
Hidden Seek User Manual

Jingyi Jia
Jilin Liao
Meng Wei
Wufei Yang
Yichen Xie
Zuojun Shi

Date: 15,07,2021



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Internet - Praktikum
Telekooperation SS21

Erklärung zur Selbständigkeit:

Hiermit versichern wir die vorliegende Ausarbeitung des Fortgeschrittenen-Praktikums ohne Hilfe Dritter nur mit den angegebenen Quellen und Hilfsmitteln angefertigt zu haben. Alle Stellen, die aus Quellen entnommen wurden, sind als solche kenntlich gemacht. Diese Arbeit hat in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegen.

Jingyi Jia
Jingyi Jia

Jilin Liao
Jilin Liao

Meng Wei
Meng Wei

Wufei Yang
Wufei Yang

Yichen Xie
Yichen Xie

Zuojun Shi
Zuojun Shi

Contents

1	Motivation	3
2	Technical Overview	4
2.1	Architectural Overviews	4
2.2	Details of Architecture	4
2.3	Database Structure	5
3	User Manual	7
3.1	Overall Function	7
3.2	Operation Environment	7
3.3	Software Install	7
3.4	Software Operation Introduce	8
3.4.1	Map Module	8
3.4.2	Friend Module	10
3.4.3	Shop Module	11
3.4.4	Tree Planting Module	12
4	Bullet Feature List	14
5	Conclusion and outlook	15

1 Motivation

As lockdown policy has been conducted, offices, markets and gyms have been closed, people are getting bored to stay home. Lying in the sofa, working on the table, learning with the computer, all of these make our bodies more and more unhealthy. It is meaningful for our developers to create an application to motivate people to go out and have entertainment, without contacting with others physically.

With modern lifetime, more and more people, especially teenagers, have less interest in sport and tend to spend more time at home. Aiming at these young people, we decided to develop a game that could encourage outdoor fitness. Meanwhile, our target users may have difficulty in communication, because the fast-paced life leaves them less time to participant in social activities and meet friends. In order to provide them more chance to make new friends, our game focuses on the interaction between players. Considering the main object of the game, it should be meaningful and educational. So we choose and set the tree planting as the main object. We hope that the game could bring environmental awareness and some knowledge of plants to users.

For this purpose, we design a game that will encourage players to go outside and walk around, enhance communication between people, and make them aware of the preciousness of plants. The designed game includes a high level of playability. There are many items that can be set up in the game that are scattered all over the map, such as special seeds, treasures, etc. This forces the players to go outside and find these things. To enhance interaction between players, we plan to set up some items or activities in the map and share them with all players in the game, which allows interaction and competition between users. In addition, considering the concept of environmental protection, we set the background of the game so that players need to use the rewards they get through the game to plant flowers and trees. This also allows users to subconsciously understand the preciousness of plants. By planting different flowers and trees, players can also subconsciously learn some knowledge about plants.

Therefore, the idea of the game we designed is about the following. Out of the purpose of encouraging players to go out and exercise, the whole game is based on a map, and people need to go out and walk to get the items that are set on the map. We set up rare seeds and bombs as features, which allow players to meet more people by burying, picking up bombs and sharing information about rare seeds with your friends through messages. Items in the shop and rewards on the map are set up as flowers and trees, allowing players to learn more about plants. Our game has daily missions where the user needs to reach the location marked by the task to get the reward, which helps the user to leave home at least once every day. In addition, the buddy system also promotes user communication, players will not be alone in the game. To motivates players to continue playing, the game set coins as rewards and has a record of every plant the player harvest. The player who sees these record could feel a sense of accomplishment.

In summary, the designed game will achieve the goals of fitness, friend communication, meaning of education and enhancement of the awareness of environmental.

2 Technical Overview

In this chapter, we will introduce two charts of the system architecture and the details of the connection between the service (database, file system, API), and our application. The database structure will be introduced in the next section.

2.1 Architectural Overviews

The backend database is based on Google Firebase, which stores user information. We use Osmdroid API for realizing the functionality of geolocation.

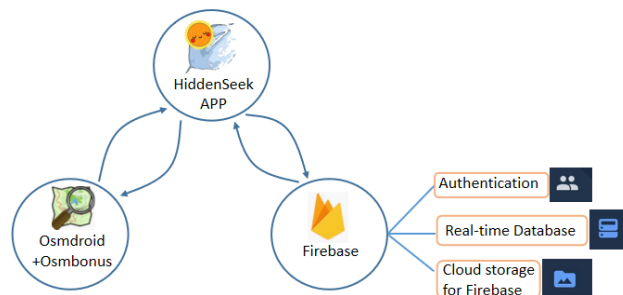


Figure 2.1: Architecture overviews

2.2 Details of Architecture

In the following chart, the detail functionalities between the main platforms and every module of our application are discussed.

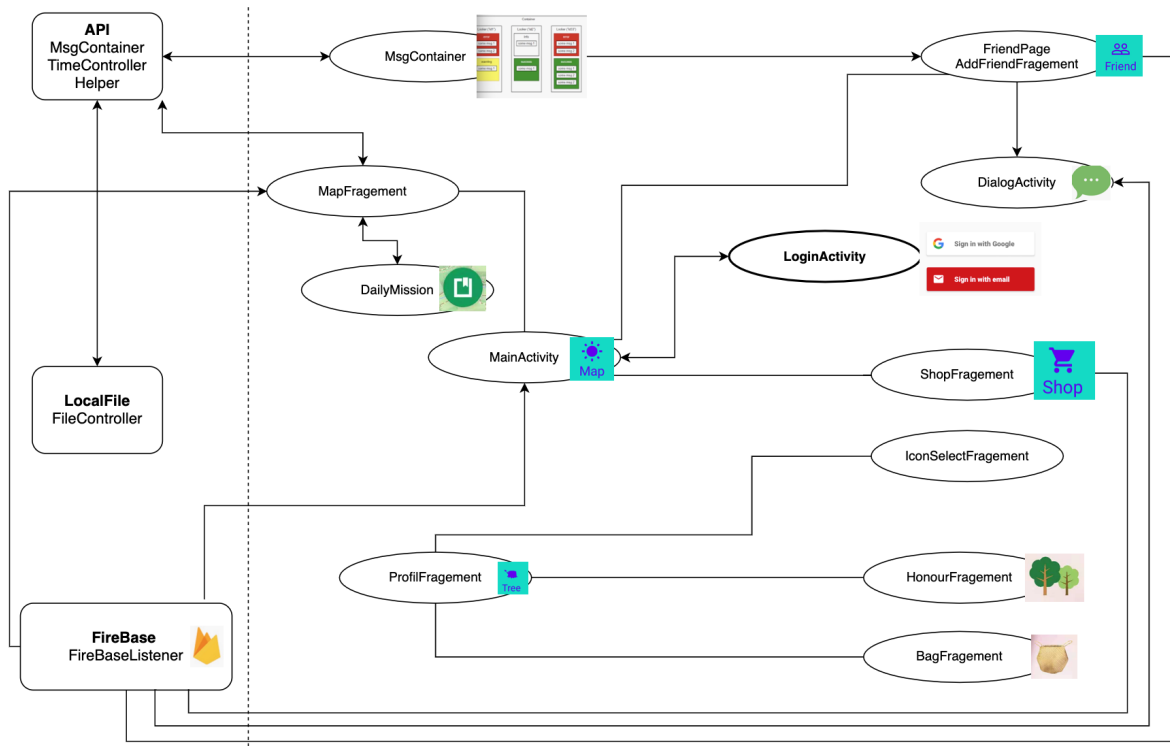


Figure 2.2: Details of architecture

2.3 Database Structure

The following are the types of our back-end data structure. It is smoothly for developers to access and modify the data when it is defined as flat. That will also helpful to decrease redundancy, increase portability, reusability, scalability, and maintainability.

Database structure:

```
users{
  user(Uid){
    E-mail:string(e-mail),
    bag{
      tree{
        tree_name{
          available: boolean,
          maxlevel:string(parse as number),
          Surname:string,
          name:double,
          photoRef{
            0:string,
            5:string,
            10:string
          },
          price:double,
        },
      }
    },
    bomb_status:string,
    fertilizer:string(parse as number),
    icon:string,
    score:string(parse as number),
    sun:string(parse as number),
    username:string
  }
},

shop{
  tree{
    tree_name{
      available: boolean,
      maxlevel:string(parse as number),
      Surname:string,
      photoRef{
        0:string,
        5:string,
        10:string
      },
      price:double
    }
  }
},

map{
  map1(id){
    G:string,
    I{
      0:double,
      1:double
    },
  },
}
```

```
        property{
            Uid:string ,
            type:string
        }
    },
    global_seed{
        seed1{
            property{
                add_time:long ,
                capture_time:string(parse as number),
                location:string
            }
        }
    }
}
```

3 User Manual

3.1 Overall Function

The game is a combination of entertainment and fitness, which is an osmdroid-based (an open-source API which is similar to the functionality of Google map) application. Location sensing and compass functionalities are included.

The main functionalities of the game:

1. Map function: it is mainly used for guiding players to the desired location, where players can pick up suns, seeds, bombs, or coins. The players could search any positions in the world and come back to the current location in the map.
2. Daily mission: players will accomplish the required mission every day, which could be going to the target place and picking up a special seed from a supermarket/park/cinema.
3. Special Seed: players should go to the target place and pick up the special seed within 2 hours, otherwise, the seed will disappear.
4. Open the question mark: there are two different kinds of question marks. A question mark could be a bomb generated from a player who spends 300 coins to buy. Or it could be a coin box automatically created by the system. For the player who opens the bomb, will lose 100 coins, but the player who buries will get the same amount of coins. For the player who opens the coin box, he will get a random amount of coins between 100 and 120. The player could open all existing question marks within 50 meters around her/him.
5. Friend function: in the friend page, players can search others from the global players, send messages with friends via text and emoji.
6. Shop function: players buy common seeds and fertilizer by using their coins.
7. Planting tree function: a player plant a tree if she/he has a seed. Plants will grow gradually over time depending on the amount of suns. When the number of suns is zero, the tree will no longer grow.
8. Other: players can select one of the images from the folded page as profile images. The module of profile will show the player's name, the tree level, the honor (planting history), players belongs (seeds, suns, fertilizer). Players can speed up the growth of the tree by using fertilizer.

3.2 Operation Environment

We need a smartphone to do the operations, and the operating system should be above Android version 6.0.

Software requirement:

Device	Platform	Based environment
Smartphone	Operating system	Android version 6.0
	Applications	Osmdroid map

3.3 Software Install

Register/Login : the players can register with Google account or email.

Login: the user account and password could be saved securely. (Security is guaranteed by Google, from the authentication, provided by Firebase.)

A player can choose one of her/his accounts to login or change the account via "Add another account" to login.

Logout: click this icon  to logout.

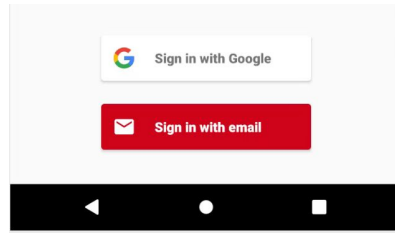


Figure 3.1: Players login page

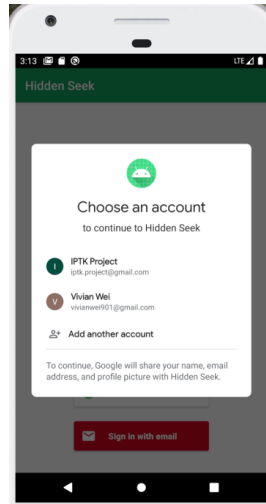




Figure 3.2: Players login page


3.4 Software Operation Introduce

This section mainly introduces the main functionalities of this game. It will be divided into 4 parts, Map Module, Friend Module, Shop Module and Tree Module, corresponding to the four buttons on the navigation bar.

3.4.1 Map Module

-  Map icon. This icon will show the map in real-time. It is used for guiding players to arrive at the desired destination, while the functionality is based on osmdroid map.
-  Sun icon. This icon will show where a sun is and where it can be picked up. When the player is near the sun, she/he can click the sun and get it. The sun is used for seeds/trees growth.

Sun Rule:

1. There are only 10 suns at most in the certain scope of the map each day. If the player clicks a sun, then the sun will disappear from the map.
 2. The suns in the map will be updated automatically every 24 hours. Every player will see only 10 suns in a random location. But different players in different districts will see different located suns.
 3. The number of suns will be shown in the Tree page.
 4. Message receiving: when a player gets a sun, the system will notify "Got suns!".
 5. A sun will be automatically consumed by the tree each hour until used up.
-  Question mark icon. When arriving at the place where this icon shows, the player clicks the mark and get a treasure box.

Question mark rule:

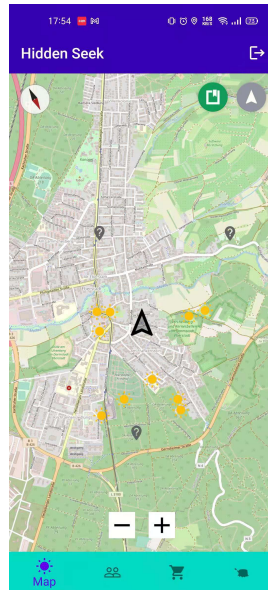



Figure 3.3: Map page




1. The question mark is either a treasure box, or a bomb.
 2. If it is a treasure box, the player will get an amount of coins between 100 and 120 randomly. The system will notify "Got 100 coins".
 3. If it is a bomb, the player who opens it will lose 100 coins, but the other player who buries it will get 100 coins. The system will notify, "Sorry! You opened a bomb! 100 Coins are deducted!".
 4. The treasure box will be refreshed at 00:00 every day. The system will automatically add 3-5 treasure boxes each day.
 5. Players can bury bombs on the map. Choose a desired place and press for a while to bury a bomb. Then there will be shown a new question mark icon. The system will notify "bomb successfully added". If a player does not have enough coins to buy a bomb, the system will notify "You don't have enough coins to set a bomb". If the bomb is failed to be set, the system will notify "Adding bomb failed, please try again".
 6. If player A opens a bomb which was buried by player B. Player A will lose 100 coins and player B will get 400 coins. (300 coins are used for buying the bomb, which is also a refund from the system.) The system will notify, "Sorry! You opened a bomb! 100 coins deducted". A message will be sent from A to B, "Oops. I was blown to bits. You get 100 coins from me." And B will send A a message, "OH OH! You opened my bomb. I get 100 coins from you."
 7. If player A opens a bomb which was set by herself/himself, the mark will also disappear and the system will notify "You opened a bomb from yourself! Get nothing."
-  Special seed icon. The special seed that can be picked up on the map is a snow lotus. The administrator will add it randomly.

Special seed (snow lotus/water lily) from time-limited mission rule:

1. This special seed is time-limited for being picked up. Within 2 hours, if no one arrives at the place near the seed, it will disappear.
2. Every special seed can be picked up by three Players. But it is not allowed for the same player to pick up it more than one time.
3. A sun/a bag of fertilizer can be consumed for this special seed to grow up 1 level.
4. The highest level of a special seed is 50, which refers to growing up to a mature tree.
5. The special seed is only generated randomly by administrator.

6. When the player picks up the special seed, the system will notify “You have got the * seed.” (* stands for a snow lotus or a water lily.)


7. When the special seed grows up to the highest level, the player who plants it will be rewarded 2000 coins.

-  Big black arrow icon in the top right corner. If a player clicks this icon, it will show the current location of the player.
-  Small grey arrow icon. This icon refers to the current location of the player.
-  Daily mission icon. This icon refers to daily mission. Players can get another special seed after finishing the daily mission. This kind of special seed is a water lily.

Special seed (water lily) from daily mission rule:

1. Players can get a water lily from a park, supermarket, or cinema.
2. Daily mission will be updated at 00:00 each day.
3. Players will get 1 daily mission each day.
4. A sun/a bag of fertilizer can be used for this special seed to grow up 1 level.
5. The highest level of water lily is 50.
6. When the player arrives at the place where a water lily appears (in a park, supermarket or cinema), she/he will choose whether to buy it. If yes, she/he needs to pay extra 1000 coins. After that, the system will notify “You have got the water lily seed.”
7. When a water lily grows up to the highest level, the player who plants it will be rewarded 2000 coins.

3.4.2 Friend Module

The icon  is friend module.

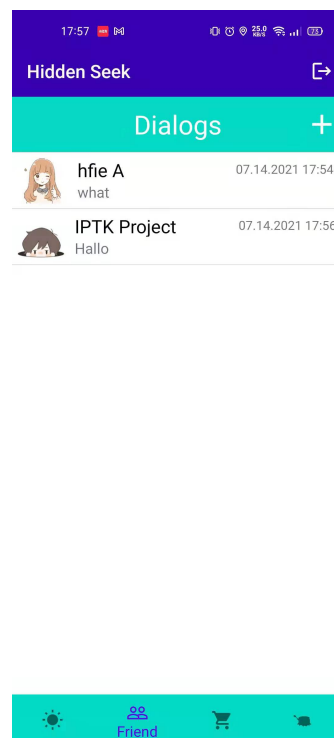


Figure 3.4: Friend page



Plus icon. This icon is used for searching players. Click this icon to search the players from the global players and add new friend. Players can send text and emoji messages to friends. Players are also enabled to delete friends, as showing in Fig. 3.5.

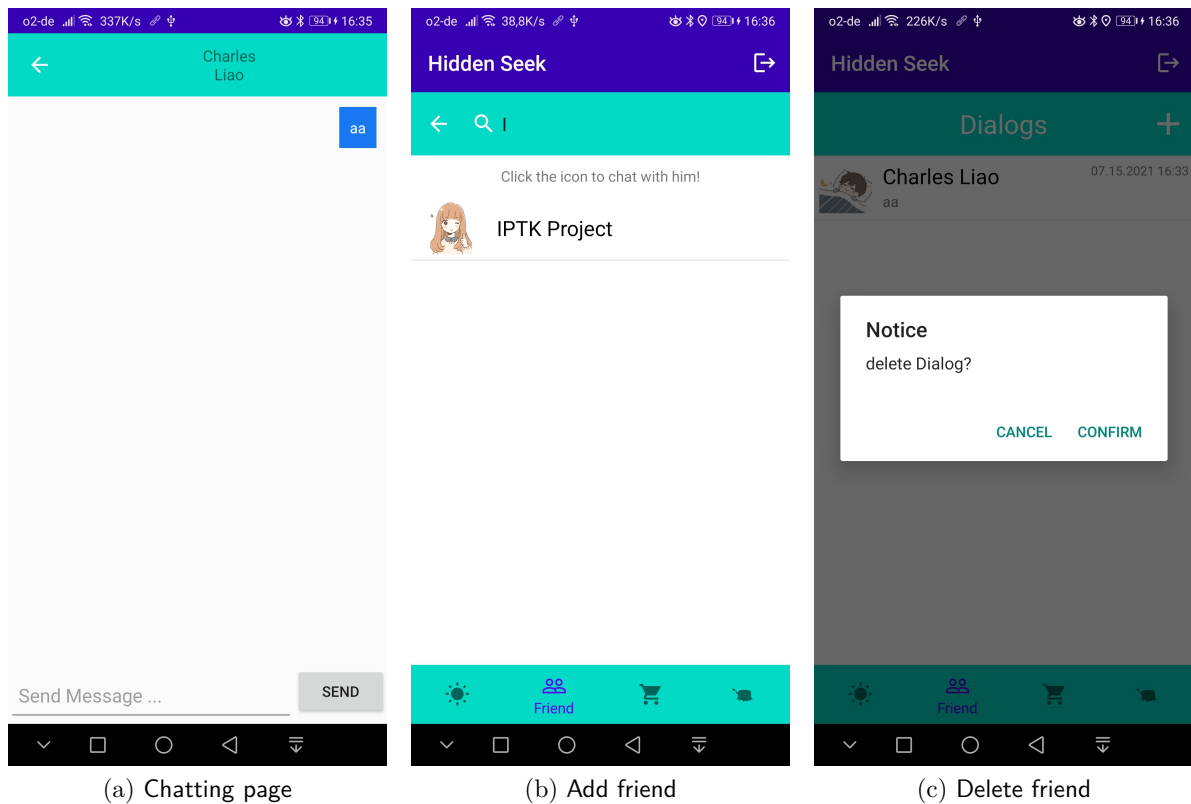



Figure 3.5: Players chatting page

3.4.3 Shop Module

The icon  is the shop page, as shown in Fig. 3.6.



Coin icon. This icon refers to how many coins the player owns now. When a new player registers with this game, the system will automatically reward 500 coins to her/him.



Morning glory. The price of the morning glory is 100 coins. It is a common seed.



Manjusawa. The price of the manjusawa is 500 coins. It is also a common seed.



Fertilizer. Players can buy bags of fertilizer from the shop. Fertilizer can be used for the growth of the seed. The price of a bag of fertilizer is 1000 coins.

Common seed rule:

1. There are two kinds of common seeds. The one is morning glory, and the other one is manjusawa. Both of them can be bought only from shop.
2. A sun/a bag of fertilizer can be used for the common seeds to grow up 1 level.
3. The highest level of morning glory is 10 while the highest level of a manjusawa is 20.
4. When players buy common seeds from the shop, the system will notify, "You have bought the xxx seed!".
5. When a morning glory grows up to the highest level, the player who plants it will be rewarded 200 coins. When a manjusawa grows up to the highest level, the player who plants it will be rewarded 1000 coins. (The reward is twice the price of buying it.)

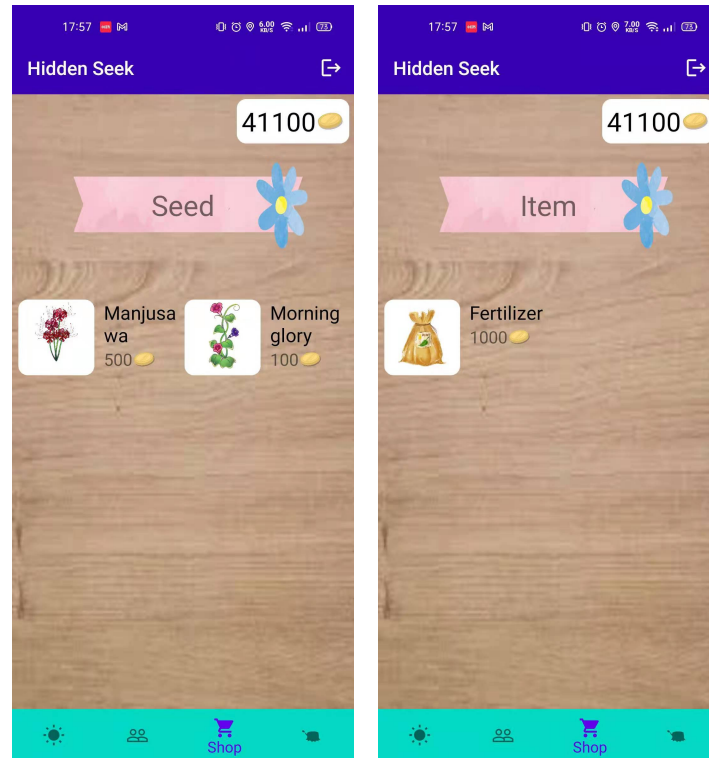



Figure 3.6: Shop page

3.4.4 Tree Planting Module

The icon  is Tree planting module, as shown in Fig. 3.7 and 3.8.

IPTK Project The username is following with Google account or email account.



User image icon. The player can select an image as user image.

Water lily: Lv. 0/50 This icon refers to the name and the level of the tree. It is a Water lily, the current level is 0, the highest level is 50. When the tree grows up to the highest level, then the player can plant a new tree. This icon will become “Please plant a tree!”. It is not allowed to abandon the seed/tree once it has been planted.



This icon refers to the number of current suns.



Seed bag. This bag is used for storing seeds. The players could check how many seeds and how many kinds of seeds they have. Open the bag, and it will look like Fig. 3.8.



Honour icon. This icon is used for recording the history of the players successfully getting the seed.



Fertilizer icon. This icon refers to the number of the bags of fertilizer.

Fertilizer rule:

1. Fertilizer is used for growing up one level for a seed.
2. The fertilizer can be bought only from the shop. If the player successfully buys a bag of fertilizer, the system will notify “You have bought a fertilizer!”.

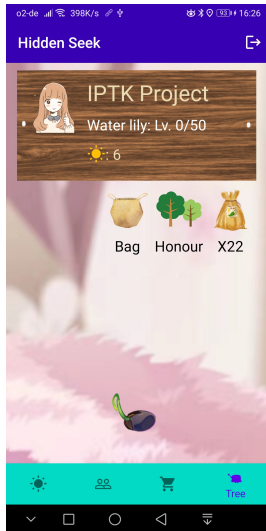


Figure 3.7: Seed bag



Figure 3.8: Tree show

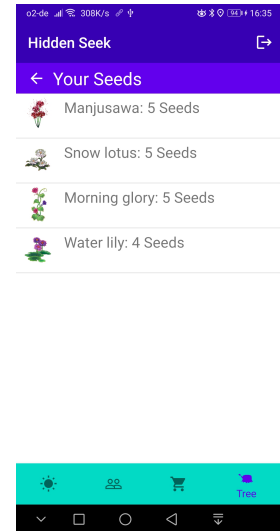


Figure 3.9: Seed bag

3. When the player clicks the fertilizer, the fertilizer will be used for the tree. Then the system will notify, "You have used a fertilizer!"
4. If the fertilizer is used up, the system will notify, "You have no fertilizer!"

Tree planting rule:

1. When the player clicks the seed, the system will notify "You have planted xxx". The seed image will be shown on the tree page.
2. When the seed grows up to a mature tree, which means it reaches the highest level, players can harvest the tree and get the reward from the system.
3. There are currently 4 kinds of seeds, 2 common ones(manjusawa and morning glory) and 2 special ones(water lily and snow lotus). The common seeds are only bought from the shop, while the special seeds are only got from the missions.
4. The player is only allowed to sow a seed each time. If the player already has a tree that is currently being planted, and is trying to sow another seed, then the system will notify: "You are now planting a tree!" to prevent planting this seed.

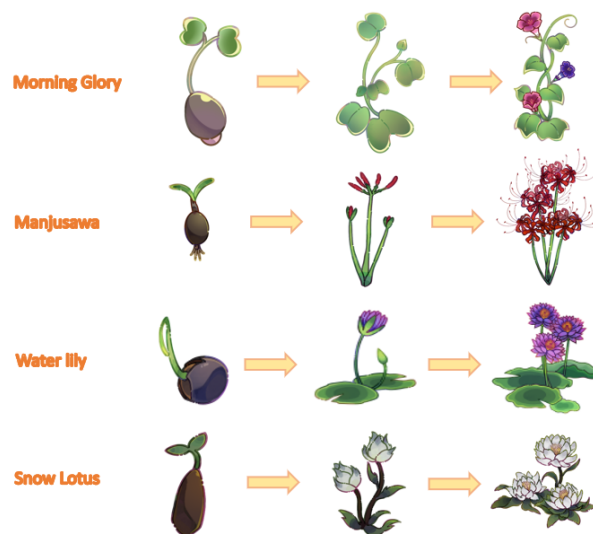


Figure 3.10: Images of four seeds

4 Bullet Feature List

Real-time geolocation

- This game is developed based on osmdroid. Players can reach desired location via this real-time geolocation map

- Picking up suns/seeds/treasures
- Burying a bomb (generated by other players from interesting sites)
- Daily mission (generated automatically by the system)
- Time-limited activities (special seeds generated by the administrators)
- Knowing the distance from current location to the selected destination

Friend List

- Add/Remove friends
- Interaction between players (real-time message)
- Chat function

Shop

- Buy seeds/fertilizer/bombs

Profile

- Username/image
- Honor (how many trees the player has harvested.)
- Planting trees

General

- Message boxes (generated automatically by the system)
- Based on cloud computing
- Login with Google account
- Module programming
- Divide and conquer algorithm
- Scalability

5 Conclusion and outlook

The project aims at entertainment and physical exercise, which is based on the android platform via Java. In addition to improving the programming skills of team members, we have also finished the tasks of the overall architecture, the required documents and the promotional video.

Throughout the developing process, the project team members understand that to create a perfect product requires not only programming skills, but also collaboration and communication with different roles of the whole team. Even to some degree, understanding to each other seems to be the most important factor during the development process.

For example, players' experience will directly decide whether the product is useful or useless. In the beginning, we didn't find the right direction, just because of ignoring the user experience. After that, we improve our design concept, putting the players' experience on the first place. This important change helped us find the right development direction and brought a successful finished product.

In the final stage of development, it is necessary to use a short video to catch users' attention. We learned how to make good videos and how to edit it fluently and how to make it funny.

There is a long way for the team to explore. The ability of project management, whose key point is to save costs and control risks, which is what we exactly lack of. Since we have not put it into the physic commercial market, so it is hard to say we have this ability.

Users can not change usernames in the profile module, but they can change it with the Google account. According to the original design, when the number of the harvested trees from a player reaches a certain number, we could plant a physical tree in the desert or bared districts. So that we can achieve the target, which is really environmental friendly. But now we plant trees only in the app.