Participated.

## 1.9 Report Structure

### Introduction

This report is about the structure of a football booking application. The app is designed to allow users to book football pitches and facilities for their own use.

### Functionality

The app will have a range of features to enable users to book a seat in the nearest pitches and facilities. These features include:

- Search: Users will be able to search for football pitches and facilities in their area. The search will be based on location, availability, and other criteria.
- Booking: Once a user has found a suitable pitch or facility, they will be able to book a seat.
- Reviews: Users will be able to leave reviews for other users about their experience with the app. This will help other users decide if they want to book using our application.
- Notifications: The application will send notifications to users when their booking is confirmed or when a new pitch or facility is available in their area.

### **User Interface**

The user interface of the application will be designed to be user-friendly and intuitive. The app will have a simple navigation system that allows users to quickly find the features they need. The app will also have a range of visuals to help users understand the features and how to use them.

### **Security**

The application will have a range of security measures in place to protect user data. These measures include encryption and two-factor authentication.

### **Conclusion**

This report has outlined the structure of a football booking application. The application will have a range of features to enable users to book a spot to play. The user interface will be designed to be user-friendly and intuitive. The application will also have a range of security measures in place to protect user data.

## **1.10 Summary**

At the end of this section, we wanted to provide an overview of the project idea and mention the goals and features that will benefit users in general and football fans. And we have tried to list so alternative solutions to the problem that will be encouraged in the implementation of the project, all tasks were detailed and distributed in detail between responsibility and participant among group members, and the timing for each task was clarified.

## **Chapter Two: Literature Review**

## 2 Literature Review

### 2.1 Introduction

In the previous chapter of Introduction, it was presented the problem that faced people who practice football in their lives since they get tired by searching fields to play in available and closer pitches to them. Also, in the Problem Definition section we discussed a solution for this issue by implementing our project also defines the project scope with aims and objectives was presented. This chapter focuses on the scientific background of this project and related work that implemented an application in the field of football management games and talks about their advantages and disadvantages. And create a table to comparison between these applications. Finally, have a brief summary to summarize what was mentioned in this chapter.

### 2.2 Background

Our project is mainly for players who are looking for an easy access to the football fields, the project is about how we are going to manage the players to book their spot from the technical aspect, and how are they going to enter the field, and other things like how the fields maintenance is going to work with the app.

Another thing is the technology we are going to use is a Quick Response Scanner with the Arduino LED green light that indicate validity, and red light for invalid QR which indicate expired QR code. From a software perspective we are going to use common languages like Java, Java Script, and other JS libraries.

#### 2.2.1 Concepts of our application

In Foul application we used many concept and physical components that will be discuss and covered below:

- **Internet of things IoT** refers how the network of physical objects that contain sensors or other technologies can connect and exchanging data over the internet without any human intervention[3].
- **GPS Technology** is global positioning system is a radio-navigation setup based on satellite systems that provide positioning, navigation, and timing information to users through sending impulses to an earthbound receiver by provides the fastest and most accurate method for mariners to navigate, measure speed, and determine location[4].
- **ESP32** is a series of low-cost, low-power on a chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth[5].

- **QR code** Stands for "Quick Response" is a type of matrix bar code or two-dimensional code that can store data information and designed it to be read by smartphones. The content of the code can be very easily decoded at a high speed, the code consists of black modules set on a white background in a square pattern[6].

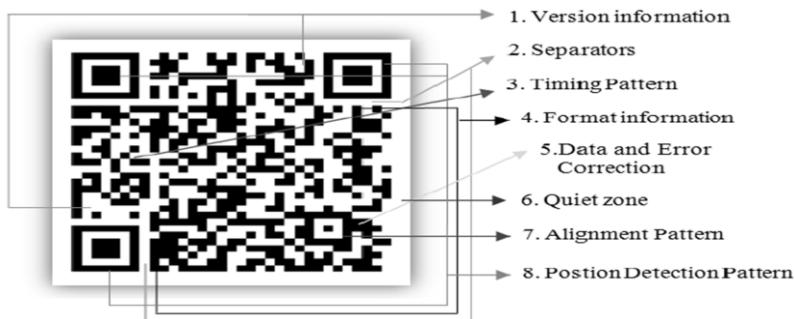


Figure 2. Structure of QR code[7].

## 2.3 Related Work

### 2.3.1 Koora App



Figure 3. Application Icon



Figure 4. Login Interface

العنوان	النوع	الوقت	المزيد
ملعب ون - الملاهي	ملعب	2023-01-18 PM 05:00	
ملعب شوت - الملاهي	ملعب	2023-01-18 PM 06:15	
ملعب ون - الملاهي	ملعب	2023-01-18 PM 06:30	
ملعب شوت - الملاهي	ملعب	2023-01-18 PM 07:45	
ملعب ون - الملاهي	ملعب	2023-01-18 PM 08:45	

Figure 5. Home Page

The Koora application is a forum for football enthusiasts and fans, so that it facilitates the task of coordinating or participating in playing a match that suits them in terms of time and place. Also, it should solve these issues. Are you facing a problem with the number of players to organize your match? Would you like to participate in playing a match in

your city with other players without trouble and arrangement? The Main disadvantage point of this application is the limitation places that people will play in the region since its support a few places "pitches" to play.

### **The Advantages:**

- Free application that any user can download.
- Easy to use app interface.
- Protecting user data so that no other user can view the other user's data.
- The presence of more than one means of communication with the developers of the app.
- Ease of registering for the app.
- Ease of movement between sections.
- The ability to share the application.

### **The Disadvantages:**

- Boring interface.
- A few specific places to play.
- There is a cost per match.
- There are certain times for matches.
- Does not provide more than one way to register for the program (by email, by Facebook, etc.)
- It does not support multiple languages

Application name	Foul	Koora app	Other apps
Registration	Multi ways	One way	One way
Operating system	Android-IOS	IOS -Android	IOS
Cost of download	free	free	free
Security	Very high	High	Medium
Support languages	Multi languages	One language	Two languages
Usage interface	Convenience	Boring	Easy
Covered area	Entire area of Riyadh	Three specific area	Multi spaces

sports	Football	Football	Multi sports
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*Table 2. Comparison Table of Related Works*

## 2.4 Summary

This chapter discussed the literature review and the background section. And talk about gaps in some of the mentioned related works such as they require people to pay for each game to book their reservation, and the program interface is boring or its inconvenient design to make user interact with it easily. And These gaps will be solved on Foul application. The next chapter is the system analysis and design, and it will analyze the project requirements and what the application must do.

## **Chapter Three: System Analysis and Design**

## **3 System Analysis and Design**

### **3.1 Introduction**

In the previous chapter the main definitions of the project and the components of the devices that will be used were presented. Review of previous studies with its advantages and disadvantages of an application that talk about the same idea of our project for football-enthusiasts. In this chapter, it focuses on the work that will be done to make the system by identifying system perspectives, collecting system requirements to and displaying the results also it will focus on the analysis of the presented system and its design. The presented system is an Android/IOS application known as Foul that will help people to pre-booked a desired seat to play football game with less time and effort in organizationally way.

### **3.2 System Perspective**

The Foul application is not a self-contained system. Since it depends on the Ministry of Municipal database. With QR technology it will reduce effort and facilitate playing football matches since the user pre-booked a seat before going to the desired field. The Application will work on Android and IOS Operating Systems, so it can be downloaded and accessed by any Mobile or Tablet using these systems.

### **3.3 Requirements Elicitation Techniques**

In this section will describe the techniques used to collect needed information.

Gathering Information describes the process of acquiring knowledge. It is not the knowledge itself. When a portion of a story focuses on learning, it is the gathering of an education that is of concern, not the education that ultimately has been gathered. Gathering Information need not be an academic endeavor. One might learn to express one's feelings or learn about love. Gathering Information does not even require new information as sometimes one learns simply by looking through old information from a different perspective or with a new approach. It is not important if one is learning to arrive at a particular understanding or just to gather data. As long as the focus is on the process of gaining information or learning, Gathering Information is the operative word[8].

There are many methods of collecting data, such as: Interviews, Survey, Focus Group Interviews, Questionnaires. The questionnaire method will be used to collect information for the following reasons: It will enable us to collect a lot of data in less time, which is a fast and cost-effective method, and it enables us to compare responses with historical data and understand the shift in respondents choices and experiences. Respondents can answer the questionnaire without revealing their identity[9].

### 3.1 Questionnaires

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. It is a structured technique for collecting primary data in a marketing survey, customer satisfaction research, or other social and market research[10].

#### 3.1.1 Questionnaire Analysis

In this section will discuss and analyze (58) answers to the main questions in the Questionnaire

-Age

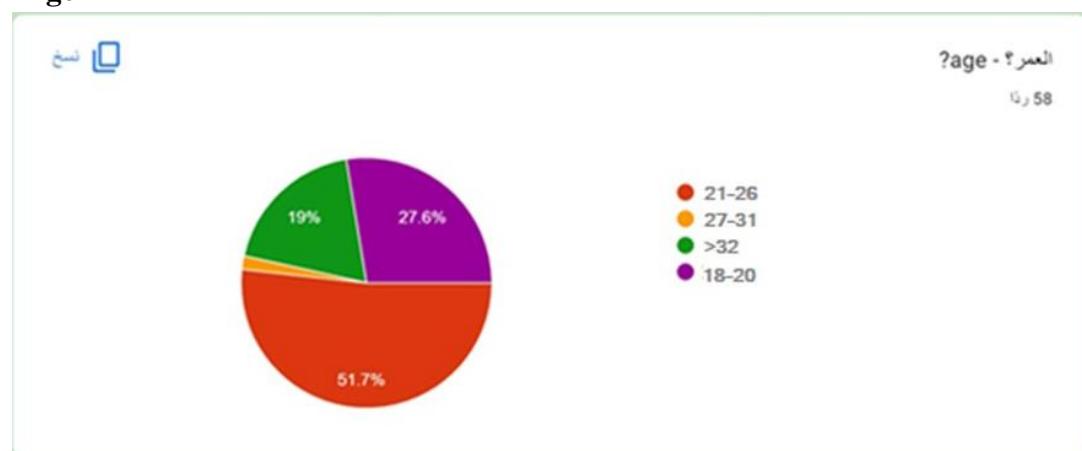


Figure 6. Survey Question 1

In the figure(6) the pie chart shows that 51.7% of the ages range between (21-26) and they are the most answered group and then 27.6% age (18-20) then 19% (32 and over) then 1.7% age (27-31).

- Have you ever been to the fields in the neighborhood?

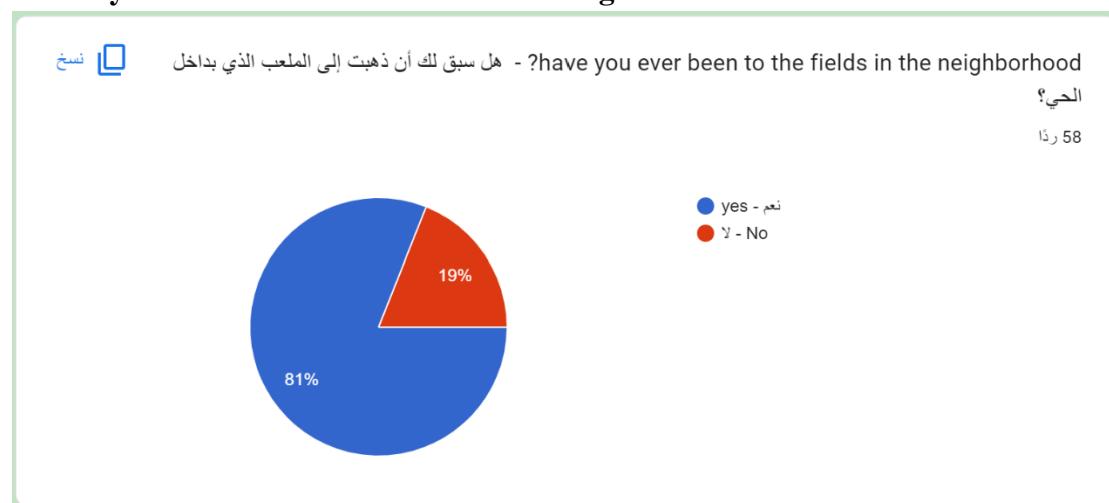


Figure 7. Survey Question 2

In the figure (7) the project team members asked the respondents have you ever been to the fields in the neighborhood? , it's shows that 81% of them prefer to go to the neighborhood fields and 19% of the respondents not .

#### - If your answer is yes, how often do you go to play in a week?

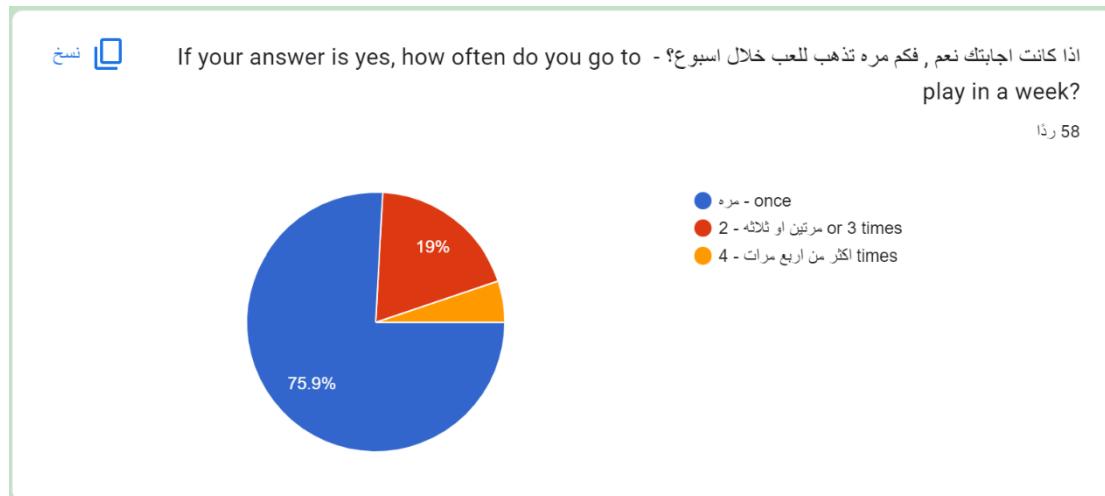


Figure 8. Survey Question 3

The project team members asked the respondents If your answer is yes, how often do you go to play in a weak , the figure (8) shows that 75.9% of them go to play weakly ,while 19% are go twice or three times ,and 5.2% of them are going to play more than four times.

#### - When going to play, were you an individual or a group?

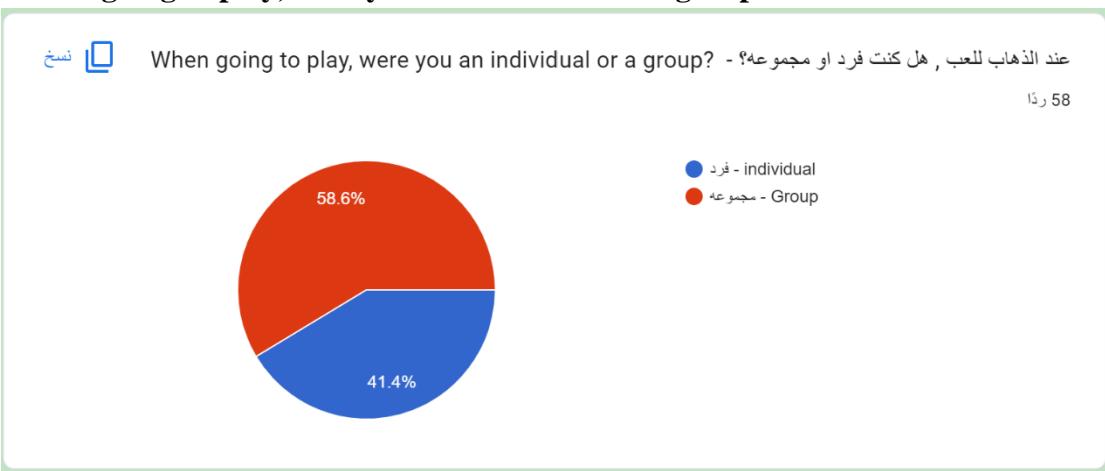


Figure 9. Survey Question 4

The project team members asked the respondents When going to play, were you an individual or a group? , the figure (9) shows that 58.6% of the are going individually , while 41.4% are going in groups , and that is make our project best solution to those who going to the fields individually .

### - When I go to the field , I go for...

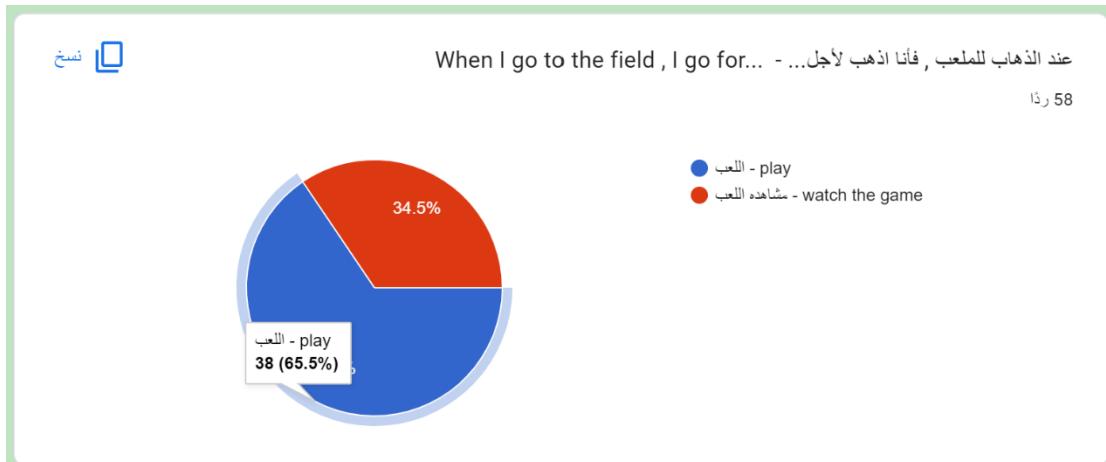


Figure 10. Survey Question 5

As the diagram is shown in the figure (10) 65.5% of the respondent are going to play ,while 34.5% of them are going to watch the game which is not simple rate ,that makes our project a great idea t use to make the field managed and easy to play .

### - What problems do you face while playing?



Figure 11. Survey Question 6

Project team members asked respondents What problems do you face while playing and the answers shows that it's achieved the aims of our project such as, manage the entry to the fields and the problems with crowded and chaos happened there.

### -What do you think if the field had a free reservation allowing only registered players to enter?



Figure 12. Survey Question 7

The project team members asked the respondents What do you think if the field had a free reservation allowing only registered players to enter , the figure(12) shows the majority of their answers were agreed that our application is an appropriate idea to implement the project.

#### - Suggestions you would like to share with us to develop the application?



Figure 13. Survey Question 8

The project team members asked the respondents Suggestions you would like to share with us to develop the application , The figure(13) shows that is some of the answers are already on our project objectives such as looking for a nearby location to the user and display the closest field to him , and the other suggestion may be in the future work.

## 3.4 System Requirement

### 3.4.1 Functional Requirement

Functional Requirement relates directly to a process a system has to perform or information it needs to contain and flow directly into the creation of functional, structural and behavioral models that represent the functionality of the evolving system[11].

The Functional Requirements for Foul Application are:

- The user must be able to create an account.
- The user shall be able to booked a game.
- The user shall be able to see the closest fields to him and choose it.
- The user shall be able to check the availability of the seats.
- The user shall be able to specifies time.
- The user shall be able to edit and change the time easily.
- The user shall be able to manage and update his profile.
- The user shall be able to send suggestions and complaints.
- The admin shall be able to edit Field Status.
- The admin shall be able to react with suggestions and complaints

### 3.4.2 Use Case Diagram

A Unified Modeling Language (UML) Use-case shows the relationships among actors and use cases within a system and how they interact with. They are often used to provide an overview of all or part of the usage requirement[12].

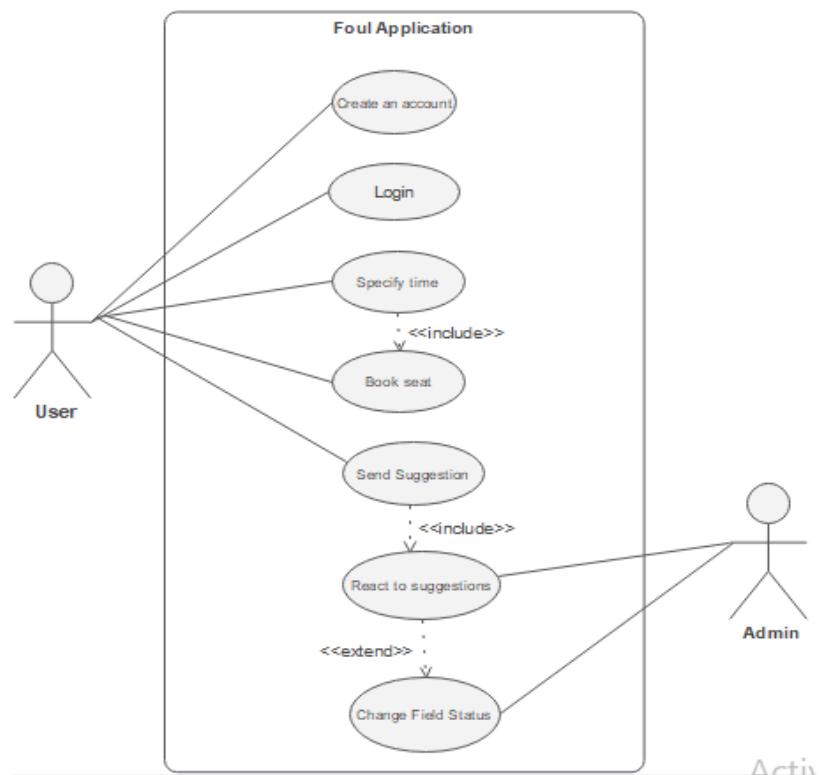


Figure 14. Use Case Diagram

### 3.4.3 Use Case Description

<b>Use case name :Create Account</b>	<b>ID : 1</b>	<b>Importance level : High</b>		
<b>Primary Actor:</b> User	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b> User: Create account on the application.				
<b>Brief Description:</b>				
This use case describe how user create an account.				
<b>Trigger:</b> User needs to have an account on the application.				
<b>Type:</b> External				
<b>Relationships:</b> Association: User Include: Extend:				
<b>Normal Flow of Events:</b> 1. The user opens the application 2. The user clicks on Registration option. 3. The user enters their information. 4. The user click sign in. 5. Creating an account is now completed.				
<b>SubFlows:</b> 1.1 The application shows instruction 3.1 The user enter username, email,password and phone number.				
<b>Alternate/Exceptional Flows:</b> 3.a Enter invalid email or phone number.				

Table 3, Use Case Description For Create Account

<b>Use case name : Login</b>	<b>ID : 2</b>	<b>Importance level : High</b>		
<b>Primary Actor:</b> User	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b> User: login to the system.				
<b>Brief Description:</b>				
This use case describe how user login to the application.				
<b>Trigger:</b> User needs to login to start reservation.				
<b>Type:</b> External				
<b>Relationships:</b> Association: User Include:				
<b>Normal Flow of Events:</b> 1. The user opens the application 2. The user enters his email or phone and his password 3. The application verifies the entered data.				

<b>SubFlows:</b>
2.1 The application logs the user if inputs data are correct.
<b>Alternate/Exceptional Flows:</b>
2.a If the user enters wrong data a message will appear to ask him enter correct info.

*Table 4. Use Case Description For Login*

<b>Use case name:</b> Specify Time	<b>ID :</b> 3	<b>Importance level :</b> High		
<b>Primary Actor:</b> User	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b>				
User: Wants to choose time to play.				
<b>Brief Description:</b>				
This use case describe user choices of time selection.				
<b>Trigger:</b> The user applied to set up appropriate time to play.				
<b>Type:</b> External				
<b>Relationships:</b>				
Association: User				
Include: Book seat.				
Extend:				
<b>Normal Flow of Events:</b>				
<ol style="list-style-type: none"> <li>1. The user view time picker.</li> <li>2. The user selects the time.</li> <li>3. The user chooses the time.</li> </ol>				
<b>SubFlows:</b>				
<b>Alternate/Exceptional Flows:</b>				
3.a The time is full reserved.				

*Table 5. Use Case Description For Specify Time*

<b>Use case name :</b> Book seat	<b>ID :</b> 4	<b>Importance level :</b> High		
<b>Primary Actor:</b> User	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b>				
User: wants to reserve a seat to play.				
<b>Brief Description:</b>				
This use case describe how user to book a seat.				
<b>Trigger:</b> The user applied to set up appropriate time for him.				
<b>Type:</b> External				
<b>Relationships:</b>				
Association: User				
Include:				

<b>Normal Flow of Events:</b>
1. The user opens the application
2. The user view the seats.
3. The user selects a seat.
<b>SubFlows:</b>
2.1 If the seat is not available display an error message.
<b>Alternate/Exceptional Flows:</b>
3.a The seat is already reserved.

*Table 6. Use Case Description For Book a Seat*

<b>Use case name :Send suggestion</b>	<b>ID : 5</b>	<b>Importance level : High</b>		
<b>Primary Actor:</b> User	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b> User: the user submit suggestion or a complaints.				
<b>Brief Description:</b>  This use case describe how to submit suggestion in application.				
<b>Trigger:</b> User reports an issue or send a feedback.				
<b>Type:</b> External				
<b>Relationships:</b> Association: User Include: React to suggestion Extend:				
<b>Normal Flow of Events:</b>				
1. The user opens the application. 2. In the menu tap click suggestion. 3. The user type his comment. 4. The user tap send.				
<b>SubFlows:</b>				
<b>Alternate/Exceptional Flows:</b>				

*Table 7. Use Case Description For Send Suggestion*

<b>Use case name : React to Suggestion</b>	<b>ID : 6</b>	<b>Importance level : High</b>		
<b>Primary Actor:</b> Admin	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b> Admin: the admin will view and respond to user suggestions.				
<b>Brief Description:</b> This use case describes how to admin respond to the user suggestion in application.				
<b>Trigger:</b> When admin receives suggestions and complaints.				
<b>Type:</b> External				
<b>Relationships:</b> Association: Admin Include: Extend:				
<b>Normal Flow of Events:</b> 1. The admin receives the suggestions. 2. The admin to view the suggestions. 3. The admin react with them.				
<b>SubFlows:</b> 3.1 The admin will send her/his response, will moved to solved messages.				
<b>Alternate/Exceptional Flows:</b>				

*Table 8. Use Case Description For React To Suggestion*

<b>Use case name : Change Field Status</b>	<b>ID : 7</b>	<b>Importance level : High</b>		
<b>Primary Actor:</b> Admin	<b>Use case type:</b> Detail, Essential			
<b>Stakeholders and Interests:</b> Admin: the admin has access to change field status .				
<b>Brief Description:</b> This use case describe when the admin changes the status of the field.				
<b>Trigger:</b> admin changes the status when receives complaints or for Periodic maintenance.				
<b>Type:</b> External				
<b>Relationships:</b> Association: User Include: Extend: React to suggestion				
<b>Normal Flow of Events:</b> 1. The admin receives a complaints. 2. The admin examin the complaints. 3. The admin take actions based on the complaints.				
<b>SubFlows:</b> 3.1 The admin change the field status(Open/Close).				
<b>Alternate/Exceptional Flows:</b> 2.a The admin respond to the user without changing the status.				

*Table 9. Use Case Description For Changes Field Status*

#### **3.4.4 Non-Functional Requirement**

Non-functional requirement defines system attributes such as Security, Usability, Performance and Maintainability. They serve as constraints or restrictions on the design of the system across the different backlogs[13].

- **Operational requirements**

The application will operate in Android and IOS environments.

The application should be able to connect to the internet.

- **Usability requirements**

The application should allow easy navigation between interfaces.

The application designed to make all buttons visible to the user and make the page color comfortable for the user's eyes.

- **Integrity requirements**

The application shall provide accurate and consistent data.

- **Security requirements**

The application should maintain the privacy of user's information as it will not share their data to others.

The application shall authenticate the username and password of the user.

### **3.5 User Interface Prototype**

A prototype is an initial model of an object built to test a design. Prototypes are widely used in design and engineering to perfect items and processes before implementing them on a large scale. Automobile designers, for example, typically build prototypes of new cars to see if their ideas work in practice. A prototype is a vital part of the design process because it allows designers to see the product in action, so they can see what works and what does not. It is also useful for showing designs to corporate executives or investors to persuade them to support a project[14].

#### **-Application Icon**



*Figure 15. Application icon*

The Figure(15) above shows the App icon when the user downloaded it .

### **-Welcome Screen**

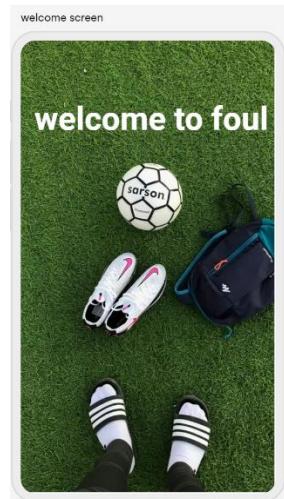


Figure 16. Welcome Screen

This Figure (16) shows that when user click the app appear this screen to him .this make it friendly to use .

### **-Start Screen**



Figure 17. Start Screen

This screen where user can login or sing in if he is a new user .

### **-Sign in Screen**

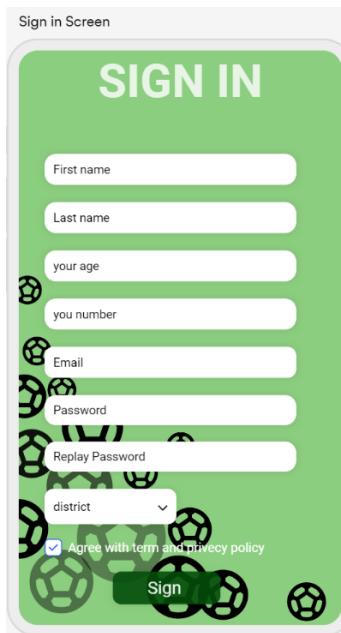


Figure 18. Sign in Screen

This figure(18) shows enter new user information like(name, age, number, etc.)with the term and the privacy policy of the App.

### **-Verify Page**

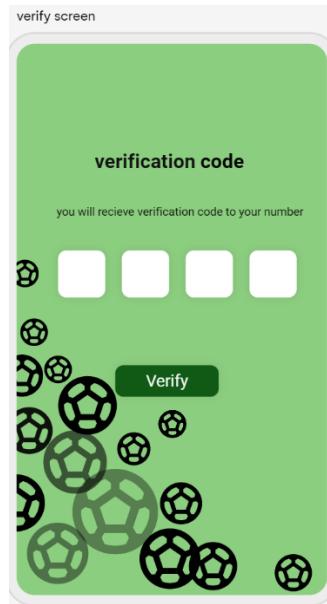


Figure 19. Verify Page

This figure shows that when user sign in then he will receive a code of four random number to configuration for the user .for more security .

## -Login Page

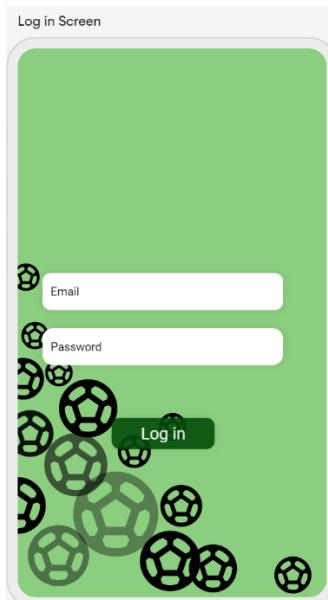


Figure 20. Login Page

This figure(19) if it is not new user this screen will appear to the user when click the App.

## -Home Screen



Figure 21. Home Screen

This is the main Screen in the App where the user can navigate the sections of the App and will be able to see the Fields where they are closest to their location.

### -Field information

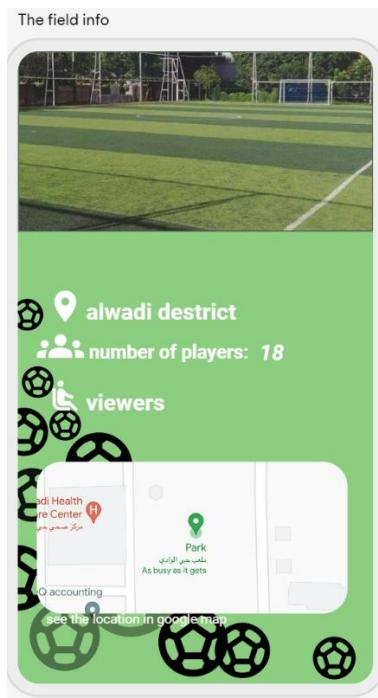


Figure 22. Field info

When the user chooses the field he want to go to and clicks on it, the current information of the field will appear to him , including the number of players and the viewers , and he will also be able to open the location on google map to make it easier for him .

### -QR Screen

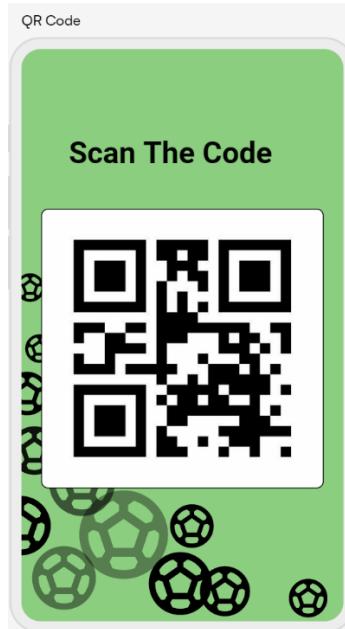


Figure 23. QR Code Screen

The figure(22) shows the QR Code and each user has his own code , when the user arrive to the field in the gate before he inter there will be a scanner , the user should scan his QR code to inter the field.

## -Profile Screen

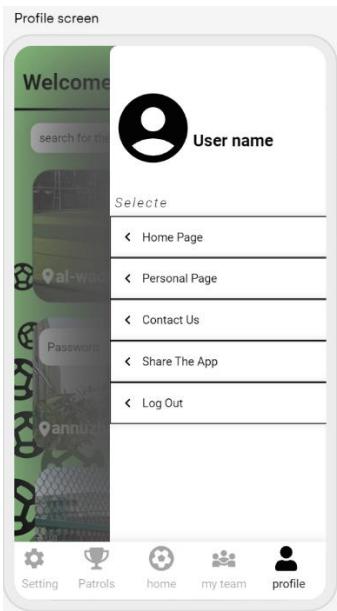


Figure 24. User Profile

This figure shows the user profile, He can access to previous page(Home Page) and he can go to his personal Page for Update his Information ,also he can contact to App developers if he face some problem or any kind of situation ,or log out of the App.

## 3.6 System Design

### 3.6.1 Architectural Design

As shown in the figure below, we designed a system that contains a hardware and application , At first the user will display the QR code after booking a seat and scan it at the camera , And the camera will process the QR code then look for the booking in the database if its valid or not , next the Arduino will get a signal that trigger a LED light.

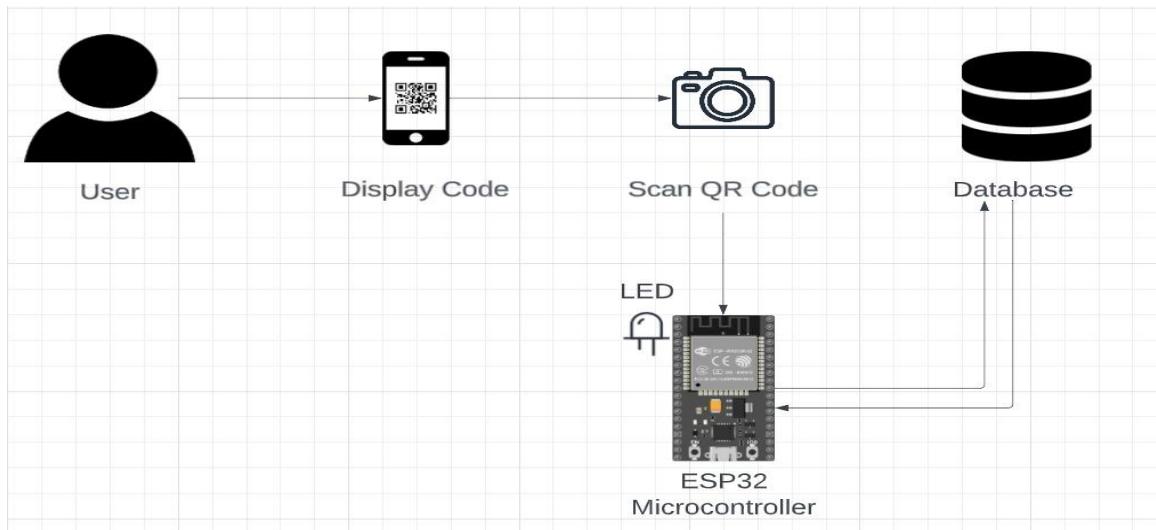


Figure 25. Architectural Design

### 3.6.2 Class Diagram

The class diagram in the Unified Modeling Language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations or methods and the relationships among objects[15].

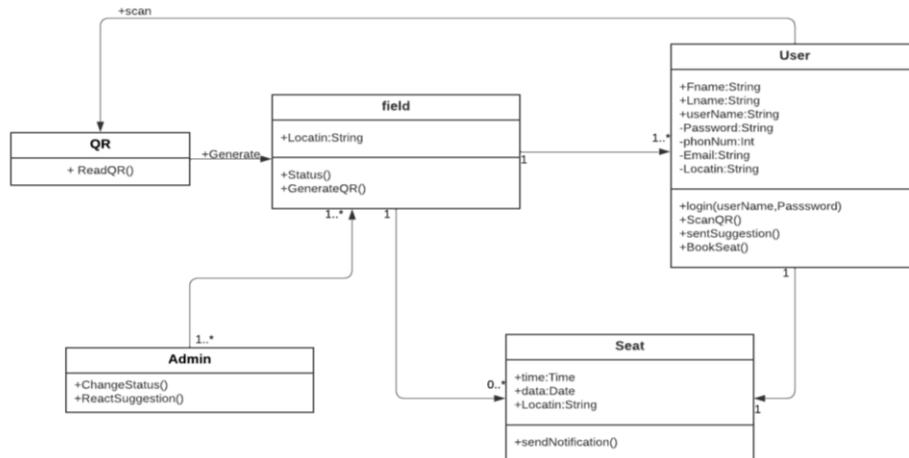


Figure 26. Class Diagram

### 3.6.3 Sequence Diagram

A sequence diagram is a Unified Modeling Language (UML) diagram that illustrates the sequence of messages between objects in an interaction. A sequence diagram consists of a group of objects that are represented by lifelines, and the messages that they exchange over time during the interaction[16].

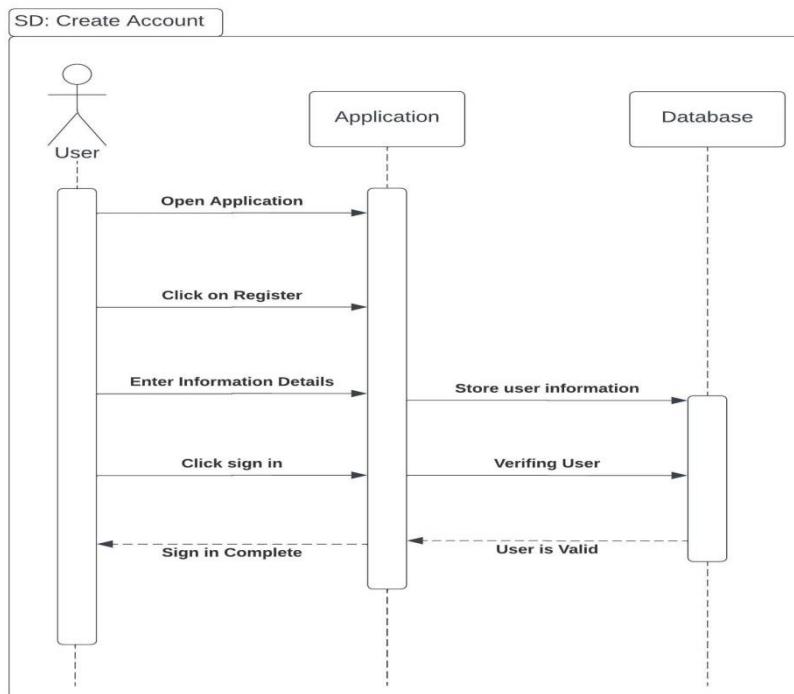


Figure 27. Sequence diagram for Create Account

SD: Login

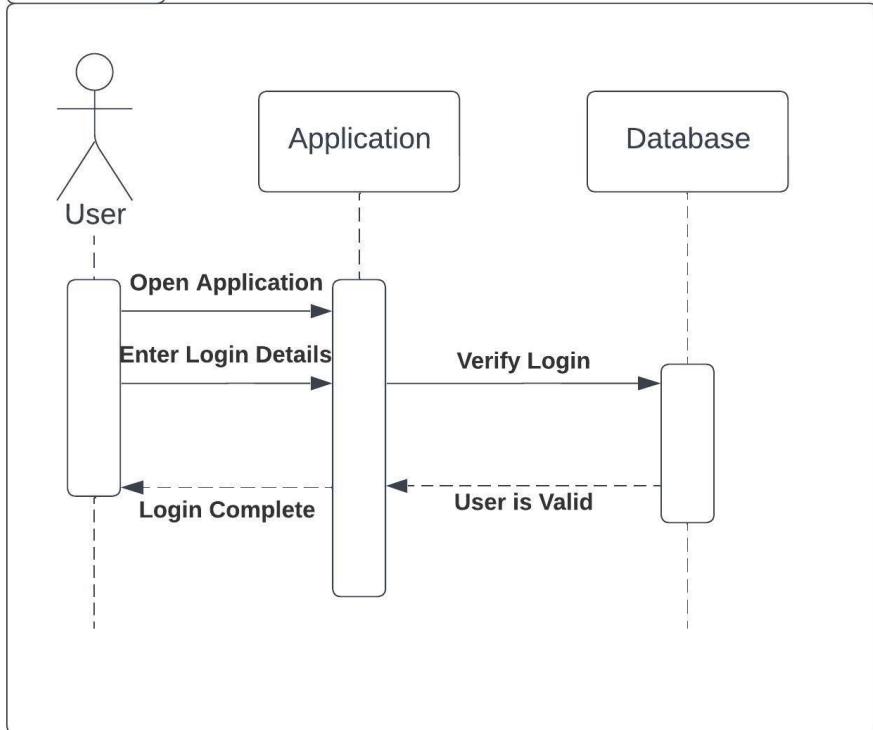


Figure 28. Sequence diagram for Login

SD: Specify Time

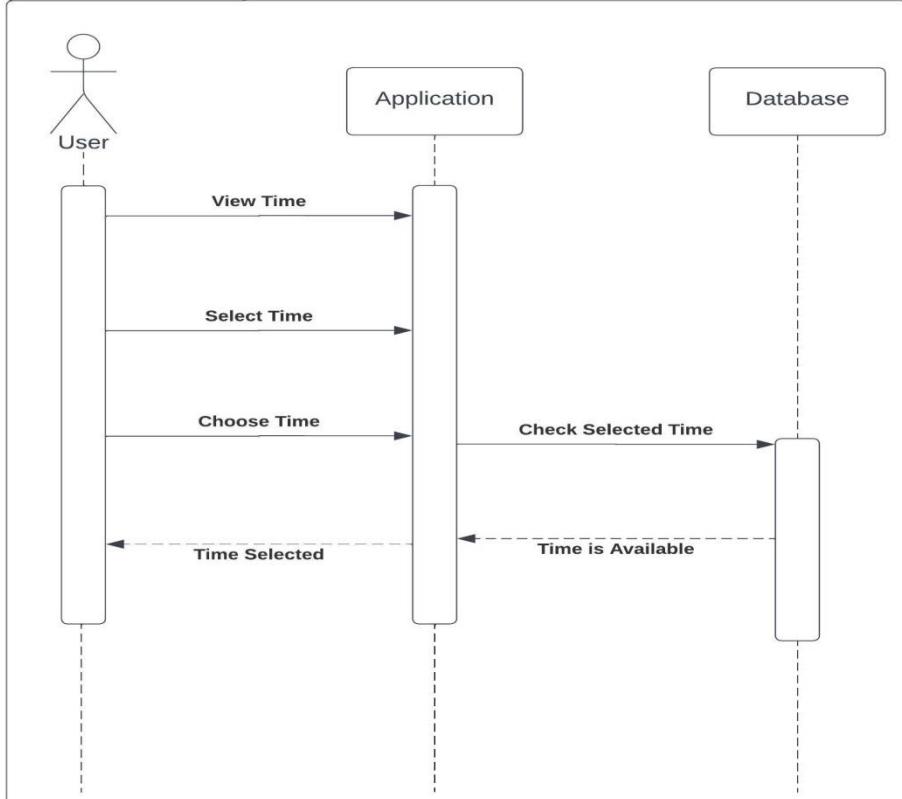


Figure 29. Sequence diagram for Specify Time

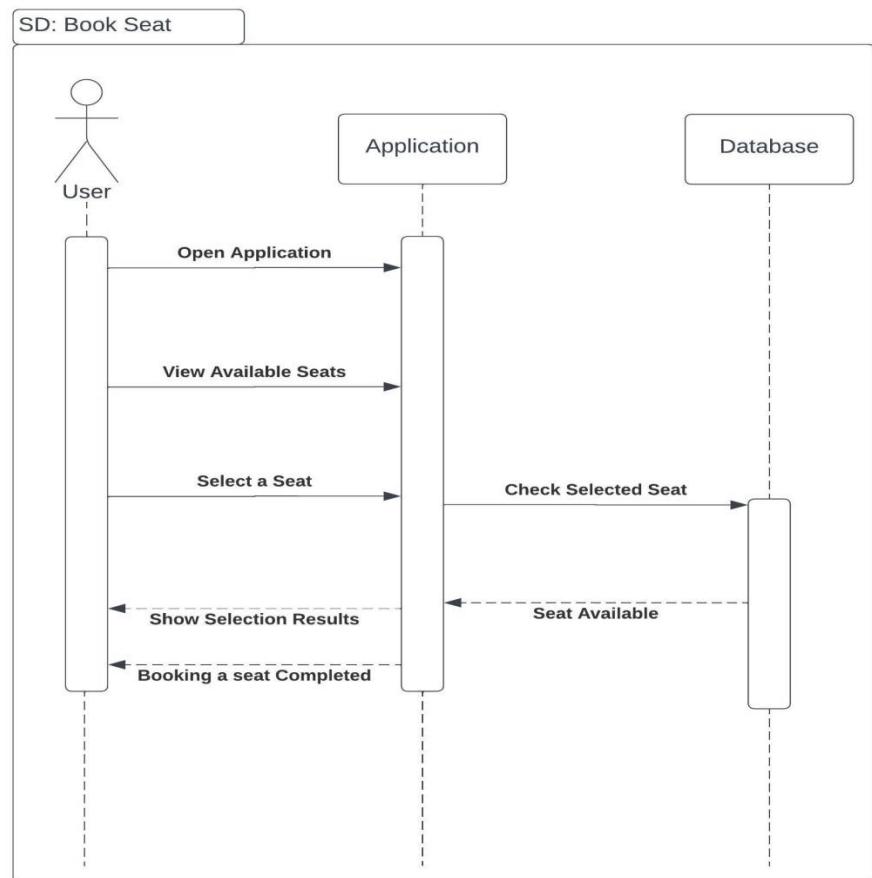


Figure 30. Sequence diagram for Book Seat

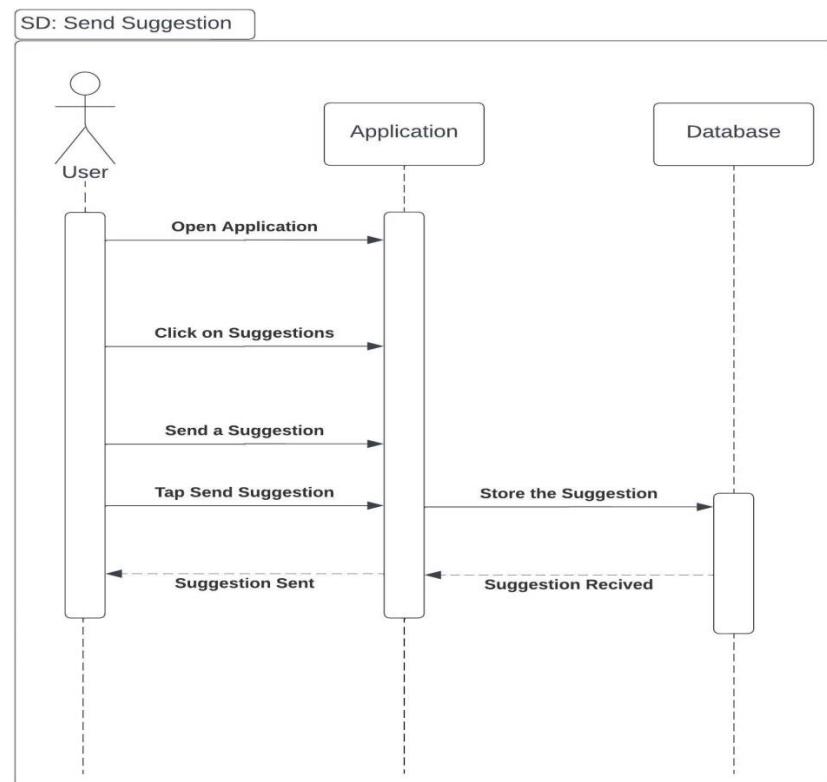


Figure 31. Sequence diagram for Send Suggestion

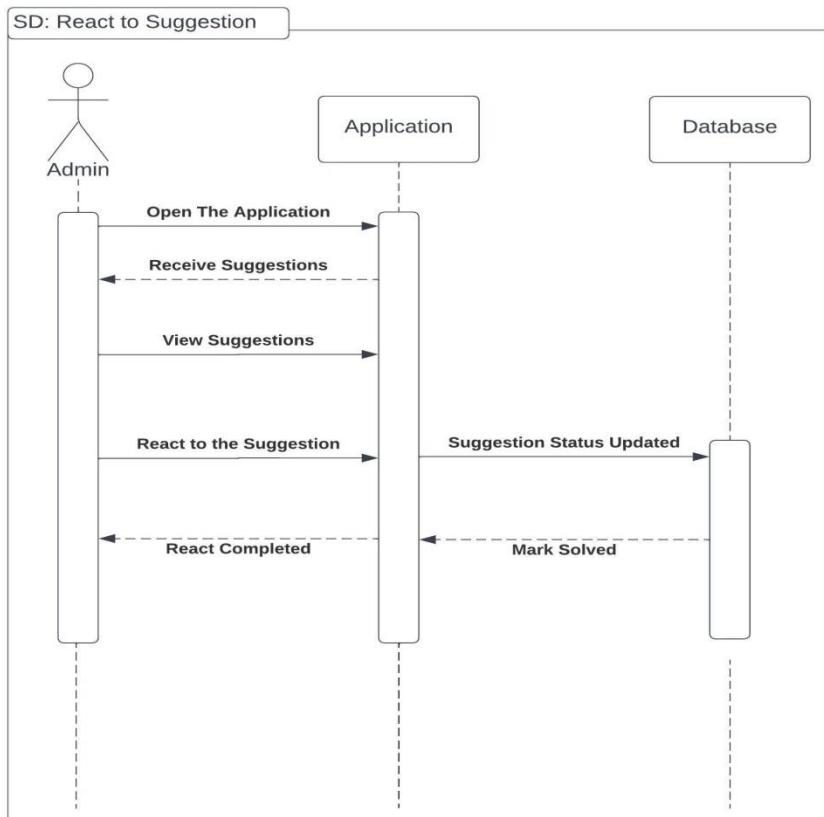


Figure 32. Sequence diagram for React to Suggestion

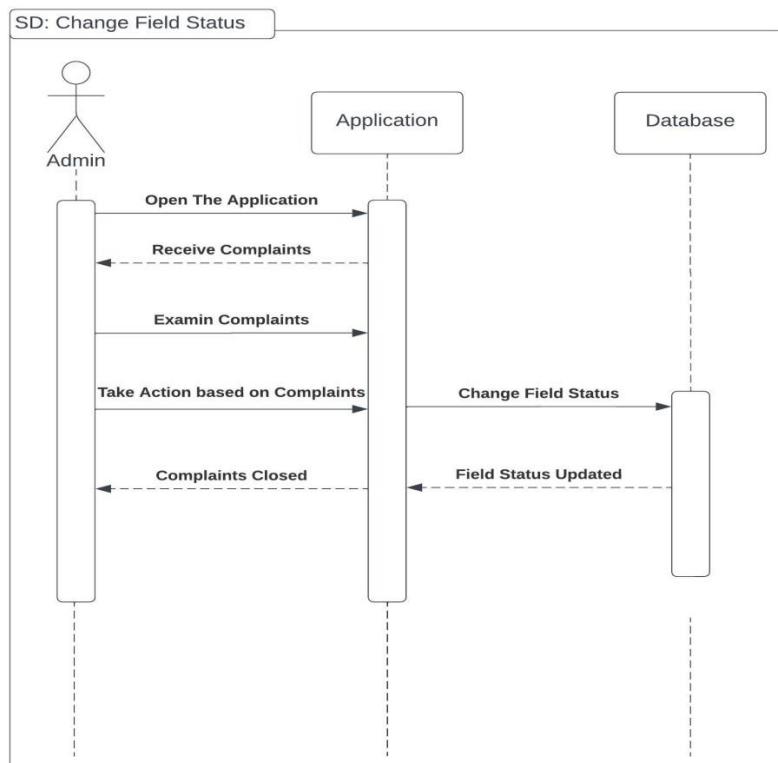


Figure 33. Sequence diagram for Change Field Status

### 3.6.4 Database Design

#### 3.6.4.1 ER Diagram

The Entity Relationship (ER) model shows the relationships between the set of entities stored in the database by defining the entities and their attributes and showing the relationships between them, the ER diagram of Foul Application is shown in the Figure below[17].

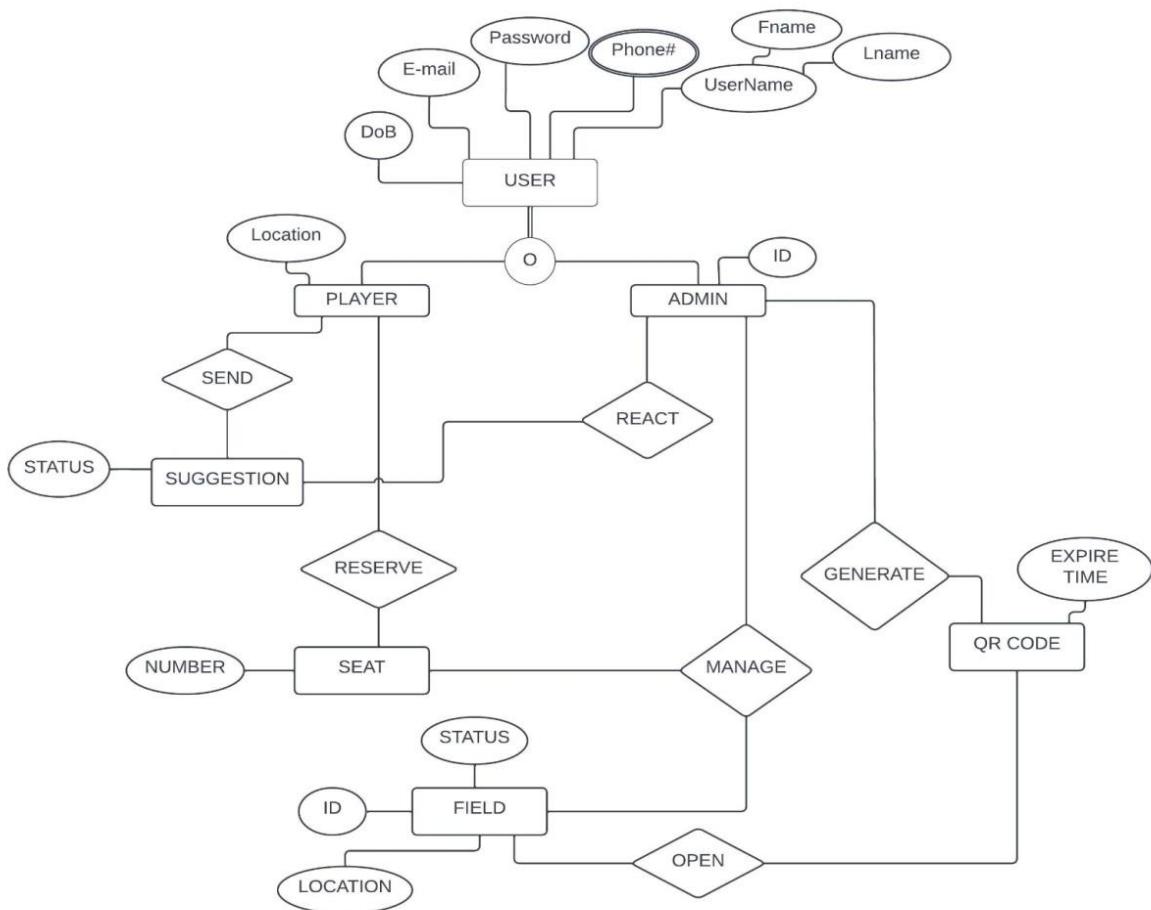


Figure 34. ER diagram

### 3.6.4.2 Database Dictionary

The data dictionary will provide names and data types with a description of each attribute.

PLAYER table includes:

Attribute Name	Data Type	Description
<b>Fname</b>	VARCHAR(50)	First Name of Player
<b>Lname</b>	VARCHAR(50)	Last Name of Player
<b>E-mail</b>	VARCHAR(50)	Email of the Player
<b>Password</b>	VARCHAR(50)	Password of the Player
<b>Phone#</b>	INTEGER	Phone number of Player
<b>DoB</b>	DATE	Date of Birth of Player

*Table 10. Player's table*

Table of ADMIN includes:

Attribute Name	Data Type	Description
<b>Fname</b>	VARCHAR(50)	First Name of Admin
<b>Lname</b>	VARCHAR(50)	Last Name of Admin
<b>E-mail</b>	VARCHAR(50)	Email of the Admin
<b>Password</b>	VARCHAR(50)	Password of the Admin
<b>Phone#</b>	INTEGER(10)	Phone number of Admin
<b>DoB</b>	DATE	Date of Birth of Admin
<b>ID</b>	INTEGER(5)	ID of Admin

*Table 11. Admin's table*

Table of SUGGESTION

Attribute Name	Data Type	Description
<b>Status</b>	VARCHAR(50)	Status of current suggestion

*Table 12. Suggestion table*

Table of SEAT

Attribute Name	Data Type	Description
<b>Status</b>	VARCHAR(50)	Status of current seat

*Table 13. Seat table*

Table of FIELD includes:

Attribute Name	Data Type	Description
<b>ID</b>	VARCHAR(10)	The ID of the Field
<b>Location</b>	VARCHAR(50)	Location of the Field
<b>Status</b>	VARCHAR(50)	The status of the Field

*Table 14. Field's table*

Table of QR CODE Includes:

Attribute Name	Data Type	Description
<b>Expire Time</b>	DATE	Expire Time of QR Code

*Table 15. QR Code table*

## **3.7 Summary**

The application was evaluated and designed in this chapter so that more knowledge on the needs of Football-enthusiasts was gathered since the results of the developed questionnaire have shown that implementing a mobile application to manage the chaos that occurs and help make the match that will be played in the dialogues organized and enjoyable, so our project would be effective for those people who like to playing football. And a complete description of the characteristics of the application was given for an efficient design. The Use Case diagram was made to clarify the actions steps between the user and the application. In addition, the system interface was sketched which include various pages, and the system design was given which includes Architectural design of the application and its Class diagram which shows the classes and the Sequence diagram to describe each Use Case of the application in details, Furthermore, the entity-relationship schema of Foul was presented to clarify application's database. In the next chapter, a detailed explanation of the implementation phase will provide which has an outline of the Programming Language, tools to implement this application.

## **Chapter Four: Implementation**

## 4 Implementation

### 4.1 Introduction

In the prior chapter, a development questionnaire was presented to spot the views of user about the importance of having an application to manage the entry to the fields and the problems with crowded and chaos happened there. Moreover the functional requirements of the application were illustrated by the Use Case, Also the system design of the project has been explained through the diagrams. In this chapter it will be focuses on the implementation phase which involves putting the project plan into action. It will clarify the use of software materials and writing the code for developing Foul project. This chapter contains a description of how to start with Foul application in terms of the main user interfaces implementation and database implementation. The other section is about the packages, classes and libraries. And the last section that we have indicates the system procedures description. Finally, the conclusion of this chapter will be shown in the Summary section.

### 4.2 Programming Languages and Tools

In this section, a description of the chooses languages and hardware tools that used in this project is given in the following points:

- 1- Flutter Dart:** Dart is used to build high-performance mobile web applications. Some of its most significant applications include: It is the basic programming language for the Flutter framework, It is a client-optimized language for developing fast applications on IOS and Android platforms. Its goal is to offer the most productive programming language for multi-platform development, paired with a flexible execution runtime platform for application[18].
- 2- GDAL:** Stands for Geospatial Data Abstraction Library is a library of tools used for manipulating geospatial data. GDAL works on both raster and vector data types, and is an incredible useful tool to be familiar with when working with geospatial data[19].
- 3- Arduino IDE:** The Arduino Integrated Development Environment connects to the Arduino boards to upload programs and communicate with them. Programs written using IDE are called sketches. These sketches are written in the text editor and are saved with the file extension[20].
- 4- Firebase:** It is a great platform that provides a free database. It is useful in storing data on the server and most of what distinguishes it is real-time which means that any change that gets the database will change immediately in the application. The team used Firebase as the main database server for Foul project the reason because it has an easy Application Programming Interface[21].

### 4.3 User Interface Implementation

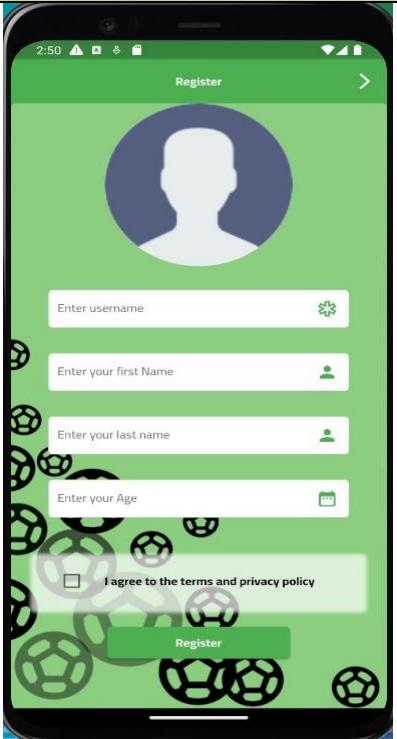
Interface name	Description	Screenshot
Sign up	The user can create an account by entering his username, password phone number or by his email	

Table 16. Sign up page.

Interface name	Description	Screenshot
Login	The user can use the application by entering his phone number and password when he is already registered	

Table 17. Login Page.

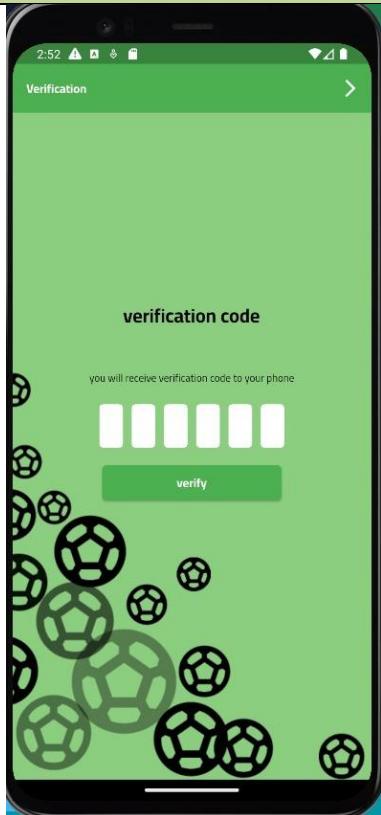
Interface name	Description	Screenshot
Verification code	The user enters the code sent to him to verify his login	

Table 18. Verification code.

Interface name	Description	Screenshot
Setting page	The user can enter setting page by click on the down bar then he can change the language or can send an feedback about the field itself or he can sign out from the application.	

Table 19. Setting Page.

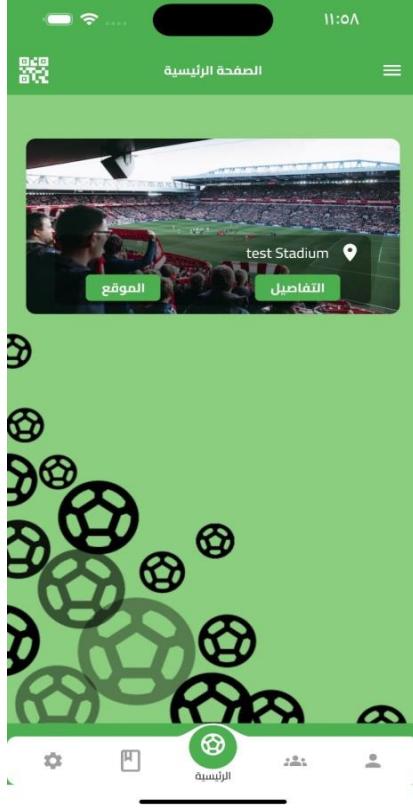
Interface name	Description	Screenshot
Field's Information	In home page the user can click on the map to define the closest field to play and it is have a details option to appears number of players that reserved in the same field.	

Table 20. Field Information.

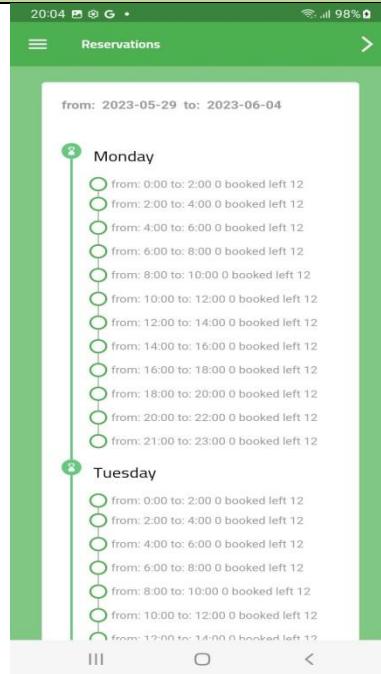
Interface name	Description	Screenshot
Choosing Time	The user can select which period of time he needs to play for two hours. And the capacity of each period is about 12 players. Otherwise he would not be able reserve a seat.	

Table 21. Choosing Time.

## 4.4 Database Implementation

The Firebase Real-time Database was chosen for this project in order to store information and to authenticate users on the application. This database is basically a cloud-hosted database unlike MySQL and SQLite databases which are local. In addition to Firebase it is easy to setup and support user authentication which these features are not available in other databases. Knowing a user's identity allows an app to securely save user data in the cloud and provide the same personalized experience across all of the user's devices. Firebase Authentication provides backend services, easy-to-use Software Development kits, and ready-made User Interfaces libraries to authenticate users to our application.[22]

Database name	Firebase Real-time Database	MySQL
Cloud-based only	✓	✗
Developer	Google	Oracle
Database model	Document Store	Relational DBMS
Server Operating system	Hosted	Server-less

Table 22. Database Comparison[22].

## 4.5 Packages and Classes Description

Name of class	Description
<i>WelcomePage</i>	It contains Welcome screen with login and signup buttons.
<i>Signup</i>	Used for creating an account on the application.
<i>Login</i>	Allows the user to use application by verifying his account.
<i>HomePage</i>	Will contain details of location and number of players the field involves.
<i>DateTime</i>	Allow the user to choose specific period of time to play.
<i>MyQRCode</i>	A page that appears Barcode to the user to verify his reservation.
<i>SettingsPage</i>	Allow the user to change language or to edit profile and so on.
<i>ReservationPage</i>	Includes reservation details and the barcode.

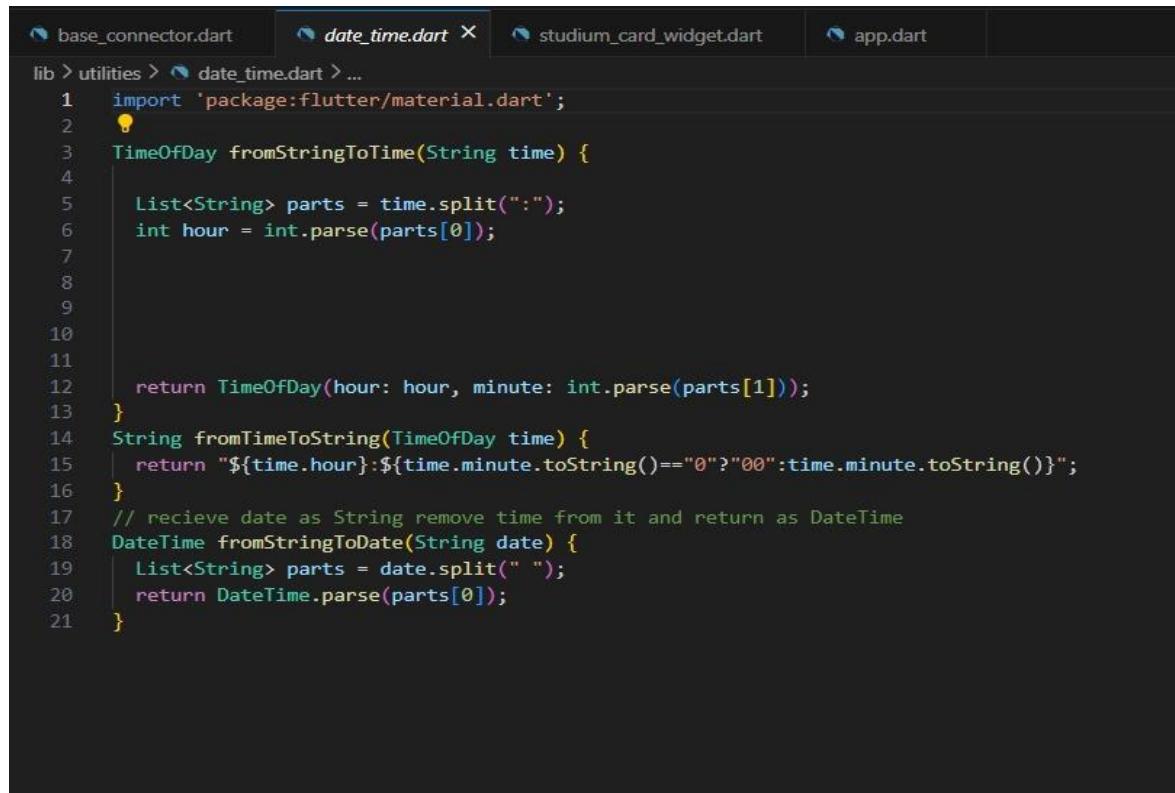
Table 23. Class Name Table.

Libraries and Services	Description
<b>Firebase core</b>	It provides analytics for Firebase Functionality
<b>Dexter</b>	It used for handling runtime permission, such as allow application to open Camera and Google map of the mobile.
<b>Authentication</b>	It used for authenticating users on application by sending a Code verification.
<b>Realtime Database</b>	Used for storing information for Foul specifications, users contact information.

Table 24. Libraries Table[23].

## 4.6 Procedures Description

The functions of choose the appropriate period time and then reserve a seat in a match to play are defined as the main work of Foul application And it is sensitive function since the reservation process will not completed when the user need to reserve the same period time when it is full of players. The player simply go to the home page and choose the time then book a seat successfully.



```

base_connector.dart  date_time.dart X  studium_card_widget.dart  app.dart
lib > utilities > date_time.dart > ...
1 import 'package:flutter/material.dart';
2
3 TimeOfDay fromStringToTime(String time) {
4
5   List<String> parts = time.split(":");
6   int hour = int.parse(parts[0]);
7
8
9
10
11
12   return TimeOfDay(hour: hour, minute: int.parse(parts[1]));
13 }
14 String fromTimeToString(TimeOfDay time) {
15   return "${time.hour}:${time.minute.toString()=='0'?'00':time.minute.toString()}";
16 }
17 // recieve date as String remove time from it and return as DateTime
18 DateTime fromStringToDate(String date) {
19   List<String> parts = date.split(" ");
20   return DateTime.parse(parts[0]);
21 }

```

Figure 35. Time code.

## **4.7 Summary**

In this chapter, the programming languages and tools used to implement this application were reviewed. The implementation of the user interface presented to illustrate each function that used in this application. Also choosing Firebase from among all of databases that exists was discussed. Also, an outline of package, libraries and categories utilized are introduced in this chapter Finally, reserved a spot process is illustrated in Foul as a main function. In the next chapter, a detailed explanation of the system Testing and Results will be provided additionally the tools used to complete these tests.

## **Chapter Five: Testing and Results**

# 5 Testing and Results

## 5.1 Introduction

In the prior Chapter, the implementation process is mentioned including the programming language, reasons' of selection of the Dart language. The implementation of user interfaces explains each function of Foul application. Additionally, the general explanation of Firebase database with its characteristics are presented also the outline packages and classes are presented. This chapter will presents the testing process and results of this phase to test the effectiveness and system functionality of Foul application including System testing which contain the Unit testing that will show the result of each function, Integration testing will portray the result of numerous work test, User acceptance testing that affirms the system prepared for operational utilize and the Test cases will contain the set of each component. The rest of this chapter is the Discussions section that will focus on the limitations and obstacles that we face during the different phases and Finally Summary of testing phase is presented.

## 5.2 System Testing

### 5.2.1 Unit Testing

Unit Test	Inputs	Pass/Fail	Screenshot
Sign up	Enter Username, First Name,Last Name ,Age and Password Then Check Agree To The Terms Of Privacy Policy.	Pass	 A screenshot of the Foul app's registration screen. The screen shows fields for Username, First Name, Last Name, Age, and Email. The 'I agree to the terms and privacy policy' checkbox is checked. A success message at the bottom states 'You have successfully registered.'

Table 25. Signup Unit Testing.

Unit Test	Inputs	Pass/Fail	Screenshot
Login	Select One Of The Method To Login Mobile Phone or Login By Using Google Account Then Verified The Login By Sending A Code.	Pass	

Table 26. Login Unit Testing.

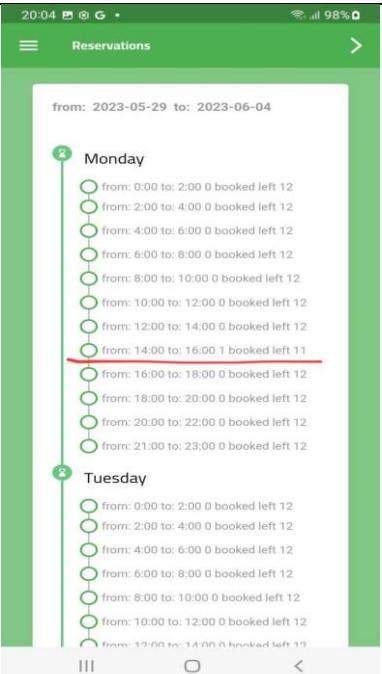
Unit Test	Inputs	Pass/Fail	Screenshot
Choose Time	Select and Determine The Appropriate Time Period To Play And Then Number Of Players That Will Be Able To Reserve In That Time Will Reduced To 11 Player Out Of 12..	Pass	

Table 27. Choose Time Unit Testing.

Unit Test	Inputs	Pass/Fail	Screenshot
Send Suggestion	When The User Need To Report An Issue That Happened In A Field Or Send Suggestion For The Application.	Pass	

Table 28. Send Suggestion Unit Testing.

Unit Test	Inputs	Pass/Fail	Screenshot
Reservation Page	View Reservation Page To Ensure That It's Completed Successfully.	Pass	

Table 29. Reservation Page Unit Testing.

Unit Test	Inputs	Pass/Fail	Screenshot
Edit Profile	The User Can Edit His Profile Such As His First Name Or His Age Then His Changes Successfully Saved.	Pass	

Table 30. Edit Profile Unit Testing.

<b>Unit Test</b>	<b>Inputs</b>	<b>Pass/Fail</b>	<b>Screenshot</b>
QR Code	A code That Appear When The User Book A Seat And Choosing Time Successfully, Then Scanning The Code Later In The Field For Verify His Reservation.	Pass	 A screenshot of a mobile application interface. At the top, there's a green header bar with icons for signal strength, battery level (100%), and other status indicators. Below the header, there's some Arabic text and a large QR code in the center. At the bottom, there's a navigation bar with several icons, including one for settings and another for a menu labeled "الدروس".

Table 31.QR Code Unit Testing.

### 5.2.2 Integration Testing

Inputs	Expected Output	Unexpected behavior	How it is been resolved	Pass/Fail	Actual Result
Choose the field's location, Pick period of time, Barcode will appear to verify the reservation on the scanner	Reservation process is completed successfully	- Forget completed all Fields  - Internet disconnection	- Fill all the required information  - By having strong Wi-Fi connection	Pass	

Table 32.Reservation Process Integration Testing.

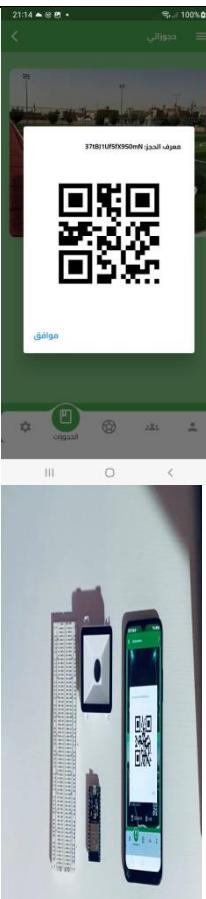
<b>Inputs</b>	<b>Expected Output</b>	<b>Unexpected behavior</b>	<b>How it is been resolved</b>	<b>Pass/Fail</b>	<b>Actual Result</b>
The user scanning the QR code in the scanner to verify his reservation	Reservation process is completed successfully and green led will indicate to insure it is valid code that already booked	-It is Invalid code  -Internet disconnection	-By ensuring that the user already booked a seat  - By having strong Wi-Fi connection	Pass	

Table 33.Scanning QR code Integration Testing.

### 5.2.3 User Acceptance Testing

End user test is defined as a type of testing performed by the user to certify the system with respect to the requirements that was agreed upon. This testing happens in the final phase of deploying the system before moving it to the market environment and from the results of the user acceptance test to the application. Now, to improve this project the team have chooses three users in which each one of these users installed and use this application[24]. The results of these operations are given in the table below:

Criteria	User#1	User#2	User#3
Efficiency	100%	100%	90%
Usability	100%	100%	100%
Layout	100%	100%	100%
Satisfaction	100%	75%	100%
Feedback	The application is good for it is color and appearance. Also, I can navigate easily between the interfaces.	Must have other languages.	Extend application to support other types of sports fields.

Table 34. User Acceptance Testing.

#### 5.2.4 Test Cases

This section provides description of the various test cases including the most extreme cases. Test every component in the application with all possible actions and inputs.

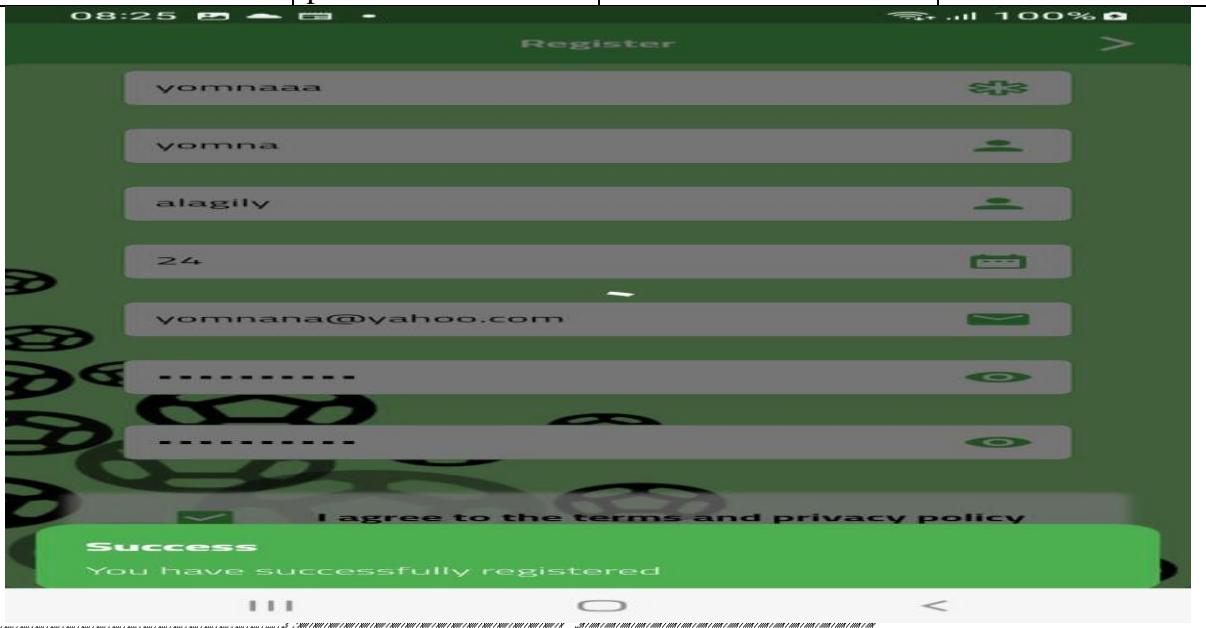
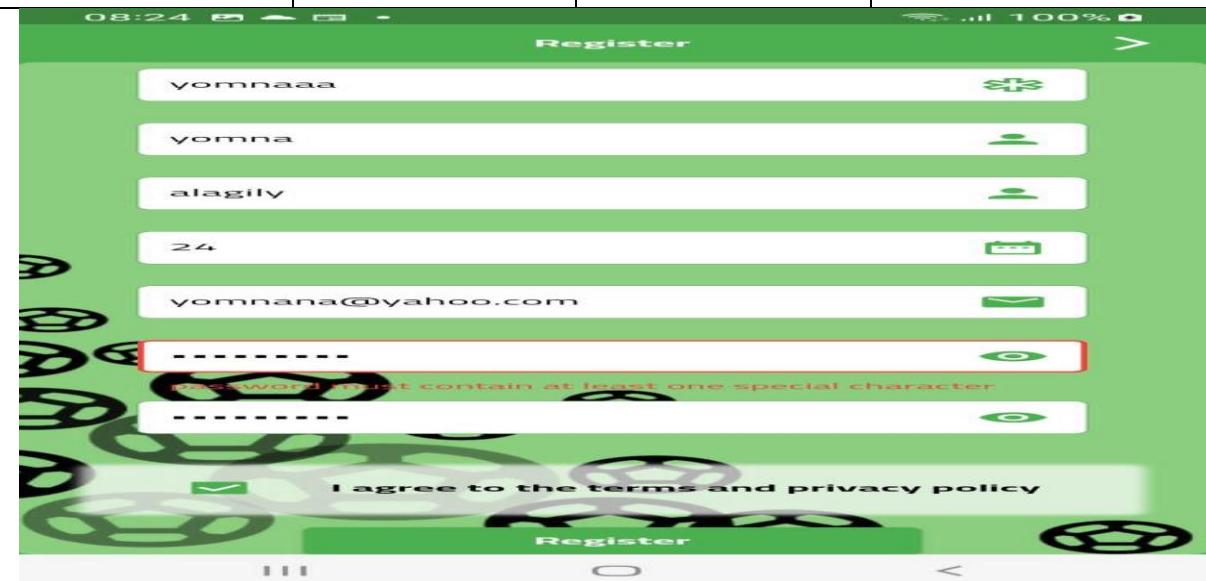
Purpose	Inputs	Expected Output	Pass/Fail Criteria
Creating an account with correct inputs	Username, phone number and password	Successfully registered	Pass
 <p>A screenshot of a mobile application's registration screen. The screen shows fields for entering a username ('yomnaaa'), phone number ('24'), and email ('yomnana@yahoo.com'). Below these fields are two password input fields, both of which are redacted with dashed lines. At the bottom of the screen, there is a checkbox labeled 'I agree to the terms and privacy policy' with a checked mark. A green success message box is displayed, stating 'Success' and 'You have successfully registered'. The top of the screen shows a status bar with the time '08:25' and battery level '100%'. The overall background of the app screen is dark green.</p>			
Purpose	Inputs	Expected output	Pass/Fail Criteria
Creates an account with invalid password	Entering password without followed password policy	Invalid Password	Fail
 <p>A screenshot of a mobile application's registration screen, similar to the one above but with an error. The password field is highlighted with a red border and contains the text '----'. A red error message at the bottom of the password field area states 'Password must contain at least one special character.' The rest of the screen, including the other input fields and the success message, appears identical to the successful registration screenshot.</p>			

Table 35. Signup Test Case.

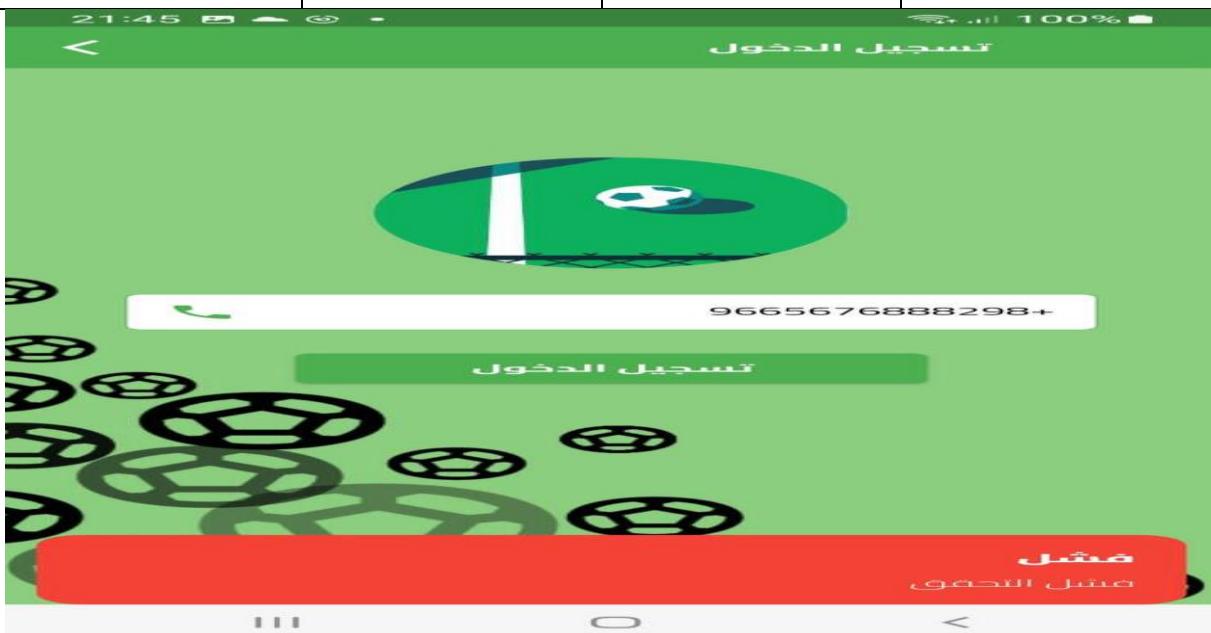
Purpose	Inputs	Expected Output	Pass/Fail Criteria		
Enter Mobile Number to login with	Enter valid format for the Mobile Number	Number Accepted then will be send verification code to that number	Pass		
					
Purpose	Inputs	Expected Output	Pass/Fail Criteria		
Enters Mobile Number to login to the application	Long Mobile Number	Number NOT Accepted Retry with another one	Fail		
					

Table 36. Mobile Number Test Case.

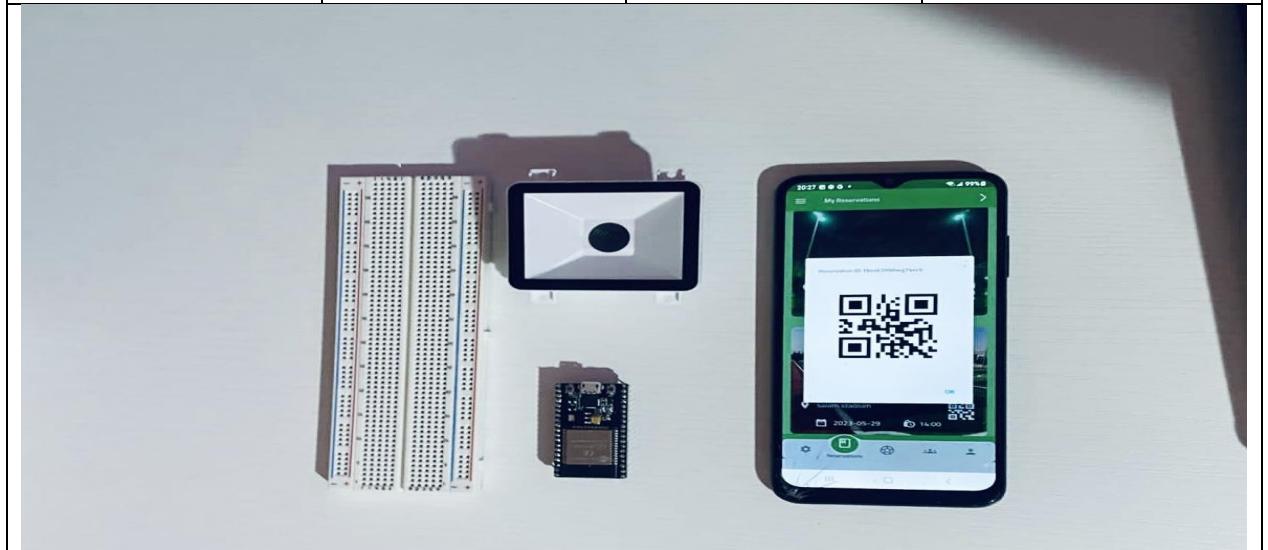
Purpose	Inputs	Expected Output	Pass/Fail Criteria
The user Choose period of time to reserve	Pick one of the scheduled periods	Time picked successfully	Pass
The user Choose which period of time he needs to play	The user Pick period of time that fully booked	It's full of players Choose another time	Fail

Table 37. Choose Time Test Case

Purpose	Inputs	Expected Output	Pass/Fail Criteria
Indicates whether the barcode is valid	Scanning the barcode to the scanner	Green Led	Pass



Purpose	Inputs	Expected Output	Pass/Fail Criteria
Indicates whether the barcode is not valid	Scanning the barcode to the scanner	Red Led	Fail



## **5.3 Discussion**

Foul Application was developed to help users pre-booked a desired seat to play football game with less time and effort in organizationally way by manage the entry to the fields and the problems with crowded and chaos happened there. The set objectives of this application was achieved. The team has more established lots of limitations and obstacles throughout the preparation and implementation of Foul application. One of those challenges that the team encountered was within the related works due to the lack studies within the filed of football booking application. Additionally there have been many difficulties that faced the team particularly within the design and implementation phases, including the Dart language because the team does not have enough expertise of this language. However, those obstacles were overcome by self-education, research, trying and viewing related information.

## **5.4 Summary**

In this chapter, Several things of testing are applied to make sure each functions of the application are work successfully. The testing is covering the valid and invalid inputs from the users and all expected outputs. The limitations and obstacles that we faced DART is new environment for the team and it is required a lot of time from the team to learn this new language. In the last and next chapter we have, It is talking about the Conclusion and Outcomes of the project and what features will be developed on the near future.

*Table 38. Barcode Scanner Test Case.*

## **Chapter Six: Conclusion and Future Work**

## **6. Conclusion and Future Work**

### **6.1 Conclusion**

In project Foul Application, the intention was to solve the problem that caused with football practitioners when they decide to play a game in their free time by achieving the planned objective. Therefore, the main aim of this project is to present a service that helps those people for searching and booking an available spot by using a mobile application before they go to the specific field and waste their time and effort. And from the previous description, Foul Application has achieved all work objectives, although there is some difficulties and obstacles that faced the team, The main challenge that we faced during the project life cycle was getting to know a new programming language (Dart) and detecting the encountered programming errors throughout the implementation phase. Moreover, implementing and completing this project allowed the team to gain valuable insight into software programming and acquire new skills and capabilities to achieve difficult goals and objectives. Among the lessons learned that we achieved during this project's implementation are:

- Being educated regarding the new programming language of Flutter Dart that used to implement and test this project.
- New types of electronic pieces have been learned to connect the hardware modules together.
- Improving the skills of writing a documentation while the same time of implementation.
- Improving in extracting and collecting required information.
- Improving efficiency and productivity by working as a team.
- Being able to work under supervision and apply the advised tasks effectively.
- Developing interpersonal and problem-solving skills.

### **6.2 Future Work**

In the upcoming features step of this project that team members will implement more functionalities to make the application more scalable such as:

- Develop the application to support many languages for those who cannot speak and read English..
- Extending the application to support other types of sports.
- Expanding the application to use for other regions in Saudi Arabia.
- For more organized process will use Automatic Arm Barrier to ensure the Authenticity of the Barcode.
- Categorized people into two different groups (Adult or Child) according to their ages to prevent the problems that will be caused.

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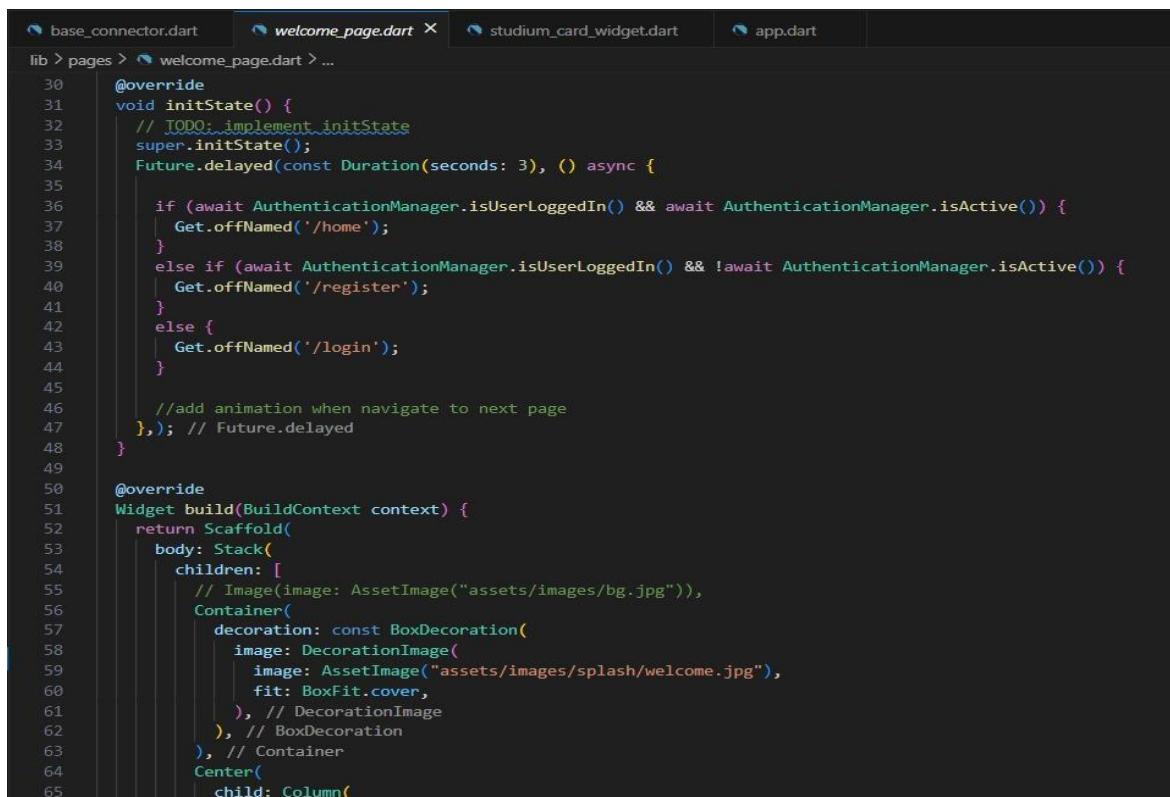
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## Appendix

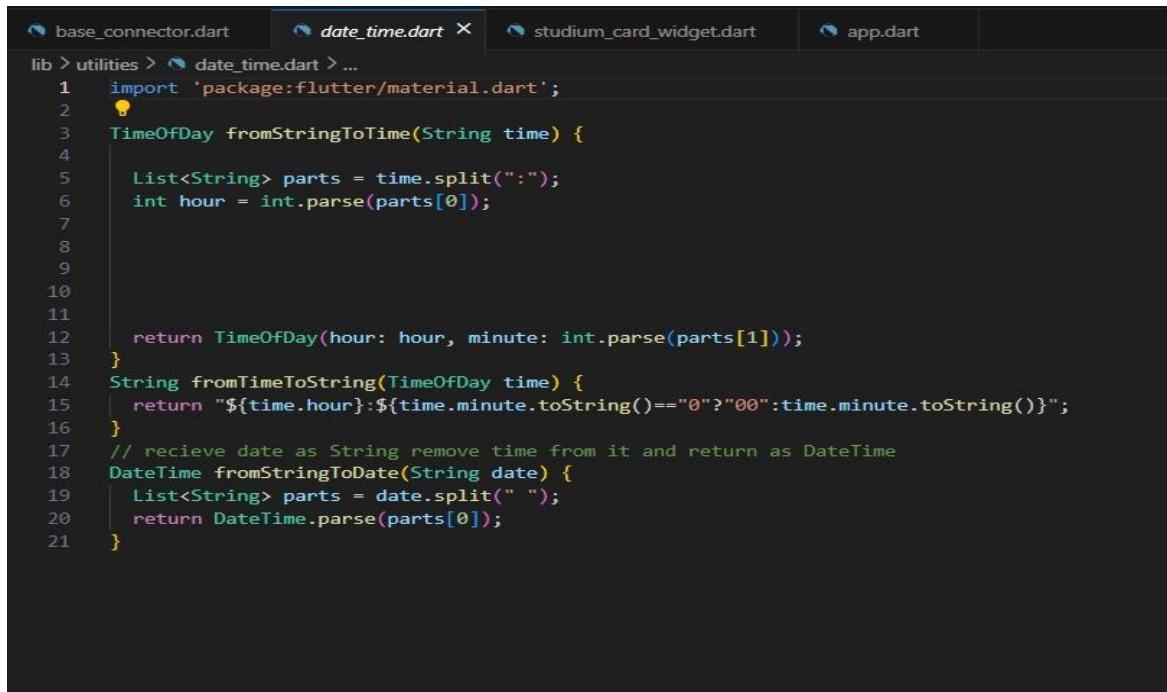
## A. Code Snippets

### Welcome Page



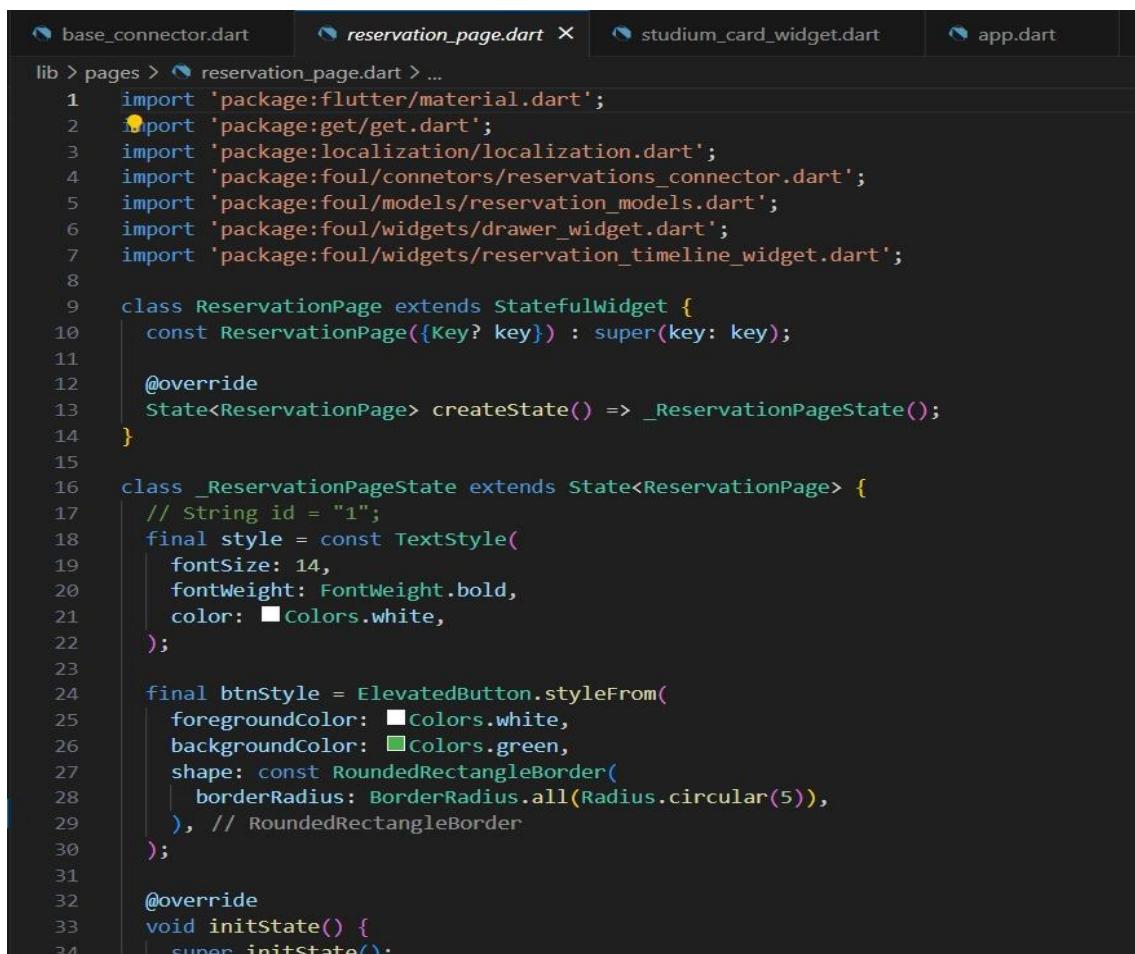
```
lib > pages > welcome_page.dart > ...
30  @override
31  void initState() {
32    // TODO: implement initState
33    super.initState();
34    Future.delayed(const Duration(seconds: 3), () async {
35
36      if (await AuthenticationManager.isUserLoggedIn() && await AuthenticationManager.isActive()) {
37        Get.offNamed('/home');
38      }
39      else if (await AuthenticationManager.isUserLoggedIn() && !await AuthenticationManager.isActive()) {
40        Get.offNamed('/register');
41      }
42      else {
43        Get.offNamed('/login');
44      }
45
46      //add animation when navigate to next page
47    },); // Future.delayed
48  }
49
50  @override
51  Widget build(BuildContext context) {
52    return Scaffold(
53      body: Stack(
54        children: [
55          // Image(image: AssetImage("assets/images/bg.jpg")),
56          Container(
57            decoration: const BoxDecoration(
58              image: DecorationImage(
59                image: AssetImage("assets/images/splash/welcome.jpg"),
60                fit: BoxFit.cover,
61              ), // DecorationImage
62            ), // BoxDecoration
63          ), // Container
64          Center(
65            child: Column(
```

### Time Code



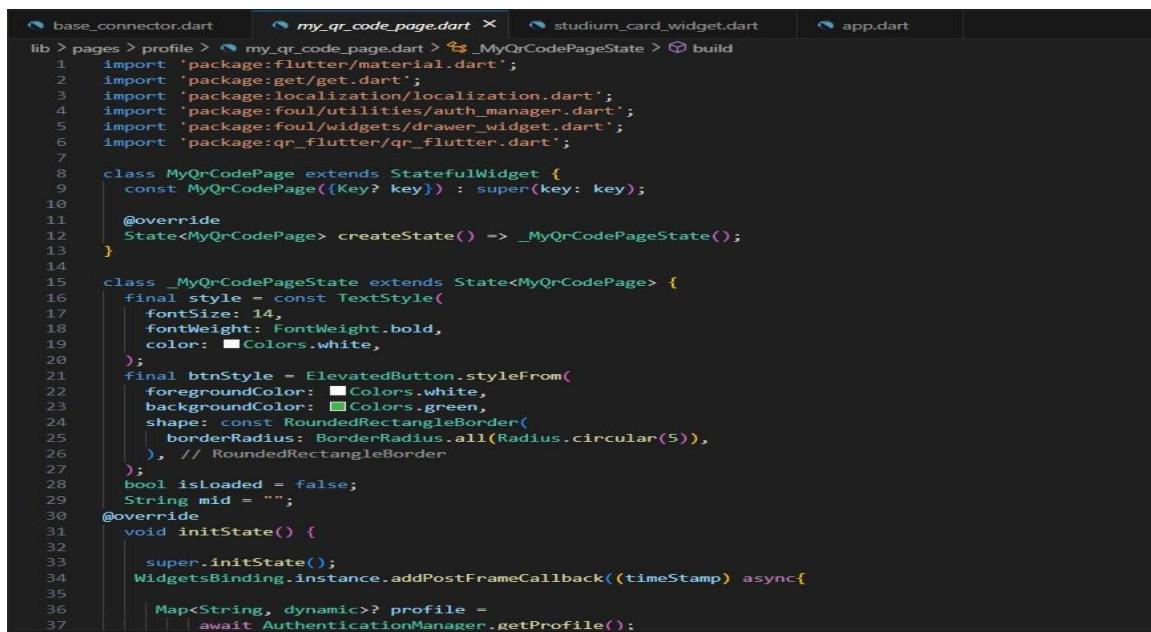
```
base_connector.dart date_time.dart ✘ studium_card_widget.dart app.dart
lib > utilities > date_time.dart > ...
1 import 'package:flutter/material.dart';
2
3 TimeOfDay fromStringToTime(String time) {
4
5   List<String> parts = time.split(":");
6   int hour = int.parse(parts[0]);
7
8
9
10
11
12   return TimeOfDay(hour: hour, minute: int.parse(parts[1]));
13 }
14 String fromTimeToString(TimeOfDay time) {
15   return "${time.hour}:${time.minute.toString()=='0'?'00':time.minute.toString()}";
16 }
17 // recieve date as String remove time from it and return as DateTime
18 DateTime fromStringToDate(String date) {
19   List<String> parts = date.split(" ");
20   return DateTime.parse(parts[0]);
21 }
```

## Reservation Page



```
base_connector.dart reservation_page.dart ✘ studium_card_widget.dart app.dart
lib > pages > reservation_page.dart > ...
1 import 'package:flutter/material.dart';
2 import 'package:get/get.dart';
3 import 'package:localization/localization.dart';
4 import 'package:foul/connectors/reservations_connector.dart';
5 import 'package:foul/models/reservation_models.dart';
6 import 'package:foul/widgets/drawer_widget.dart';
7 import 'package:foul/widgets/reservation_timeline_widget.dart';
8
9 class ReservationPage extends StatefulWidget {
10   const ReservationPage({Key? key}) : super(key: key);
11
12   @override
13   State<ReservationPage> createState() => _ReservationPageState();
14 }
15
16 class _ReservationPageState extends State<ReservationPage> {
17   // String id = "1";
18   final style = const TextStyle(
19     fontSize: 14,
20     fontWeight: FontWeight.bold,
21     color: Colors.white,
22   );
23
24   final btnStyle = ElevatedButton.styleFrom(
25     foregroundColor: Colors.white,
26     backgroundColor: Colors.green,
27     shape: const RoundedRectangleBorder(
28       borderRadius: BorderRadius.all(Radius.circular(5)),
29     ), // RoundedRectangleBorder
30   );
31
32   @override
33   void initState() {
34     super.initState();
35   }
36 }
```

## QR Code



The screenshot shows a code editor with several tabs at the top: base\_connector.dart, my\_qr\_code\_page.dart (which is the active tab), studium\_card\_widget.dart, and app.dart. The code in the my\_qr\_code\_page.dart tab is as follows:

```
lib > pages > profile > my_qr_code_page.dart > _MyQrCodePageState > build
1 import 'package:flutter/material.dart';
2 import 'package:get/get.dart';
3 import 'package:localization/localization.dart';
4 import 'package:foul/utilities/auth_manager.dart';
5 import 'package:foul/widgets/drawer_widget.dart';
6 import 'package:qr_flutter/qr_flutter.dart';
7
8 class MyQrCodePage extends StatefulWidget {
9   const MyQrCodePage({Key? key}) : super(key: key);
10
11   @override
12   State<MyQrCodePage> createState() => _MyQrCodePageState();
13 }
14
15 class _MyQrCodePageState extends State<MyQrCodePage> {
16   final style = const TextStyle(
17     fontSize: 14,
18     fontWeight: FontWeight.bold,
19     color: Colors.white,
20   );
21   final btnStyle = ElevatedButton.styleFrom(
22     foregroundColor: Colors.white,
23     backgroundColor: Colors.green,
24     shape: const RoundedRectangleBorder(
25       borderRadius: BorderRadius.all(Radius.circular(5)),
26     ), // RoundedRectangleBorder
27   );
28   bool isLoaded = false;
29   String mid = "";
30   @override
31   void initState() {
32     super.initState();
33     WidgetsBinding.instance.addPostFrameCallback((timeStamp) async{
34       Map<String, dynamic>? profile =
35         await AuthenticationManager.getProfile();
36
37   });
38 }
```

## B.Presentation Slides



**Problem definition**

With the increase of interest of many people in football sport, people are required to come to the location and check the Availability of the field and the field might be not open to play at all or there is no spot for him to play.

1

**Aims and Objectives**

- 1-creating a platform for football lovers and facilities.
- 2-Insure the application compatibility with all operating systems.
- 3-Developing user-friendly interface.
- 4- Providing customer service available 24/7.

1

**03**

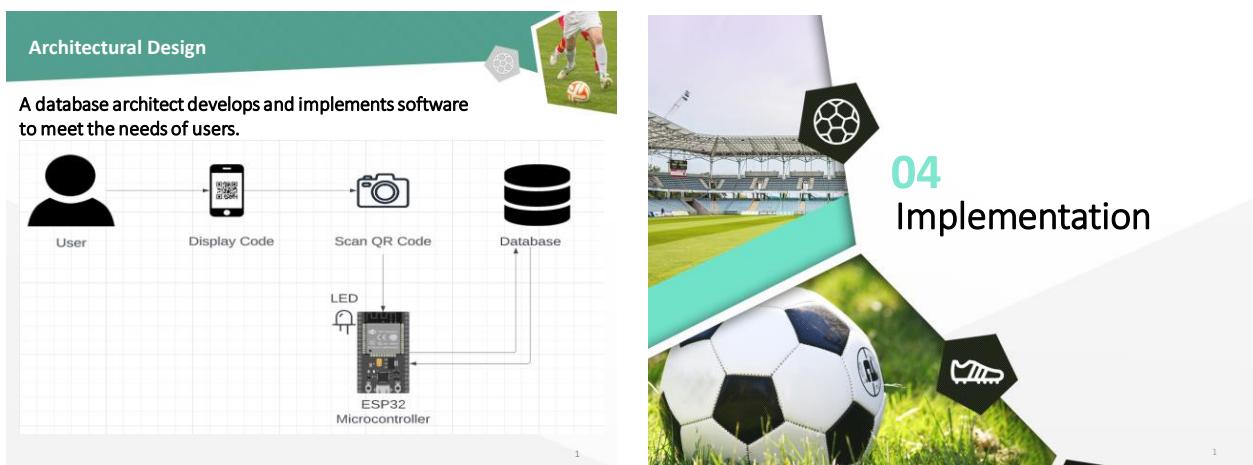
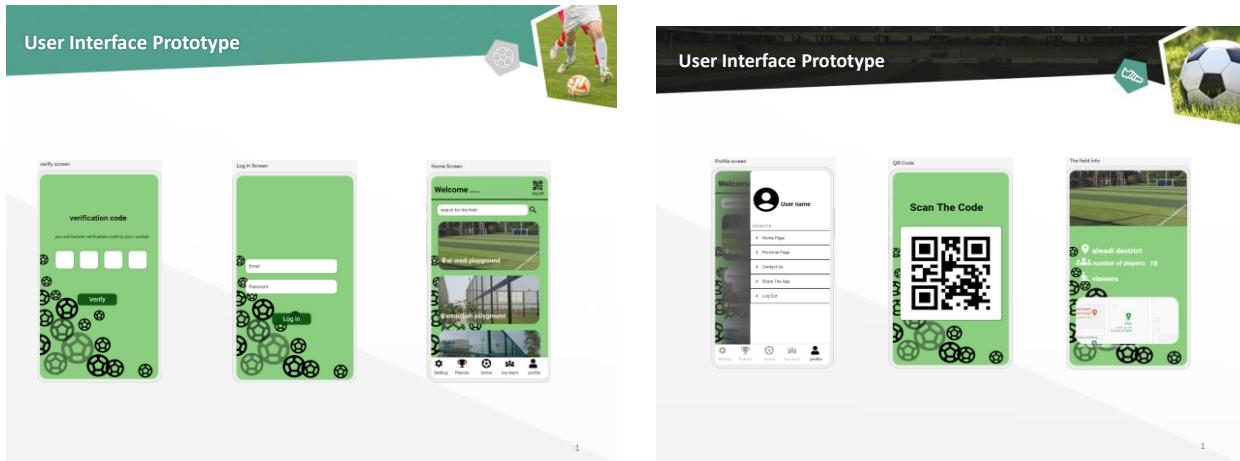
## Data analysis and design

1

**User Interface Prototype**

We collected information using questionnaire and we developed the system requirement and then implemented it to the prototype of our application.

1



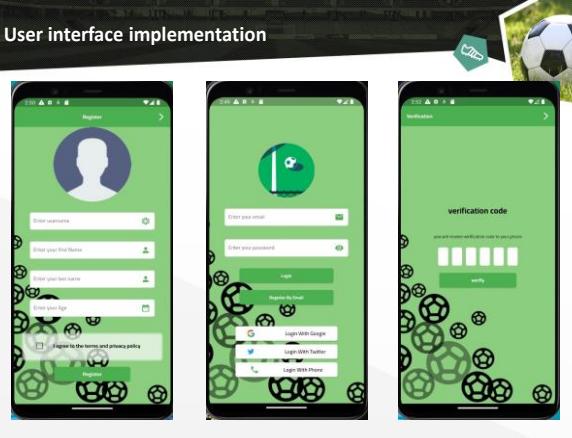
**Programming Languages and Tools**



- Flutter Dart:** Dart is used to build high-performance mobile web Applications.
- GDAL:** Stands for Geospatial Data Abstraction Library is a library of tools used for manipulating geospatial data.
- Arduino IDE:** The Arduino Integrated Development Environment connects the Arduino boards to upload programs and communicate with them.
- Firebase:** It is a great platform that provides a free database. It is useful in storing data on the server and most of what distinguishes .

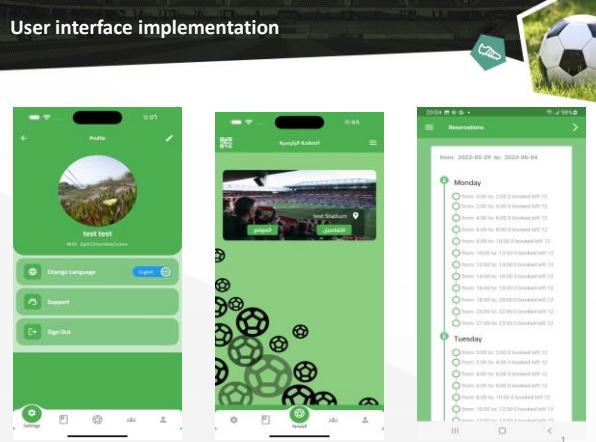
1

**User interface implementation**



1

**User interface implementation**

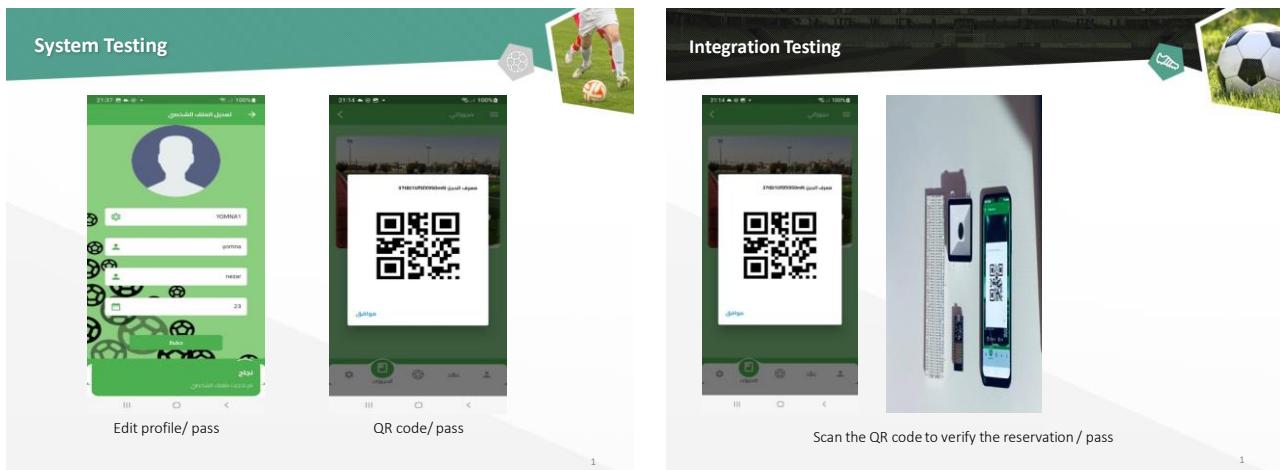
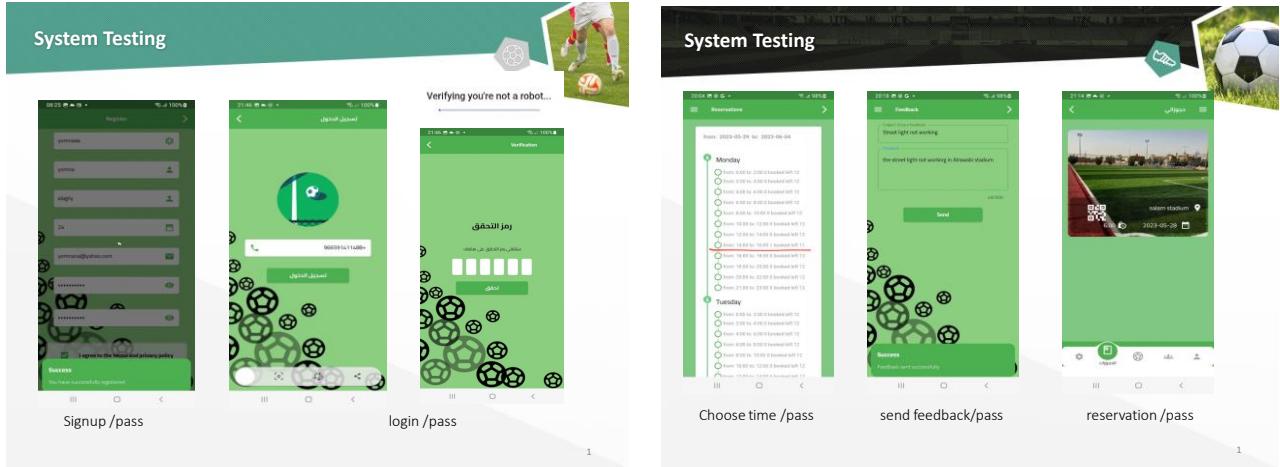


1

## 05 Testing and Result



1



## Futuer Work

- Develop the application to support many languages for those who cannot speak and read English..
- Extending the application to support other types of sports.
- Expanding the application to use for other regions in Saudi Arabia.
- For more organized process will use Automatic Arm Barrier to ensure the Authenticity of the Barcode.
- Categorized people into two different groups (Adult or Child) according to their ages to prevent the problems that will be caused.

## 06 Conclusion

In the Foul Application project, the goal was to solve the problem caused by soccer practitioners when they decided to play a game in their spare time by achieving the planned goal. Therefore, the main objective of this project is to provide a service that helps these people to search for and book an available place using the mobile application before they go to the specified field and waste their time and effort. The Foul application achieved all business goals, despite the presence of some difficulties and obstacles that faced the team. The main challenge that we faced during the project life cycle was to identify a new programming language (Dart) and detect programming errors that were encountered during the implementation phase.



# THANK YOU

Any questions are welcomed



## C. Miscellaneous

### Questioner questions:

نعمل على بناء تطبيق لملاعب البلدية في مدينة الرياض مما يساهم في مساعدة المهتمين بكرة القدم لتنظيم اللعب داخل ملاعب الحي ، سيساعدنا هذا الاستطلاع في جمع المتطلبات الخاصة بمشروع التخرج ، ونأمل منكم الإجابة على الأسئلة ونشكر لكم تعاونكم معنا.

age? - العمر؟

- اقل من 18
- 21-26
- 27-31
- فوق 32

هل سبق لك أن ذهبت إلى الملعب الذي يدخل الحي؟

- نعم - yes
- لا - No

If your answer is yes, how often do you go to play in a week?

- مره - once
- 2 or 3 times - مرتين او ثلاثة
- More than 4 times - اكثرب من اربع مرات

When going to play, were you an individual or a group?

- فرد - individual
- مجموعه - Group

When I go to the field , I go for...  
...عند الذهاب للملعب ، فأنا اذهب لأجل

- اللعب - play
- مشاهده اللعب - watch the game

What problems do you face while playing?

- عدم التنظيم/unorganized .
- Congestion./كثرة الازدحام

- ما رأيك لو كان الملعب له حجز مجاني يسمح لدخول اللاعبين المسجلين فقط؟ - What do you think if the field had a free reservation allowing only registered players to enter?

- أفضل / Much better.
- فكرة رائعة / Good idea.

- اقتراحات ترغب بمشاركتها معنا لتطوير التطبيق؟ - Suggestions you would like to share with us to develop the application?

- Find out what times are available throughout the week.
- Reminder of the approaching reservation date.

Link:

[https://docs.google.com/forms/d/e/1FAIpQLScA4PQm7nqhkJGr7Jb6Agf\\_QzMQ\\_xgH7iYNMYsN0lZ7yro1yA/viewform](https://docs.google.com/forms/d/e/1FAIpQLScA4PQm7nqhkJGr7Jb6Agf_QzMQ_xgH7iYNMYsN0lZ7yro1yA/viewform)

## D.Obligation

### تعهد

أتعهد بعدم المشاركة في الفعاليات أو المبادرات أو المسابقات ذات العلاقة دون أخذ موافقة خطية مسبقة من الكلية، و أقر بمعرفتي أنني إذا خالفت هذا التعهد ستم محاسبتي وفق اللوائح و الأنظمة.

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