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Scavenger Hunt Game Using BLE Beacon**

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Abstract

In this project, we will develop a mobile “Scavenger Hunt Game” which will be a service-based web application built on top of this application for BLE Beacons, that makes it possible to do all your configurations of the application on the web. This game will be a fun game where several teams earn points by doing the jobs in the task list which is given to them and try to get the highest points by doing the jobs that specified in the city, campus or a certain area. The fundamental idea of this scavenger hunt game type is that you can see the locations on the map by following specific rules. Players can make appear the locations as game creator wants and questions pop up when a player is at the right position. The main purpose of this project is to make easier to perform the missions which is expected from people with an entertaining way [1].

Key words:

Bluetooth Low Energy (BLE), BLE Beacon, Android Studio, Scavenger Hunt Game, Mobile Application, MySQL, Database Management System.

Özet

Bu projede, BLE Beacons için bu uygulamanın üzerine inşa edilmiş, web üzerinde uygulamanın tüm yapılandırmalarını yapmanıza olanak sağlayan hizmet tabanlı bir web uygulaması olacak mobil bir “Scavenger Hunt Oyunu” geliştireceğiz. Bu oyun, çeşitli ekiplerin kendilerine verilen görev listesindeki işleri yaparak puan kazandığı ve şehir, kampüs veya belirli bir alanda belirtilen işleri yaparak en yüksek puanları almaya çalıştığı eğlenceli bir oyun olacak. Bu Scavenger Hunt oyun tipinin temel fikri, belirli kuralları izleyerek haritadaki konumları görebilmenizdir. Oyuncular, oyun yaratıcısının istediği yerleri görebilir ve bir oyuncu doğru pozisyonda olduğunda sorular ortaya çıkar. Bu projenin temel amacı, insanlardan beklenen görevleri eğlenceli bir yolla yerine getirmeyi sağlamaktır [1].

Anahtar Kelimeler:

Bluetooth Düşük Enerji (BLE), BLE Beacon, Android Stüdyo, Scavenger Hunt Oyunu, Mobil Uygulama, MySQL, Veri Tabanı Yönetim Sistemleri.

1. Introduction

1.1. Motivation

As a group of computer engineer candidates, we are designing a game which will make daily responsibilities less boring. In this project, we are aiming to use Beacon, Game and Android technologies together. We decided to use MySQL as database in our project because it is more suitable than others. We are going to use phpMyAdmin which is a web application written primarily in PHP for managing our MySQL database. In order to reach our aim, we made researches about beacons, web servers, Android programming and games.

1.2. Problem Statement

In developing world, people have daily responsibilities and they can feel bored with the realization of these responsibilities, and sometimes they can make a little cheat on their work lives. For example, they can make someone else to do their jobs. Therefore, their responsibilities cannot be done as one hundred percent. If we think that these responsibilities are important and must be done correctly, we should change the old way. If they have a competitive game about their daily responsibilities, their potential to do their works increases.

In daily life, people do not have same characteristic abilities. Some people cannot communicate with strangers or some need to handle their works as being a group. But people cannot be close with other group members all the time and they cannot help their group members to do their project. Hence, we need something to get people close with each other.

1.3. Solution Statement

In our project, we will use BLE Beacons and mobile technologies. BLE Beacons provides Bluetooth signals to detect people's mobile devices' location. So, we are developing a program which managers can add people's responsibilities as missions and these managers are going to be able to follow missions' status. Also, this program is going to be a competitive game. People are going to be in race with others. Therefore, they definitely want to get higher scores and they do not get bored easily.

2. Literature Search

2.1. Gamification

Gamification can be defined as the use of game design elements in non-game applications. It is the process of integrating game mechanics and game dynamics into a website, service, online platform or content portal to ensure participation and engagement [2].

2.1.1. What is Gamification?

Gamification means applying gaming philosophy and game-based thinking to non-game activities in order to change the tendencies and behaviours of people. The main goal of this method is combining work with fun to encourage people and increase their participation and motivation [3]. For example, gamification can be used to increase the participation in a business activity, to increase the frequency of use of a service or a website, to encourage people to share more on their platforms where they are registered, or identify active users in a platform.

2.1.2. Game Mechanics and Game Dynamics

Game mechanics are the fundamental actions, behaviours, processes and control mechanisms that are used to gamify an activity. They are the rules and techniques that taken together to create a compelling and engaging user experience. They make the activity challenging, fun, satisfying, or any other emotion that designers of game want to remind users [4]. Using them individually or together generates highly motivational users. These game mechanics are:

- Points
- Levels
- Challenges, Trophies, Badges, Achievements
- Leader boards [5]

On the other hand, game dynamics are the reasons why people are motivated by game dynamics. The emotions that are reminded to users by game mechanics are called as game dynamics. Game dynamics are people's desires, motivations and needs of the game experience. Some of the game dynamics are:

- Reward
- Status
- Achievement

- Self-expression
- Competition
- Altruism [5]

2.1.3. History of Gamification

Using play and fun to motivate people and make work life more entertaining is in our lives for a long time. According to known, the use of gamification started in 1912 but the term gamification is added to our vocabulary recently. Even before this term entered into our lives, many researchers were already exploring the role of fun and play in computer-based applications. In 1980s, publications that are related to Gamification were released by Thomas W. Malone which are “What Make Things Fun to Learn” and “Heuristics for Designing Enjoyable User Interfaces: Lessons from Computer Games”. In 1990s, Stephen W. Draper published Analyzing Fun as a Candidate Software Requirement [6].

In the early 2000s, the role of fun and play in user experience became a more considered tool by people. The idea behind this use of playfulness in software was that instead of just making simply usable interfaces, they could be fun to use as well. Therefore, to enhance the experience that the user had with the software, designers chose to consider how positive emotions and good feelings could be ensured through things such as sounds, graphics and challenges [7]. After this, applications that directly used elements from games have appeared. In 2007, Chore Wars which is a task management application with a role-playing game with experience points and monster battles has released [6]. Then, Bunchball which is a gamification tool for enterprises was introduced. Bunchball launched the Nitro platform which allows organizations to integrate game mechanics into social networks, mobile applications and websites [7]. In 2009, Foursquare which is a highly successful and popular application was released. It is a location sharing social network application that gives points and badges to users for using its “check-in” service to indicate their locations. In 2010, gamification became more popular and the term adopted by companies such as Bunchball and Badgeville to represent the platforms they had created to integrate game elements into websites [6]. In 2011, the first Gamification Summit held in San Francisco [7].

Since 2011, gamification gained much more attention in both industry and academic world and growing rapidly. Conferences are organizing, books and articles are publishing about

gamification. In time, more and more organizations started to use gamification in many different areas.

2.1.4. Examples of Gamification

2.1.4.1. Amazon.com

Reviews in online websites are very significant for customers because other customer's opinions have a big influence on the decision of buying the products. Both the quality and the quantity of reviews are important. Writing a comprehensive review can be difficult. That is why some comments are so much more beneficial and useful than others [8].

In order to improve both the quality and the quantity of reviews Amazon.com started the Amazon's Top Reviewers program which rewards customers for their helpful reviews. Customers vote the reviews of other customers to indicate if that review was helpful for them or not by choosing yes or no. The number of helpful reviews of a customer turns into points. To increase the competition, there is a leader board which shows the rank of reviewers [8].

2.1.4.2. Prezi

Prezi is popular presentation software like Microsoft PowerPoint. It is a web-based tool for creating innovative and original presentations. This service works in the online platform and it offers a totally new and different way of presenting such as zooming to pictures and using one big picture instead of regular slides. Its unique features are the reasons why people choose Prezi against Microsoft PowerPoint which its big competitor [8].

Prezi targeted students which are the professionals of tomorrow to get the general public to use Prezi instead of Microsoft PowerPoint. Because, if they are using Prezi now, they might continue to use it in the future. To reach students, Prezi has started the Prezi Ambassador Program [8]. The Prezi Ambassador Program is an exclusive opportunity for fully matriculated university students around the world to gain valuable start up experience of their own [9]. Students from all over the world can apply for the Prezi Ambassador position of their university. There can be only one Ambassador in each university. The mission of the Ambassador is to prepare a plan to make Prezi popular in their university. To arrange activities like making presentations for other students will earn points, status and Prezi merchandise to Ambassador. Ambassadors from all over the world compete against each

other for big prizes such as a trip to Prezi offices in Budapest or San Francisco. Prezi uses some of the key game elements in this program such as points, status and leader boards. In this way, Prezi uses gamification in its Ambassador Program to get new users from all over the world [8].

2.2. Android

2.2.1. What is Android?

Android is an operating system which is designed for mobile devices and it is working on UNIX kernel. It is an open source and free to use. It was developed by the Open Handset Alliance, led by Google and other companies. It has quite comprehensive software architecture [10].

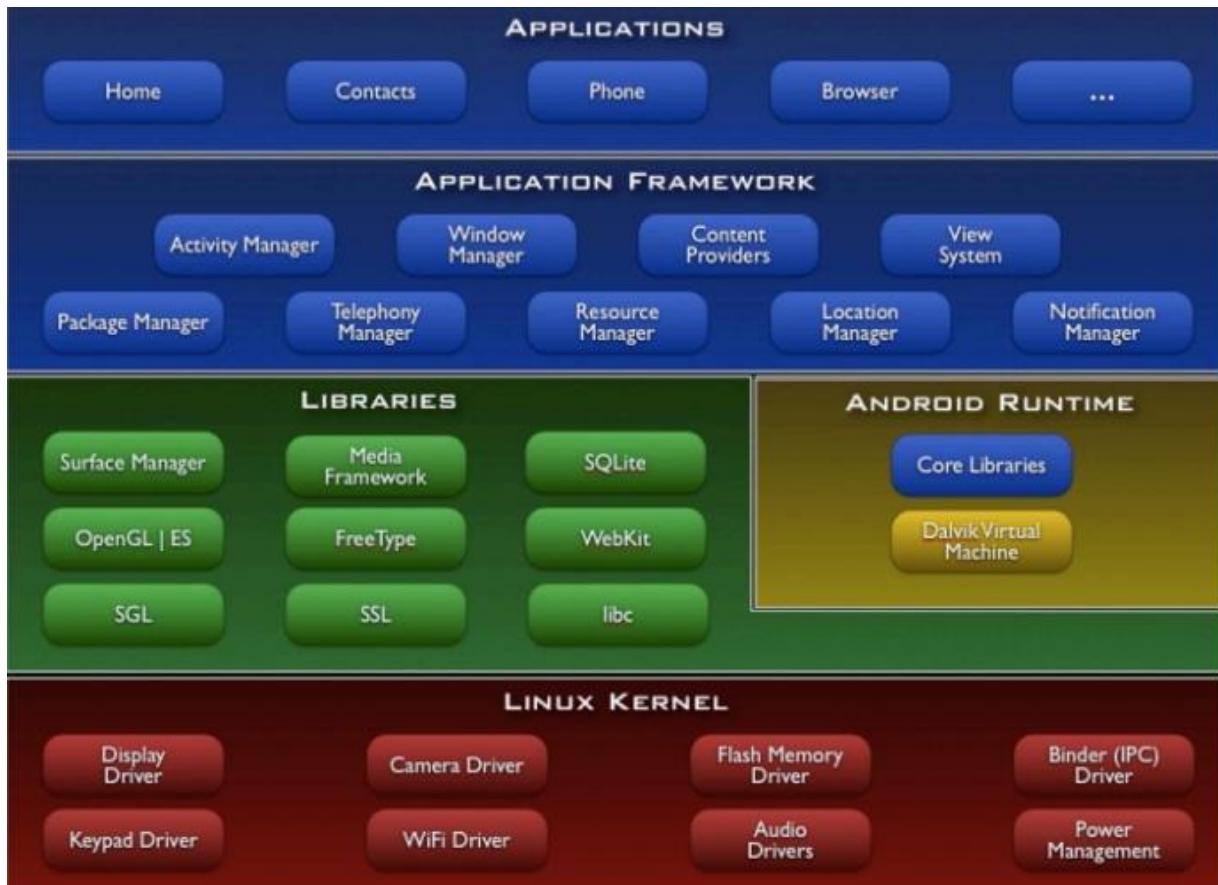


Figure 1 The architecture of the android operating system [11]

Android has all necessary substructures and a large library for software developers. Previously, for the development of an application for mobile devices, developers handled the complex C and C++ codes which can change according to the device's processor, but thanks

to evolution of mobile operating systems hardware access provided successfully by the developers. In this way, information of the hardware that works on a mobile device is not a necessity to access and control the hardware's component with Software Development Kit (SDK) [12].

2.2.2. Common Applications which Comes with Android

When you buy an Android mobile device, you will have some applications like web browser, music player, camera application and mail manager. These are just a few of the applications that come with Android. In addition, mobile device manufacturers provide their own applications. For example, for HTC phones, there is an interface library that coding on Android OS and its name is HTC sense. This is the special part of an Android OS. It does not depend on one shape of usage way. Different manufacturers are free to produce their own usage way. This is the purpose of establishing the Open Handset Alliance (OHA) [12].

With Android SDK, developers can do location-based operations, database operations with SQLite database, graphic operations like 2D or 3D game development, sensor and camera operations or background operations like automatic answer system to SMS.

2.2.3. Android Development Environments

There are several environments to develop Android applications such as Eclipse, IntelliJ IDEA and Android Studio. They help us to develop Android applications. Generally, we can represent the differences between Android Studio and others as shown in below:

- With Android Studio, we can develop applications for all Android devices and environments (phone, TV ...),
- Advanced compilation method with Grandle,
- Android application templates,
- Android Emulator support,
- The advanced interface develop editor,
- With Espresso Test Recorder, advanced test management [10].

There are more features like these, so that is why we decided to develop our project in the Android Studio.

2.3. Database Management Systems

A database is an organized collection structured information, or data that stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). The data, the database management system and the application that is associated with these forms the database system [13].

In a database, the data is usually modeled in rows and columns in a series of tables to make processing and data querying efficient. In this way the data can be accessed, managed, modified, updated, controlled and organized easily. Most databases use structured query language (SQL) for writing and querying data [13].

A database management system (DBMS) is system software for creating and managing databases. The DBMS provides a way of creating, reading, updating and deleting the data in a database to users [14]. In our project we decided to use MySQL as our DBMS because it fits into our project.

2.3.1. MySQL

MySQL is an Oracle-based open source relational database management system (RDBMS) based on structured query language (SQL). MySQL runs virtually on all platforms such as Windows, Linux and UNIX [15].

MySQL is originally designed by the Swedish company MySQL AB. Then it was acquired by Sun Microsystems in 2008. After that Oracle bought Sun in 2010 and became the owner of MySQL. Developers can use MySQL under the GNU General Public License (GPL), but enterprises must obtain a commercial license from Oracle [15].

Today, MySQL is the RDBMS behind many of the top websites in the world and countless corporate and consumer-facing web-based applications, including Facebook, Twitter and YouTube [15].

We decided to use MySQL because it is free and easy to access. All of the group members and our advisor can reach the database at any time. We chose to use phpMyAdmin which is a web application written primarily in PHP for managing our MySQL database.

2.4. BLE Beacon

2.4.1. What is BLE Beacon?

First, if you need to define this technology, beacon is a technology that provides location information using low energy Bluetooth (BLE) technology. In other words, products or devices with beacon technology can emit passive signals to interact with mobile devices near them. Depending on the distance, this technology reaches people and transmits the information that they want to interact with [16].

2.4.2. How does BLE Beacon Work?

Beacons transmit small amounts of data through Bluetooth Low Energy (BLE) up to 50-70 meters. They are often used as indoor location technology and can also be used outside. Beacons are usually used with small batteries, but can be plugged into a wall outlet or USB port to provide consistent power. In addition to independent beacon devices, mobile phones, tablets and computers with BLE support can both emit and receive beacon signals and function as beacons [17].

2.4.3. What does BLE Beacon Look Like?

Beacons are small and simple devices. If you turn one of them on, you cannot see multiple motherboard or cable clutter; you will probably find CPU, radio transmitter and battery. Beacons often use CR2477-derived lithium-ion chip batteries. Beacons may be in different colors or shapes; they may have an accelerometer, temperature sensor or special additional components. Still, the common feature of all beacons is to broadcast signals [18].

2.4.4. How does BLE Beacon Communicate?

The beacon emits an identification number ten times per second. A nearby Bluetooth enabled device receives this signal. When an application recognizes its signal, it connects it to an action or content track stored in the cloud and allows the user to view it. By editing the application on your phone, you can set how it reacts to signals [19].

2.4.5. When did BLE Beacon Appear?

Today's beacons appeared with Apple's announcement of iBeacon in 2013 and in 2015 Google entered the market with Eddy Stone. Since then, these two product groups have been leading the market [18].

2.4.6. BLE Beacon Usage Areas

2.4.6.1. Monitoring

Manufacturing and transport are practical areas of beacon technologies. Managers want to know exactly where the products are in the factory and when they are delivered. With the help of the beacon network, they can obtain exactly what they want and access the archive of this information [19].

2.4.6.2. Navigation

Google Maps and other map providers serve for external areas. Clear instructions can be taken with beacons in the closed areas. For example, the Louvre Museum covers an area of 60,600 m². It is very difficult to reach the artwork that is desired to be seen in such great museums without getting lost [19].

2.4.6.3. Interaction

Beacons can automate responses and trigger events. When you enter the room, the projection device starts to operate. Every time you go to the cafe, you pay nine and when you go to the vault for the tenth time, the app lets you know you have won a free latte [19].

2.4.6.4. Security

Beacon can automatically send a safety issue notice (to application users or property owners) when patients enter the wrong wings or make factory workers dangerous changes [19].

2.4.6.5. Analysis

Data is one of the largest tools in the hands of a company. Beacons can collect information about where the customers are going to or where there are problems in the production line. This information can be stored and accessed on how users interact with the beacon via the online platform [19].

2.5. Related Applications with BLE Beacon

2.5.1. “Beacon Me” Mobile Application Help the Travelers as Tour Guide with Using Emojis

Modern cities are home to many attractions that may interest people. But travelers need robust mobile applications with user-friendly interfaces to help them find their way easily to discover every corner of the modern city where there are dozens of points to visit [20].

The Beacon Me mobile application is an application designed to answer exactly this need. But it does this in an interesting way: using emojis to better help travelers discover new cities. It displays the activities, places to visit, restaurants, places and more on a map full of emojis. It is possible to find an emoji for almost all events and venues as the new emojis are used by Internet users every day. The Beacon Me mobile application, which makes it easy for travelers to find points of interest, also gives travelers the opportunity to experience unique experiences that they will never enjoy in any other way [20].

In application or tasks users are available to users as ideas based on tasks that make them feel like a native of their city as they explore and complement attractions. The Beacon Me mobile application is now available for download from the App Store for the iOS operating system. Although the practice is currently only available for Philadelphia, the creators of the application say they plan to launch the application in more cities soon [20].

2.5.2. Beacon and the Internet of Things are Changing the Banking Sector

When you enter the bank branch, the mobile banking application on your smart device and the sensors will tell you that you are there and will notify you of the sequence number. So, you do not have to dial the kiosks and get a number on paper. Or you will be able to receive special campaigns from your mobile device instantly within the context of your permission and needs around the bank branch. For transactions, starting from the mobile application, you will be able to receive notifications at the branch and save time by making your transaction on the phone. The sensors installed at ATMs will understand that you are approaching and it will be able to communicate with you when you are at the ATM, and you will be able to withdraw money quickly in seconds without having to deal with the minutes in the ATM [21].

2.5.3. Chrome Android App Comes with Beacon Support

According to the Google Chromium blog, Android users will be able to interact with the beacons soon via the Chrome browser. The new feature will be implemented in the 49th test version of Chrome for Android. With Bluetooth-based Beacons at any point, users will be able to exchange data between their mobile devices. Emphasizing the importance of this new interaction platform called Physical Web (Google). Google first handled this work in July last year. Google has begun testing the beacon interaction in Chrome for iOS and unveiling its work in CES 2016. With the increase of beacon manufacturers and developers, it is finally the expected step for Android [22].

It is of course long to sort out what can be done with the beacon interaction. However, details such as interoperability and user privacy are not fully resolved. We do not yet know what cyber attackers can do in this area, but the work in this area will progress continuously [22].

Google is organizing a competition in objects and it is clear that the future will expand its work under the physical web tag. If you are interested in these issues, you should follow the Chrome updates for Android closely [22].

2.5.4. iBeacon Scavenger Hunt Application for iOS

With the iBeacon Scavenger Hunt you can set your own exclusive scavenger hunt game for iOS and Android devices. You can create a game by placing iBeacons in target locations and configuring their descriptors with the application. You can create a custom application based on the open source examples for Android and iOS, or use the developer's own applications in app stores. Scavenger hunts are great team building activities. They are perfect for encouraging people to visit long distance areas in trade fairs, meetings and conferences. The application is based on the developer's Proximity Kit for iBeacons cloud service, which allows you to make the iBeacon configuration in the cloud. This configurability is what makes it possible to create different iBeacon Scavenger Hunts with the same application [23].

3. Software Requirements Specification

3.1. Introduction

3.1.1. Purpose

The purpose of this document is to define the application that is called the Scavenger Hunt Game Using BLE Beacon. The system is formed with the BLE Beacon devices and a mobile application. This application aims to be a mobile game which is using fun and creative game dynamics in it. Collecting points by doing the specified jobs in the given task list to get the highest point is the goal of this game. This document describes the application. Requirements of the project are given in this document.

3.1.2. Scope

Nowadays, people's jobs are becoming monotonous and they want to have fun in their daily lives. In work life, people are may not adapt themselves to their works or workplaces. Else, their lives became boring or they just wanted to interest in other stuffs. Therefore, their work efficiency will decrease. This is same for students. Once a student is feeling bored, they do not want to do anything willingly. This mobile application will be a Scavenger Hunt Game's mobile version, so this application will make people's jobs easier and funnier. Schools and universities can use it to create teams to get done the given tasks. Or, kids can use it just for fun. This application's main goal is to make everyday life funnier and adapt people to their living space more easily.

3.1.3. Definitions

Term	Definition
Software Requirements Specification (SRS)	The description of a software system to be developed.
BLE Beacon	The device which sends low energy Bluetooth signals.
Android	Android is an operating system for mobile devices.
Database	A database is a collection of information that is organized so that it can be easily accessed, managed and updated.
Database Management System (DBMS)	A database management system (DBMS) is system software for creating and managing databases.
MySQL	MySQL is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL).
SQL	Structured Query language (SQL) is actually the standard language for dealing with Relational Databases.
phpMyAdmin	phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the Web.
PHP	PHP is a widely-used open source general-purpose scripting language that is especially suited for web development.

3.1.4. References

- [1] IEEE. IEEE Std. 830 - 1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.

3.1.5. Overview of Document

In this document, we indicated the main parts of Scavenger Hunt Game. We explained the goals of our mobile application and described how this mobile application should work. We mentioned about the functionalities of the system. Both functional and non-functional requirements are mentioned in different sections.

3.2. Overall Description

3.2.1. Product Perspective

As mentioned earlier, this application is mobile version of the Scavenger Hunt Game. So, it has similar rules in this application. Users have some roles like becoming players or game creators. Game creators create games, create areas and create some missions for players to do. Then, players try to do these given missions in specific locations tagged with Bluetooth Low Energy Beacons and try to earn points to get the highest score. BLE Beacons just provide the necessary signals and with this signal the system confirms whether or not the task is completed. In this way, people interact with each other and they strengthen the relationships between them.

3.2.2. Product Functions

The main purpose of the Scavenger Hunt Game Using BLE Beacon project is to maximize work efficiency and make people happy. In this way, people's life quality can increase and people can build stronger relationships with each other. With this application people can have:

- Skill of work sharing,
- Time management,
- Easily adapt to group work,
- Competitive spirit.

For doing all of these, the application should be dynamic, so it cannot be static. Also, it will have security functions to secure users' information and it will have easy to use interface to be playable by every age user.

3.2.3. User Characteristics

3.2.3.1. Players

Players must have register to the mobile application as players.

Players must know how to use the mobile application.

3.2.3.2. Game Creators

Game creators must have register to the mobile application as game creators.

Game creators must know how to use the mobile application.

3.3. Requirements Specification

3.3.1. External Interface Requirements

3.3.1.1. User interfaces

The user interface will be worked on mobile devices which has Android operating system version 7.0 or above.

3.3.1.2. Hardware interfaces

The application will be required mobile devices with Bluetooth hardware on it because BLE Beacon is a Bluetooth technology device.

3.3.1.3. Software interfaces

There are not any external software interface requirements.

3.3.1.4. Communications interfaces

There are not any external communications interface requirements.

3.3.2. System Features

3.3.2.1. Login and Register Features

3.3.2.1.1. Introduction of Feature

This feature is about how to access to the system. All users need to register first to use the system. Then, they can log in and use the system. The system requires authentication. If users enter their login information correctly, they can get into the system.

3.3.2.1.2. Stimulus/Response Sequence

Stimulus: A user attempts to log in to the system.

Response: The system authenticates the user.

Stimulus: A user attempts to register into the system.

Response: The system checks whether the user already registered or not.

3.3.2.1.3. Associated Functional Requirements

3.3.2.1.3.1. Login System

Description: In the login system, all actors are able to log in to the system, and if they gave wrong information to the system, there will be a login exception to protect system's safety. And also, all actors are able to change their passwords and log out from the system. The flowchart diagram of login system is shown in Figure 2.

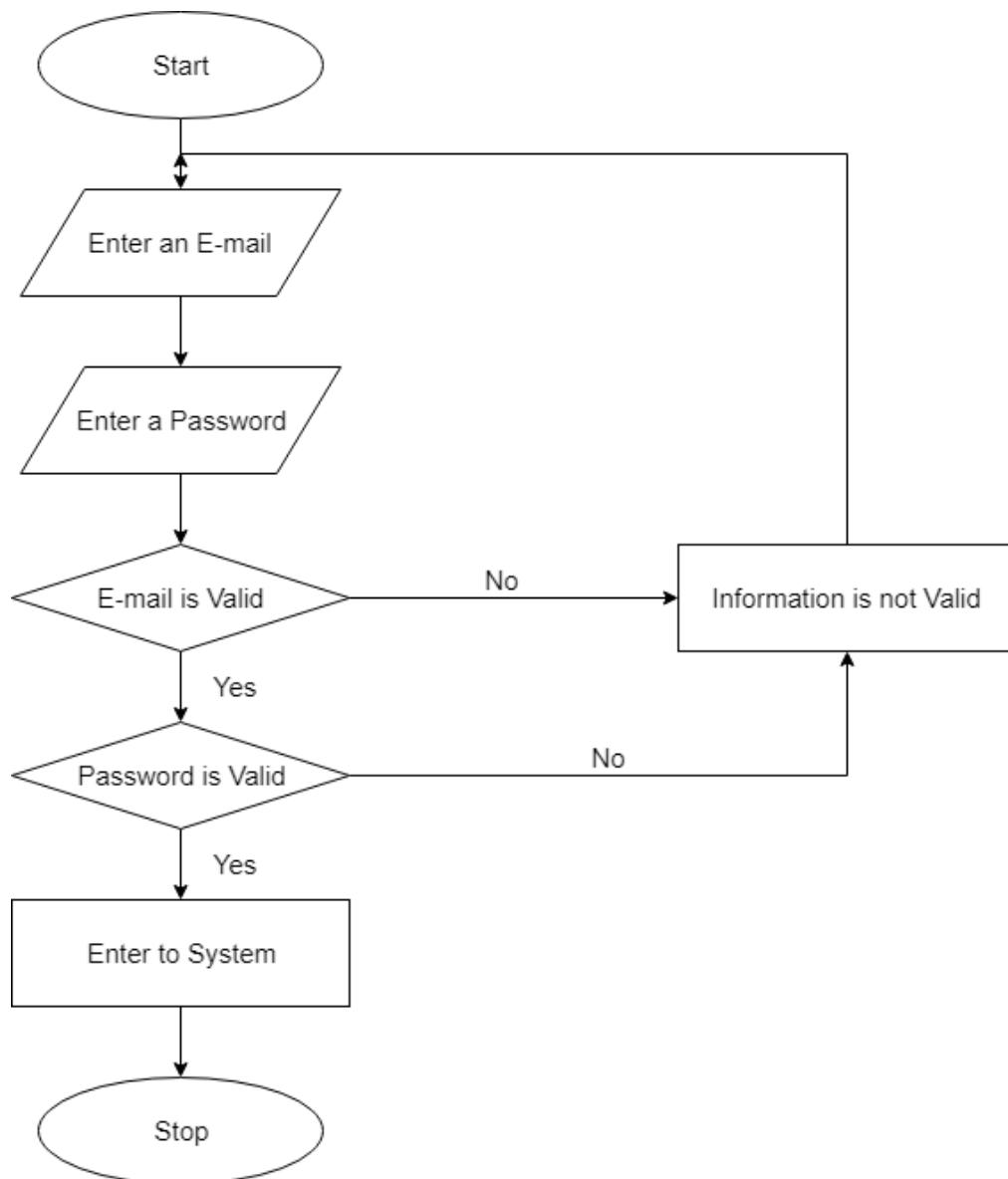


Figure 2 The flowchart diagram of the login system

3.3.2.1.3.2. Registration System

Description: In the registration system, users can register as a player or game creator. The use case of registration system is shown in Figure 3.

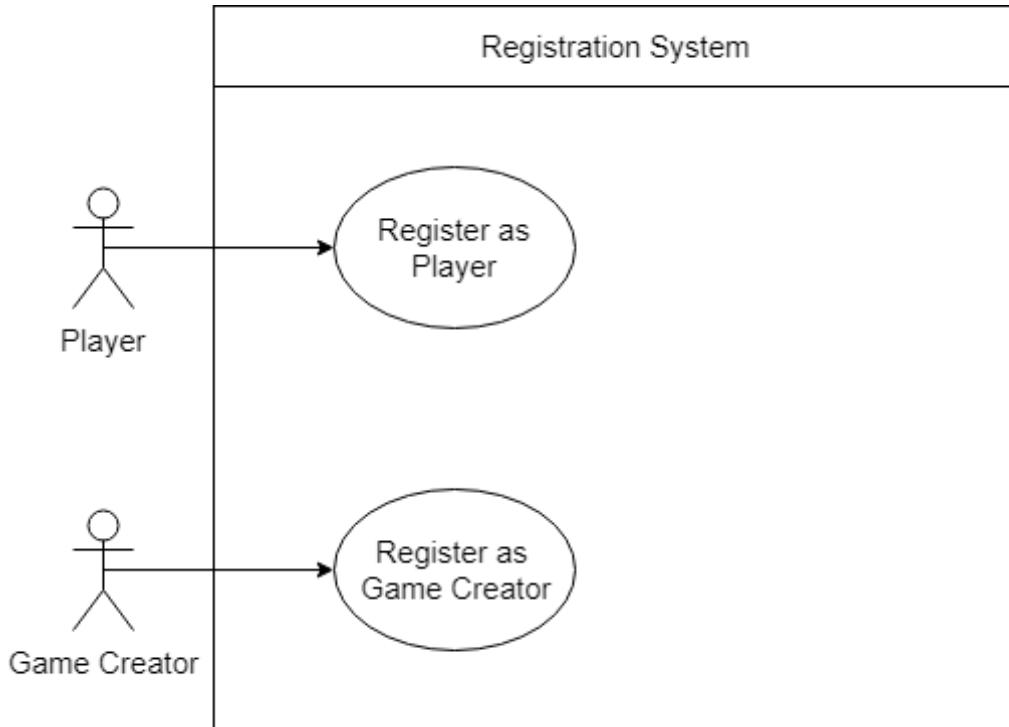


Figure 3 The use case diagram of the registration system

3.3.2.2. Defining Games Features

3.3.2.2.1. Introduction of Feature

This feature can be count as basic element of the system. In this feature, game creators decide which missions will be in the game and the players who are registered to a specific game will try to do the missions. There will be three types of mission. These types are Stand, Time and Photo. If the mission type is Photo, the player should take the wanted photo and upload it to the system. The game creator will control the photo and give its score to the player. If the mission type is Stand, the player only needs to check in to the system to confirm that he/she is in the right location. If the mission type is Time, the game creator wants players to spend time in a certain location. The system will check players' time and give their score automatically. Also, the game creator has the ability to delete or update existing missions.

3.3.2.2.2. Stimulus/Response Sequence

Stimulus: A game creator attempts to create a mission to the system.

Response: The mission is added for his/her players.

Stimulus: A player attempts to upload a photo for mission.

Response: The photo is uploaded to the system.

Stimulus: A game creator attempts to update a mission.

Response: The mission is changed.

3.3.2.2.3. Associated Functional Requirements

3.3.2.2.3.1. Game System

Description: In the game system, game creators can create a mission, update its score or all of it, remove a mission, and players can do missions and they can earn points by accomplishing them. The use case diagram of game system is shown in Figure 4.

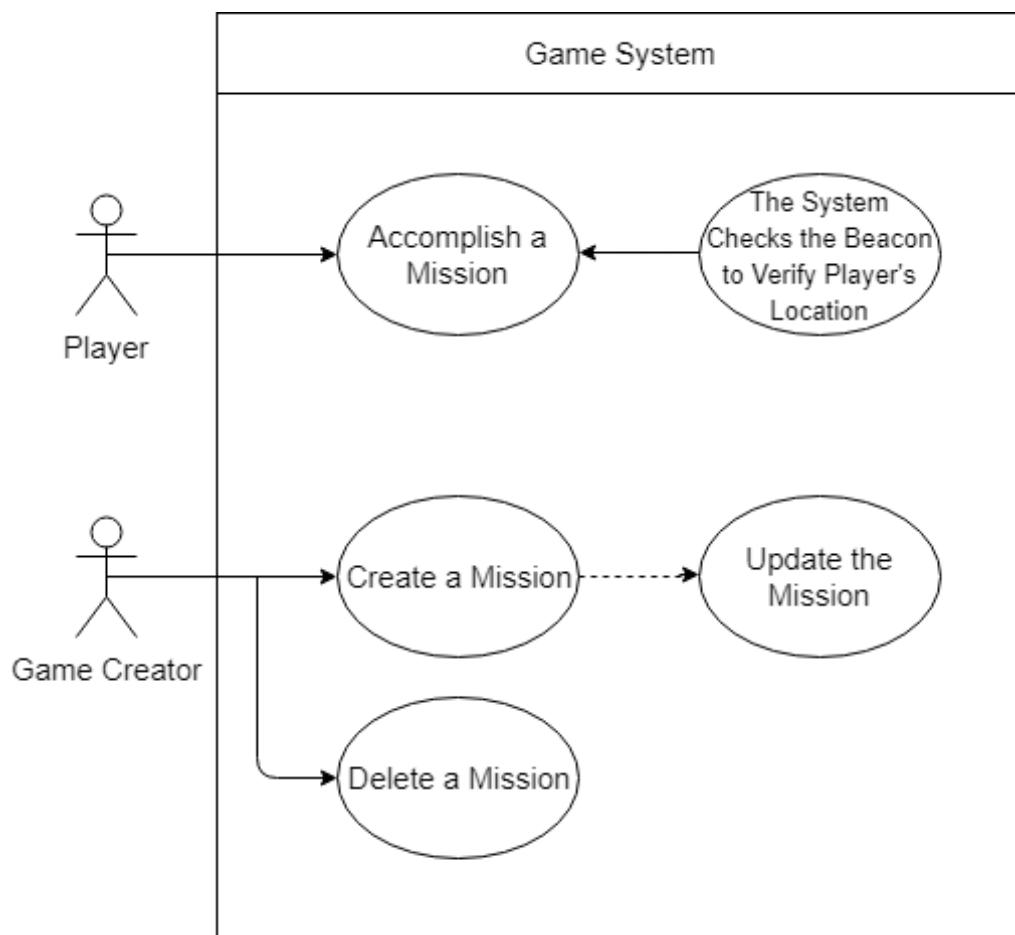


Figure 4 The use case diagram of the game system

3.3.2.3. Scoreboard Features

3.3.2.3.1. Introduction of Feature

This feature can be count as the goal of the system. When players accomplish their missions correctly, they gain scores. This game can count as a competitive game with the scoreboard

feature, because if a player completes all of the missions correctly, he/she gains the highest score and see himself/herself at the top of the scoreboard.

3.3.2.3.2. Stimulus/Response Sequence

Stimulus: A game creator attempts to see the scoreboard.

Response: The system shows the scoreboard to the game creator.

Stimulus: A player attempts to see the scoreboard.

Response: The system shows the scoreboard to the player.

3.3.2.3.3. Associated Functional Requirements

3.3.2.3.3.1. Scoreboard System

Description: In this feature, players can track their score and they can compare their scores with others. Also, game creators can see the scoreboard and they can see who their champion is. The use case diagram of the scoreboard system is shown in Figure 5.

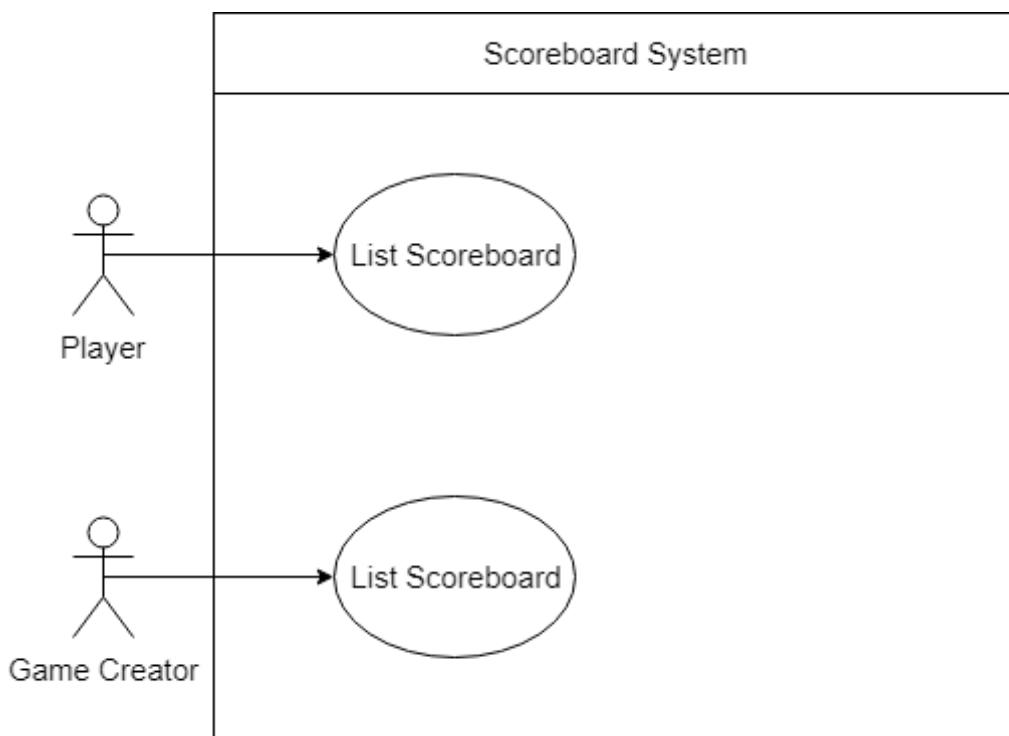


Figure 5 The use case diagram of the scoreboard system

3.3.2.4. Beacon System Features

3.3.2.4.1. Introduction of Feature

This feature can be used to identify areas and it is used to control whether the players are at the right location during the missions or not. In this way, the system verifies the players' locations and detects when players begin to their missions.

3.3.2.4.2. Stimulus/Response Sequence

Stimulus: A game creator attempts to create a beacon.

Response: Beacon added to the system.

Stimulus: A player attempts to end his/her mission.

Response: The system verifies his/her location and ends his/her mission.

3.3.2.4.3. Associated Functional Requirements

3.3.2.4.3.1. Beacon System

Description: In the beacon system, game creators can create a beacon to symbolize an area, update the beacon's properties or delete it from the system. And, players can connect to a beacon with their mobile device's Bluetooth module. After that, when a player clicks to accomplish the mission button, the system will check the player's location and whether the player accomplished the mission or not. The use case diagram of beacon system is shown in Figure 6.

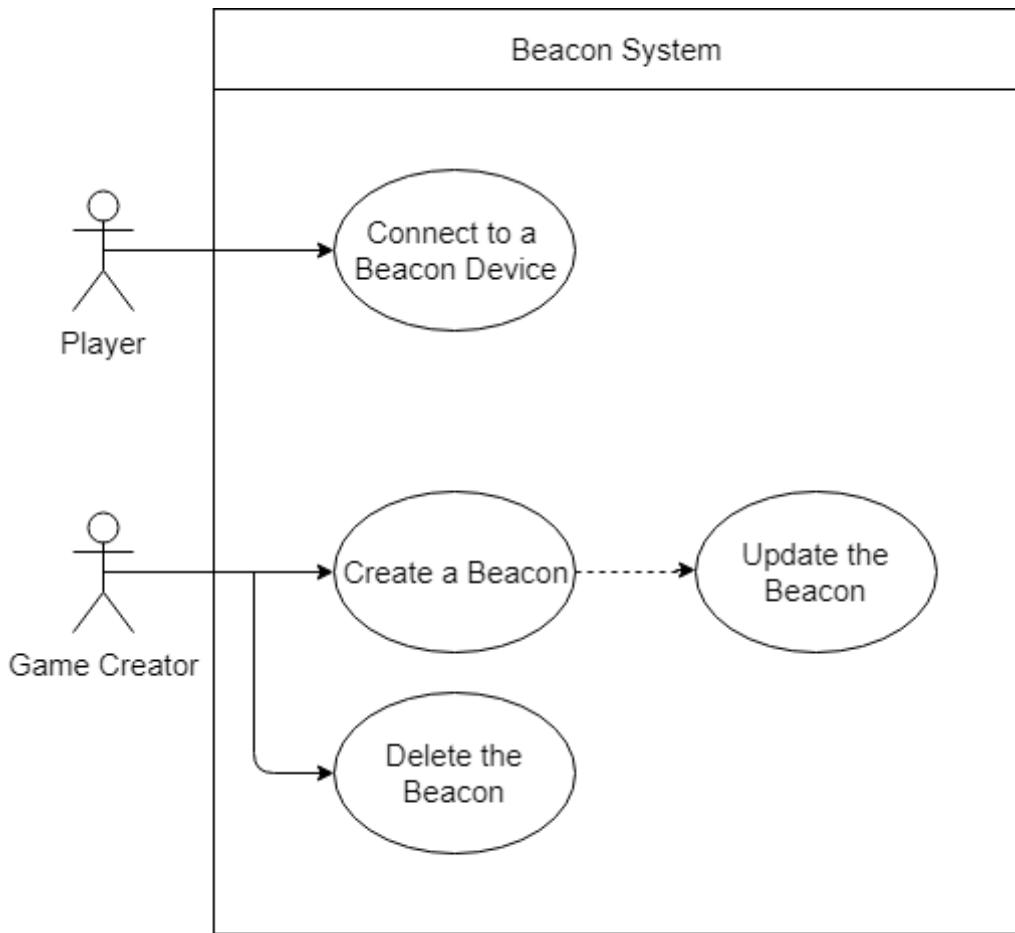


Figure 6 The use case diagram of beacon operations

3.3.3. Performance Requirements

For the Scavenger Hunt Game to work properly, user's device must not be on battery safe mode because in this mode, Bluetooth module cannot work stable, and Bluetooth must be always on. Also, players must be in the range of beacon device to end his/her missions. If beacon's signal is low, system may not approve whether the mission is accomplished or not.

3.3.4. Design constraints

3.3.4.1. Main Example: Scavenger Hunt Game

This game will be a mobile application of Scavenger Hunt Game, so the rules should be similar with the original Scavenger Hunt Game.

3.3.4.2. Software Language

All coding parts will be done in standards of Android programming.

3.3.4.3. Data Management System

We decided to use MySQL as database in our project because it is more suitable than others.

We are going to use phpMyAdmin which is a web application written primarily in PHP for managing our MySQL database.

3.3.4.4. Determining Location

BLE Beacon devices used for determining the location.

3.3.5. Software system requirements

3.3.5.1. Usability

The mobile application will have an easy interface and it will be used easily by any new user.

3.3.5.2. Portability

Scavenger Hunt game must work in every current Android device. It is designed for the devices with Android version 7.0 and above, so it must work properly with the current version of Android platform.

3.3.5.3. Performance

The mobile application must open in maximum three seconds, work without freezing and respond as fast as it can.

3.3.5.4. Scalability

The mobile application will not need so powerful hardware, so it will work properly on standard Android devices.

3.3.5.5. Security

In this mobile application, users must log in to get into the system and user's information will store safely in the system. Therefore, other users cannot access it. BLE Beacon devices work in one direction, so it will not give any location information to other users.

4. Software Design Descriptions

4.1. Overview

4.1.1. Scope

Scavenger Hunt Game Using BLE Beacon is an Android application project. It is a game which is based on the locations and missions. In this game, there are game creators and players. To begin playing, game creators should create a game in a specific location and create missions for players. Players can earn points by completing the given missions and find a place for themselves in the scoreboard. This application is going to be in the Android platform that means the users need a mobile device with Android operating system version 7.0 or above.

4.1.2. Purpose

The purpose of this Software Design Descriptions (SDD) document is describing the details of the project called "Scavenger Hunt Game Using BLE Beacon". We prepared this document according to "IEEE Standard for Information Technology - Systems Design - Software Design Descriptions - IEEE Std 1016 - 2009". In this document, we indicated how our application's software should be developed. We represented the details of design of the application by using graphical notations such as class diagrams, use case diagrams, deployment diagrams and other supporting design information.

4.1.3. Definitions

Term	Definition
IEEE	Institute of Electrical and Electronics Engineers
Software Design Description (SDD)	The complete description of the design of the system.
UML Diagram	A UML diagram is a diagram based on the UML (Unified Modeling Language) with the purpose of visually representing a system along with its main actors, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system.
Stakeholder	A person, group or organization that has interest or concern in an organization.

4.1.4. References

- [1] IEEE. IEEE Std. 1016-2009 IEEE Standard for Information Technology - Systems Design - Software Design Descriptions. IEEE Computer Society, 2009.

4.2. Conceptual Model for Software Design Descriptions

In this part, conceptual model for the SDD is introduced. This conceptual model mainly explains the context and stakeholders in which SDD is prepared.

4.2.1. Software Design in Context

In Scavenger Hunt Game Application, Incremental Software Development Methodology is used as a development method. The idea of this methodology is to divide the project into modules. After that, project is developed module by module. Hence, potential defects are spotted early and changes to project scope are less costly and easier to implement. At the end of the project, the application has fewer bugs and it works correctly.

4.2.2. Software Design Descriptions within the Life Cycle

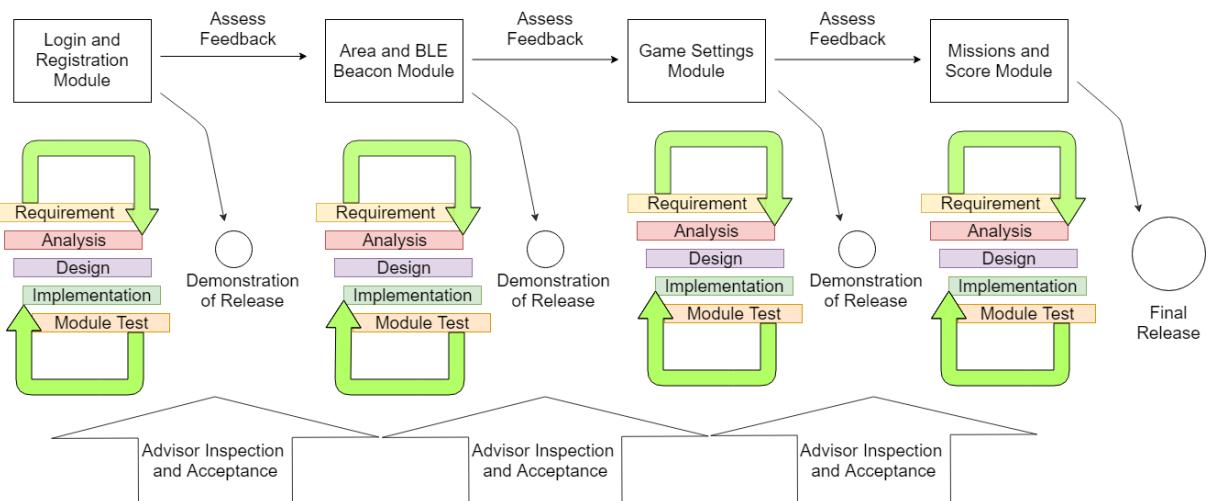


Figure 7 The development life cycle of the project

4.2.2.1. Influences on SDD Preparation

The critical software life cycle product that drives this software design is the software requirement specifications (SRS) of the project. All the details and requirements are taken from the SRS document to prepare this document.

4.2.2.2. Influences on Software Life Cycle Products

This SDD document influences the content of SRS of this project. It also has influences on the whole implementation phase of the Scavenger Hunt Game Application. Also, the test plans and documentation of the system will be influenced by the SDD.

4.2.2.3. Design Verification and Design Role in Validation

Test cases are prepared after the SDD document phase. With these test cases, the software is tested and all modules are evaluated. After the results, the success rate of this software is observed and documented.

4.3. Design Description Information Content

4.3.1. Introduction

In this part, SDD of this project that gives information about design and implementation are presented. In this part, also, the topics explained includes SDD identification, design views, design elements, design overlays, design rationale and design languages.

4.3.2. SDD Identification

This SDD report is prepared concerning the IEEE 1016 - 2009 standards and this is the second version of SDD for this project. UML notation is selected for diagrams and Draw.io website is used for drawing these diagrams.

This SDD contains development life cycle, class diagram, use case diagrams, deployment diagram, class diagram, ER diagram and flowchart diagram of this project.

4.3.3. Design Stakeholders and Their Concerns

Design stakeholders are the developer team and the advisor in the Scavenger Hunt Game project. Our developer team members are computer engineer candidates, and we know and understand software development. The concerns of this project's stakeholders are shown in below:

- The interface should be easy to use.
- The application must open in maximum three seconds.
- The application should work with every current Android device.
- The application should not need high-end hardware requirements.

- The application should be safe and secure.

4.3.4. Design Views

To represent the diagrams, UML is used in this project. This SDD document contains the design views which are governed by design viewpoints that are explained in part 4.4.

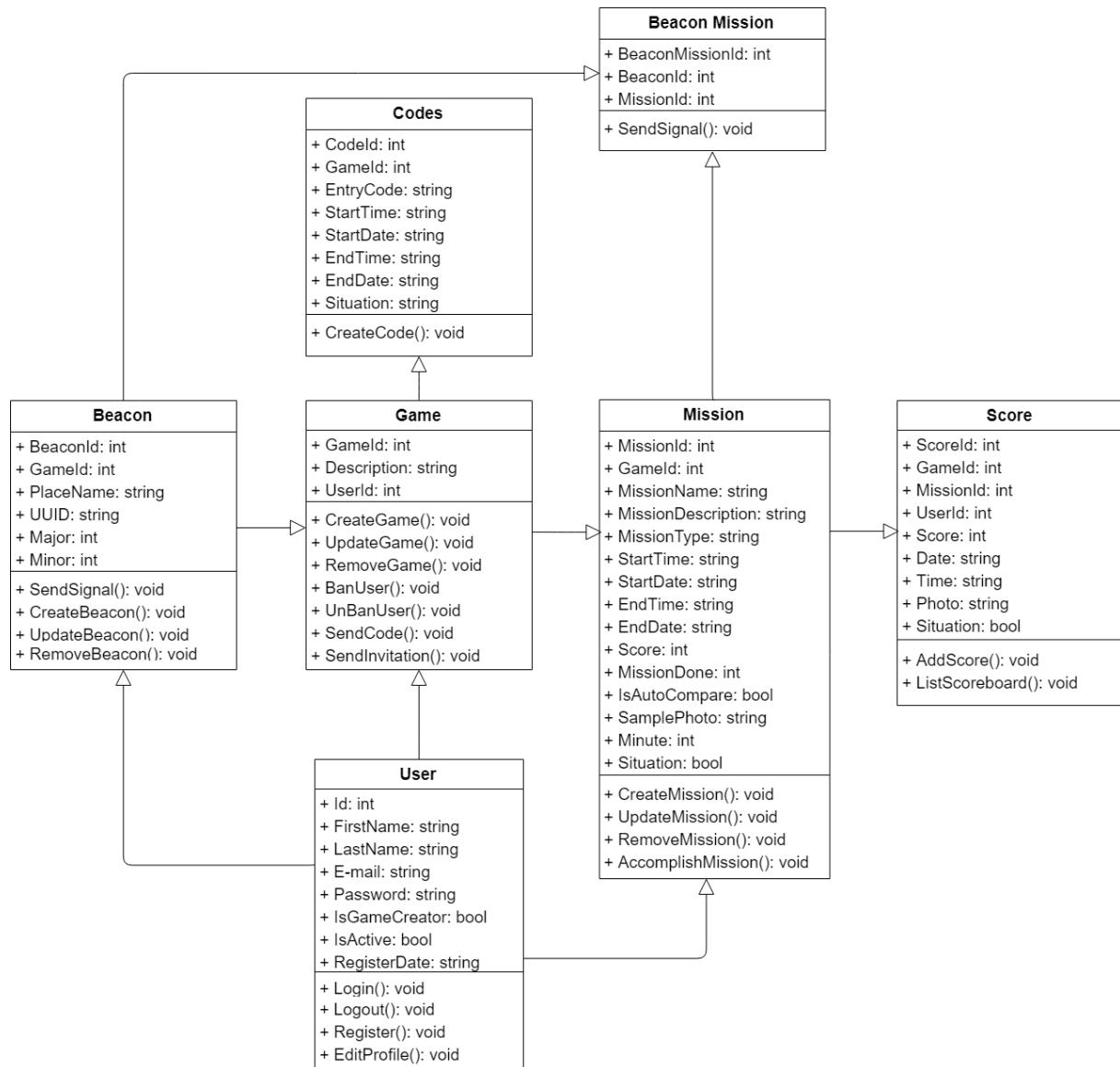


Figure 8 The class diagram of the project

As an example, Figure 9 shows the UML class diagram of Scavenger Hunt Game project. It shows the connection between all classes.

4.3.5. Design Viewpoints

This part is used to give a short explanation on the main design viewpoints which are used in part 4.4. It is defined in the IEEE 1016 - 2009 standards.

4.3.5.1. Context Viewpoint

The context viewpoint is about the relationships and interactions between the system and its environment.

4.3.5.2. Composition Viewpoint

The composition viewpoint shows the main work components of the project.

4.3.5.3. Logical Viewpoint

The logical viewpoint identifies all of the classes and the relations between those classes.

4.3.5.4. Information Viewpoint

The information viewpoint describes the storing, managing and distributing of information.

4.3.5.5. Interface Viewpoint

The interface viewpoint gives the necessary information about how the design project looks like and be used by anyone who is interested.

4.3.5.6. State Dynamics Viewpoint

The state dynamics viewpoint shows the behaviour of the system when there are some specific events.

4.3.6. Design Elements

This part is about main design elements like entities, design relationship, constraints.

4.3.6.1. Design Entities

4.3.6.1.1. Database Management System

In the Scavenger Hunt Game application, MySQL relational database management system (RDBMS) system is used for database management. It has many advantages for mobile devices and easy to integrate into the project. It is used to store users' information, beacons' information and games' information.

4.3.6.1.2. User System

Users can connect to Scavenger Hunt Game with their mobile devices. Users must use mobile devices which has Android Operating System on it and its Android version must be 7.0 or above.

4.3.6.1.3. Location System

When the system determines users' location, it uses BLE Beacon devices. So, Bluetooth modules of users' mobile devices must work properly.

4.3.6.1.4. Programming Language

The application is an Android application. Therefore, we use the Android Software Development Kit (SDK) in the software development process.

4.3.6.2. Design Relationships

This project's main parts are MySQL as database management, Android programming, BLE Beacon and Android mobile devices.

4.3.6.3. Design Constraints

- MySQL should be used for the database management system.
- Software must be programmed with according to Android programming.
- The rules of this game should be similar to the board game of Scavenger Hunt Game.
- BLE Beacon devices should be used for determining location.

4.3.7. Design Overlays

Scavenger Hunt Game's main factors are simplicity and optimized design. So, it does not require a powerful hardware and everyone can use this game application easily.

4.3.8. Design Rationale

In this project, design choices are made according to simplicity and performance concerns, but stakeholders may have request further requirements. Therefore, the system must consist of modular parts and developers of the system have to use comments in their code. In this way, other developers can understand the existing code and the system.

4.3.9. Design Languages

In this project, UML is chosen as a part of design viewpoint. It will be used for explaining design viewpoints.

4.4. Design Viewpoints

4.4.1. Introduction

In this part, Scavenger Hunt Game's design viewpoints are explained in detail. In this part, UML diagrams are used to enhance intelligibility. In this part, we explain the main design viewpoints in detail.

4.4.2. Context Viewpoint

4.4.2.1. Design Concerns

There are two main concerns which are user and game in our system. User is divided into two as the player and the game creator in this project. Users are the people who play and manage this game respectively.

4.4.2.2. Design Elements

Design Entities: Design entities are the user and its functions in the application. The use case diagram of user functions is shown in Figure 10.

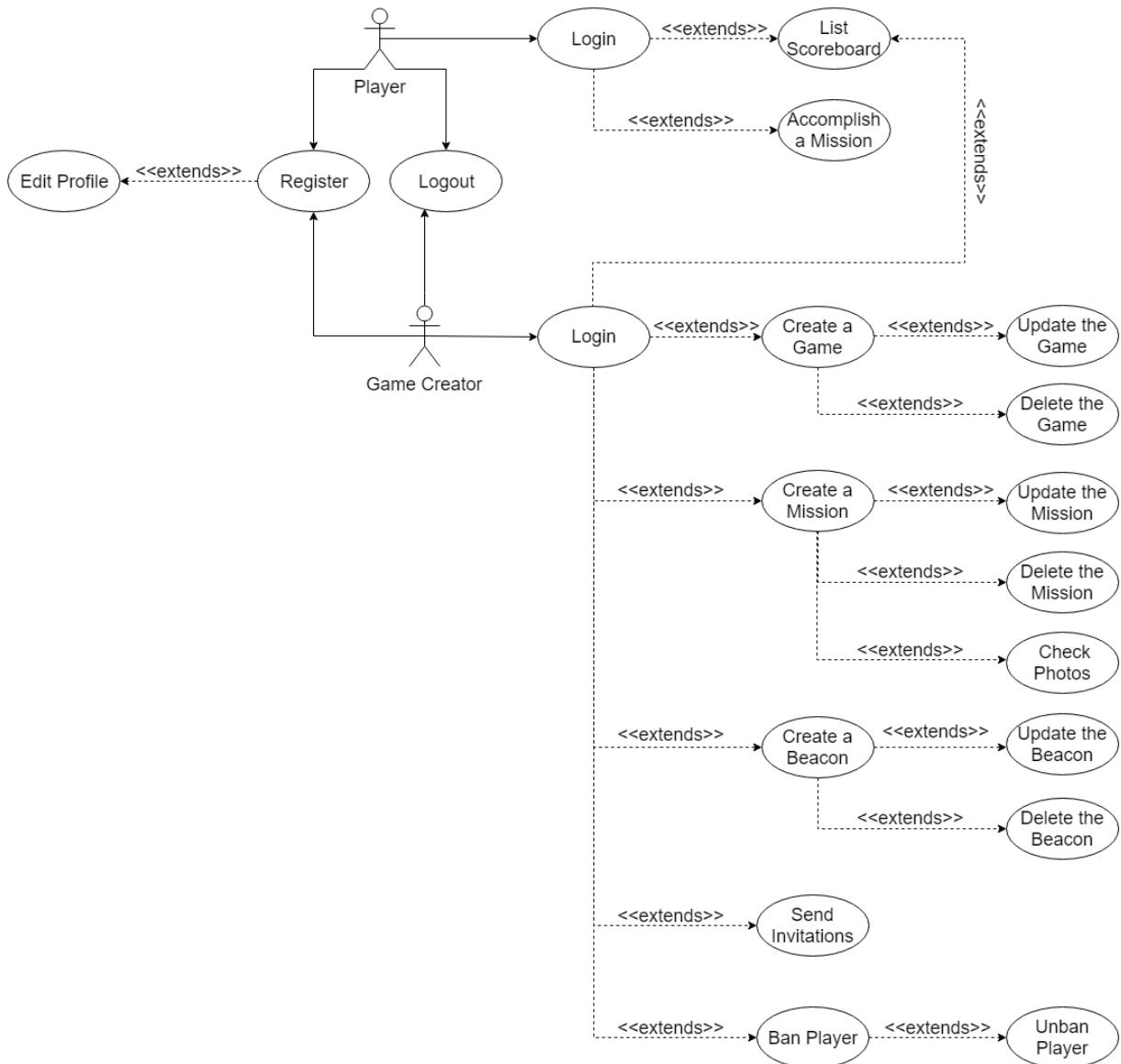


Figure 9 The use case diagram of all functions

4.4.2.2.1. Login

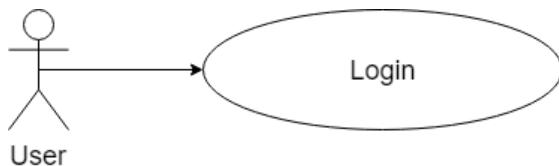


Figure 10 The use case diagram of login

Use Case Number	1
Use Case	Login
Summary	User can log in to the system with his/her e-mail and password.

Actor	Player, Game Creator
Trigger	Login Button
Primary Scenario	To log in to the system, firstly, User must be registered to the system. After that, he/she can login with writing his/her e-mail and password and clicking to login button.
Exceptional Scenario	<ul style="list-style-type: none"> • Not registered. • Incorrect information to log in.
Pre-Conditions	User must register to the system.
Post-Conditions	User can enter the system.
Assumptions	User must be connected to the Internet.

4.4.2.2.2. Register

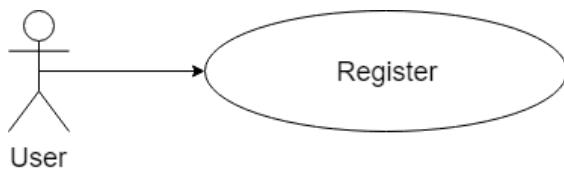


Figure 11 The use case diagram of register

Use Case Number	2
Use Case	Register
Summary	User can register to the system to log in and use the application.
Actor	Player, Game Creator
Trigger	Register Button
Primary Scenario	After the User get the application, User can register in the Register Page with required information.
Exceptional Scenario	The e-mail is already existed error.
Pre-Conditions	<ul style="list-style-type: none"> • User must have the application. • User must have an e-mail address.
Post-Conditions	After registration, user can enter the system.
Assumptions	User must be connected to the Internet.

4.4.2.2.3. Logout

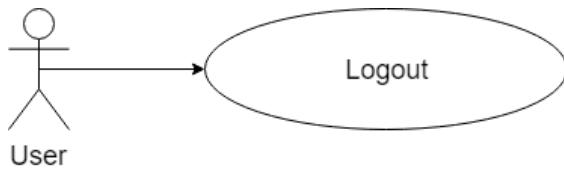


Figure 12 The use case diagram of logout

Use Case Number	3
Use Case	Logout
Summary	User can logout from the system.
Actor	Player, Game Creator
Trigger	Logout Button
Primary Scenario	After user login to the system, user can logout from the system anytime.
Exceptional Scenario	None.
Pre-Conditions	User must log in to the system.
Post-Conditions	User can see the Login Page.
Assumptions	User has already logged in to the system.

4.4.2.2.4. Accomplish a Mission

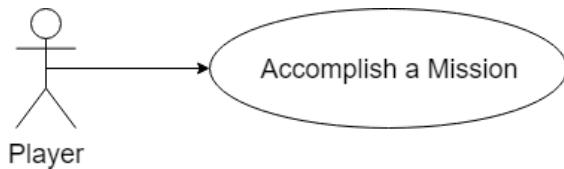


Figure 13 The use case diagram of accomplish a mission

Use Case Number	4
Use Case	Accomplish a Mission
Summary	Player can accomplish missions to earn points.
Actor	Player
Trigger	Accomplish a Mission Button
Primary Scenario	After player accomplishes a mission, player can earn points with connecting to a beacon device.
Exceptional Scenario	<ul style="list-style-type: none"> • Mission is not over yet. • Beacon connection is failed.
Pre-Conditions	Player must open the Bluetooth module of his/her mobile device.

Post-Conditions	After completing a mission, player earns points and improves his/her score.
Assumptions	<ul style="list-style-type: none"> • Player must be connected to the Internet. • Player's mobile device's Bluetooth module must stand on.

4.4.2.2.5. List Scoreboard



Figure 14 The use case diagram of list scoreboard

Use Case Number	5
Use Case	List Scoreboard
Summary	User can list a scoreboard.
Actor	Player, Game Creator
Trigger	List Scoreboard Button
Primary Scenario	After user begins to play or create a game, user can list the scoreboard which belongs to the game.
Exceptional Scenario	None.
Pre-Conditions	User must join a game or create a game.
Post-Conditions	User can list the scoreboard of the game.
Assumptions	User must be connected to the Internet.

4.4.2.2.6. Create a Game

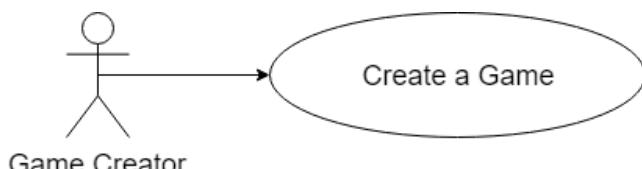


Figure 15 The use case diagram of create a game

Use Case Number	6
Use Case	Create a Game
Summary	Game Creator can create a game.

Actor	Game Creator
Trigger	Create a Game Button
Primary Scenario	None.
Exceptional Scenario	None.
Pre-Conditions	None.
Post-Conditions	Game Creator can create a game for players and players can join a game.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.7. Update the Game

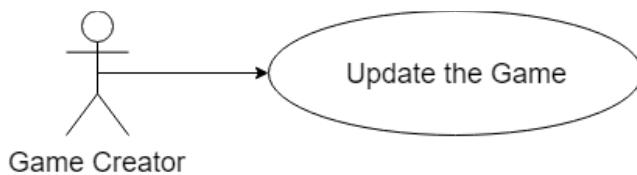


Figure 16 The use case diagram of update the game

Use Case Number	7
Use Case	Update the Game
Summary	Game Creator can update the game.
Actor	Game Creator
Trigger	Update the Game Button
Primary Scenario	Game Creator need to have at least one game.
Exceptional Scenario	If Game Creator does not have a game, he/she cannot change anything.
Pre-Conditions	Game Creator needs to have at least one game.
Post-Conditions	Game Creator can update the game.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.8. Delete the Game

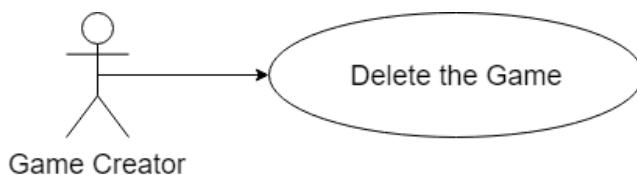


Figure 17 The use case diagram of delete the game

Use Case Number	8
Use Case	Delete the Game
Summary	Game Creator can delete the game.
Actor	Game Creator
Trigger	Delete the Game Button
Primary Scenario	Game creator needs to have at least one game.
Exceptional Scenario	If Game creator does not have a game, he/she cannot remove anything.
Pre-Conditions	Game creator needs to have at least one game.
Post-Conditions	Game Creator can delete the game.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.9. Create a Beacon

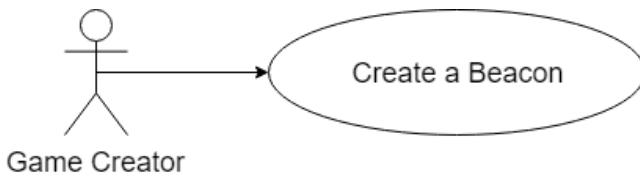


Figure 18 The use case diagram of create a beacon

Use Case Number	9
Use Case	Create a Beacon
Summary	Game Creator can create beacons to expand his/her area.
Actor	Game Creator
Trigger	Create a Beacon Button
Primary Scenario	None.
Exceptional Scenario	None.
Pre-Conditions	None.
Post-Conditions	Game Creator can expand his/her area and he/she can add missions on it.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.10. Update the Beacon



Figure 19 The use case diagram of update the beacon

Use Case Number	10
Use Case	Update the Beacon
Summary	Game Creator can update the beacon.
Actor	Game Creator
Trigger	Update the Beacon Button
Primary Scenario	Game Creator has to have at least one beacon in the system.
Exceptional Scenario	Game Creator has no beacon.
Pre-Conditions	Game Creator needs to have at least one beacon in the system. After that, he/she can update its condition.
Post-Conditions	Game Creator can update the beacon.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.11. Delete the Beacon

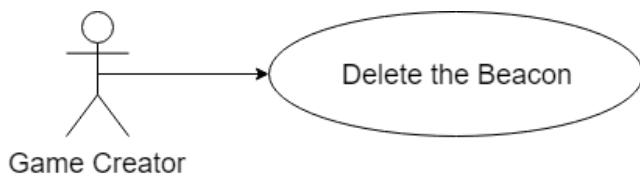


Figure 20 The use case diagram of deletethe beacon

Use Case Number	11
Use Case	Delete the Beacon
Summary	Game Creator can delete the beacon.
Actor	Game Creator
Trigger	Delete the Beacon Button
Primary Scenario	Game Creator has to have at least one beacon in the system.
Exceptional Scenario	Game Creator has no beacon.
Pre-Conditions	Game Creator needs to have at least one beacon in the system. After that, he/she can remove it.

Post-Conditions	Game Creator can delete the beacon.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.12. Create a Mission

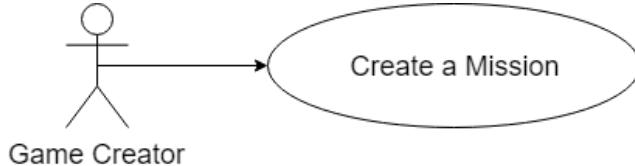


Figure 21 The use case diagram of create a mission

Use Case Number	12
Use Case	Create a Mission
Summary	Game Creator can create a mission for players to do.
Actor	Game Creator
Trigger	Create a Mission Button
Primary Scenario	If Game Creator does not have a beacon, he/she need to add a beacon. After that, he/she can create a mission.
Exceptional Scenario	None.
Pre-Conditions	If Game Creator does not have a beacon, he/she need to add a beacon first.
Post-Conditions	Player can see the missions.
Assumptions	<ul style="list-style-type: none"> • Game Creator must be connected to the Internet. • Game Creator must have at least one beacon in the system.

4.4.2.2.13. Update the Mission



Figure 22 The use case diagram of update the mission

Use Case Number	13
Use Case	Update the Mission
Summary	Game Creator can update the mission.

Actor	Game Creator
Trigger	Update the Mission Button
Primary Scenario	If Game Creator created a mission before, he/she can update that mission.
Exceptional Scenario	<ul style="list-style-type: none"> The mission's date is over. Game creator has no mission.
Pre-Conditions	Game Creator needs to create a mission first.
Post-Conditions	Player can see the updated mission.
Assumptions	<ul style="list-style-type: none"> Game Creator must be connected to the Internet. Game Creator must have at least one mission.

4.4.2.2.14. Delete the Mission

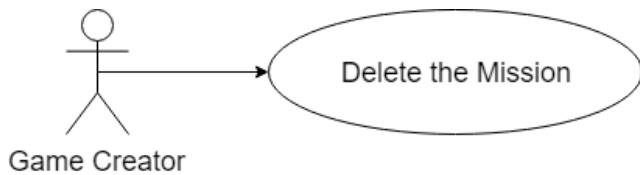


Figure 23 The use case diagram of delete the mission

Use Case Number	14
Use Case	Delete the Mission
Summary	Game Creator can delete the mission.
Actor	Game Creator
Trigger	Remove a Mission Button
Primary Scenario	Game Creator needs to have at least one mission.
Exceptional Scenario	If Game Creator does not have a mission, he/she cannot remove anything.
Pre-Conditions	Game Creator needs to have at least one mission.
Post-Conditions	Game Creator can delete the mission.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.15. Edit Profile

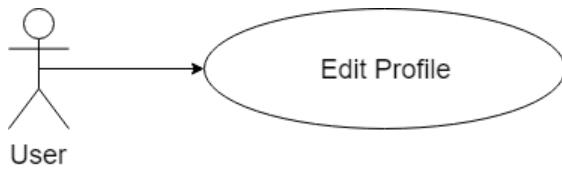


Figure 24 The use case diagram of the edit profile

Use Case Number	15
Use Case	Edit Profile
Summary	User can update his/her personal information.
Actor	Player, Game Creator
Trigger	Edit Profile Button
Primary Scenario	User needs to be registered to the system first. After that, he/she can change his/her information.
Exceptional Scenario	User is not registered.
Pre-Conditions	User needs to be registered to the system first. After that, he/she can change his/her information.
Post-Conditions	User can update his/her information.
Assumptions	User must be connected to the Internet.

4.4.2.2.16. Send Invitations

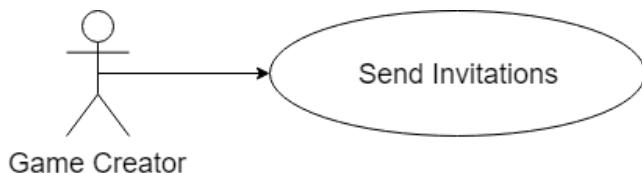


Figure 25 The use case diagram of send invitation

Use Case Number	16
Use Case	Send Invitations
Summary	Game Creator can invite players to his/her game.
Actor	Game Creator
Trigger	Send Invitations Button
Primary Scenario	After a game is created, Game Creator can invite players.
Exceptional Scenario	Game is not created.
Pre-Conditions	Game Creator need to create his/her game first.

Post-Conditions	Game Creator can invite players.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.17. Ban Player

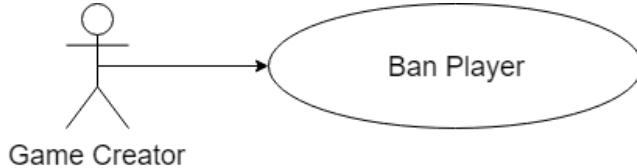


Figure 26 The use case diagram of ban player

Use Case Number	17
Use Case	Ban Player
Summary	Game Creator can ban players.
Actor	Game Creator
Trigger	Ban Player Button
Primary Scenario	None.
Exceptional Scenario	Player is not registered.
Pre-Conditions	None.
Post-Conditions	Game Creator can ban players.
Assumptions	Game Creator must be connected to the Internet.

4.4.2.2.18. Unban Player

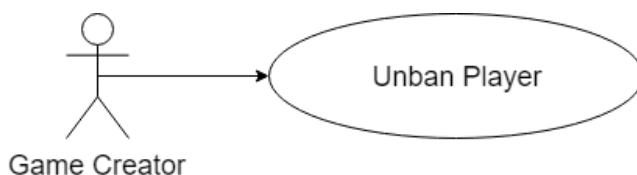


Figure 27 The use case diagram of unban player

Use Case Number	18
Use Case	Unban Player
Summary	Game Creator can unban players.
Actor	Game Creator
Trigger	Unban Player Button
Primary Scenario	None.

Exceptional Scenario	Player is not registered.
Pre-Conditions	None.
Post-Conditions	Game Creator can unban players.
Assumptions	Game Creator must be connected to the Internet.

4.4.3. Composition Viewpoint

4.4.3.1. Design Concerns

With the help of composition viewpoint software process will be understood. In this part, main work components and their inside components will be explained. There are four main work components in this software. Namely: Database, web server, client and BLE Beacon.

4.4.3.2. Design Elements

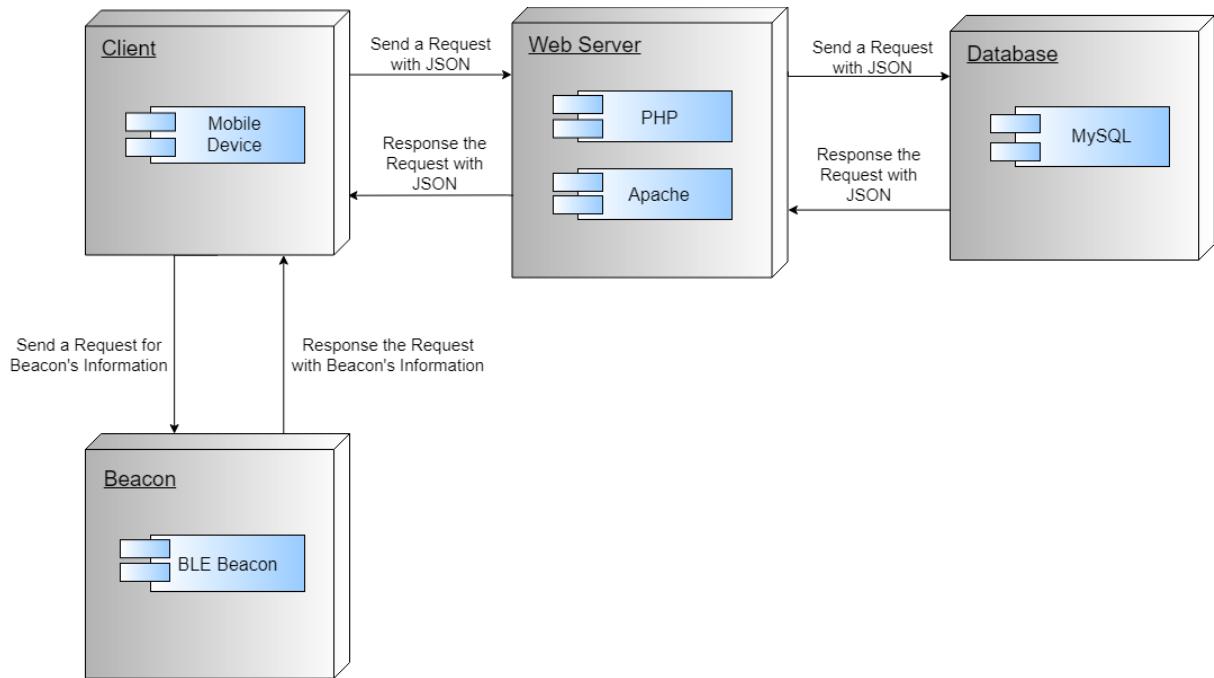


Figure 28 The deployment diagram of the project

Design Entities: There are four main design components in our project which are database, web server, client and BLE Beacon. With web server, the client and the database have a connection.

Design Attributes: Design attributes are discussed in the following two parts.

4.4.3.2.1. Function Attribute

Database, BLE Beacon, web server and client are the main components of our project. Web server is responsible for providing an interaction between the client and the database. The database stores information and BLE Beacon is responsible for detecting location.

4.4.3.2.2. Subordinates Attribute

All of the components mentioned above are composed together to build this project.

4.4.4. Logical Viewpoint

4.4.4.1. Design Concerns

The logical viewpoint identifies all classes and relations between classes. The goal of this viewpoint is to define and simplify the system design.

4.4.4.2. Design Elements

4.4.4.2.1. Class Relations

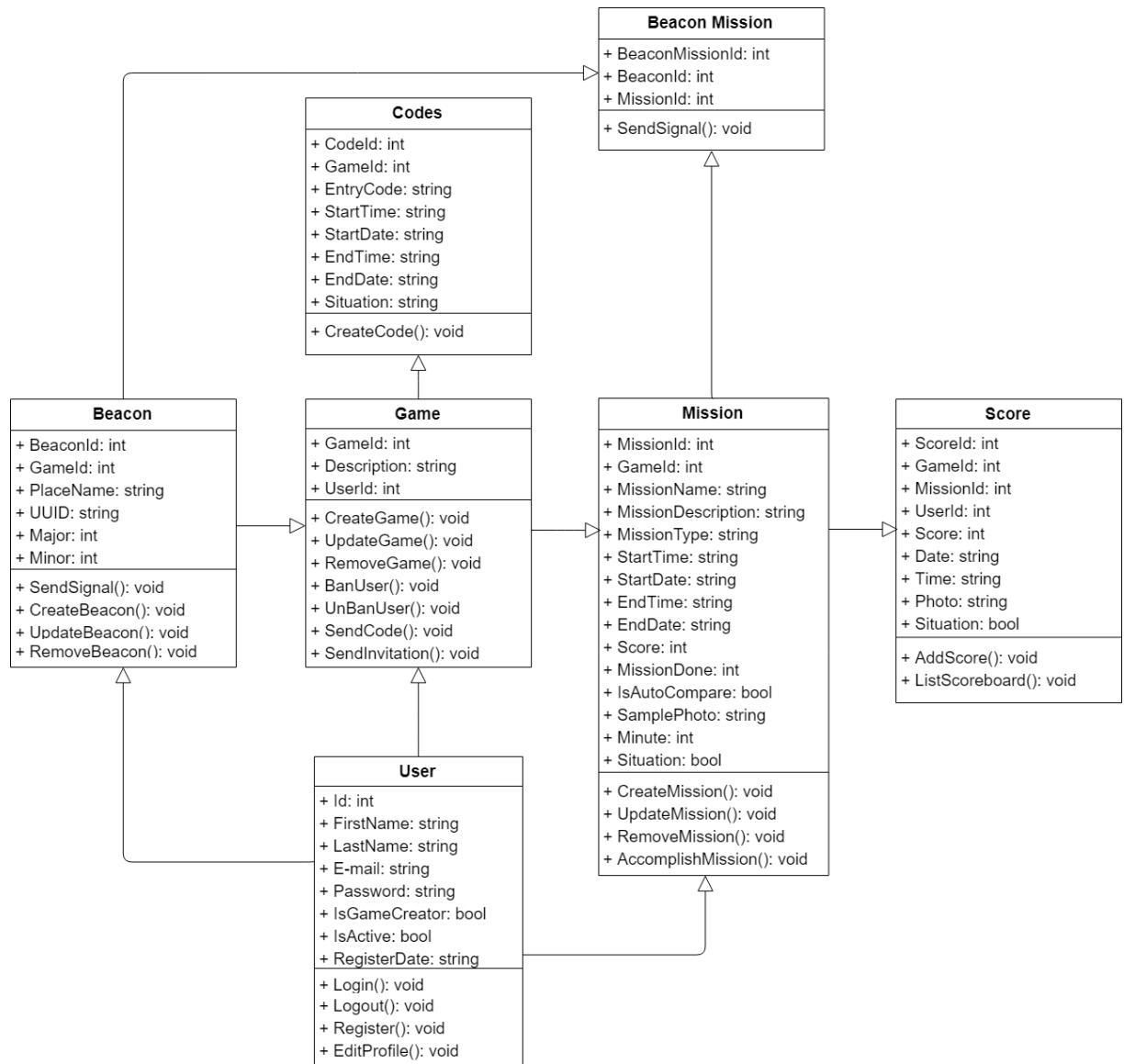


Figure 29 The class diagram of the project

4.4.4.2.2. User Class

Method/Field	Definition
Int Id	Unique id of user.
String Password	The password of user.
String E-mail	User's e-mail address.
String UserType	The authority of user.
String FirstName	User's first name.
String LastName	User's last name.
Bool IsGameCreator	User's role.
Bool IsActive	User's active situation.

String RegisterDate	User's registration date.
Void Login()	The way of enter to the system.
Void Logout()	The way of logout from the system.
Void Register()	The way of register to the system.
Void EditProfile()	The way of edit user's profile information.

4.4.4.2.3. Game Class

Method/Field	Definition
Int GameId	The unique id of game.
String Description	The description of game.
Int UserId	The unique id of user.
Void CreateGame()	The way of create a game in the system.
Void UpdateGame()	The way of change a game in the system.
Void RemoveGame()	The way of remove a game from the system.
Void BanUser()	The way of ban a player in a game.
Void UnBanUser()	The way of unban a player in a game.
Void SendCode()	The way of send an invitation code to players.
Void SendInvitation()	The way of send an invitation to players.

4.4.4.2.4. Mission Class

Method/Field	Definition
Int MissionId	The unique id of mission.
Int GameId	The unique id of game.
String MissionName	The name of the mission.
String MissionDescription	The description of the mission.
String MissionType	The type of the mission.
String StartTime	The start time of the mission.
String StartDate	The start date of the mission.
String EndTime	The end time of the mission.
String EndDate	The end date of the mission.
Int Score	The score that belongs to the mission.
Int MissionDone	The mission done situation.

Bool IsAutoCompare	Mission's auto compare situation.
String SamplePhoto	Mission's sample photo's path.
Int Minute	Mission's minute.
Bool Situation	Mission's active situation
Void CreateMission()	The way of create a mission.
Void UpdateMission()	The way of change a mission.
Void RemoveMission()	The way of remove a mission.
Void AccomplishMission()	The way of end a mission.

4.4.4.2.5. Score Class

Method/Field	Definition
Int ScoreId	The unique id of score.
Int GameId	The unique id of game.
Int MissionId	The unique id of mission.
Int UserId	The unique id of user.
Int Score	The score value.
String Date	Score's date.
String Time	Score's time.
Bool Situation	Score's active situation.
Void AddScore()	The way of add score to user's total score.
Void ListScoreboard()	The way of see the scoreboard of the game.

4.4.4.2.6. Beacon Class

Method/Field	Definition
Int BeaconId	The unique id of a beacon.
Int GameId	The unique id of game.
String PlaceName	The location of a beacon.
String UUID	The UUID of a beacon.
Int Major	The major of a beacon.
Int Minor	The minor of a beacon.
Void SendSignal()	The signal that beacon sends.
Void CreateBeacon()	The way of add a beacon.

Void UpdateBeacon()	The way of change a beacon's information.
Void RemoveBeacon()	The way of remove a beacon.

4.4.4.2.7. Codes Class

Method/Field	Definition
Int CodeId	The unique id of a code.
Int GameId	The unique id of game.
String EntryCode	The entry code.
String StartTime	The start time of the code.
String StartDate	The start date of the code.
String EndTime	The end time of the code.
String EndDate	The end date of the code.
Bool Situation	Code's active situation.
Void CreateCode()	The way of create a code.

4.4.4.2.8. Beacon Mission Class

Method/Field	Definition
Int BeaconMissionId	The unique id of a beacon-mission.
Int BeaconId	The unique id of a beacon.
Int MissionId	The unique id of mission.
Void SendSignal()	The signal that beacon sends.

4.4.5. Information Viewpoint

The information viewpoint describes the relationships between the classes. The class diagram explained differently with ER diagram. We can easily understand the relationships between classes with this diagram.

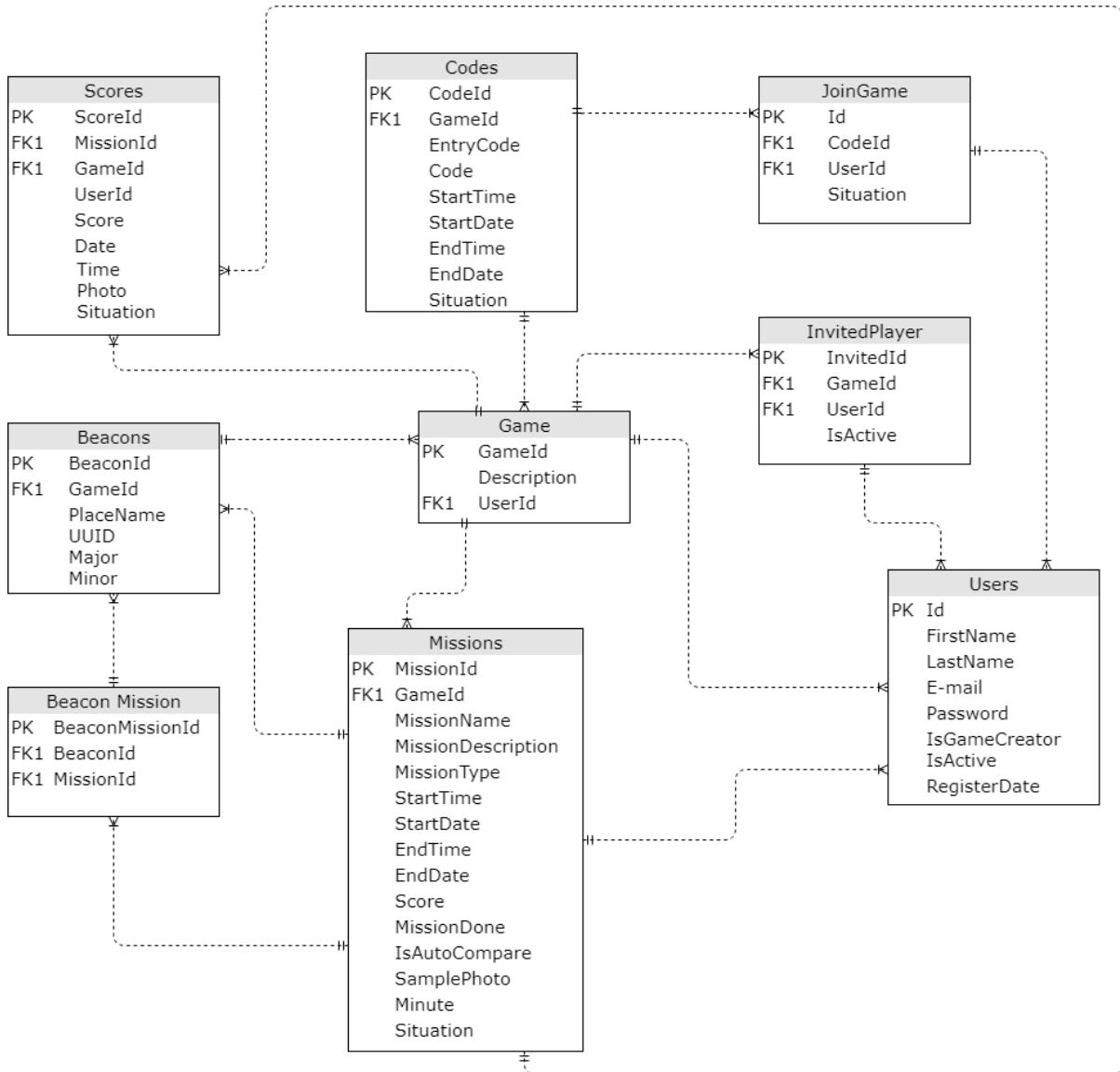


Figure 30 The ER diagram of the project

4.4.6. Interface Viewpoint

4.4.6.1. Design Concerns

The interface viewpoint provides all the information for anyone who is interested in our application. In the parts below, we created drafts of our application.

4.4.6.2. Design Elements

4.4.6.2.1. Login Page

After downloading and opening the Scavenger Hunt Game application, Login Page appears. After the user fills the e-mail and password fields, he/she should click the Login button. If the user does not have an account, he/she can register by clicking to the Register button.

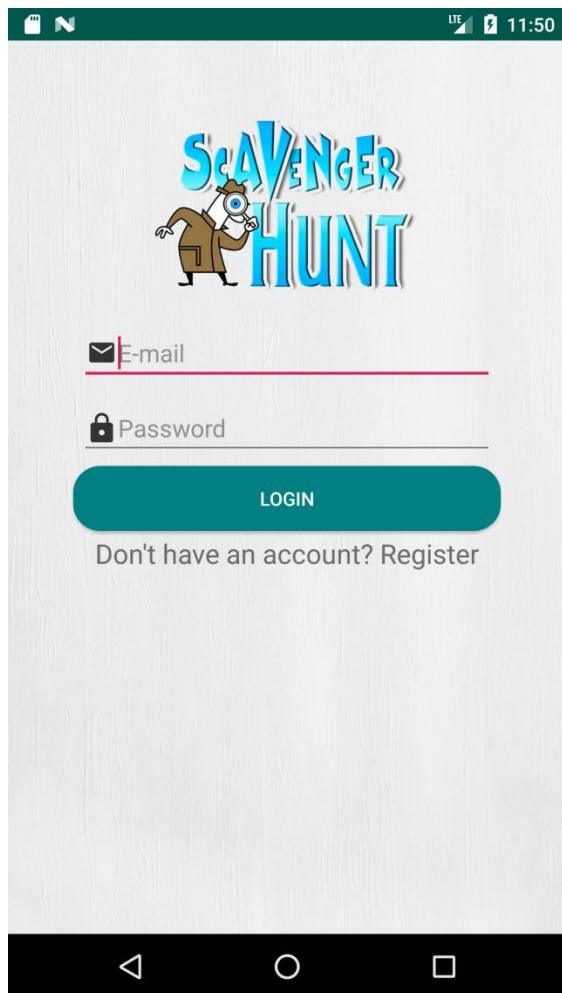


Figure 31 Login page

4.4.6.2.2. Register Page

Users who want to register to Scavenger Hunt Game can register to application after filling the required fields. After clicking the Register button, the user should be registered to the database and this button redirects user to the Login Page.

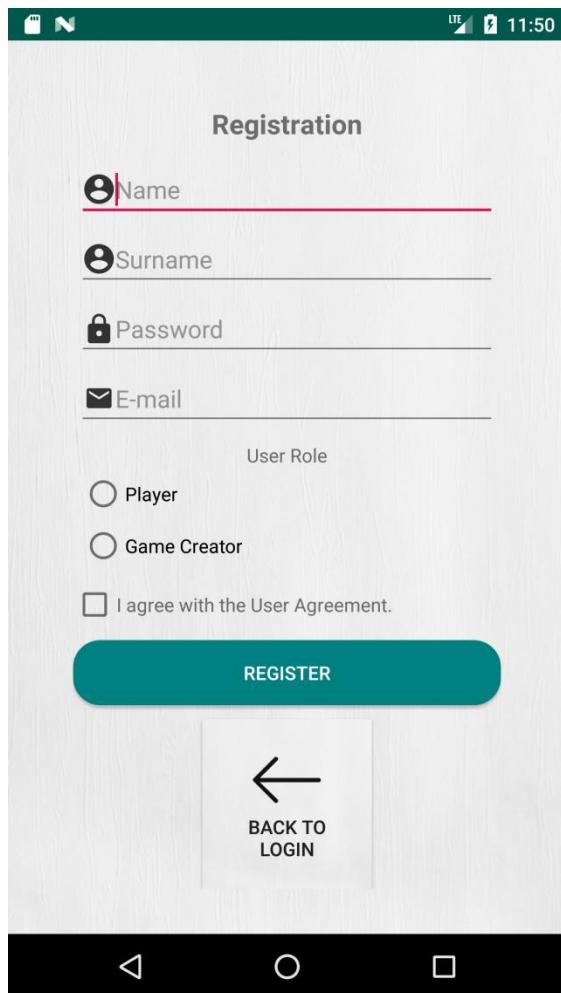


Figure 32 Register page

4.4.6.2.3. Edit Profile Page

In this page, users can change their personal information. If the user changes any of the fields, in order to save the changes, he/she should click to the Save Profile button. If he/she does not want to change anything, he/she should use the Home Page button to return to the Home Page. Save Profile button also redirects user to his/her Home Page.

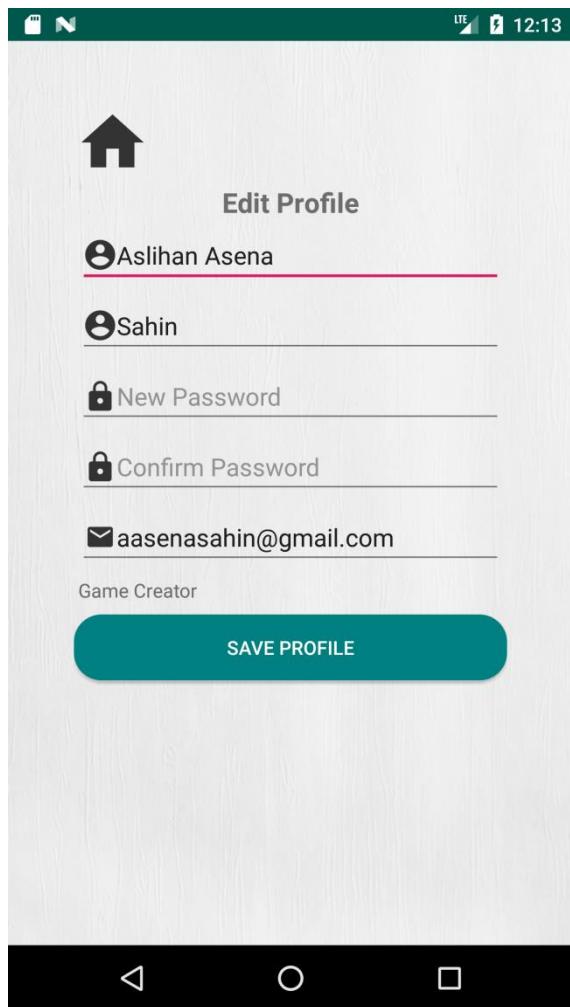


Figure 33 Edit profile page

4.4.6.2.4. Home Page (Game Creator)

This page is the Home Page of the game creator. Game creator can edit his/her personal information by clicking to the Edit Profile button. Game creator can create a game by clicking to the Create a Game button. He/she can see his/her created games by clicking to the My Games button. He/she can logout from the system with the Logout button.

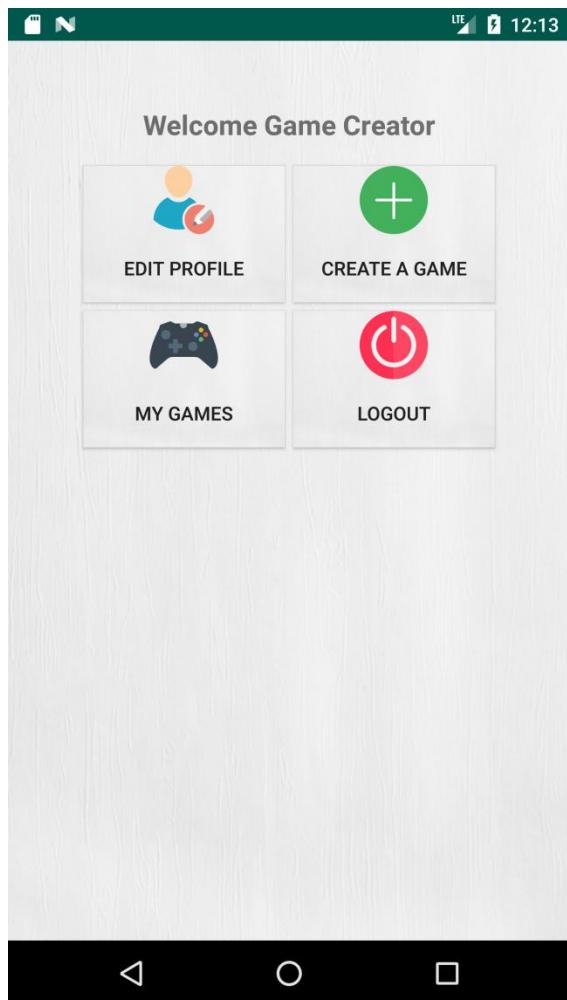


Figure 34 Home page (game creator)

4.4.6.2.5. Create a Game Page (Game Creator)

When the game creator clicks the Create a Game button, this page opens. Game creator should enter a game name to create a game. And, there is a Home Page button to return the Home Page.

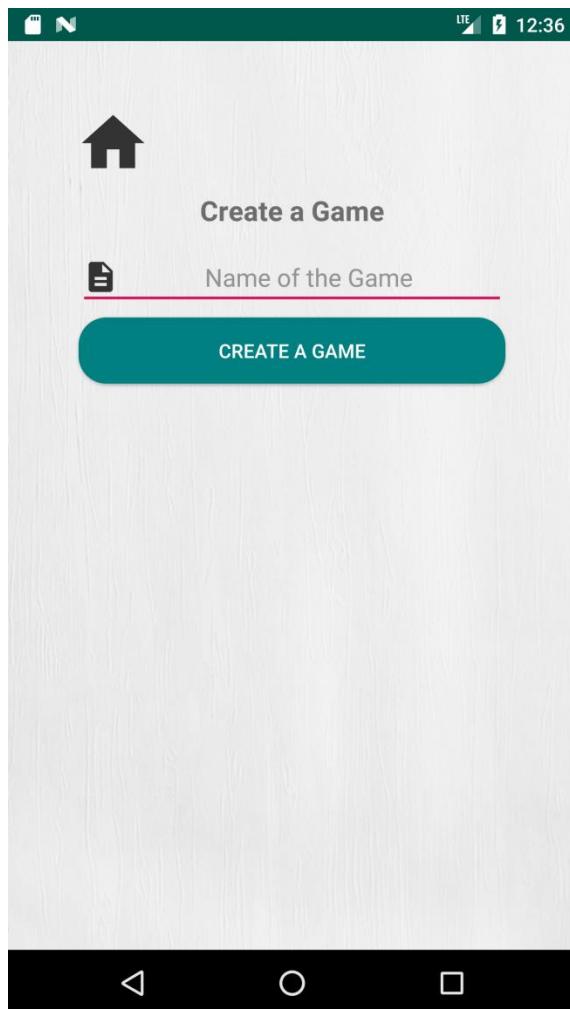


Figure 35 Create a gamepage (game creator)

4.4.6.2.6. My Games Page (Game Creator)

This page includes the list of games that are created by the game creator. And, there is a Home Page button to return the Home Page.



Figure 36 My games page (game creator)

4.4.6.2.7. Game's Main Page (Game Creator)

After the game creator selects a game from the My Games Page, Game's Main Page appears. In this page; Beacons, Create a Code, Invite, Missions, Player Settings, Game Settings, Scoreboard and Exit buttons are placed. Game creator can use the Exit button to exit from the game and return the Home Page.

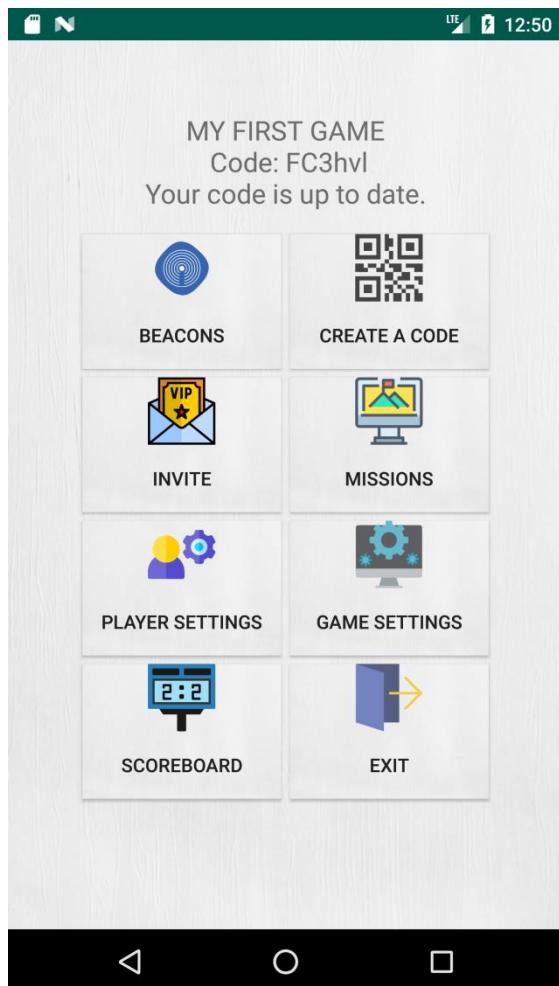


Figure 37 Game's main page (game creator)

4.4.6.2.8. Beacons Page (Game Creator)

This page appears when game creator clicks the Beacons button on the Game's Main Page. In this page, Create a Beacon and Beacons List buttons are placed. And, there is a Back to Game's Main Page button to return the Game's Main Page.

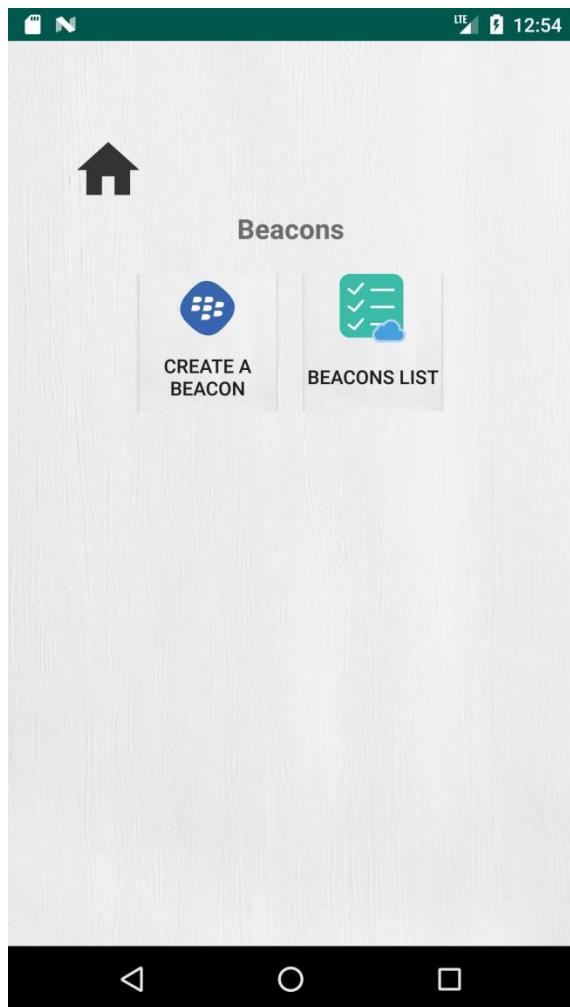


Figure 38 Beacons page (game creator)

4.4.6.2.9. Create a Beacon Page (Game Creator)

In this page, there are four fields for the beacon's information and the Create a Beacon button. After filling the required fields, in order to create a beacon, game creator should click to the Create a Beacon button. This button redirectsgame creator to Game's Main Page. And, there is a Back to Game's Main Page to return the Game's Main Page.

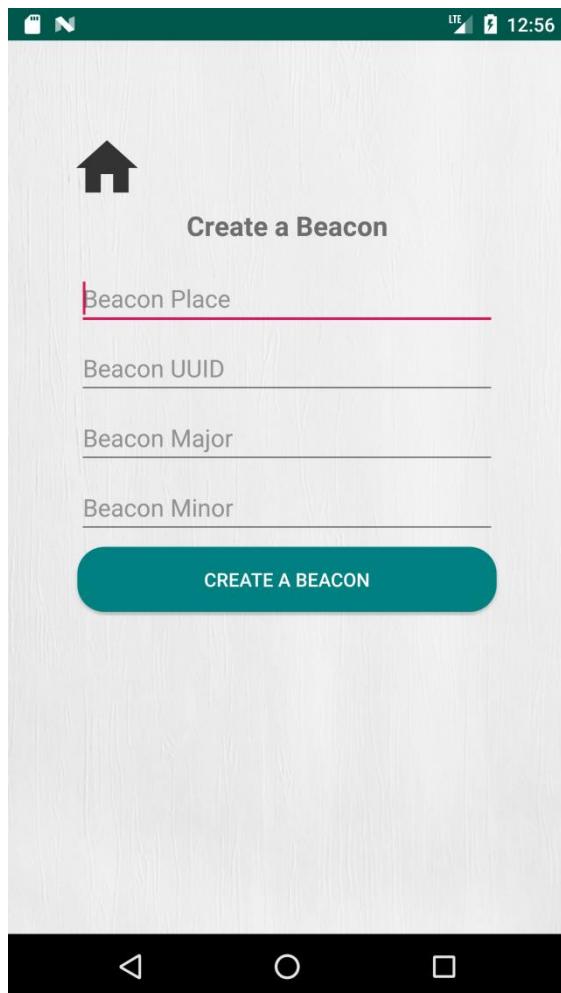


Figure 39 Create a beacon page (game creator)

4.4.6.2.10. Beacons List Page (Game Creator)

This page includes the list of beacons that are created by the game creator. Game creator can choose a beacon from the list of beacons to go to the Beacon Settings Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 40 Beacons list page (game creator)

4.4.6.2.11. Beacon Settings Page (Game Creator)

Game creator can update the beacon by changing the information fields and clicking to the Update the Beacon button or he/she can delete it completely by using the Delete the Beacon button. Both Update the Beacon and Delete the Beacon buttons redirect game creator to the Game's Main Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

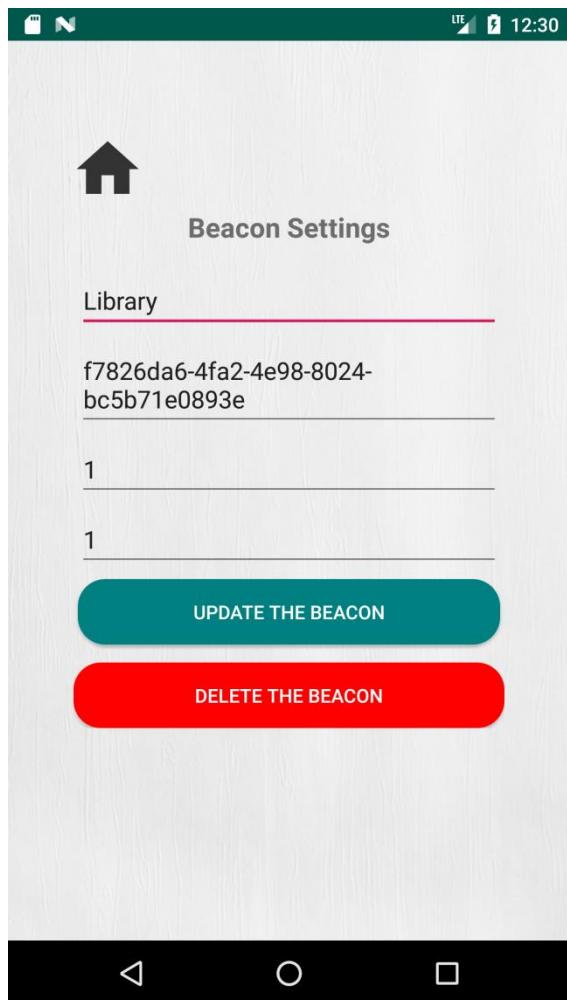


Figure 41 Beacon settings page (game creator)

4.4.6.2.12. Create a Code Page (Game Creator)

This page appears when game creator clicks the Create a Code button on the Game's Main Page. This page includes a code field, and Random Code, Code Start Time, Code End Time and Create a Code buttons. Game creator can create a code by writing or clicking to the Random Code button. Then, he/she should set the code start time and end time. To create a code, game creator should use the Create a Game button which redirectsgame creator to Game's Main Page after code creation is successful. And, there is a Back to Game's Main Page button to return the Game's Main Page.

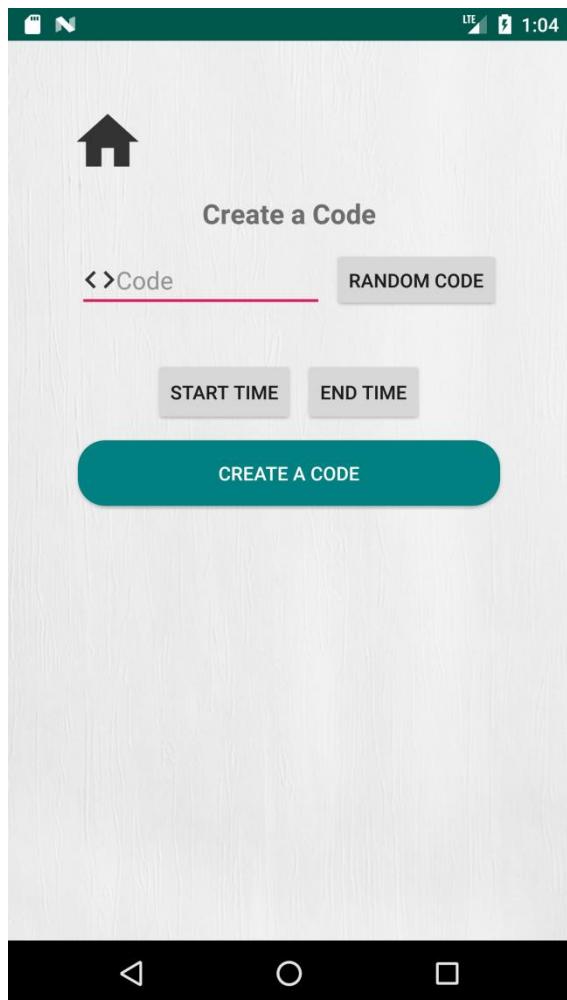


Figure 42 Create a code page (game creator)

4.4.6.2.13. Invite Page (Game Creator)

This page appears when game creator clicks the Invite button on the Game's Main Page. In this page, game creator can add players one by one to invitation list by using the Add a Player button. Game creator should click to the Send Invitations button to send the invitations. And, there is a Back to Game's Main Page button to return the Game's Main Page.

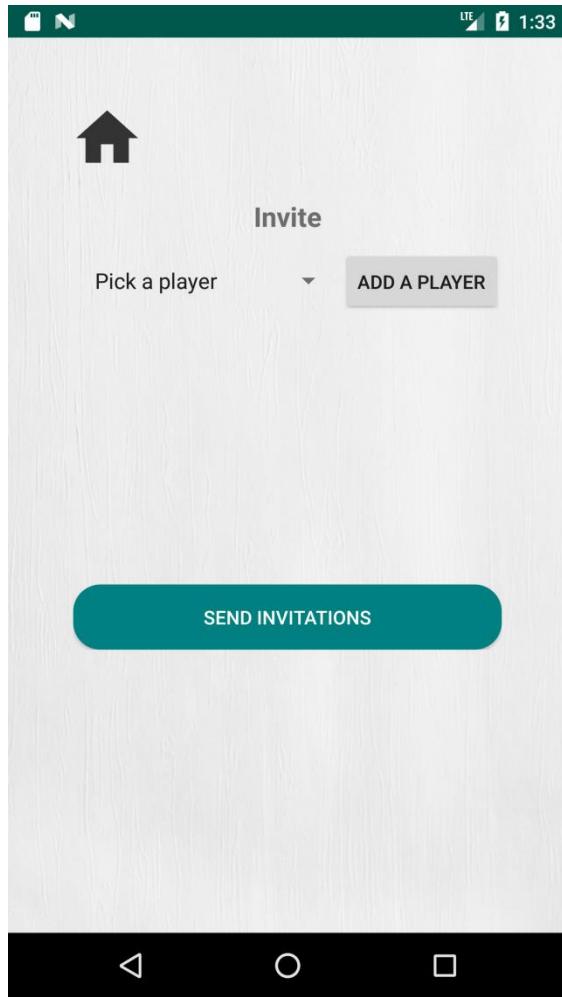


Figure 43 Invite page (game creator)

4.4.6.2.14. Missions Page (Game Creator)

This page appears when game creator clicks the Missions button on the Game's Main Page.

This page includes three buttons: Create a Mission, Check Photos and Missions List. These buttons redirect game creator to related pages. And, there is a Back to Game's Main Page button to return the Game's Main Page.

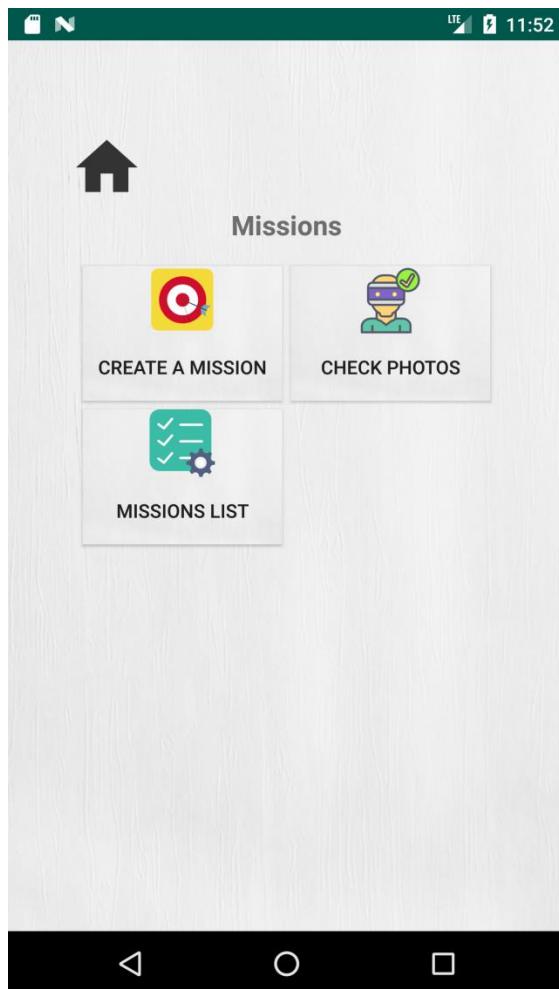


Figure 44 Missions page (game creator)

4.4.6.2.15. Create a Mission Page (Game Creator)

This page includes three fields for mission's information, and Mission Start Time, Mission End Time, Add a Beacon and Create a Mission buttons. Also, includes buttons to select the mission type: Stand, Time and Photo buttons. According to selection, new fields or buttons appear. Game creator should fill the information fields and set the code start time and end time. Then, he/she should add at least one beacon to the mission from the dropdown list of beacons with using the Add a Beacon button. After choosing the mission type, game creator should use the Create a Mission button to complete mission creation. Create a Mission button redirects game creator to Game's Main Page after mission creation is successful. And, there is a Back to Game's Main Page button to return the Game's Main Page.

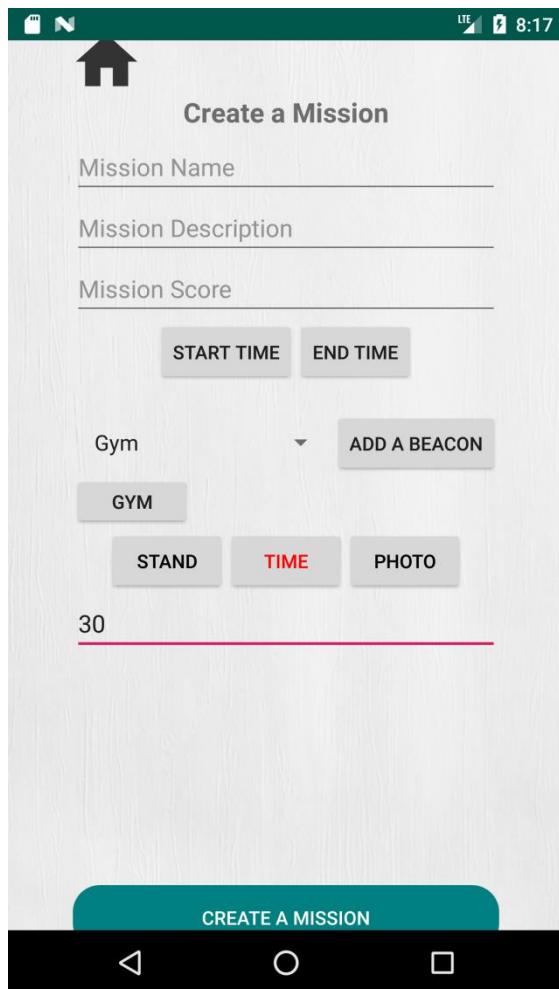


Figure 45 Create a mission page (game creator)

4.4.6.2.16. Pending Missions List Page (Game Creator)

This page appears when game creator clicks the Check Photos button on the Missions Page.

This page includes the list of photo not auto compare missions that are pending the confirmation or denial from the game creator. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 46 Pending missions list page (game creator)

4.4.6.2.17. Check the Photo Page (Game Creator)

In this page, there are Confirm and Deny buttons, and a photo that is uploaded to the system by a player for the mission. Game creator should decide whether the photo is confirmed or denied. And, there is a Back to Game's Main Page button to return the Game's Main Page.

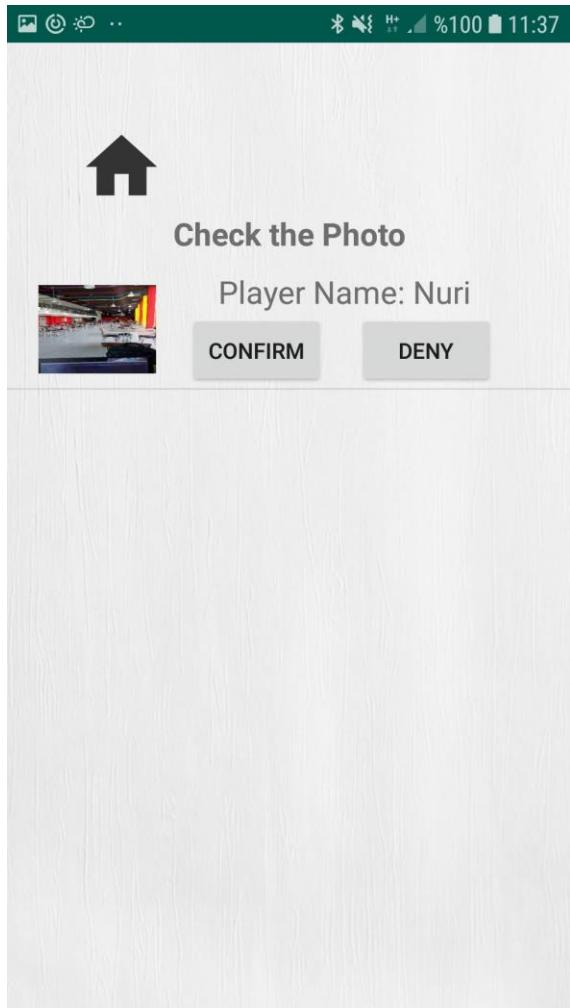


Figure 47 Check the photo page (game creator)

4.4.6.2.18. Missions List Page (Game Creator)

This page includes the list of missions that are created by the game creator. The red circle indicates that the mission is already ended. The yellow circle indicates that the mission has not started yet. The green circle indicates that the mission is valid. Game creator can choose a mission from the list of missions to go to the Mission Settings Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

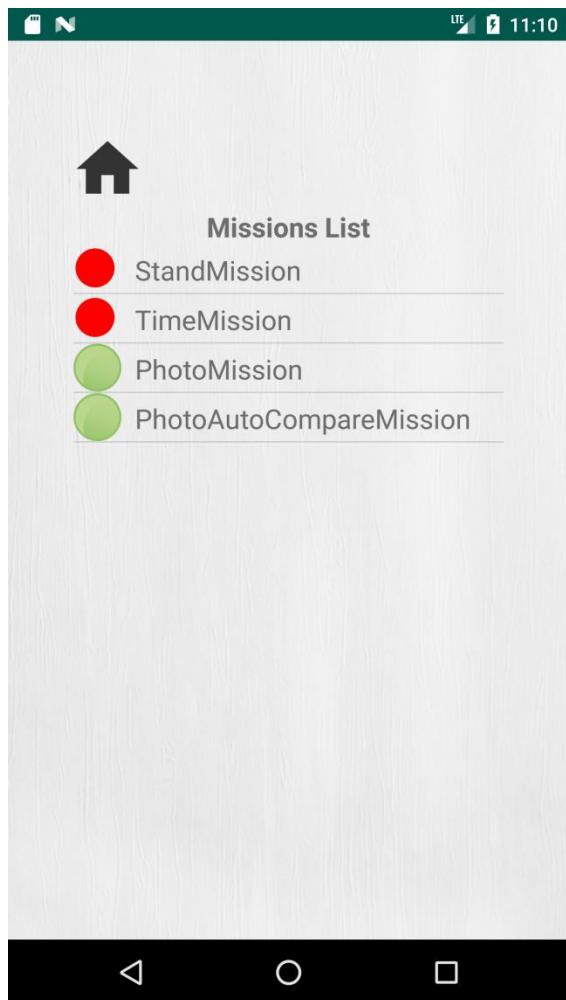


Figure 48 Missions list page (game creator)

4.4.6.2.19. Mission Settings Page (Game Creator)

Game creator can update the mission by changing the fields and clicking to the Update the Mission button or he/she can delete it completely by using the Delete the Mission button. Both Update the Mission and Delete the Mission buttons redirect game creator to the Game's Main Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

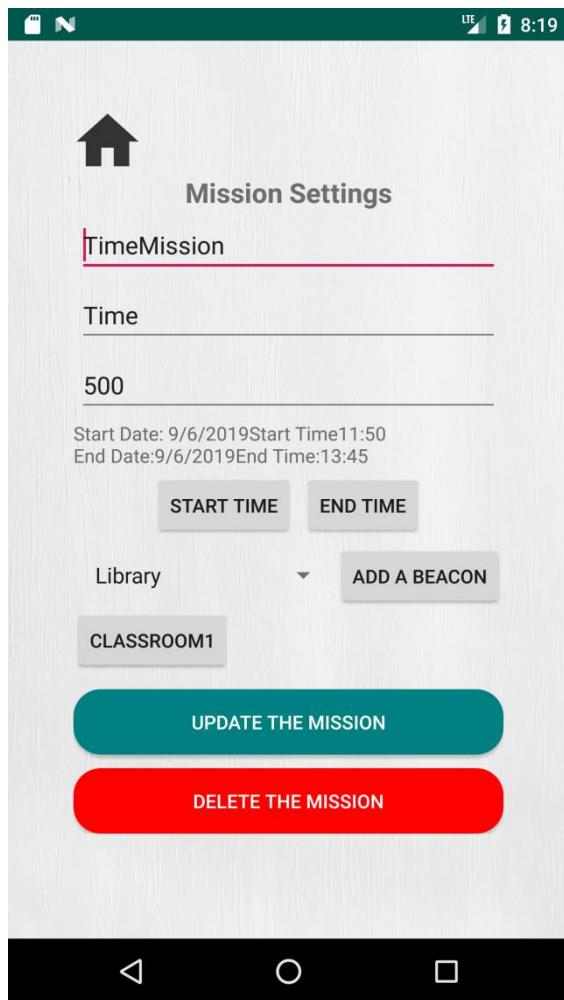


Figure 49 Mission settings page (game creator)

4.4.6.2.20. Player Settings Page (Game Creator)

This page appears when game creator clicks the Player Settings button on the Game's Main Page. In this page, Players List and Banned Players List are placed. Players List button redirects game creator to the list of players and Banned Players List button redirects to the list of banned players. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 50 Player settings page (game creator)

4.4.6.2.21. Players List Page (Game Creator)

This page includes the list of players. Game creator can ban players by clicking to the displayed player's name. And, there is a Back to Game's Main Page button to return the Game's Main Page.

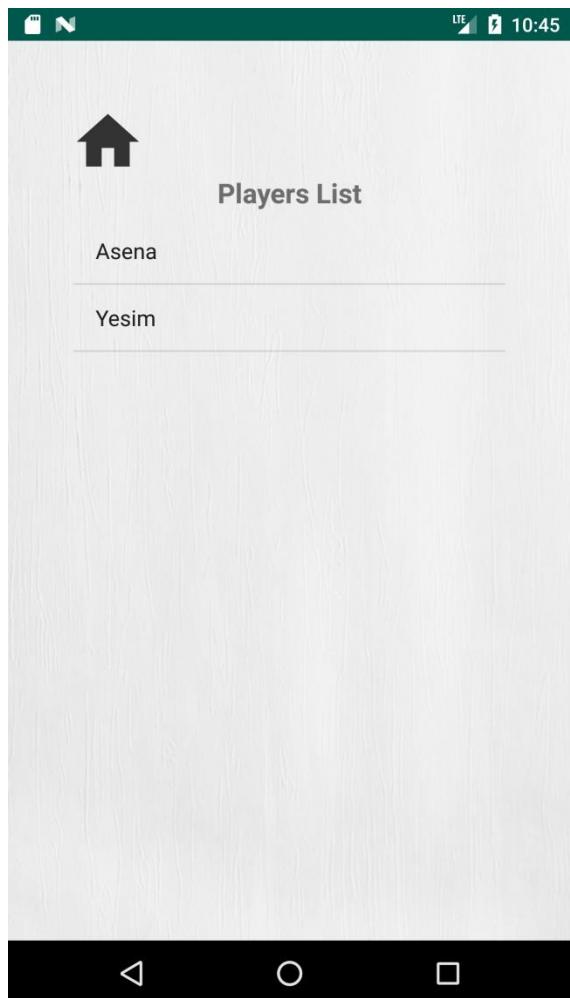


Figure 51Players list page (game creator)

4.4.6.2.22. Banned Players List Page (Game Creator)

This page includes the banned list of players. Game create can unban players by clicking to the displayed player's name. And, there is a Back to Game's Main Page button to return the Game's Main Page.

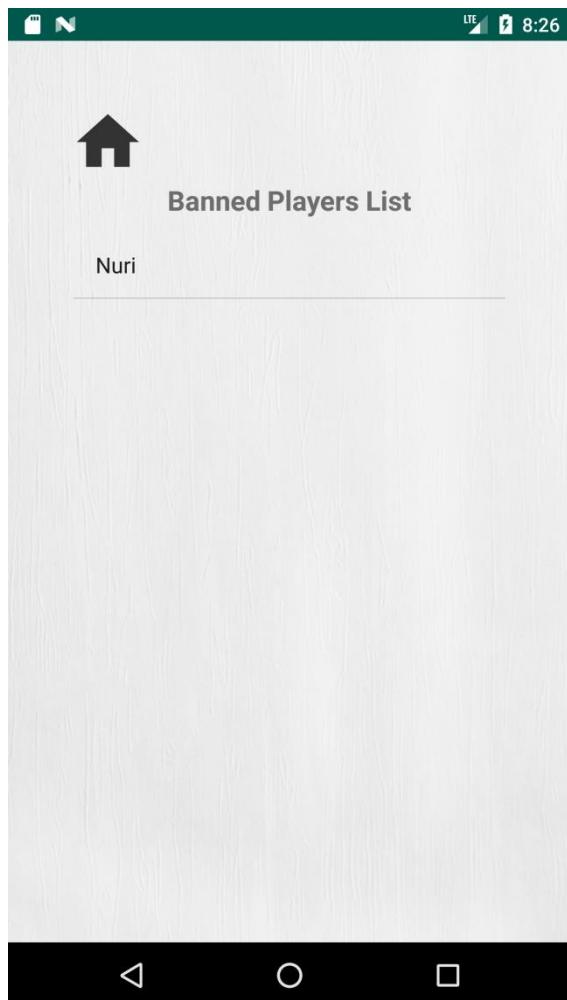


Figure 52Banned players list page (game creator)

4.4.6.2.23. Game Settings Page (Game Creator)

This page appears when game creator clicks the Game Settings button on the Game's Main Page. Game creator can update the name of the game by changing the text field and clicking to the Update the Game button or he/she can delete the game completely by using the Delete the Game button. Update the Game button redirects game creator to the Game's Main Page and Delete the Game button redirects to the Home Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

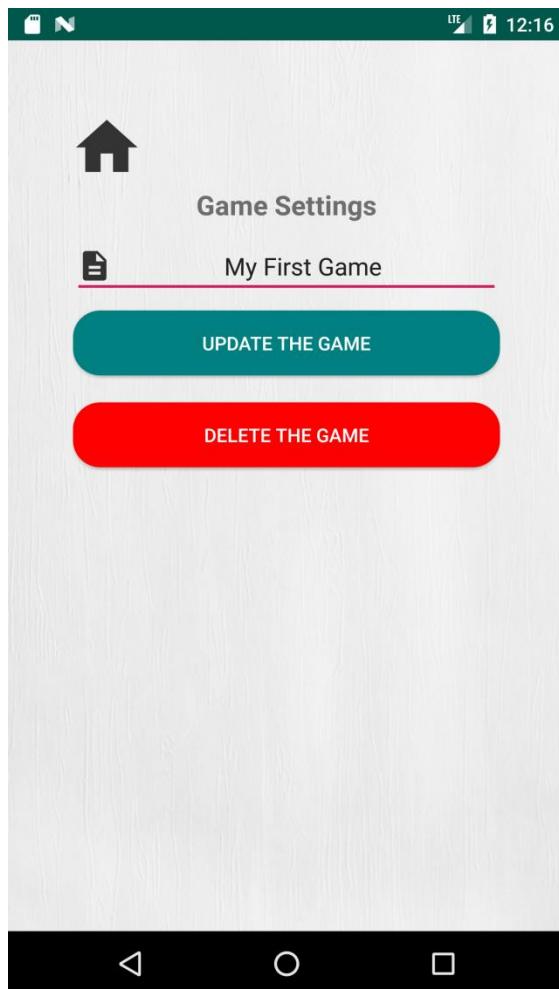


Figure 53 Game settings page (game creator)

4.4.6.2.24. Scoreboard Page (Game Creator)

This page appears when game creator clicks the Scoreboard button on the Game's Main Page. If the game's players completed any missions and earned scores, the Top 10 of players will be listed in this page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

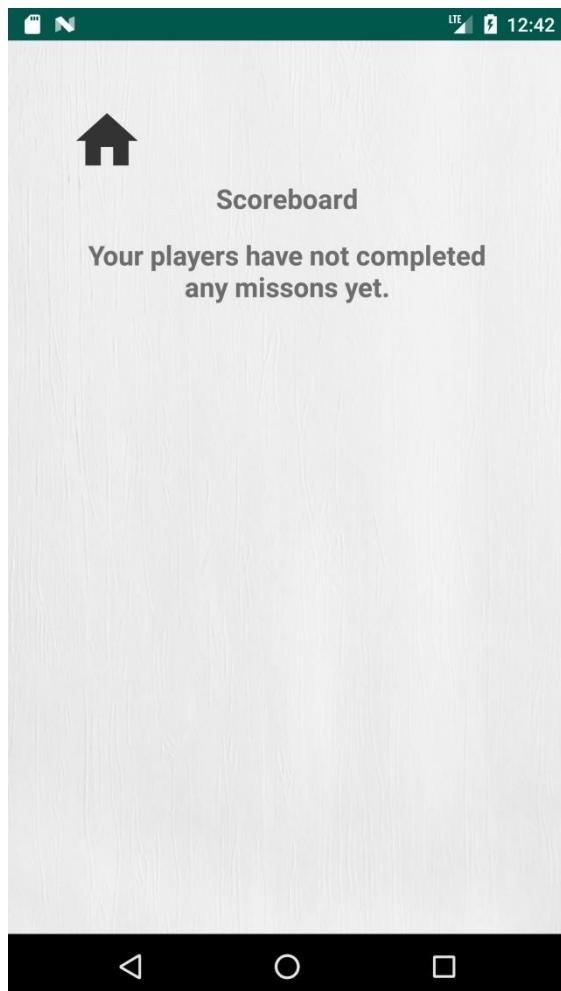


Figure 54 Scoreboard page (game creator)

4.4.6.2.25. Home Page (Player)

This page is the Home Page of the player. Player can edit his/her personal information by clicking to the Edit Profile button. Player can join a game by clicking to the Join a Game button. He/she can see his/her joined games by clicking to the My Games button. He/she can logout from the system with the Logout button.

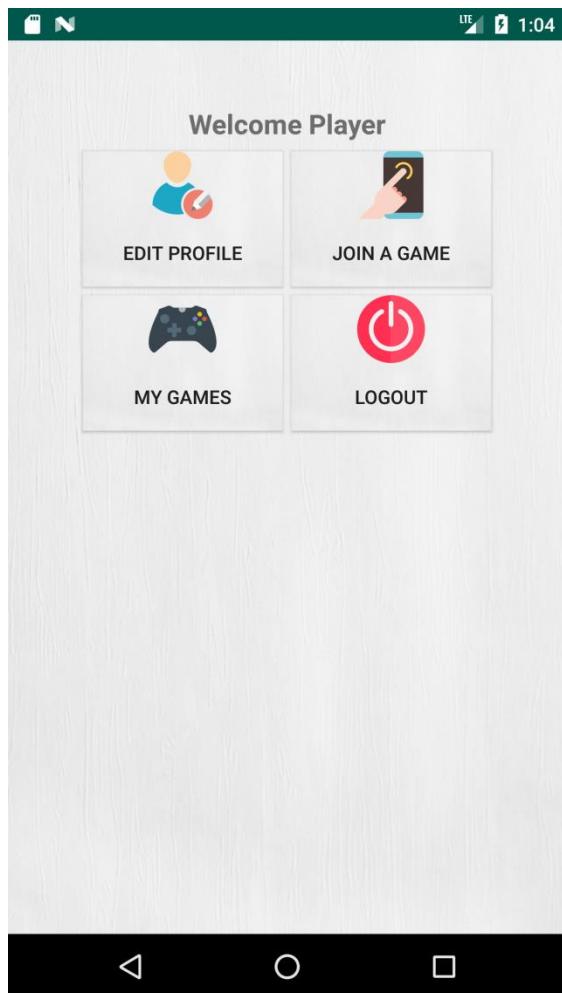


Figure 55 Home page (player)

4.4.6.2.26. Join a Game Page (Player)

When the player clicks the Join a Game button, this page opens. Player should enter a game code to join a game. And, there is a Home Page button to return the Home Page.

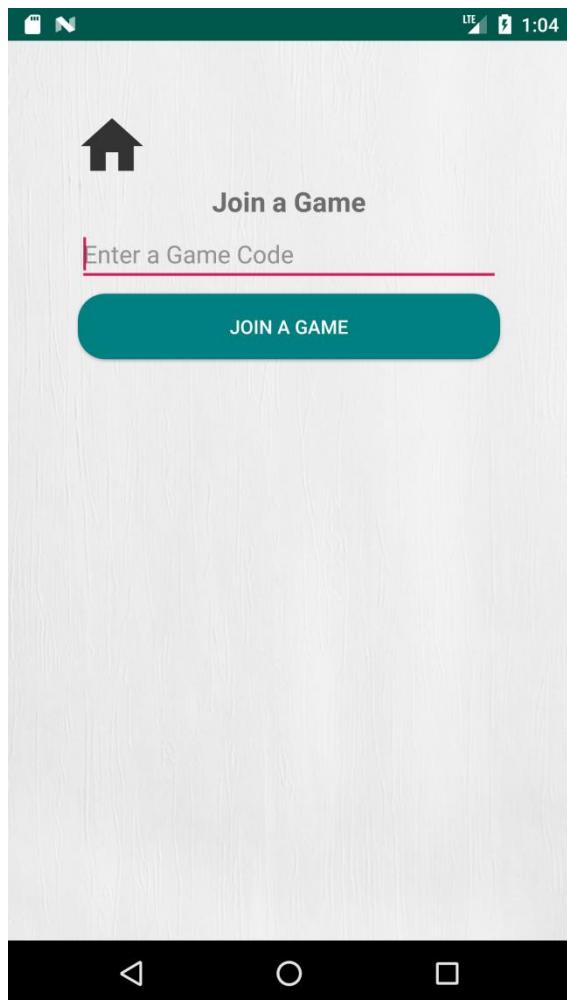


Figure 56Join a game page (player)

4.4.6.2.27. My Games Page (Player)

This page includes the list of games that are joined by the player. And, there is a Home Page button to return the Home Page.



Figure 57 My games page (player)

4.4.6.2.28. Game's Main Page (Player)

After the player selects a game from the My Games Page, Game's Main Page appears. In this page; Missions, Scoreboard, Game Settings and Exit buttons are placed. Player can use the Exit button to exit from the game and return the Home Page.

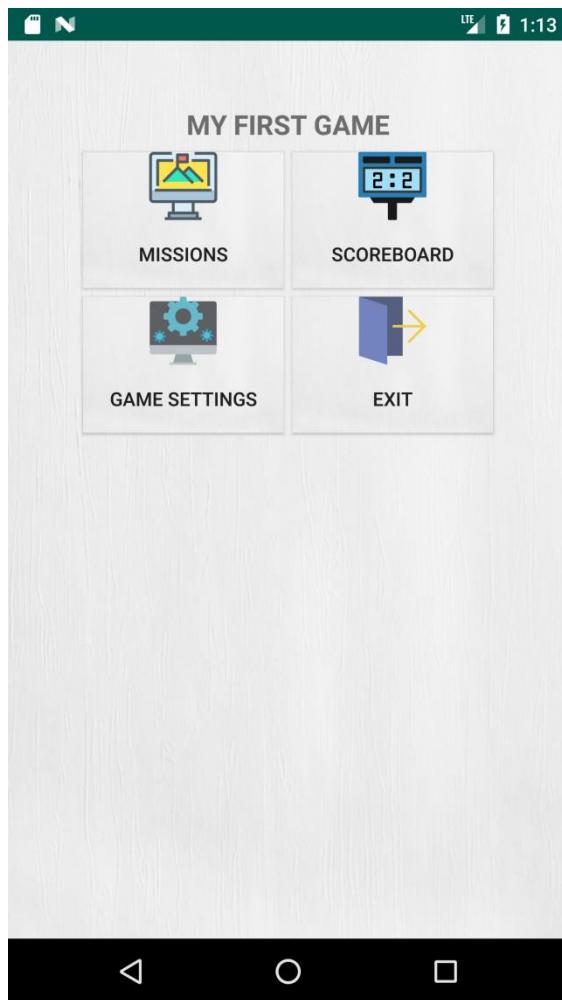


Figure 58 Game's main page (player)

4.4.6.2.29. Missions Page (Game Creator)

This page appears when player clicks the Missions button on the Game's Main Page. This page includes the list of active missions that are created by the game creator for this game. Player can choose a mission from the list of missions to go to the Accomplish the Mission Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 59 Missions page (player)

4.4.6.2.30. Accomplish the Mission Page (Player)

Player can accomplish a mission in this page. First the page opens, there is a Choose a Place button to connect to a beacon device. If the mission type is stand, Accomplish the Mission button appears. If the mission type is time, a counter appears and starts to count down. When the countdown ends, Accomplish the Mission button appears. If the mission type is stand, Accomplish the Mission button appears. If the mission type is photo, the Take a Photo and Accomplish the Mission buttons appear. When the player clicks to the Take a Photo button, camera opens. Player should take a photo and click to the Accomplish the Mission button to end the mission. And, there is a Back to Game's Main Page button to return the Game's Main Page.

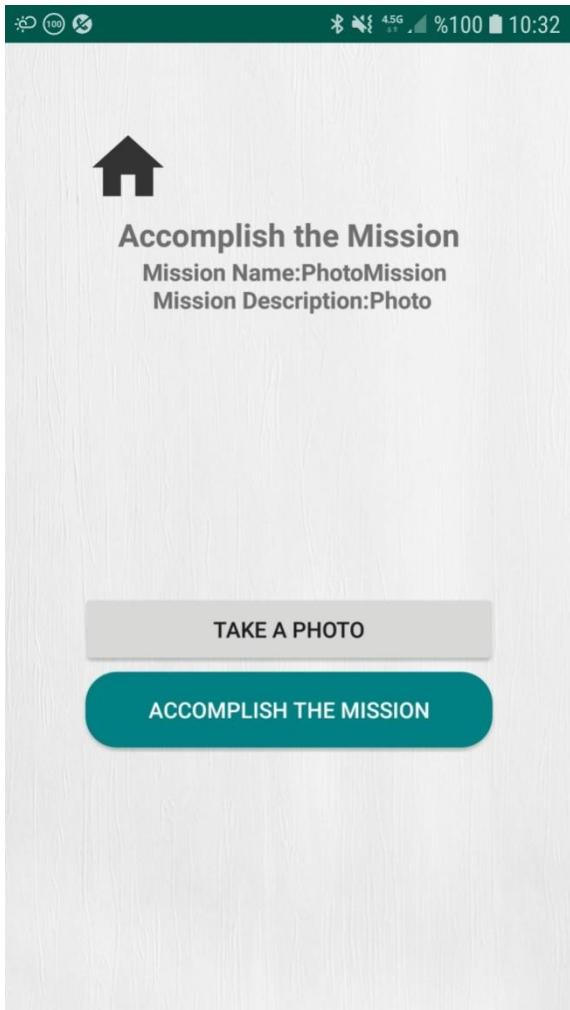


Figure 60 Accomplish the mission page (player)

4.4.6.2.31. Scoreboard Page (Player)

This page appears when player clicks the Scoreboard button on the Game's Main Page. Player's score, if it exists, appears in this page. Also, the Top 10 will be listed in the Scoreboard Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

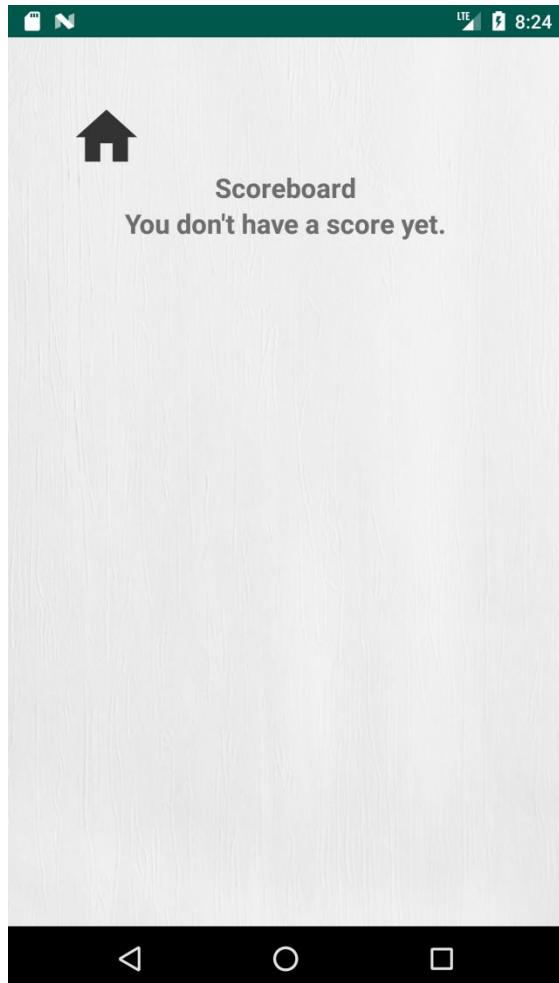


Figure 61 Scoreboard page (player)

4.4.6.2.32. Game Settings Page (Player)

This page appears when player clicks the Game Settings button on the Game's Main Page.

Player can return the Game's Main Page by clicking to the Back to Game's Main Page button or leave the game by using Leave the Game button.

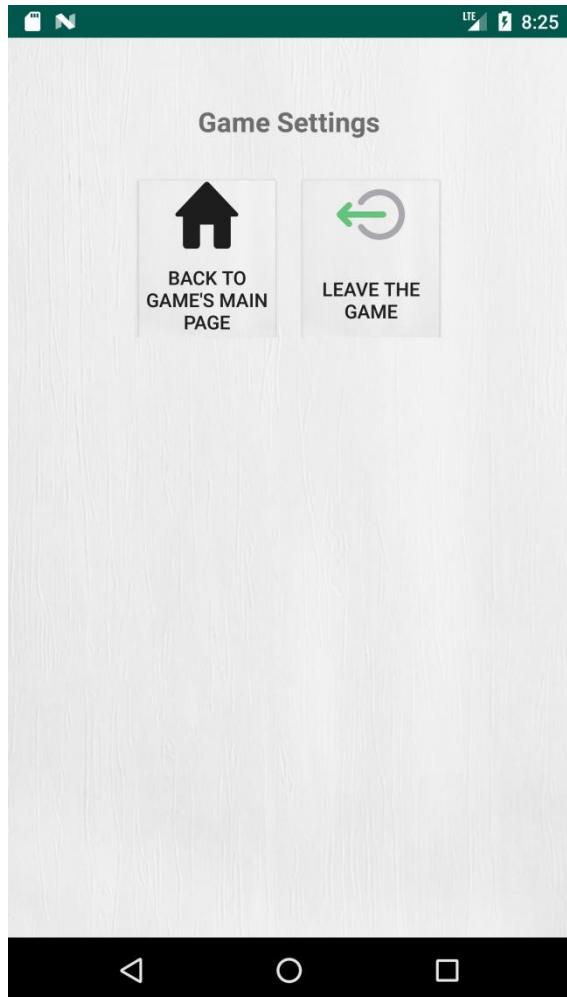


Figure 62 Game settings page (player)

4.4.7. State Dynamics Viewpoint

4.4.7.1. Design Concerns

The state dynamics viewpoint shows the behaviour of the system when there are some specific events. This viewpoint also related to the logical view. When the user enters the application, the user is redirected to the LoginPage. If the user does not have an account, he/she must register to Scavenger Hunt Game to log in to the system. If the login is successful, the user is redirected to user's HomePage according to their authority. There are two home pages which are one for players and one for game creators. From player's HomePage, a player can join a game and see his/her games which are created for players by game creators. Also, when a player comes to the end of the mission, system check the mission's Beacon, and after the confirmation, the system gives the player a score. From game creator's Home Page, the user can create a game and see his/her created games. Also, a game creator can create a mission for his/her players to do or update and remove that mission. To

log out, there is a logout button for all of the users, and if the users trigger that button, they can logout from the system.

4.4.7.2. Design Elements

In the state diagram, design elements begin with a start state and it is divided into two different states; one is for a game creator and another one is for a player. State diagram continuous with login states, display menu states, create a mission state, update a mission state, remove a mission state, create a beacon state, remove a beacon state, update a beacon state, accomplish a mission state, list scoreboard state, logout state and end with end state.

Design entities can be observed with using the state transition diagram in Figure 63 below.

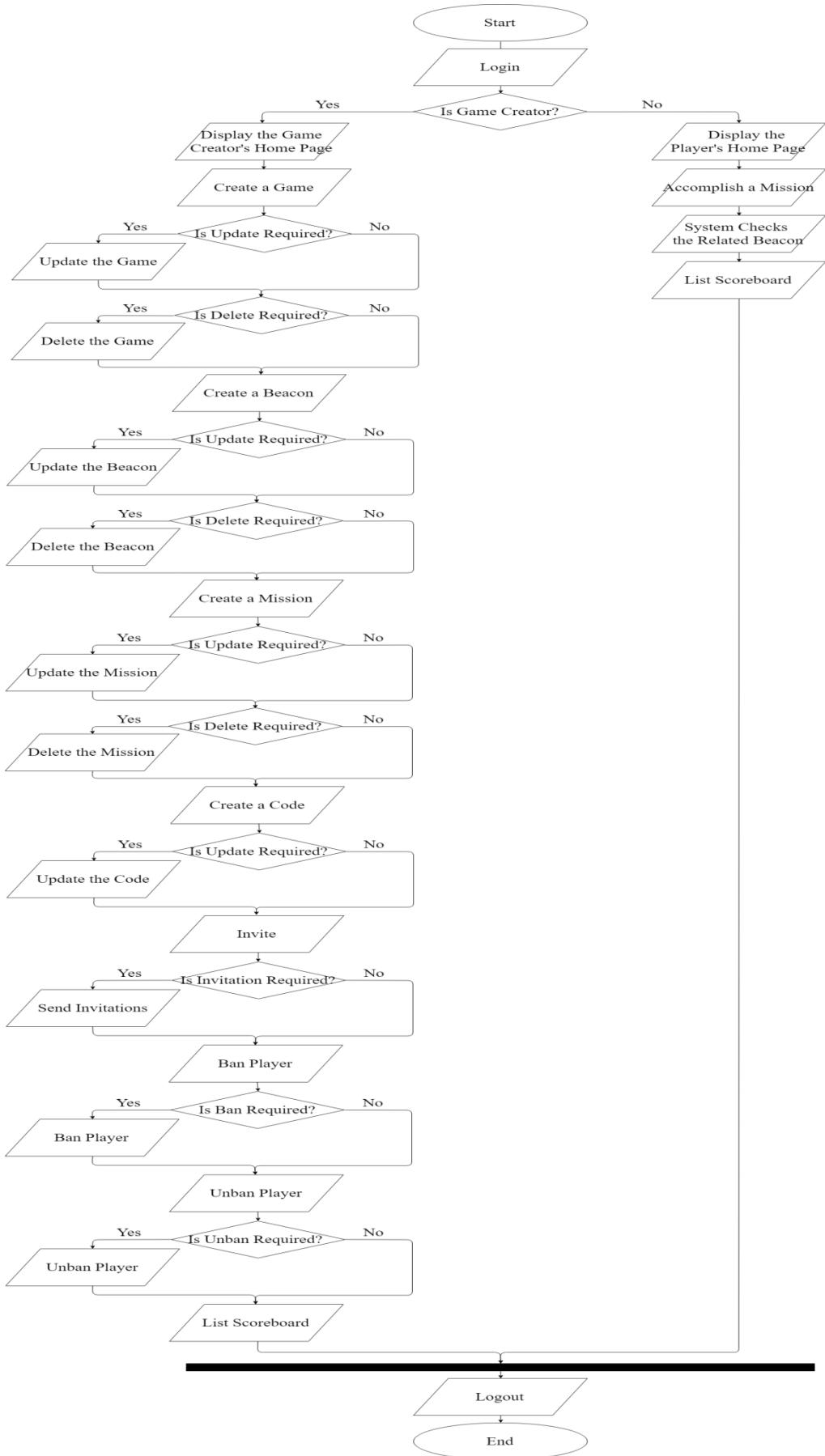


Figure 63 The flowchart diagram of the project

5. Test Plan

5.1. Introduction

5.1.1. Version Control

Version No	Description of Changes	Date
1.0	First Version	June 02, 2019

5.1.2. Overview

Use cases, graphical user interface features, system functionalities and usability factors of Scavenger Hunt Game Using BLE Beacon application is planned to be tested.

5.1.3. Scope

This document includes the test plan, test design specifications and the test cases correspond to the test plan of the project named Scavenger Hunt Game Using BLE Beacon.

5.1.4. Terminology

Acronym	Definition
GUI	Graphical User Interface

5.2. Features to be Tested

This part lists and gives a brief description of all the major features to be tested. For each major feature, there will be a Test Design Specification added at the end of this document.

5.2.1. Graphical User Interface

Graphical User Interface contains all the visual components that the user sees and uses in the system. This feature mainly contains all the texts, buttons, images, check boxes and some other visual objects seen while using the system. For this feature, each Graphical User Interface component will be tested individually whether they provide the correct functionality which is expected and they are placed correctly on the screen or not.

5.3. Item Pass/Fail Criteria

In this part, the general rule to use to decide when a test case passes and when it fails is described.

5.3.1. Entry Criteria

The below conditions must be completed before the project will accept testing.

- 100% of the promised features in SRS and SDD document should be implemented in the project.

5.3.2. Exit Criteria

Under the below conditions, the testing of the product is considered as successful.

- 100% of the test cases are executed.
- 100% of the test cases passed.
- All High and Medium Priority test cases passed

5.4. References

- [1] IEEE. IEEE Std. 829 - 2008 IE IEEE Standard for Software and System Test Documentation. IEEE Computer Society, 2008.
- [2] CENG408_Group17_SRS_V2, May 30, 2019.
- [3] CENG408_Group17_SDD_V2, May 30, 2019.

5.5. Test Design Specification

5.5.1. Graphical User Interface

5.5.1.1. Subfeatures to Be Tested

5.5.1.1.1. Login Button (GUI.LGN_BTN)

This button placed in the application's start page which is the Login Page. User should login with his/her e-mail address and password to enter the system. After this button selected, the information that user entered is checked from database and user is navigated to the HomePage.

5.5.1.1.2. Register Page Button (GUI.RGS_P_BTN)

This button placed in the Login Page. If user does not registered before, he/she should use this button to reach the RegisterPage to register the system.

5.5.1.1.3. Register Button (GUI.RGS_BTN)

This button placed in the Register Page. After filling the required fields, user should use this button to register the system.

5.5.1.1.4. Back to Login Page Button (GUI.LGN_P_BTN)

This button placed in the Register Page and redirects user to Login Page.

5.5.1.1.5. Edit ProfilePage Button (GUI.EP_P_BTN)

This button placed in the user's Home Page and redirects user to Edit Profile Page.

5.5.1.1.6. Save Profile Button (GUI.SP_BTN)

This button placed in the Edit Profile Page. If user changes any information in the fields, he/she should use this button to save the changes.

5.5.1.1.7. Logout Button (GUI.LGO_BTN)

This button placed in the user's Home Page. User can use this button to log out from the system.

5.5.1.1.8. Create a Game Page Button (Game Creator) (GUI.CRTG_P_BTN)

This button placed in the game creator's Home Page and redirects game creator to Create a Game Page.

5.5.1.1.9. Create a Game Button (Game Creator) (GUI.CRTG_BTN)

This button placed in the Create a Game Page. After filling the required fields, game creator should use this button to create a game.

5.5.1.1.10. My GamesPage Button(Game Creator) (GUI.MYG_P_GC_BTN)

This button placed in the game creator's Home Page and redirectsgame creator to game creator's My Games Page. In this page, game creator's games are listed.

5.5.1.1.11. Beacons Page Button (Game Creator) (GUI.BCN_P_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Beacons Page.

5.5.1.1.12. Create a Beacon Page Button (Game Creator) (GUI.CRTBCN_P_BTN)

This button placed in the Beacons Page and redirects game creator to Create a Beacon Page.

5.5.1.1.13. Create a Beacon Button (Game Creator) (GUI.CRTBCN_BTN)

This button placed in the Create a Beacon Page. After filling the required fields, game creator should use this button to create a beacon.

5.5.1.1.14. Beacons List Page Button (Game Creator) (GUI.BCNL_BTN)

This button placed in the Beacons Page and redirects game creator to Beacons List Page. In this page, game creator's beacons are listed.

5.5.1.1.15. Update the Beacon Button (Game Creator) (GUI.UPDBCN_BTN)

This button placed in the selected beacon's Beacon Settings Page. After changing the wanted fields, game creator should use this button to update the beacon.

5.5.1.1.16. Delete the Beacon Button (Game Creator) (GUI.DELBCN_BTN)

This button placed in the selected beacon's Beacon Settings Page. If game creator wants to delete the beacon, he/she should use this button to delete the beacon.

5.5.1.1.17. Create a Code Page Button (Game Creator) (GUI.CRTC_P_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Create a Code Page.

5.5.1.1.18. Random Code Button (Game Creator) (GUI.RNDC_BTN)

This button placed in the Create a Code Page. Game creator can create a random code for his/her game by clicking this button.

5.5.1.1.19. Code Start Time Button (Game Creator) (GUI.CST_BTN)

This button placed in the Create a Code Page. Game creator should add a start time to his/her code by using this button.

5.5.1.1.20. Code End Time Button (Game Creator) (GUI.CET_BTN)

This button placed in the Create a Code Page. Game creator should add an end time to his/her code by using this button.

5.5.1.1.21. Create a Code Button (Game Creator) (GUI.CRTC_BTN)

This button placed in the Create a Code Page. After filling the required fields, game creator should use this button to create a code.

5.5.1.1.22. InvitePage Button (Game Creator) (GUI.INV_P_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Invite Page.

5.5.1.1.23. Add a Player Button (Game Creator) (GUI.ADDPLYR_BTN)

This button placed in the Invite Page. Game creator can add players to list to send invitations by using this button. He/she can delete players by clicking on the displayed players' name.

5.5.1.1.24. Send Invitations Button (Game Creator) (GUI.SNDINV_BTN)

This button placed in the Invite Page. Game creator can send invitations to added players by using this button.

5.5.1.1.25. Missions Page Button (Game Creator) (GUI.MIS_P_GC_BTN)

This button placed in the selected Game's Main Page and redirects game creator to game creator's Missions Page.

5.5.1.1.26. Create a Mission Page Button (Game Creator) (GUI.CRTMIS_P_BTN)

This button placed in the Missions Page and redirects game creator to Create a Mission Page.

5.5.1.1.27. Mission Start Time Button (Game Creator) (GUI.MISST_BTN)

This button placed in the Create a Mission Page. Game creator should add a start time to his/her mission by using this button.

5.5.1.1.28. Mission End Time Button (Game Creator) (GUI.MISET_BTN)

This button placed in the Create a Mission Page. Game creator should add an end time to his/her mission by using this button.

5.5.1.1.29. Add a Beacon Button (Game Creator) (GUI.ADDBCN_BTN)

This button placed in the Create a Mission Page. Game creator should select at least one beacon from the dropdown list of saved beacons to add a beacon to his/her mission by using this button. He/she can delete beacons by clicking on the displayed beacons' name.

5.5.1.1.30. Stand Mission Button (Game Creator) (GUI.STDMIS_BTN)

This button placed in the Create a Mission Page. Game creator can select stand mission type by using this button.

5.5.1.1.31. Time Mission Button (Game Creator) (GUI.TIMMIS_BTN)

This button placed in the Create a Mission Page. Game creator can select time mission type by using this button. If game creator selects this mission type, he/she should fill the displayed set mission completion time field.

5.5.1.1.32. Photo Mission Button (Game Creator) (GUI.PHTMIS_BTN)

This button placed in the Create a Mission Page. Game creator can select photo mission type by using this button. If game creator selects this mission type, photo auto compare and photo not compare buttons will be displayed.

5.5.1.1.33. Photo Auto Compare Button (Game Creator) (GUI.AUTCMP_BTN)

This button placed in the Create a Mission Page after selecting the photo mission type. Game creator can select photo auto compare by using this button.

5.5.1.1.34. Choose a Photo Button (Game Creator) (GUI.CHSPHT_BTN)

This button placed in the Create a Mission Page after selecting the photo auto compare. Game creator can select a photo from his/her mobile device for auto comparing by using this button.

5.5.1.1.35. Photo Not Compare Button (Game Creator) (GUI.NOTCMP_BTN)

This button placed in the Create a Mission Page after selecting the photo mission type. Game creator can select photo not compare by using this button.

5.5.1.1.36. Create a Mission Button (Game Creator) (GUI.CRTMIS_BTN)

This button placed in the Create a Mission Page. After filling the required fields, game creator should use this button to create a mission.

5.5.1.1.37. Check Photos Button (Game Creator) (GUI.CHKPHT_BTN)

This button placed in the Missions Page and redirects game creator to Pending Missions List Page for selecting a mission.

5.5.1.1.38. Confirm Button (Game Creator) (GUI.CONF_BTN)

This button placed in the selected mission's Check the Photo Page. Game creator should use this button to confirm the photo that player uploaded.

5.5.1.1.39. Deny Button (Game Creator) (GUI.DENY_BTN)

This button placed in the selected mission's Check the Photo Page. Game creator should use this button to deny the photo that player uploaded.

5.5.1.1.40. Missions ListPage Button (Game Creator) (GUI.MISL_BTN)

This button placed in the Missions Page and redirects game creator to Missions List Page. In this page, game creator's missions are listed.

5.5.1.1.41. Mission Start Time Update Button (Game Creator)

(GUI.MISSTUPD_BTN)

This button placed in the selected mission's Mission Settings Page. Game creator can change the start time of the mission by using this button.

5.5.1.1.42. Mission End Time Update Button (Game Creator) (GUI.MISETUPD_BTN)

This button placed in the selected mission's Mission Settings Page. Game creator can change the end time of the mission by using this button.

5.5.1.1.43. Add a Beacon Update Button (Game Creator) (GUI.ADDBCNUPD_BTN)

This button placed in the selected mission's Mission Settings Page. Game creator can add new beacons to the mission from the dropdown list of saved beacons by using this button. He/she can delete beacons by clicking on the displayed beacons' name.

5.5.1.1.44. Update the Mission Button (Game Creator) (GUI.UPDMIS_BTN)

This button placed in the selected mission's Mission Settings Page. After changing the wanted fields, game creator should use this button to update the mission.

5.5.1.1.45. Delete the Mission Button (Game Creator) (GUI.DELMIS_BTN)

This button placed in the selected mission's Mission Settings Page. If game creator wants to delete the mission, he/she should use this button to delete the mission.

5.5.1.1.46. Player Settings Page Button (Game Creator) (GUI.PLYRSET_P_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Player Settings Page.

5.5.1.1.47. Players ListPage Button (Game Creator) (GUI.PLYRL_P_BTN)

This button placed in the Player Settings Page and redirects game creator to Players List Page. In this page, game creator can ban players by clicking the displayed players' name.

5.5.1.1.48. Banned Players List Page Button (Game Creator) (GUI.BPLYRL_P_BTN)

This button placed in the Player Settings Page and redirects game creator to Banned Players List Page. In this page, game creator can unban players by clicking the displayed players' name.

5.5.1.1.49. Game Settings Page Button (Game Creator) (GUI.GSET_P_GC_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Game Settings Page.

5.5.1.1.50. Update the Game Button (Game Creator) (GUI.UPDG_BTN)

This button placed in the Game Settings Page. After changing the wanted fields, game creator should use this button to update the game.

5.5.1.1.51. Delete the Game Button (Game Creator) (GUI.DELG_BTN)

This button placed in the Game Settings Page. If game creator wants to delete the game, he/she should use this button to delete the game.

5.5.1.1.52. Scoreboard Page Button (Game Creator) (GUI.SCRB_P_GC_BTN)

This button placed in the selected Game's Main Page and redirects game creator to Scoreboard Page. If the game's players completed any missions and earned scores, the Top 10 will be listed in the Scoreboard Page.

5.5.1.1.53. Join a GamePage Button (Player) (GUI.JOING_P_BTN)

This button placed in the player's Home Page and redirects player to theJoin a Game Page.

5.5.1.1.54. Join a Game Button (Player) (GUI.JOING_BTN)

This button placed in the Join a Game Page. After entering a game code, player should use this button to join a game.

5.5.1.1.55. My Games Page Button (Player) (GUI.MYG_P_P_BTN)

This button placed in the player's Home Page and redirects player to player's My Games Page. In this page, player's games are listed.

5.5.1.1.56. Missions Page Button (Player) (GUI.MIS_P_P_BTN)

This button placed in the selected Game's Main Page and redirects player to player's Missions ListPage. In this page, player's missions are listed.

5.5.1.1.57. Choose a Place Button (Player) (GUI.CHSPCL_BTN)

This button placed in the selected mission's Accomplish the Mission Page. Player should choose a place from the dropdown list of beacons and connect to the beacon device by using this button.

5.5.1.1.58. Accomplish the Mission Button (Player) (GUI.ACMMIS_BTN)

This button placed in the Accomplish the Mission Page after choosing a place. According to mission type, this button's appearance time can change. Player should use this button to complete the mission.

5.5.1.1.59. Take a Photo Button (Player) (GUI.TKPHT_BTN)

This button placed in the Accomplish the Mission Page according to mission type. If the mission type is photo, this button appears in the Accomplish the Mission Page. When the player clicks to this button, camera opens.

5.5.1.1.60. Scoreboard Page Button (Player) (GUI.SCRB_P_P_BTN)

This button placed in the selected Game's Main Page and redirects player to Scoreboard Page. Player's score, if it is existed, will be displayed in the Scoreboard Page. Also, the Top 10 will be listed in the Scoreboard Page.

5.5.1.1.61. Game Settings Page Button (Player) (GUI.GSET_P_P_BTN)

This button placed in the selected Game's Main Page and redirects player to Game Settings Page.

5.5.1.1.62. Leave the Game Button (GUI.LVG_BTN)

This button placed in the Game Settings Page. Player can use this button to leave the game.

5.5.1.1.63. Exit Button (GUI.EXT_BTN)

This button placed in the selected Game's Main Page and redirects user to Home Page.

5.5.1.1.64. Back to Game's Main Page Button (GUI.MAIN_P_BTN)

User can use back to Game's Main Page button to return the Game's Main Page.

5.5.1.1.65. Home Page Button (GUI.HOM_P_BTN)

User can use Home Page button to return the Home Page.

5.5.1.2. Test Cases

TC ID	Requirements	Priority	Scenario Description
GUI.LGN_BTN.01	3.3.2.1	H	Enter a valid e-mail and password. Then select "Login" button.
GUI.LGN_BTN.02	3.3.2.1	H	Enter an invalid e-mail and a valid password. Then select "Login" button.

GUI.LGN_BTN.03	3.3.2.1	H	Enter a valid e-mail and an invalid password. Then select “Login” button.
GUI.LGN_BTN.04	3.3.2.1	H	Enter an invalid e-mail and password. Then select “Login” button.

TC ID	Requirements	Priority	Scenario Description
GUI.RGS_P_BTN.01	3.3.2.1	H	Select “Register Page” button. After the selection, Register Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.RGS_BTN.01	3.3.2.1	H	Enter valid registration information. Then select “Register” button.
GUI.RGS_BTN.02	3.3.2.1	H	Enter invalid registration information. Then select “Register” button.

TC ID	Requirements	Priority	Scenario Description
GUI.LGN_P_BTN.01	3.3.2.1	H	Select “Back to Login Page” button. After the selection, Login Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.EP_P_BTN.01	3.3.2.1	M	Select “Edit Profile Page” button. After the selection, Edit Profile Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.SP_BTN.01	3.3.2.1	M	Select “Save Profile” button. After the selection, changed information

			will be saved.
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TC ID	Requirements	Priority	Scenario Description
GUI.LGO_BTN.01	3.3.2.1	H	Select “Logout” button. After the selection, user will logout from the system and Login Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTG_P_BTN.01	3.3.2.2	H	Select “Create a Game Page” button. After the selection, Create a Game Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTG_BTN.01	3.3.2.2	H	Select “Create a Game” button. After the selection, a game will be created.

TC ID	Requirements	Priority	Scenario Description
GUI.MYG_P_GC_BTN.01	3.3.2.2	H	Select “My Games Page” button. After the selection, game creator’s My Games Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.BCN_P_BTN.01	3.3.2.4	H	Select “Beacons Page” button. After the selection, Beacons Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description

GUI.CRTBCN_P_BTN.01	3.3.2.4	H	Select “Create a Beacon Page” button. After the selection, Create a Beacon Page interface will be displayed.
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TC ID	Requirements	Priority	Scenario Description
GUI.CRTBCN_BTN.01	3.3.2.4	H	Select “Create a Beacon” button. After the selection, a beacon will be created.

TC ID	Requirements	Priority	Scenario Description
GUI.BCNL_BTN.01	3.3.2.4	H	Select “Beacons List Page” button. After the selection, Beacons List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.UPDBCN_BTN.01	3.3.2.4	M	Select “Update the Beacon” button. After the selection, changed information will be saved.

TC ID	Requirements	Priority	Scenario Description
GUI.DELBCN_BTN.01	3.3.2.4	H	Select “Delete the Beacon” button. After the selection, the beacon will be deleted.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTC_P_BTN.01	3.3.2.2	H	Select “Create a Code Page” button. After the selection, Create a Code Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.RNDC_BTN.01	3.3.2.2	M	Select “Random Code” button. After the selection, a random code will be created.

TC ID	Requirements	Priority	Scenario Description
GUI.CST_BTN.01	3.3.2.2	H	Select “Code Start Time” button. After the selection, code start time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CET_BTN.01	3.3.2.2	H	Select “Code End Time” button. After the selection, code end time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTC_BTN.01	3.3.2.2	H	Select “Create a Code” button. After the selection, a code will be created.

TC ID	Requirements	Priority	Scenario Description
GUI.INV_P_BTN.01	3.3.2.2	M	Select “Invite Page” button. After the selection, Invite Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.ADDPLYR_BTN.01	3.3.2.2	M	Select “Add a Player” button. After the selection, players will be added one by one to invitation list to send

			invitations or will be deleted by clicking the displayed players' name.
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TC ID	Requirements	Priority	Scenario Description
GUILSNDINV_BTN.01	3.3.2.2	M	Select “Send Invitations” button. After the selection, invitations will be sent.

TC ID	Requirements	Priority	Scenario Description
GUI.MIS_P_GC_BTN.01	3.3.2.2	H	Select “Missions Page” button. After the selection, game creator’s Missions Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTMIS_P_BTN.01	3.3.2.2	H	Select “Create a Mission Page” button. After the selection, Missions Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.MISST_BTN.01	3.3.2.2	H	Select “Mission Start Time” button. After the selection, mission start time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.MISET_BTN.01	3.3.2.2	H	Select “Mission End Time” button. After the selection, mission end time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.ADDBCN_BTN.01	3.3.2.2	H	Select “Add a Beacon” button. After the selection, beacons will be added to mission one by one or will be deleted by clicking the displayed beacons’ name.

TC ID	Requirements	Priority	Scenario Description
GUI.STDMIS_BTN.01	3.3.2.2	H	Select “Stand Mission” button. After the selection, stand mission type will be selected.

TC ID	Requirements	Priority	Scenario Description
GUI.TIMMIS_BTN.01	3.3.2.2	H	Select “Time Mission” button. After the selection, time mission type will be selected.

TC ID	Requirements	Priority	Scenario Description
GUI.PHTMIS_BTN.01	3.3.2.2	H	Select “Photo Mission” button. After the selection, photo mission type will be selected.

TC ID	Requirements	Priority	Scenario Description
GUI.AUTCMP_BTN.01	3.3.2.2	M	Select “Photo Auto Compare” button. After the selection, photo auto compare will be selected.

TC ID	Requirements	Priority	Scenario Description
GUI.CHSPHT_BTN.01	3.3.2.2	M	Select “Choose a Photo” button. After the selection, device will

			want to permission to access photos. After choosing the photo, it will be added to mission.
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TC ID	Requirements	Priority	Scenario Description
GUI.NOTCMP_BTN.01	3.3.2.2	H	Select “Photo Not Compare” button. After the selection, photo not compare will be selected.

TC ID	Requirements	Priority	Scenario Description
GUI.CRTMIS_BTN.01	3.3.2.2	H	Select “Create a Mission” button. After the selection, a mission will be created.

TC ID	Requirements	Priority	Scenario Description
GUI.CHKPHT_P_BTN.01	3.3.2.2	H	Select “Check Photos Page” button. After the selection, Pending Missions List Page interface will be displayed for selecting a mission.

TC ID	Requirements	Priority	Scenario Description
GUI.CONF_BTN.01	3.3.2.2	H	Select “Confirm” button. After the selection, Pending Missions List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.DENY_BTN.01	3.3.2.2	H	Select “Deny” button. After the selection, Pending Missions List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description

GUI.MISL_BTN.01	3.3.2.2	H	Select “Missions List Page” button. After the selection, Missions List Page interface will be displayed.
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TC ID	Requirements	Priority	Scenario Description
GUI.MISSTUPD_BTN.01	3.3.2.2	H	Select “Mission Start Time Update” button. After the selection, mission start time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.MISETUPD_BTN.01	3.3.2.2	H	Select “Mission End Time Update” button. After the selection, mission end time selection interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.ADDBCNUPD_BTN.01	3.3.2.2	H	Select “Add a Beacon Update” button. After the selection, beacons will be added to mission one by one or will be deleted by clicking the displayed beacons’ name.

TC ID	Requirements	Priority	Scenario Description
GUI.UPDMIS_BTN.01	3.3.2.2	H	Select “Update the Mission” button. After the selection, changed information will be saved.

TC ID	Requirements	Priority	Scenario Description
GUI.DELMIS_BTN.01	3.3.2.2	H	Select “Delete the Mission” button. After the selection, the mission will be deleted.

TC ID	Requirements	Priority	Scenario Description
GUI.PLYRSET_P_BTN.01	3.3.2.2	H	Select “Player Settings Page” button. After the selection, Player Settings Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.PLYRL_P_BTN.01	3.3.2.2	H	Select “Players List Page” button. After the selection, Players List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.BPLYRL_P_BTN.01	3.3.2.2	H	Select “Banned Players List Page” button. After the selection, Banned Players List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.GSET_P_GC_BTN.01	3.3.2.2	H	Select “Game Settings Page” button. After the selection, game creator’s Game Settings Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.UPDG_BTN.01	3.3.2.2	H	Select “Update the Game” button. After the selection, changed information will be saved.

TC ID	Requirements	Priority	Scenario Description
GUI.DELG_BTN.01	3.3.2.2	H	Select “Delete the Game” button.

			After the selection, the game will be deleted.
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TC ID	Requirements	Priority	Scenario Description
GUI.SCRB_P_GC_BTN.01	3.3.2.3	H	Select “Scoreboard Page” button. After the selection, game creator’s Scoreboard Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.JOING_P_BTN.01	3.3.2.2	H	Select “Join a Game Page” button. After the selection, Join a Game Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.JOING_BTN.01	3.3.2.2	H	Select “Join a Game” button. After the selection, player will be joined a game.

TC ID	Requirements	Priority	Scenario Description
GUI.MYG_P_P_BTN.01	3.3.2.2	H	Select “My Games Page” button. After the selection, player’s My Games Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.MIS_P_P_BTN.01	3.3.2.2	H	Select “Missions Page” button. After the selection, player’s Missions List Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.CHSPLC_BTN.01	3.3.2.4	H	Select “Choose a Place” button. After the selection, player’s device will be connected to the selected beacon.

TC ID	Requirements	Priority	Scenario Description
GUI.ACMMIS_BTN.01	3.3.2.2	H	Select “Accomplish the Mission” button. After the selection, mission will be completed.

TC ID	Requirements	Priority	Scenario Description
GUI.TKPHT_BTN.01	3.3.2.2	H	Select “Take a Photo” button. After the selection, player’s device’s camera will be opened.

TC ID	Requirements	Priority	Scenario Description
GUI.SCRB_P_P_BTN.01	3.3.2.3	H	Select “Scoreboard Page” button. After the selection, player’s Scoreboard Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.GSET_P_P_BTN.01	3.3.2.2	H	Select “Game Settings Page” button. After the selection, player’s Game Settings Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.LVG_BTN.01	3.3.2.2	H	Select “Leave the Game” button. After the selection, player will be

			left the game.
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TC ID	Requirements	Priority	Scenario Description
GUI.EXIT_BTN.01	3.3.2.2	H	Select “Exit” button. After the selection, Home Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.MAIN_P_BTN.01	3.3.2.2	H	Select “Back to Game’s Main Page” button. After the selection, Game’s Main Page interface will be displayed.

TC ID	Requirements	Priority	Scenario Description
GUI.HOM_P_BTN.01	3.3.2.2	H	Select “Home Page” button. After the selection, Home Page interface will be displayed.

5.6. Detailed Test Cases

5.6.1. GUI.LGN_BTN.01

TC_ID	GUI.LGN_BTN.01
Purpose	Performing “Login” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	<p>[A01] Enter a valid e-mail address.</p> <p>[A02] Enter a valid password.</p> <p>[A03] Click “Login” button.</p> <p>[V01] Observe that the login is successful and the “Home Page”</p>

	appears.
Cleanup	“Logout” button.

5.6.2. GUI.LGN_BTN.02

TC_ID	GUI.LGN_BTN.02
Purpose	Performing “Login” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	<p>[A01] Enter an invalid e-mail address.</p> <p>[A02] Enter a valid password.</p> <p>[A03] Click “Login” button.</p> <p>[V01] Observe that the “Login is failed.” message displays.</p>
Cleanup	“Retry” button.

5.6.3. GUI.LGN_BTN.03

TC_ID	GUI.LGN_BTN.03
Purpose	Performing “Login” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	<p>[A01] Enter a valid e-mail address.</p> <p>[A02] Enter an invalid password.</p> <p>[A03] Click “Login” button.</p> <p>[V01] Observe that the “Login is failed.” message displays.</p>
Cleanup	“Retry” button.

5.6.4. GUI.LGN_BTN.04

TC_ID	GUI.LGN_BTN.04
Purpose	Performing “Login” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	<p>[A01] Enter an invalid e-mail address.</p> <p>[A02] Enter an invalid password.</p> <p>[A03] Click “Login” button.</p> <p>[V01] Observe that the “Login is failed.” message displays.</p>
Cleanup	“Retry” button.

5.6.5. GUI.RGS_P_BTN.01

TC_ID	GUI.RGS_P_BTN.01
Purpose	Opening “Register Page” interface correctly.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	<p>[A01] Click “Register” button.</p> <p>[V01] Observe that the “Register Page” appears.</p>
Cleanup	“Back to Login Page” button.

5.6.6. GUI.RGS_BTN.01

TC_ID	GUI.RGS_BTN.01
Purpose	Performing “Registration” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds

Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	[A01] Fill the required fields.
	[A02] Click “Register” button.
	[V01] Observe that the registration is successful and the “Login Page” appears.
Cleanup	-

5.6.7. GUI.RGS_BTN.02

TC_ID	GUI.RGS_BTN.02
Purpose	Performing “Registration” operation.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	[A01] Do not fill the required fields or fill them with invalid information.
	[A02] Click “Register” button.
	[V01] Observe that the registration is not successful and the system wants the correct information.
Cleanup	“Back to Login Page” button.

5.6.8. GUI.LGN_P_BTN.01

TC_ID	GUI.LGN_P_BTN.01
Purpose	Opening “Login Page” interface correctly.
Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	Application should be started.
Setup	Application should be installed to the mobile device.
Procedure	[A01] Click “Back to Login Page” button.

	[V01] Observe that the “Login Page” appears.
Cleanup	-

5.6.9. GUI.EP_P_BTN.01

TC_ID	GUI.EP_P_BTN.01
Purpose	Opening “Edit Profile Page” interface correctly.
Requirements	3.3.2.1
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	“Home Page” should be opened.
Procedure	<p>[A01] Click “Edit Profile Page” button.</p> <p>[V01] Observe that the “Edit Profile Page” appears.</p>
Cleanup	“Home Page” button.

5.6.10. GUI.SP_BTN.01

TC_ID	GUI.SP_BTN.01
Purpose	Performing “Save Profile” operation.
Requirements	3.3.2.1
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	“Edit Profile Page” should be opened.
Procedure	<p>[A01] Change the wanted fields.</p> <p>[A02] Click “Save Profile” button.</p> <p>[V01] Observe that the profile saving is successful and the “Home Page” appears.</p>
Cleanup	“Logout” button.

5.6.11. GUI.LGO_BTN.01

TC_ID	GUI.LGO_BTN.01
Purpose	Performing “Logout” operation.

Requirements	3.3.2.1
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	“Home Page” should be opened.
Procedure	[A01] Click “Logout” button. [V01] Observe that the “Login Page” appears.
Cleanup	-

5.6.12. GUI.CRTG_P_BTN.01

TC_ID	GUI.CRTG_P_BTN.01
Purpose	Opening “Create a Game Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Home Page” should be opened.
Procedure	[A01] Click “Create a Game Page” button. [V01] Observe that the “Create a Game Page” appears.
Cleanup	“Home Page” button.

5.6.13. GUI.CRTG_BTN.01

TC_ID	GUI.CRTG_BTN.01
Purpose	Performing “Create a Game” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Game Page” should be opened.
Procedure	[A01] Fill the required field. [A02] Click “Create a Game” button. [V01] Observe that the game creation is successful and the

	“Home Page” appears.
Cleanup	“Logout” button.

5.6.14. GUI.MYG_P_GC_BTN.01

TC_ID	GUI.MYG_P_GC_BTN.01
Purpose	Opening “My Games Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Home Page” should be opened.
Procedure	<p>[A01] Click “My Games Page” button.</p> <p>[V01] Observe that the “My Games Page” appears.</p> <p>[V02] To continue, select one of the listed games.</p>
Cleanup	“Home Page” button.

5.6.15. GUI.BCN_P_BTN.01

TC_ID	GUI.BCN_P_BTN.01
Purpose	Opening “Beacons Page” interface correctly.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	<p>[A01] Click “Beacons Page” button.</p> <p>[V01] Observe that the “Beacons Page” appears.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.16. GUI.CRTBCN_P_BTN.01

TC_ID	GUI.CRTBCN_P_BTN.01
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Purpose	Opening “Create a Beacon Page” interface correctly.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Beacons Page” should be opened.
Procedure	[A01] Click “Create a Beacon Page” button. [V01] Observe that the “Create a Beacon Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.17. GUI.CRTBCN_BTN.01

TC_ID	GUI.CRTBCN_BTN.01
Purpose	Performing “Create a Beacon” operation.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Beacon Page” should be opened.
Procedure	[A01] Fill the required fields. [A02] Click “Create a Beacon” button. [V01] Observe that the beacon creation is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.18. GUI.BCNL_BTN.01

TC_ID	GUI.BCNL_BTN.01
Purpose	Opening “Beacons List Page” interface correctly.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Beacons Page” should be opened.

Procedure	[A01] Click “Beacons List Page” button. [V01] Observe that the “Beacons List Page” appears. [V02] To continue, select one of the listed beacons.
Cleanup	“Back to Game’s Main Page” button.

5.6.19. GUI.UPDBCN_BTN.01

TC_ID	GUI.UPDBCN_BTN.01
Purpose	Performing “Update the Beacon” operation.
Requirements	3.3.2.4
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Beacons List Page” should be opened and one of the listed beacons should be selected. Therefore, selected beacon’s “Beacon Settings Page” should be opened.
Procedure	[A01] Change the wanted fields. [A02] Click “Update the Beacon” button. [V01] Observe that the updating of the beacon is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.20. GUI.DELBCN_BTN.01

TC_ID	GUI.DELBCN_BTN.01
Purpose	Performing “Delete the Beacon” operation.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Beacons List Page” should be opened and one of the listed beacons should be selected. Therefore, selected beacon’s “Beacon Settings Page” should be opened.
Procedure	[A01] Click “Delete the Beacon” button.

	[V01] Observe that the beacon's deletion is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.21. GUI.CRTC_P_BTN.01

TC_ID	GUI.CRTC_P_BTN.01
Purpose	Opening “Create a Code Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Create a Code Page” button. [V01] Observe that the “Create a Code Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.22. GUI.RNDC_BTN.01

TC_ID	GUI.RNDC_BTN.01
Purpose	Performing “Random Code” creation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Code Page” should be opened.
Procedure	[A01] Click “Random Code” button. [V01] Observe that the random code creation is successful.
Cleanup	“Back to Game’s Main Page” button.

5.6.23. GUI.CST_BTN.01

TC_ID	GUI.CST_BTN.01
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Purpose	Performing “Code Start Time” creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Code Page” should be opened.
Procedure	[A01] Click “Code Start Time” button.
	[V01] Observe that the code start time selection interface appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.24. GUI.CET_BTN.01

TC_ID	GUI.CET_BTN.01
Purpose	Performing “Code End Time” creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Code Page” should be opened.
Procedure	[A01] Click “Code End Time” button.
	[V01] Observe that the code end time selection interface appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.25. GUI.CRTC_BTN.01

TC_ID	GUI.CRTC_BTN.01
Purpose	Performing “Create a Code” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Code Page” should be opened.

Procedure	[A01] Click “Create a Code” button. [V01] Observe that the code creation is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.26. GUI.INV_P_BTN.01

TC_ID	GUI.CRTC_P_BTN.01
Purpose	Opening “Invite Page” interface correctly.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Invite Page” button. [V01] Observe that the “Invite Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.27. GUI.ADDPLYR_BTN.01

TC_ID	GUI.ADDPLYR_BTN.01
Purpose	Performing “Add a Player” for invitation operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Invite Page” should be opened.
Procedure	[A01] Select a player from dropdown list. [A02] Click “Add a Player” button and add the player to list. [V01] Observe that the name of player appears on the list. [A03] Click the displayed player’s name to delete it. [V02] Observe that the name of player disappears from the list.

Cleanup	“Back to Game’s Main Page” button.
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5.6.28. GUI.SNDINV_BTN.01

TC_ID	GUI.SNDINV_BTN.01
Purpose	Performing “Send Invitations” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Invite Page” should be opened.
	[A01] Click “Send Invitations” button.
	[V01] Observe that the sending of invitations is successful.
Cleanup	“Back to Game’s Main Page” button.

5.6.29. GUI.MIS_P_GC_BTN.01

TC_ID	GUI.MIS_P_GC_BTN.01
Purpose	Opening “Missions Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Missions Page” button.
	[V01] Observe that the “Missions Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.30. GUI.CRTMIS_P_BTN.01

TC_ID	GUI.CRTMIS_P_BTN.01
Purpose	Opening “Create a Mission Page” interface correctly.
Requirements	3.3.2.2

Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions Page” should be opened.
Procedure	[A01] Click “Create a Mission Page” button. [V01] Observe that the “Create a Mission Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.31. GUI.MISST_BTN.01

TC_ID	GUI.MISST_BTN.01
Purpose	Performing “Mission Start Time” creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Mission Start Time” button. [V01] Observe that the mission start time selection interface appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.32. GUI.MISET_BTN.01

TC_ID	GUI.MISET_BTN.01
Purpose	Performing “Mission End Time” creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Mission End Time” button. [V01] Observe that the mission end time selection interface appears.

Cleanup	“Back to Game’s Main Page” button.
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5.6.33. GUI.ADDBCN_BTN.01

TC_ID	GUI.ADDBCN_BTN.01
Purpose	Performing “Add a Beacon” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	<p>[A01] Select a beacon from dropdown list.</p> <p>[A02] Click “Add a Beacon” button and add the beacon to list.</p> <p>[V01] Observe that the name of beacon appears on the list.</p> <p>[A03] Click the displayed beacon’s name to delete it.</p> <p>[V02] Observe that the name of beacon disappears from the list.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.34. GUI.STDMIS_BTN.01

TC_ID	GUI.STDMIS_BTN.01
Purpose	Performing “Stand Mission” type creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	<p>[A01] Click “Stand Mission” button.</p> <p>[V01] Observe that the mission type is “Stand Mission”.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.35. GUI.TIMMIS_BTN.01

TC_ID	GUI.TIMMIS_BTN.01
Purpose	Performing “Time Mission” type creation.

Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Time Mission” button. [A01] Fill the required field. [V01] Observe that the mission type is “Time Mission”.
Cleanup	“Back to Game’s Main Page” button.

5.6.36. GUI.PHTMIS_BTN.01

TC_ID	GUI.PHTMIS_BTN.01
Purpose	Performing “Photo Mission” type creation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Photo Mission” button. [V01] Observe that the mission type is “Photo Mission”.
Cleanup	“Back to Game’s Main Page” button.

5.6.37. GUI.AUTCMP_BTN.01

TC_ID	GUI.AUTCMP_BTN
Purpose	Performing “Photo Auto Compare” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Photo Auto Compare” button. [V01] Observe that the “Photo Auto Compare” selection is

	successful.
Cleanup	“Back to Game’s Main Page” button.

5.6.38. GUI.CHSPHT_BTN.01

TC_ID	GUI.CHSPHT_BTN.01
Purpose	Performing “Choose a Photo” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	<p>[A01] Click “Choose a Photo” button.</p> <p>[A02] Give permission to access Photos.</p> <p>[A03] Choose a photo from Photos.</p> <p>[V01] Observe that the addition of the photo is successful.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.39. GUI.NOTCMP_BTN.01

TC_ID	GUI.NOTCMP_BTN.01
Purpose	Performing “Photo Not Compare” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	<p>[A01] Click “Photo Not Compare” button.</p> <p>[V01] Observe that the “Photo Not Compare” selection is successful.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.40. GUI.CRTMIS_BTN.01

TC_ID	GUI.CRTMIS_BTN.01
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Purpose	Performing “Create a Mission” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Create a Mission Page” should be opened.
Procedure	[A01] Click “Create a Mission” button. [V01] Observe that the mission creation is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.41. GUI.CHPKHT_P_BTN.01

TC_ID	GUI.CHPKHT_P_BTN.01
Purpose	Opening “PendingMissions List Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions Page” should be opened.
Procedure	[A01] Click “Check Photos Page” button. [V01] Observe that the “Pending Missions List” appears for mission selection. [V02] To continue, select one of the listed missions.
Cleanup	“Back to Game’s Main Page” button.

5.6.42. GUI.CONF_BTN.01

TC_ID	GUI.CONF_BTN.01
Purpose	Performing “Confirm” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.

Setup	“Pending Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Check the Photo Page” should be opened.
Procedure	[A01] Click “Confirm” button.
	[V01] Observe that the confirmation is successful and the “Pending Missions List Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.43. GUI.DENY_BTN.01

TC_ID	GUI.DENY_BTN.01
Purpose	Performing “Deny” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Pending Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Check the Photo Page” should be opened.
Procedure	[A01] Click “Deny” button.
	[V01] Observe that the denial is successful and the “Pending Missions List Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.44. GUI.MISL_BTN.01

TC_ID	GUI.MISL_BTN.01
Purpose	Opening “Missions List Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions Page” should be opened.
Procedure	[A01] Click “Missions List Page” button.

	[V01] Observe that the “Missions List Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.45. GUI.MISSTUPD_BTN.01

TC_ID	GUI.MISSTUPD_BTN.01
Purpose	Performing “Mission Start Time Update” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Mission Settings Page” should be opened.
Procedure	<p>[A01] Click “Mission Start Time Update” button.</p> <p>[V01] Observe that the mission start time update interface appears.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.46. GUI.MISETUPD_BTN.01

TC_ID	GUI.MISETUPD_BTN.01
Purpose	Performing “Mission End Time Update” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Mission Settings Page” should be opened.
Procedure	<p>[A01] Click “Mission End Time Update” button.</p> <p>[V01] Observe that the mission end time update interface appears.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.47. GUI.ADDBCNUPD_BTN.01

TC_ID	GUI.ADDBCNUPD_BTN.01
Purpose	Performing “Add a Beacon Update” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Mission Settings Page” should be opened.
Procedure	<p>[A01] Select a beacon from dropdown list.</p> <p>[A02] Click “Add a Beacon” button and add the beacon to list.</p> <p>[V01] Observe that the name of beacon appears on the list.</p> <p>[A03] Click the displayed beacon’s name to delete it.</p> <p>[V02] Observe that the name of beacon disappears from the list.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.48. GUI.UPDMIS_BTN.01

TC_ID	GUI.UPDMIS_BTN.01
Purpose	Performing “Update the Mission” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Mission Settings Page” should be opened.
Procedure	<p>[A01] Change the wanted fields.</p> <p>[A02] Click “Update the Mission” button.</p> <p>[V01] Observe that the updating of the mission is successful and the “Game’s Main Page” appears.</p>
Cleanup	“Exit” button.

5.6.49. GUI.DELMIS_BTN.01

TC_ID	GUI.DELMIS_BTN.01
Purpose	Performing “Delete the Mission” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Missions List Page” should be opened and one of the listed missions should be selected. Therefore, selected mission’s “Mission Settings Page” should be opened.
Procedure	[A01] Click “Delete the Mission” button. [V01] Observe that the mission’s deletion is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.50. GUI.PLYRSET_P_BTN.01

TC_ID	GUI.PLYRSET_P_BTN.01
Purpose	Opening “Player Settings Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Player Settings Page” button. [V01] Observe that the “Player Settings Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.51. GUI.PLYRL_P_BTN.01

TC_ID	GUI.PLYRL_P_BTN.01
Purpose	Opening “Players List Page” interface correctly.

Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Player Settings Page” should be opened.
Procedure	<p>[A01] Click “Players List Page” button.</p> <p>[V01] Observe that the “Players List Page” appears.</p> <p>[A02] Click the displayed player’s names to ban.</p> <p>[V02] Observe that the name of player disappears from the “Players List”.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.52. GUI.BPLYRL_P_BTN.01

TC_ID	GUI.BPLYRL_P_BTN.01
Purpose	Opening “Banned Players List Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Player Settings Page” should be opened.
Procedure	<p>[A01] Click “Banned Players List Page” button.</p> <p>[V01] Observe that the “Banned Players List Page” appears.</p> <p>[A02] Click the displayed player’s names to unban.</p> <p>[V02] Observe that the name of player disappears from the “Banned Players List”.</p>
Cleanup	“Back to Game’s Main Page” button.

5.6.53. GUI.GSET_P_GC_BTN.01

TC_ID	GUI.GSET_P_GC_BTN.01
Purpose	Opening “Game Settings Page” interface correctly.
Requirements	3.3.2.2
Priority	High

Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Game Settings Page” button.
	[V01] Observe that the “Game Settings Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.54. GUI.UPDG_BTN.01

TC_ID	GUI.UPDG_BTN.01
Purpose	Performing “Update the Game” operation.
Requirements	3.3.2.2
Priority	Medium
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Game Settings Page” should be opened.
Procedure	[A01] Change the field.
	[A02] Click “Update the Game” button.
	[V01] Observe that the updating of the game is successful and the “Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.55. GUI.DELG_BTN.01

TC_ID	GUI.DELG_BTN.01
Purpose	Performing “Delete the Game” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	“Game Settings Page” should be opened.
Procedure	[A01] Click “Delete the Game” button.

	[V01] Observe that the game's deletion is successful and the "Home Page" appears.
Cleanup	"Logout" button.

5.6.56. GUI.SCRB_P_GC_BTN.01

TC_ID	GUI.SCRB_P_GC_BTN.01
Purpose	Opening "Scoreboard Page" interface correctly.
Requirements	3.3.2.3
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as game creator.
Setup	"My Games Page" should be opened and one of the listed games should be selected. Therefore, "Selected Game's Main Page" should be opened.
Procedure	[A01] Click "Scoreboard Page" button. [V01] Observe that the "Scoreboard Page" appears.
Cleanup	"Back to Game's Main Page" button.

5.6.57. GUI.JOING_P_BTN

TC_ID	GUI.JOING_P_BTN.01
Purpose	Opening "Join a Game Page" interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	"Home Page" should be opened.
Procedure	[A01] Click "Join a Game Page" button. [V01] Observe that the "Join a Game Page" appears.
Cleanup	"Home Page" button.

5.6.58. GUI.JOING_BTN.01

TC_ID	GUI.JOING_BTN.01
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Purpose	Performing “Join a Game” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Join a Game Page” should be opened.
Procedure	<p>[A01] Fill the required field.</p> <p>[A02] Click “Join a Game” button.</p> <p>[V01] Observe that the game joining is successful and the “Home Page” appears.</p>
Cleanup	“Logout” button.

5.6.59. GUI.MYG_P_P_BTN.01

TC_ID	GUI.MYG_P_P_BTN.01
Purpose	Opening “My Games Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Home Page” should be opened.
Procedure	<p>[A01] Click “My Games Page” button.</p> <p>[V01] Observe that the “My Games Page” appears.</p> <p>[V02] To continue, select one of the listed games.</p>
Cleanup	“Home Page” button.

5.6.60. GUI.MIS_P_P_BTN.01

TC_ID	GUI.MIS_P_P_BTN.01
Purpose	Opening “Missions Page” interface correctly.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.

Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Missions Page” button.
	[V01] Observe that the “Missions Page” appears.
	[V02] To continue, select one of the listed missions.
Cleanup	“Back to Game’s Main Page” button.

5.6.61. GUI.CHSPLC_BTN.01

TC_ID	GUI.CHSPLC_BTN.01
Purpose	Performing “Choose a Place” operation.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Accomplish the Mission Page” should be opened.
Procedure	[A01] Select a place from dropdown list.
	[A02] Click “Choose a Place” button.
	[V01] Observe that the place is selected.
Cleanup	“Back to Game’s Main Page” button.

5.6.62. GUI.ACMMIS_BTN.01

TC_ID	GUI.ACMMIS_BTN.01
Purpose	Performing “Accomplish the Mission” operation.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Accomplish the Mission Page” should be opened.
Procedure	[A01] Click “Accomplish the Mission” button.
	[V01] Observe that the mission accomplishment is successful and the “Game’s Main Page” appears.

Cleanup	“Exit” button.
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5.6.63. GUI.TKPHT_BTN.01

TC_ID	GUI.TKPHT_BTN.01
Purpose	Performing “Take a Photo” operation.
Requirements	3.3.2.4
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Accomplish the Mission Page” should be opened.
Procedure	[A01] Click “Take a Photo” button.
	[V01] Observe that the camera opens.
Cleanup	“Back to Game’s Main Page” button.

5.6.64. GUI.SCRB_P_P_BTN.01

TC_ID	GUI.SCRB_P_P_BTN.01
Purpose	Opening “Scoreboard Page” interface correctly.
Requirements	3.3.2.3
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Scoreboard Page” button.
	[V01] Observe that the “Scoreboard Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.65. GUI.GSET_P_P_BTN.01

TC_ID	GUI.GSET_P_P_BTN.01
Purpose	Opening “Game Settings Page” interface correctly.
Requirements	3.3.2.2

Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.
Procedure	[A01] Click “Game Settings Page” button. [V01] Observe that the “Game Settings Page” appears.
Cleanup	“Back to Game’s Main Page” button.

5.6.66. GUI.LVG_BTN.01

TC_ID	GUI.LVG_BTN.01
Purpose	Performing “Leave the Game” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in as player.
Setup	“Game Settings Page” should be opened.
Procedure	[A01] Click “Leave the Game” button. [V01] Observe that the “Home Page” appears.
Cleanup	“Logout” button.

5.6.67. GUI.EXT_BTN.01

TC_ID	GUI.EXT_BTN.01
Purpose	Performing “Exit” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened.

Procedure	[A01] Click “Exit” button. [V01] Observe that the “Home Page” appears.
Cleanup	“Logout” button.

5.6.68. GUI.MAIN_P_BTN

TC_ID	GUI.MAIN_P_BTN.01
Purpose	Performing “Back to Game’s Main Page” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	“My Games Page” should be opened and one of the listed games should be selected. Therefore, “Selected Game’s Main Page” should be opened and user should be in one of the pages related to the selected game.
Procedure	[A01] Click “Back to Game’s Main Page” button. [V01] Observe that the “Selected Game’s Main Page” appears.
Cleanup	“Exit” button.

5.6.69. GUI.HOM_P_BTN.01

TC_ID	GUI.LVG_BTN.01
Purpose	Performing “Home Page” operation.
Requirements	3.3.2.2
Priority	High
Estimated Time Needed	2 Seconds
Dependency	User should be logged in.
Setup	User should be in one of the pages related to the home game.
Procedure	[A01] Click “Home Page” button. [V01] Observe that the “Home Page” appears.
Cleanup	“Logout” button.

6. Test Results

6.1. Individual Test Results

TC_No	TC_ID	Priority	Run Date	Run By	Result	Explanation
1	GUI.LGN_BTN.01	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The login is successful and the “Home Page” appears.
2	GUI.LGN_BTN.02	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Login is failed.” message displays.
3	GUI.LGN_BTN.03	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Login is failed.” message displays.
4	GUI.LGN_BTN.04	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Login is failed.” message displays.
5	GUI.RGS_P_BTN.01	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Register Page” appears.
6	GUI.RGS_BTN.01	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The registration is successful and the “Login Page” appears.
7	GUI.RGS_BTN.02	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The registration is not successful and the system wants the correct information.
8	GUI.LGN_P_BTN.01	H	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Login Page” appears.
9	GUI.EP_P_BTN.01	M	02.06.2019	Ümmü gülsüm Kaşıkçı	Pass	The “Edit Profile Page” appears.
10	GUI.SP_BTN.01	M	02.06.2019	Ümmü	Pass	The profile saving is

				gülsum Kaşıkçı		successful and the “Home Page” appears.
11	GUI.LGO_BTN.01	H	02.06.2019	Ümmü gülsum Kaşıkçı	Pass	The “Login Page” appears.
12	GUI.CRTG_P_BTN. 01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Create a Game Page” appears.
13	GUI.CRTG_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The game creation is successful and the “Home Page” appears.
14	GUI.MYG_P_GC_B TN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “My Games Page” appears.
15	GUI.BCN_P_BTN.0 1	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Beacons Page” appears.
16	GUI.CRTBCN_P_B TN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Create a Beacon Page” appears.
17	GUI.CRTBCN_BTN .01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The beacon creation is successful and the “Game’s Main Page” appears.
18	GUI.BCNL_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Beacons List Page” appears.
19	GUI.UPDBCN_BT N.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The updating of the beacon is successful and the “Game’s Main Page” appears.
20	GUI.DELBCN_BTN .01	H	02.06.2019	Aslıhan Asena	Pass	The beacon’s deletion is successful and the

				Şahin		“Game’s Main Page” appears.
21	GUI.CRTC_P_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Create a Code Page” appears.
22	GUI.RNDC_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The random code creation is successful.
23	GUI.CST_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The code start time selection interface appears.
24	GUI.CET_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The code end time selection interface appears.
25	GUI.CRTC_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The code creation is successful and the “Game’s Main Page” appears.
26	GUI.INV_P_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The “Invite Page” appears.
27	GUI.ADDPLYR_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The name of player appears on the list.
28	GUI.SNDINV_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The sending of invitations is successful.
29	GUI.MIS_P_GC_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Missions Page” appears.
30	GUI.CRTMIS_P_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Create a Mission Page” appears.

31	GUI.MISST_BTN.0 1	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission start time selection interface appears.
32	GUI.MISET_BTN.0 1	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission end time selection interface appears.
33	GUI.ADDBCN_BT N.01	H	02.06.2019	Aslihan Asena Şahin	Pass	The name of beacon disappears from the list.
34	GUI.STDMIS_BTN. 01	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission type is “Stand Mission”.
35	GUI.TIMMIS_BTN. 01	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission type is “Time Mission”.
36	GUI.PHTMIS_BTN. 01	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission type is “Photo Mission”.
37	GUI.AUTCMP_BT N.01	M	02.06.2019	Aslihan Asena Şahin	Pass	The “Photo Auto Compare” selection is successful.
38	GUI.CHSPHT_BTN .01	M	02.06.2019	Aslihan Asena Şahin	Pass	The addition of the photo is successful.
39	GUI.NOTCMP_BT N.01	H	02.06.2019	Aslihan Asena Şahin	Pass	The “Photo Not Compare” selection is successful.
40	GUI.CRTMIS_BTN. 01	H	02.06.2019	Aslihan Asena Şahin	Pass	The mission creation is successful and the “Game’s Main Page” appears.
41	GUI.CHPKHT_P_B TN.01	H	02.06.2019	Aslihan Asena	Pass	The “Missions List” appears for mission

				Şahin		selection.
42	GUI.CONF_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The confirmation of the photo is successful and the “Pending Mission List Page” appears.
43	GUI.DENY_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The denial of the photo is successful and the “Pending Mission List Page” appears.
44	GUI.MISL_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The “Missions List Page” appears.
45	GUI.MISSTUPD_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The mission start time update interface appears.
46	GUI.MISETUPD_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The mission end time update interface appears.
47	GUI.ADDBCNUPD_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The name of beacon appears on the list.
48	GUI.UPDMIS_BTN.01	M	02.06.2019	Aslıhan Asena Şahin	Pass	The updating of the mission is successful and the “Game’s Main Page” appears.
49	GUI.DELMIS_BTN.01	H	02.06.2019	Aslıhan Asena Şahin	Pass	The mission’s deletion is successful and the “Game’s Main Page” appears.
50	GUI.PLYRSET_BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Player Settings Page” appears.
51	GUI.PLYRL_P_BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Players List Page” appears.

52	GUI.BPLYRL_P_B TN.01	H	02.06.2019	Nuri Akseli	Pass	The “Banned Players List Page” appears.
53	GUI.GSET_P_GC_ BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Game Settings Page” appears.
54	GUI.UPDG_BTN.01	M	02.06.2019	Nuri Akseli	Pass	The updating of the game is successful and the “Game’s Main Page” appears.
55	GUI.DELG_BTN.01	H	02.06.2019	Nuri Akseli	Pass	The game’s deletion is successful and the “Home Page” appears.
56	GUI.SCRB_P_GC_ BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Scoreboard Page” appears.
57	GUI.JOING_P_BTN .01	H	02.06.2019	Nuri Akseli	Pass	The “Join a Game Page” appears.
58	GUI.JOING_BTN.0 1	H	02.06.2019	Nuri Akseli	Pass	The game joining is successful and the “Home Page” appears.
59	GUI.MYG_P_P_BT N.01	H	02.06.2019	Nuri Akseli	Pass	The “My Games Page” appears.
60	GUI.MIS_P_P_BTN .01	H	02.06.2019	Nuri Akseli	Pass	The “Missions Page” appears.
61	GUI.CHSPLC_BTN .01	H	02.06.2019	Nuri Akseli	Pass	The place is selected for beacon connection.
62	GUI.ACMMIS_BT N.01	H	02.06.2019	Nuri Akseli	Pass	The mission accomplishment is successful and the “Game’s Main Page” appears.
63	GUI.TKPHT_BTN.0 1	H	02.06.2019	Nuri Akseli	Pass	The camera opens for taking a photo.
64	GUI.SCRB_P_P_BT N.01	H	02.06.2019	Nuri Akseli	Pass	The “Scoreboard Page” appears.

65	GUI.GSET_P_P_BT N.01	H	02.06.2019	Nuri Akseli	Pass	The “Game Settings Page” appears.
66	GUI.LVG_BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Home Page” appears.
67	GUI.EXT_BTN.01	H	02.06.2019	Nuri Akseli	Pass	The “Home Page” appears.
68	GUI.MAIN_P_BTN. 01	H	02.06.2019	Nuri Akseli	Pass	The “Selected Game’s Main Page” appears.
69	GUI.HOM_P_BTN. 01	H	02.06.2019	Nuri Akseli	Pass	The “Home Page” appears.

6.2. Summary of Test Results

Priority	Number of TCs	Executed	Passed
H	55	55	55
M	14	14	14
L	-	-	-
Total	69	69	69

We have executed all of the test cases that we identified and 100% of them are passed. Also, 100% of high and medium priority test cases are passed. Software development activities are completed within the timeline. As a result, exit criteria is met.

7. Conclusions

In this project, we aimed to create an enjoyable game that contains people's responsibilities as missions. Users get points when they complete their missions. Then, they can see their place in the scoreboard. In our world, people are transforming their jobs into their habits and their performances are decreasing. In this project, our goal is to create a competitive game to increase people's performances and get people closer to their environment. To be able to do that we used BLE Beacons to determine missions' location and people's location. BLE Beacon devices provide low energy Bluetooth signals and they cannot take any data from user, so it is safe and secure for usage. That is one of the reasons that we chose to use BLE Beacons in this project. The other reason is that Beacons are very beneficial at indoor location determining.

We researched about gamification, BLE Beacons and other similar projects. According to our researches, we reshaped our project. As a result of this reshaping, we prepared our SRS document. Then, we decided a developing plan for our project and we have documented this in SDD report. In this period, we explored our project's details and we decided a way of developing our project.

Acknowledgement

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Appendix A. Installation Manual

1. Download the .zip file that contains the codes from our GitHub page’s Code section.
2. Unzip the file.
3. Download Android Studio from <https://developer.android.com/studio/>, and complete the installation. Then open it. (If you have already installed Android Studio, skip this step. If any project is open in your Android Studio, close it before skip to next step.)
4. Click to the “Open an existing Android Studio Project”.
5. Find your unzipped file and select it. Then click to the “OK”.
6. If your computer’s language is English, click to the “Run” button or use [Shift+F10] key combination to run the application.
7. If your computer’s language is Turkish, program will give an error. To fix this error, click to the given error. Then, change “testImplementation” to “testImplementation”, “androidTestImplementation” to “androidTestImplementation” and save the changes with [Ctrl+S] key combination. Then, select “Sync Project with Gradle Files” from under the File section. Then, click to the “Run” button or use [Shift+F10] key combination to run the application.
8. In the opened page, click to the “Create New Virtual Device”.
9. In the opened page, choose a device definition from the list and click to the “Next”.

10. In the opened page, select a system image from the list and click to the “Next”. The system image must be Android version 7.0 or above.
11. In the opened page, click to the “Finish”. Then your virtual device will be created.
12. In the opened page, select the virtual device that you created and click to the “OK”.
13. Enjoy the application.

Appendix B. User Manual

1. Login Page

After downloading and opening the Scavenger Hunt Game application, Login Page appears. After the user fills the e-mail and password fields, he/she should click the Login button. If the user does not have an account, he/she can register by clicking to the Register button.

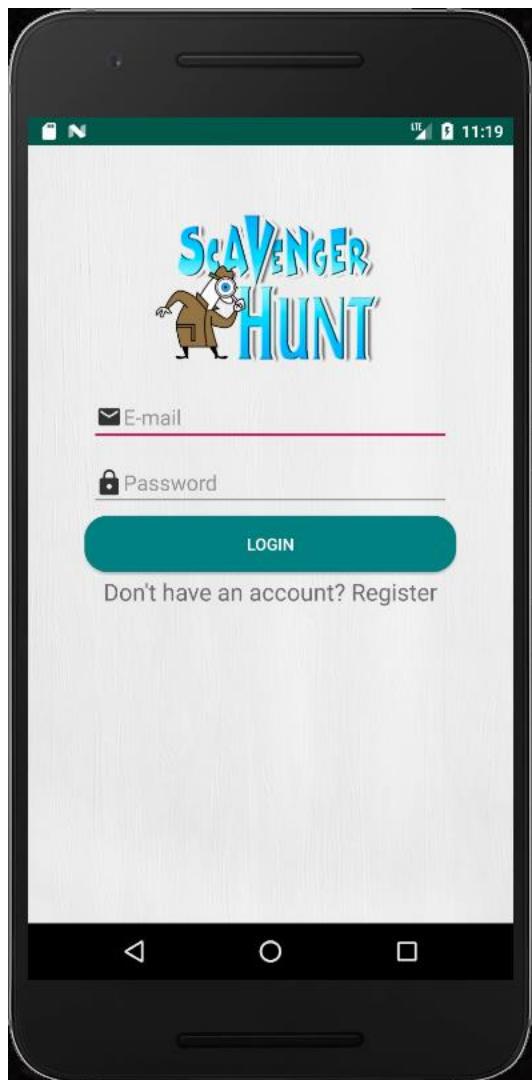


Figure 64 Login page

2. Register Page

Users who want to register to Scavenger Hunt Game can register to application after filling the required fields. After clicking the Register button, the user should be registered to the database and this button redirects user to the Login Page.

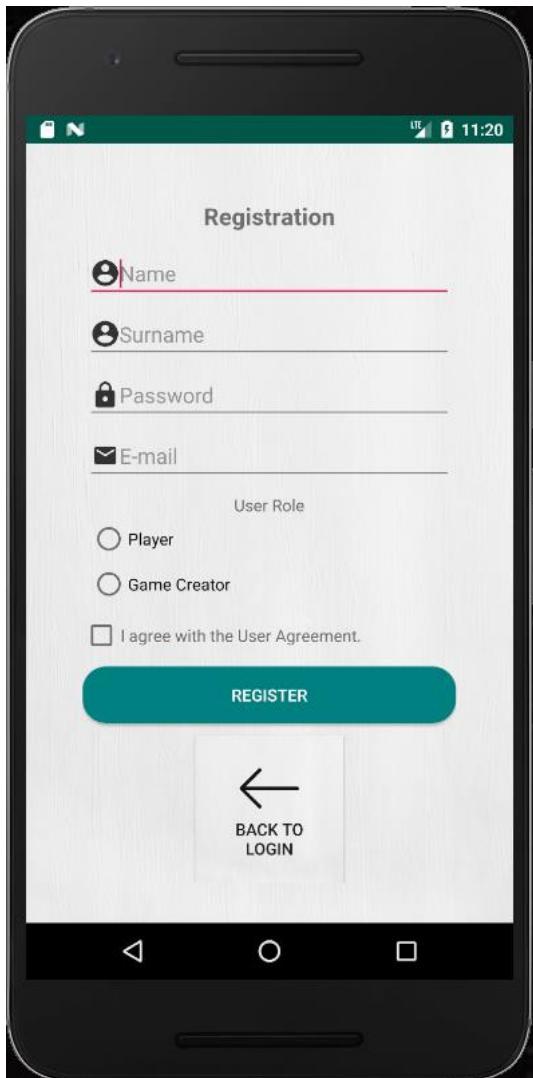


Figure 65 Register page

3. Edit Profile Page

In this page, users can change their personal information. If the user changes any of the fields, in order to save the changes, he/she should click to the Save Profile button. If he/she does not want to change anything, he/she should use the Home Page button to return to the Home Page. Save Profile button also redirects user to his/her Home Page.

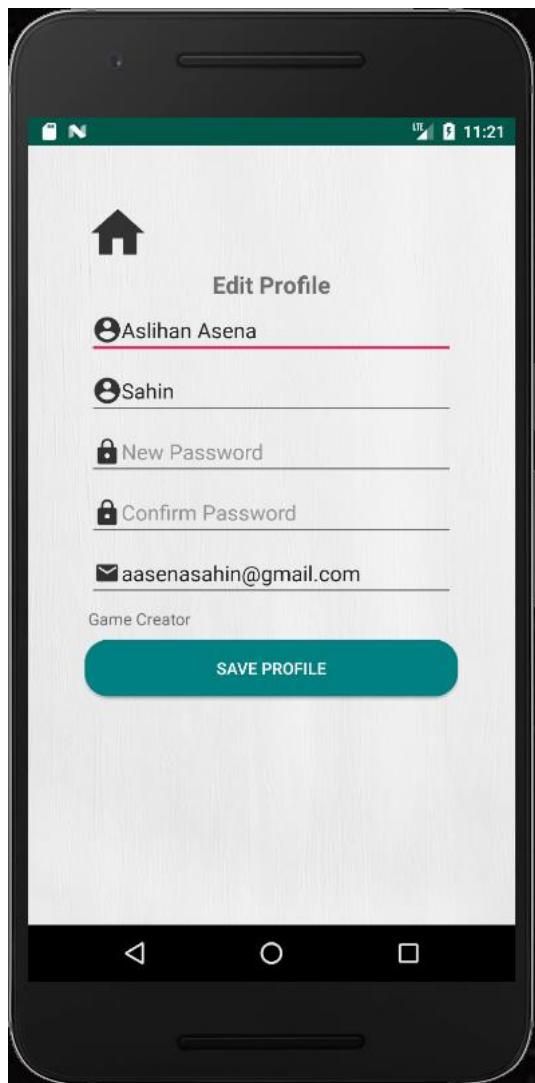


Figure 66 Edit profile page

4. Home Page (Game Creator)

This page is the Home Page of the game creator. Game creator can edit his/her personal information by clicking to the Edit Profile button. Game creator can create a game by clicking to the Create a Game button. He/she can see his/her created games by clicking to the My Games button. He/she can logout from the system with the Logout button.

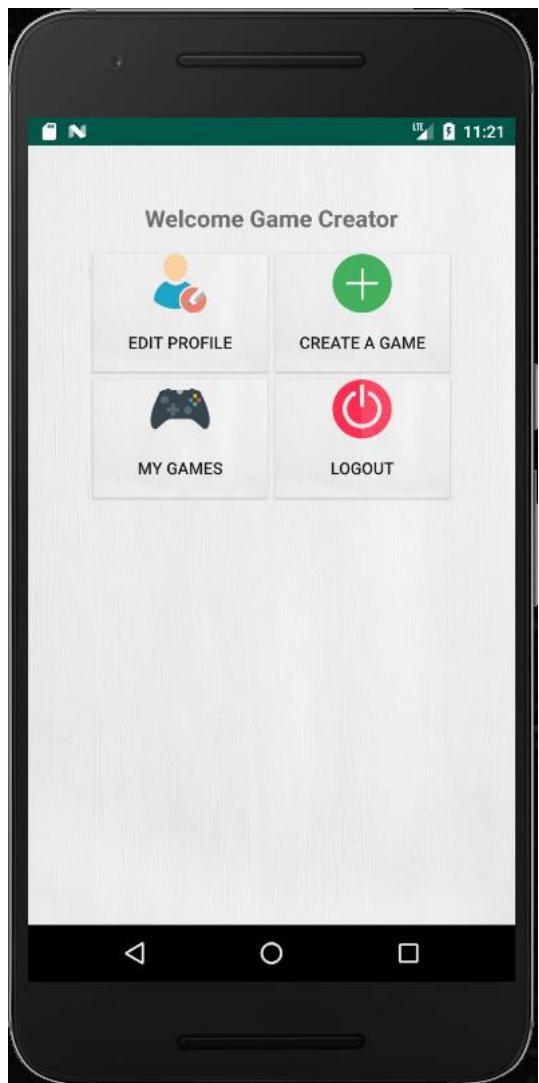


Figure 67 Home page (game creator)

5. Create a Game Page (Game Creator)

When the game creator clicks the Create a Game button, this page opens. Game creator should enter a game name to create a game. And, there is a Home Page button to return the Home Page.



Figure 68 Create a game page (game creator)

6. My Games Page (Game Creator)

This page includes the list of games that are created by the game creator. And, there is a Home Page button to return the Home Page.



Figure 69 My games page (game creator)

7. Game's Main Page (Game Creator)

After the game creator selects a game from the My Games Page, Game's Main Page appears. In this page; Beacons, Create a Code, Invite, Missions, Player Settings, Game Settings, Scoreboard and Exit buttons are placed. Game creator can use the Exit button to exit from the game and return the Home Page.

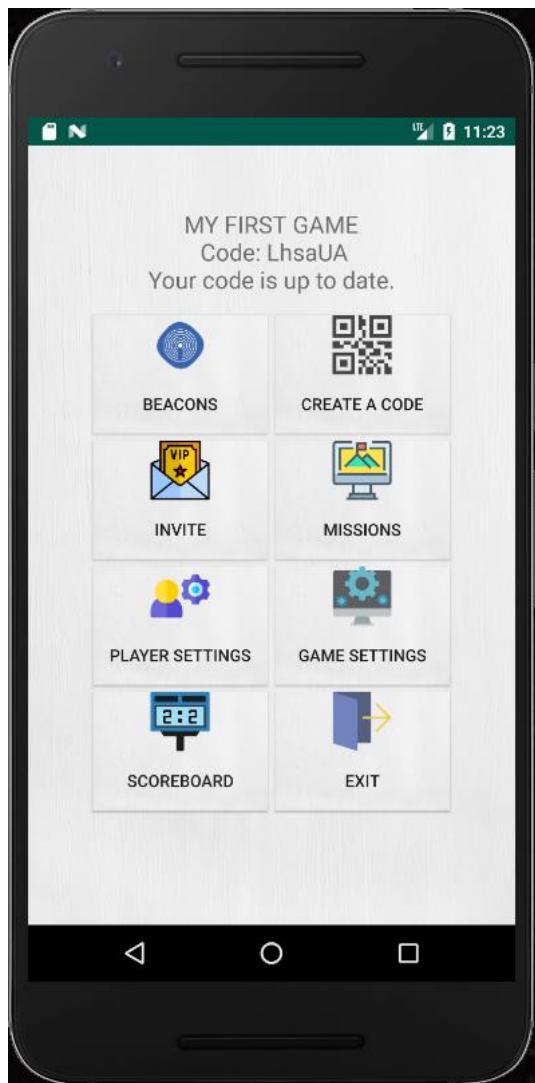


Figure 70 Game's main page (game creator)

8. Beacons Page (Game Creator)

This page appears when game creator clicks the Beacons button on the Game's Main Page. In this page, Create a Beacon and Beacons List buttons are placed. And, there is a Back to Game's Main Page button to return the Game's Main Page.

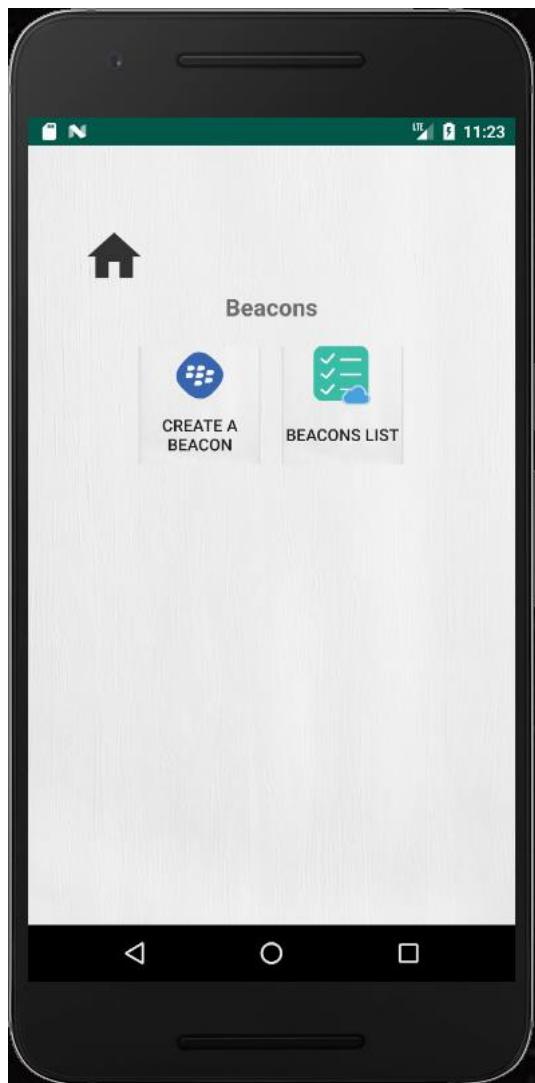


Figure 71 Beacons page (game creator)

9. Create a Beacon Page (Game Creator)

In this page, there are four fields for the beacon's information and the Create a Beacon button. After filling the required fields, in order to create a beacon, game creator should click to the Create a Beacon button. This button redirects game creator to Game's Main Page. And, there is a Back to Game's Main Page to return the Game's Main Page.

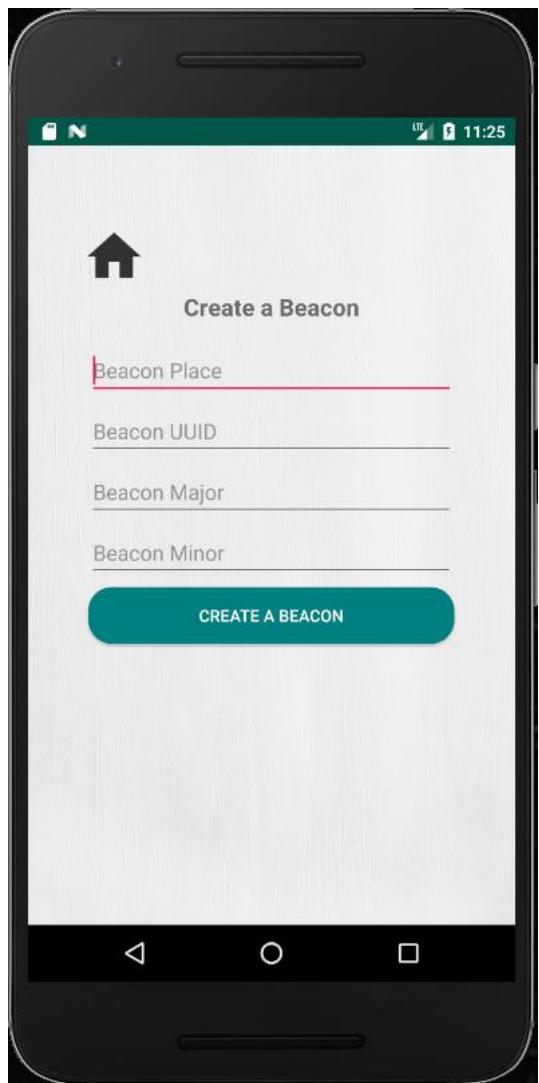


Figure 72 Create a beacon page (game creator)

10. Beacons List Page (Game Creator)

This page includes the list of beacons that are created by the game creator. Game creator can choose a beacon from the list of beacons to go to the Beacon Settings Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 73 Beacons list page (game creator)

11. Beacon Settings Page (Game Creator)

Game creator can update the beacon by changing the information fields and clicking to the Update the Beacon button or he/she can delete it completely by using the Delete the Beacon button. Both Update the Beacon and Delete the Beacon buttons redirect game creator to the Game's Main Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

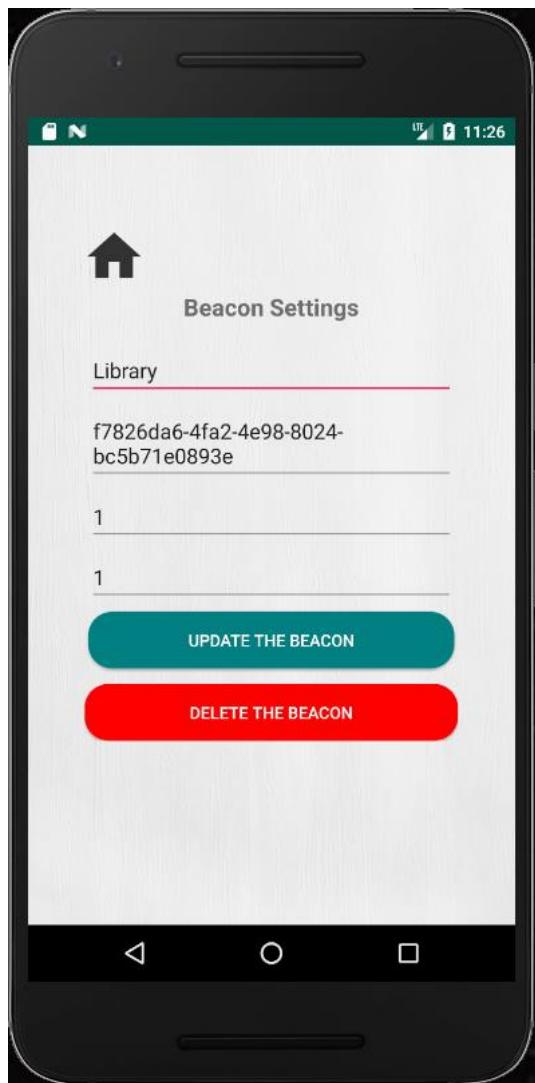


Figure 74 Beacon settings page (game creator)

12. Create a Code Page (Game Creator)

This page appears when game creator clicks the Create a Code button on the Game's Main Page. This page includes a code field, and Random Code, Code Start Time, Code End Time and Create a Code buttons. Game creator can create a code by writing or clicking to the Random Code button. Then, he/she should set the code start time and end time. To create a code, game creator should use the Create a Game button which redirects game creator to Game's Main Page after code creation is successful. And, there is a Back to Game's Main Page button to return the Game's Main Page.

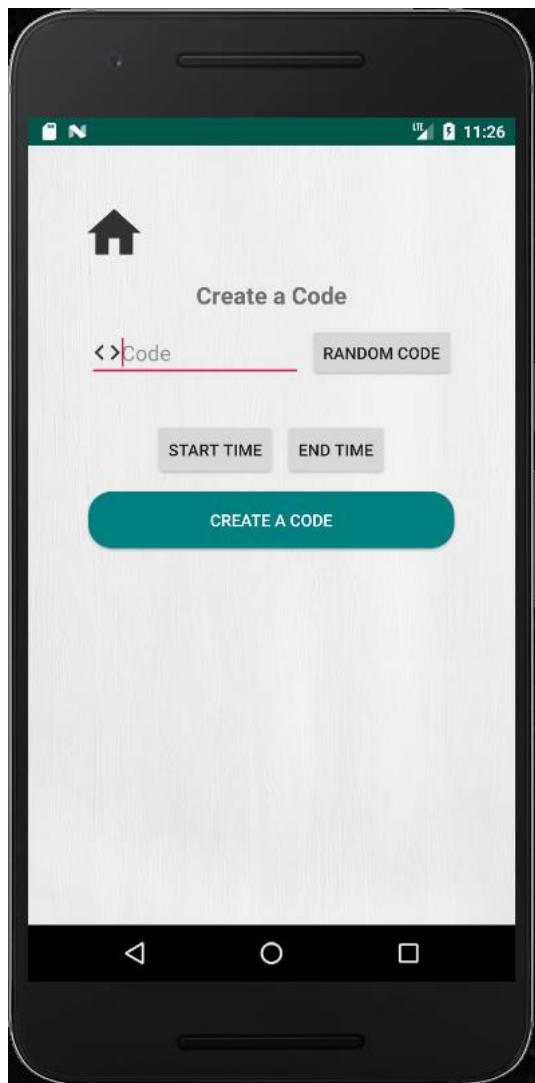


Figure 75 Create a code page (game creator)

13. Invite Page (Game Creator)

This page appears when game creator clicks the Invite button on the Game's Main Page. In this page, game creator can add players one by one to invitation list by using the Add a Player button. Game creator should click to the Send Invitations button to send the invitations. And, there is a Back to Game's Main Page button to return the Game's Main Page.

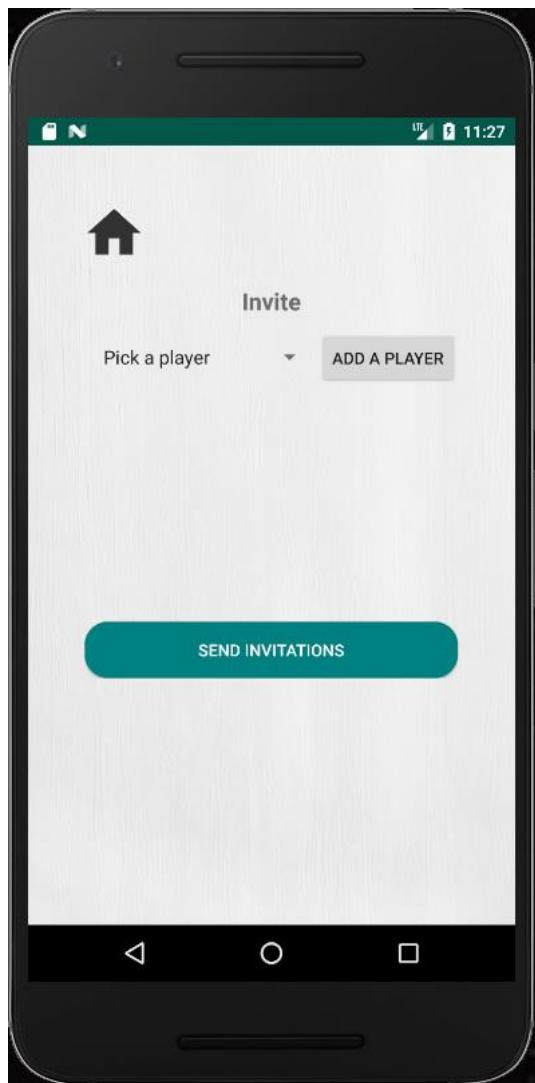


Figure 76 Invite page (game creator)

14. Missions Page (Game Creator)

This page appears when game creator clicks the Missions button on the Game's Main Page. This page includes three buttons: Create a Mission, Check Photos and Missions List. These buttons redirect game creator to related pages. And, there is a Back to Game's Main Page button to return the Game's Main Page.

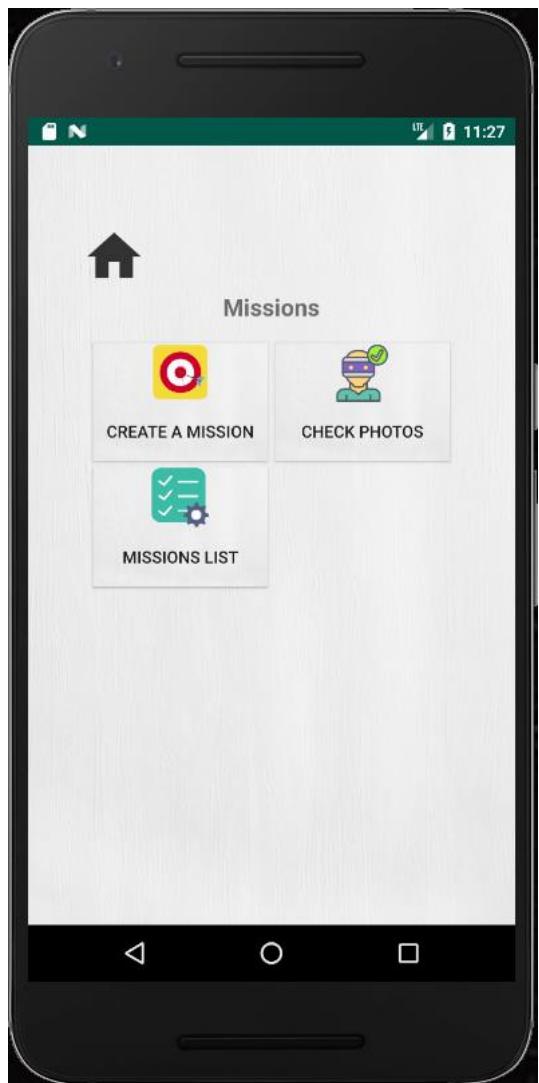


Figure 77 Missions page (game creator)

15. Create a Mission Page (Game Creator)

This page includes three fields for mission's information, and Mission Start Time, Mission End Time, Add a Beacon and Create a Mission buttons. Also, includes buttons to select the mission type: Stand, Time and Photo buttons. According to selection, new fields or buttons appear. Game creator should fill the information fields and set the code start time and end time. Then, he/she should add at least one beacon to the mission from the dropdown list of beacons with using the Add a Beacon button. After choosing the mission type, game creator should use the Create a Mission button to complete mission creation. Create a Mission button redirects game creator to Game's Main Page after mission creation is successful. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 78 Create a mission page (game creator)

16. Pending Missions List Page (Game Creator)

This page appears when game creator clicks the Check Photos button on the Missions Page.

This page includes the list of photo not auto compare missions that are pending the confirmation or denial from the game creator. After choosing a mission from the listCheck the Photo Page appears. In this page, there are Confirm and Deny buttons, and a photo that is uploaded to the system by a player for the mission. Game creator should decide whether the photo is confirmed or denied. In both pages, there are Back to Game's Main Page buttons to return the Game's Main Page.



Figure 79 Pending missions list page (game creator)

17. Missions List Page (Game Creator)

This page includes the list of missions that are created by the game creator. The red circle indicates that the mission is already ended. The yellow circle indicates that the mission has not started yet. The green circle indicates that the mission is valid. Game creator can choose a mission from the list of missions to go to the Mission Settings Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 80 Missions list page (game creator)

18. Mission Settings Page (Game Creator)

Game creator can update the mission by changing the fields and clicking to the Update the Mission button or he/she can delete it completely by using the Delete the Mission button. Both Update the Mission and Delete the Mission buttons redirect game creator to the Game's Main Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

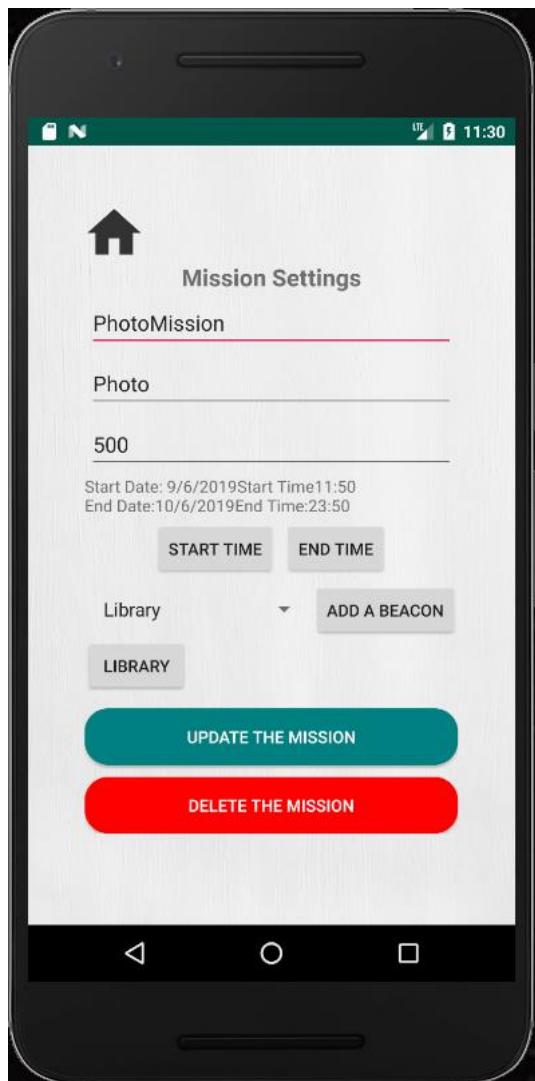


Figure 81 Mission settings page (game creator)

19. Player Settings Page (Game Creator)

This page appears when game creator clicks the Player Settings button on the Game's Main Page. In this page, Players List and Banned Players List are placed. Players List button redirects game creator to the list of players and Banned Players List button redirects to the list of banned players. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 82 Player settings page (game creator)

20. Players List Page (Game Creator)

This page includes the list of players. Game create can ban players by clicking to the displayed player's name. And, there is a Back to Game's Main Page button to return the Game's Main Page.

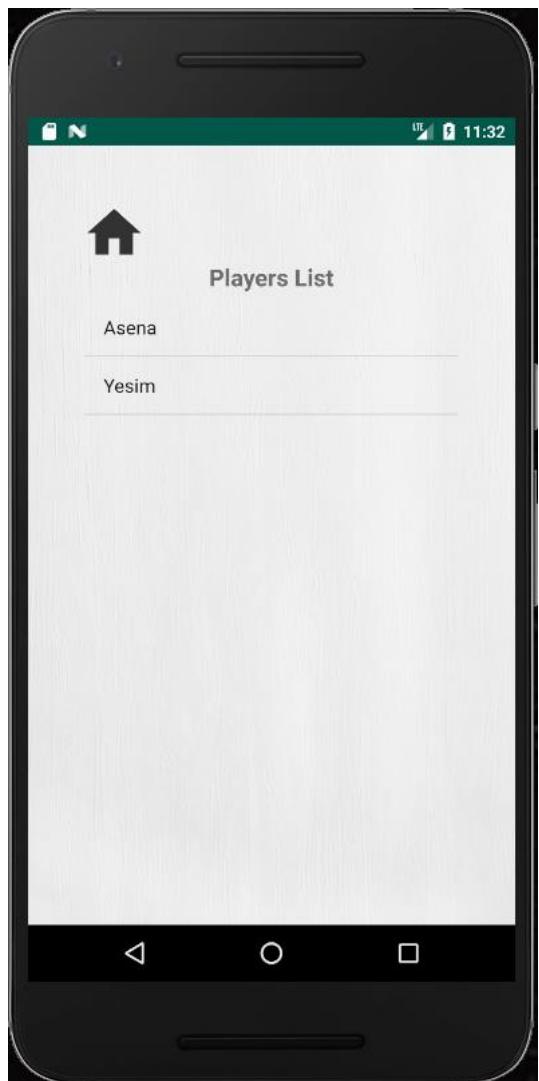


Figure 83 Players list page (game creator)

21. Banned Players List Page (Game Creator)

This page includes the banned list of players. Game create can unban players by clicking to the displayed player's name. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 84 Banned players list page (game creator)

22. Game Settings Page (Game Creator)

This page appears when game creator clicks the Game Settings button on the Game's Main Page. Game creator can update the name of the game by changing the text field and clicking to the Update the Game button or he/she can delete the game completely by using the Delete the Game button. Update the Game button redirects game creator to the Game's Main Page and Delete the Game button redirects to the Home Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 85 Game settings page (game creator)

23. Scoreboard Page (Game Creator)

This page appears when game creator clicks the Scoreboard button on the Game's Main Page. If the game's players completed any missions and earned scores, the Top 10 of players will be listed in this page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 86 Scoreboard page (game creator)

24. Home Page (Player)

This page is the Home Page of the player. Player can edit his/her personal information by clicking to the Edit Profile button. Player can join a game by clicking to the Join a Game button. He/she can see his/her joined games by clicking to the My Games button. He/she can logout from the system with the Logout button.

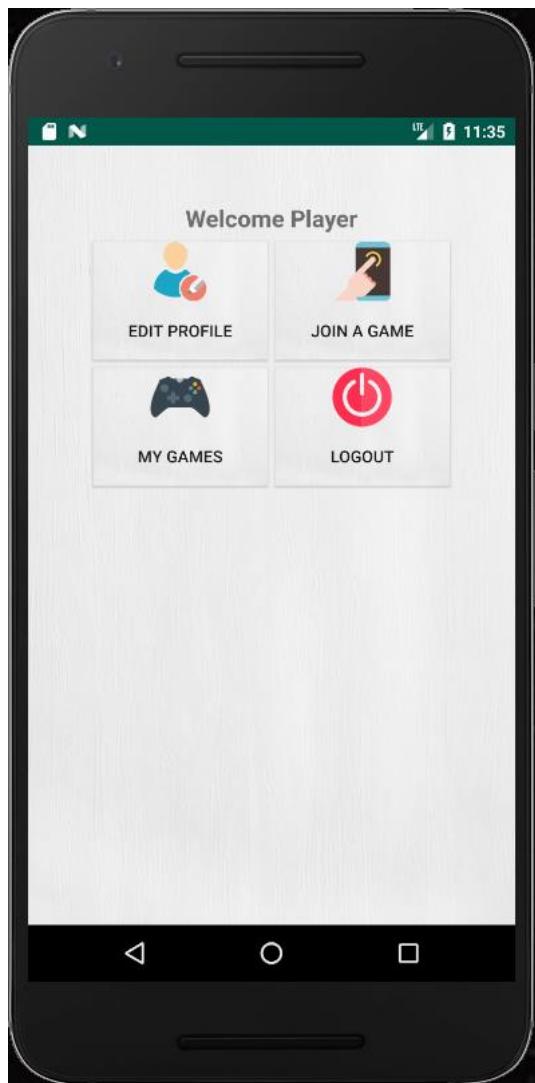


Figure 87 Home page (player)

25. Join a Game Page (Player)

When the player clicks the Join a Game button, this page opens. Player should enter a game code to join a game. And, there is a Home Page button to return the Home Page.

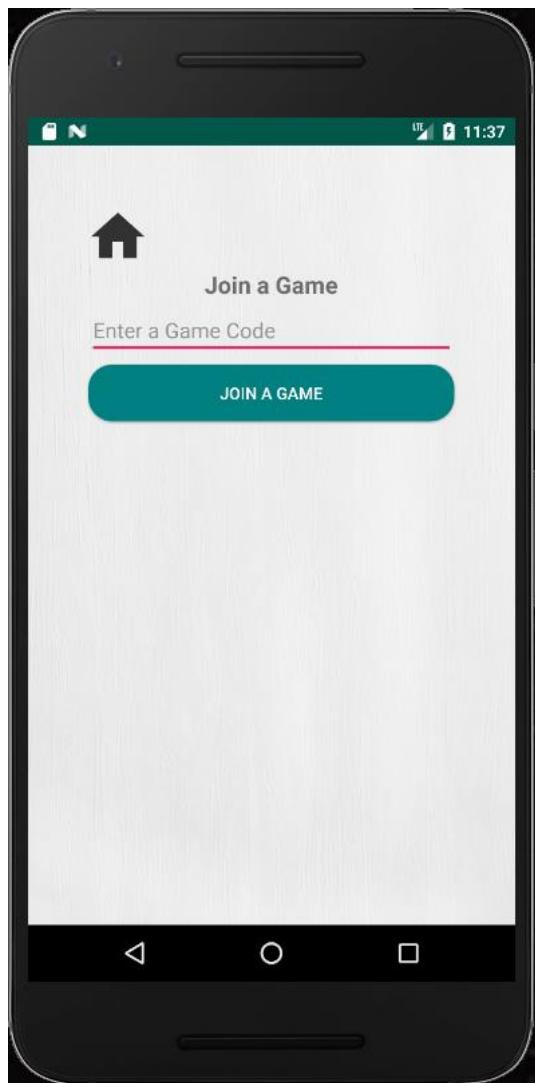


Figure 88 Join a game page (player)

26. My Games Page (Player)

This page includes the list of games that are joined by the player. And, there is a Home Page button to return the Home Page.



Figure 89 My games page (player)

27. Game's Main Page (Player)

After the player selects a game from the My Games Page, Game's Main Page appears. In this page; Missions, Scoreboard, Game Settings and Exit buttons are placed. Player can use the Exit button to exit from the game and return the Home Page.

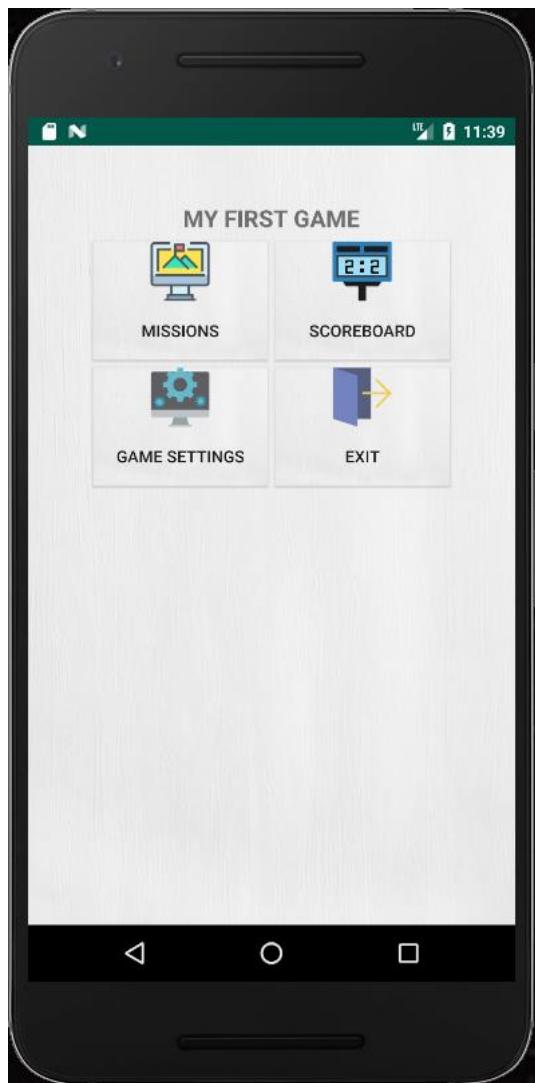


Figure 90 Game's main page (player)

28. Missions Page (Game Creator)

This page appears when player clicks the Missions button on the Game's Main Page. This page includes the list of active missions that are created by the game creator for this game. Player can choose a mission from the list of missions to go to the Accomplish the Mission Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 91 Missions page (player)

29. Accomplish the Mission Page (Player)

Player can accomplish a mission in this page. First the page opens, there is a Choose a Place button to connect to a beacon device. If the mission type is stand, Accomplish the Mission button appears. If the mission type is time, a counter appears and starts to count down. When the countdown ends, Accomplish the Mission button appears. If the mission type is stand, Accomplish the Mission button appears. If the mission type is photo, the Take a Photo and Accomplish the Mission buttons appear. When the player clicks to the Take a Photo button, camera opens. Player should take a photo and click to the Accomplish the Mission button to end the mission. And, there is a Back to Game's Main Page button to return the Game's Main Page.



Figure 92 Accomplish the mission page (player)

30. Scoreboard Page (Player)

This page appears when player clicks the Scoreboard button on the Game's Main Page. Player's score, if it exists, appears in this page. Also, the Top 10 will be listed in the Scoreboard Page. And, there is a Back to Game's Main Page button to return the Game's Main Page.

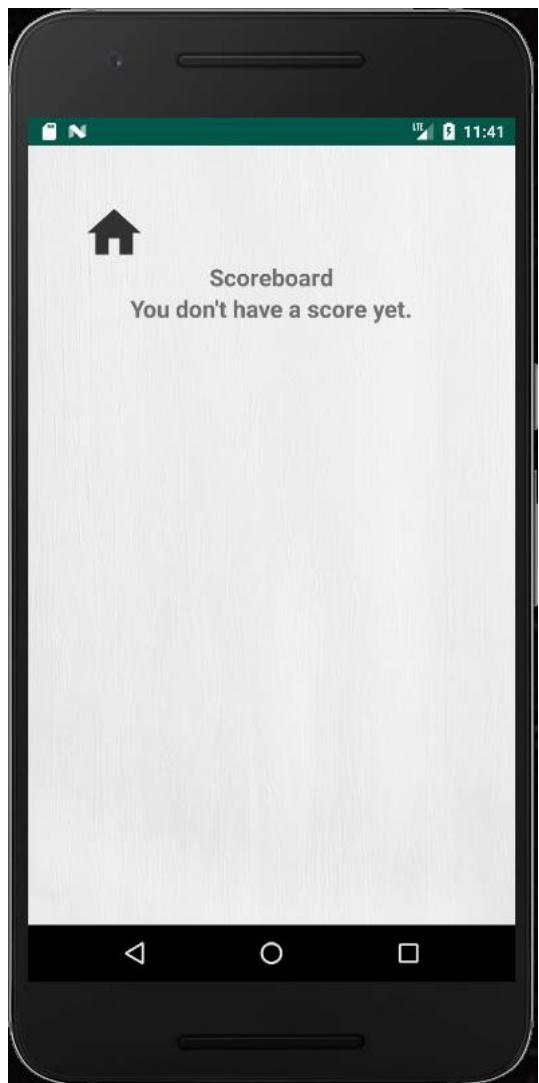


Figure 93 Scoreboard page (player)

31. Game Settings Page (Player)

This page appears when player clicks the Game Settings button on the Game's Main Page.

Player can return the Game's Main Page by clicking to the Back to Game's Main Page button or leave the game by using Leave the Game button.



Figure 94 Game settings page (player)