Bilkent University
Department of Computer Engineering

CS 491
Senior Design Project

Analysis Report

Project Name:

GrouPub

- A Location-based Chat Engine-

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Project Website: http://groupub.github.io/

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ABSTRACT

“GrouPub” is a location based quiz engine for users who want to play a quiz game and socialize. It is a mobile application especially for teenagers that want to compete and socialize. GrouPub provides a large variety of people to talk with, but in a game form. System analysis of the GrouPub application will be given in the following parts of the report starting with an introduction, requirements and system models that documents how GrouPub will be designed to be functional, therefore, achieve its goal.

1. INTRODUCTION

GrouPub is a location based quiz application where users can sign up to an event, form or join a group and participate in a quiz that is hosted in a specific pub or café.

Users need to create an account first to be able to use GrouPub. After successfully creating an account and logging in, users will see a list of upcoming events. These events represent the actual quiz event that is taking place in a specific location. After selecting an event, users can see the groups that were already formed by other users that belong to the selected event. Users can either join a group that has an available slot or form a new group (maximum of five). Once the user successfully joins or forms a group, he/she can go the specified location at the specified time to join the quiz.

A quiz event will start at the specified time and users that have successfully signed up to that quiz (and present at the specified location) will start to receive questions every ten minutes. Users will have twenty seconds to answer a question. Once the quiz event is over, the winner group will be rewarded with drinks or food by the host and they will be recorded in GrouPub's public leaderboards. The winner group will also be prompted to take a photo of themselves and upload it GrouPub's leaderboards (this is an optional step for the group).

The purpose of GrouPub is to create an environment where even strangers can form groups, share a few drinks and socialize while trying to win a quiz event.

2. PROPOSED SYSTEM

2.1. Overview

GrouPub aims to provide its users with location-based quiz application in social platform. It will be implemented as mobile application both for Android and iOS operating systems. We will create platform, which enables its users to participate in a quiz application. Application allow users to play in a quiz game if these people share the same location such as pubs, restaurants, cafes and so on. We will choose the days, quiz topics and place weekly/monthly. Users will be qualified as player in the quiz game application if they are in correct location. Because application works as location-based, it is controlled by the QR code that will be available on quiz place. Then, application informs its users about upcoming quiz details. People are able to just come the place and enjoy the quiz game or they may form a group before quiz day via application's "make a group" part. Therefore, while people attend in a quiz game, they may also socialize by grouping other participants. In addition to this, application will have variety of quiz categories such as sports, history, geography, literature, science, music and so on. People will be informed about dates and categories of closest quiz event and also its location.

People will try to get higher scores, and then they may share their performance on quizzes. We also plan to connect application with Facebook, Twitter or other social platforms to enable users to share their current scores.

2.2. Functional Requirements

- ✓ User registers the system via e-mail and nickname.

- ✓ User log in the system with nickname and password.
- ✓ User may participate in quiz game as single player or as a group.
  - If user does not want to participate in a group, he/she does not attend any group and play as a single player.
  - If user wants to participate with his/her group, she registers the game with her own group and then comes the place to play.
  - If user wants to participate as group but does not have a group, he/she may announce it to the system and others may attend her group.
- ✓ Users can communicate with other players via chat option in GrouPub application.
  - Chat has two options as private and public:
  - Private chat provides in-group communication so that other groups cannot see the dialogs.
  - Public chat is communication among the all people, who are in same location and active in the quiz application.

2.3. Non-Functional Requirements

- ✓ Reliability: Because application needs multiple users to socialize them in location-based game, system needs to respond high-level and large-numbers of requests with in a valid time.
- ✓ Availability: It is measured as a factor of system's reliability and as reliability increases, availability increases, too. It is a standard of a total time a system is capable of being used in given time interval. Therefore, we aim to develop a system with both reliability and availability to enlarge the area of usage.
- ✓ Performance: Because there will be numerous users and data storage of quiz categories and quiz questions, we aim to develop an application with short response time and fast data compression to increase rivalry among users.
- ✓ Usability: It is ease of use and learnability of users. We will implement a usable and easy Graphical User Interface (GUI), because we aim at diversified age and technological-capability users.

2.4. Pseudo Requirements

GrouPub application will be implemented via Model-View-Controller software architectural pattern.

- ✓ Client side: PhoneGap
- ✓ Controller side: Restful Web Services
- ✓ Model side: POJO, DAO, ManagedBean
- ✓ Requests client to server: JSON, AJAX

PhoneGap: We will use PhoneGap that provides web-based mobile application implementation framework. PhoneGap is an open-source framework that allows programmer to create mobile applications using standardized web APIs for the platform [1].

Why do we choose PhoneGap?

- ✓ It is cross-platform framework so that we do not need to use native language for different platforms. Supported platforms are:

- Android
- Blackberry WebWorks (OS 6.0 or higher)
- iPhone

✓ We will use HTML, CSS and JavaScript for implementation.
✓ We will use command-line interface via Node.js.
✓ It eases the code signing, debugging and compiling. It provides instant view and testing the application on our mobile phone. Therefore, it emphasis on the testing phase and it saves the time of programmer.
✓ We will use Toad Oracle or Mongo DB for data storage, which provides standardization for web technologies.

Restful Web Services: It is an architectural style that satisfies constraints to a web service that enables services to work on web. Data and functionality are considered resources and are accessed using Uniform Resource Identifiers (URI) links on the web. The rest architectural style models the client/server architecture and is designed to use a stateless communication protocol, HTTP. Therefore, it allows client and server exchange representations of resources by using a standardized interface and protocol [2].

POJO (Plain Old Java Objects): It is Java object that not bound by any restriction.

DAO (Data Access Objects): It exchanges data between POJO to bean.

ManagedBean: Java bean classes are used for communication between layers in multi-layered applications.

2.5. System Models

2.5.1. Scenarios

Scenario 1: Registering to the Application

Ayberk got an invitation to a quiz night from one of his friends. His friend told him to download a mobile application called GrouPub to join to the quiz night and wants him to join his friends group called “Pattern”. Ayberk downloads it and fills the necessary information such as e-mail, user name and password. He quickly registers to the system. After he registers to the system his friend Merve sends him an invitation for joining the group. He accepts the invitation and now he can join to an event with his friends.

Scenario 2: Finding an Event

Arda logins to the system. He sees his profile and under his profile he sees the “Gelecek Yarışmalar” title. Under this title some events and their places are listed. Ayberk looks into the events listed there and does not want to participate in those. So he taps the button called “Hepsini Gör” located under these events. Now he can see every event that is going to be organized in his city. He finds the most suitable event for him and taps on it. After tapping on an event he reaches to the event page and now can see the detailed information about the place and the groups participating in that event. He joins to a random group here and now

can able to talk with the people in this group. Arda chas three new people and meets them in real life when the event time has come.

Scenario 3: Participating in an Event

The group Pattern has joined to an event held in Varuna Gezgin café. They meet just before the quiz has started. They scanned the QR code available inside the café to verify that they are participating in that event. After getting their drinks, the event has started. The first question is appeared on their smartphones screen. They decided the correct answer to this question is the option C. They have total amount of 15 seconds to answer to this question. They all tapped to the C option and after the time is over the correct answer is displayed on the screen. When the time goes out the question screen flips and the chat screen appears. In this chat screen they can talk to each other or with other groups if they want to. There is a total amount of 10 minutes for the beginning of second question. After 10 minutes the second question is asked.

Scenario 4: Using Jokers in an Event

The event has started and the question 10 is asked. This is an important question since there are two groups that did really well in the previous questions and now are competing with each other to become in the first place. Merve's group has used all of their jokers before this question and Arda's group still has one joker option. The question 10 is a really difficult question and there are two close options that only one of them is correct. Merve's team the Pattern agrees on the choice A but the Arda's team decides to use their final joker to see if the choice A is correct. Arda's team uses their 50:50 joker to eliminate half of the choices. The choice A is eliminated and they decided to chooce option D. After 15 seconds passed the correct answer is revealed and it is the option D. Arda's team won the quiz night thanks to their last joker.

2.5.2. Use Case Model

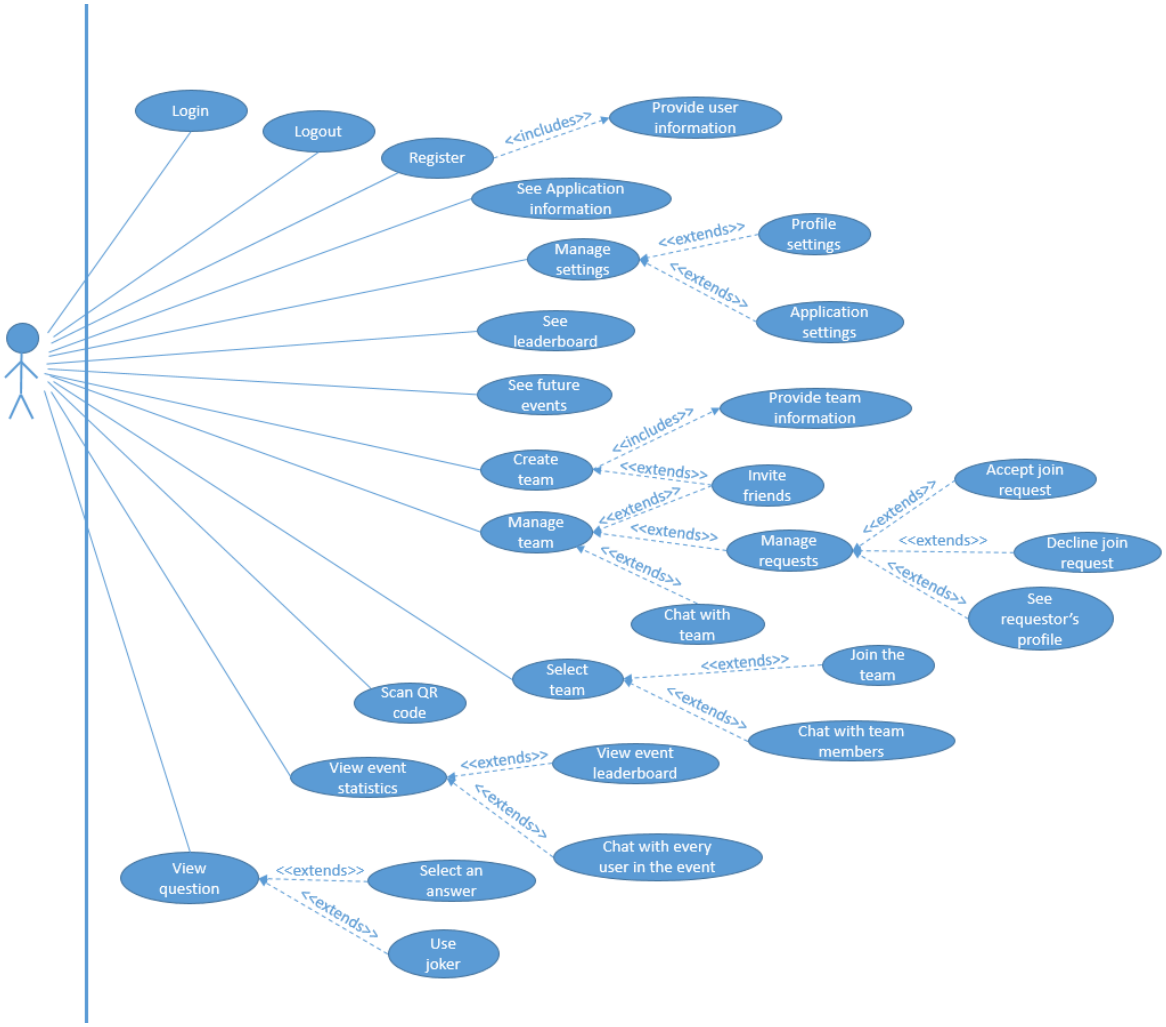

Figure 1: Use Case Diagram for a GrouPub user

2.5.3. Class Diagram

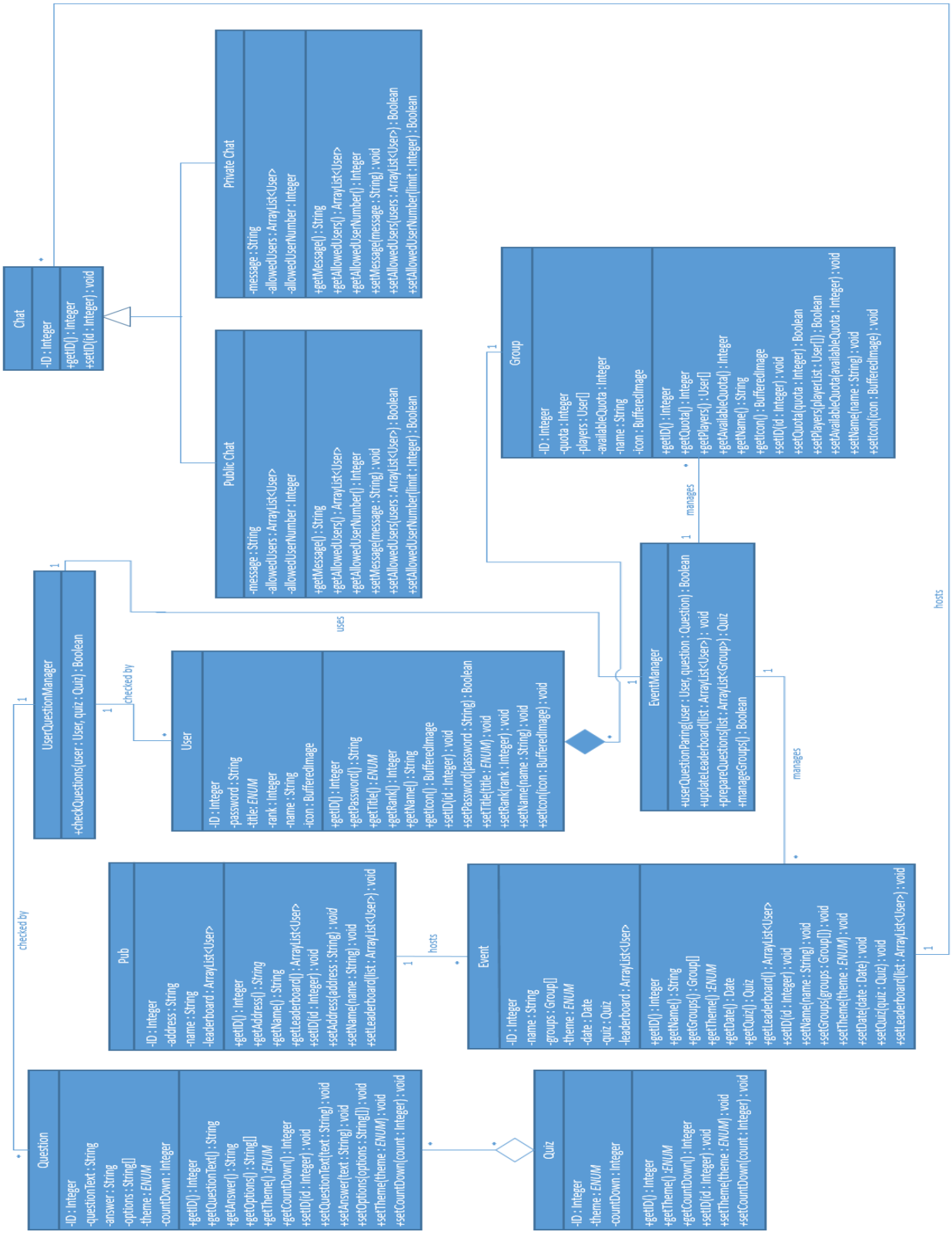

Figure 2: Class Diagram for the server-side of GrouPub system

2.5.4. Dynamic Models

2.5.4.1. Sequence Diagram

Scenario: Arda has just downloaded the GrouPub application to his smartphone. Now he wants to find and join an event. He does not have any friends yet. He turns on the application and sees the available events list and he successfully joins a random group in an event.

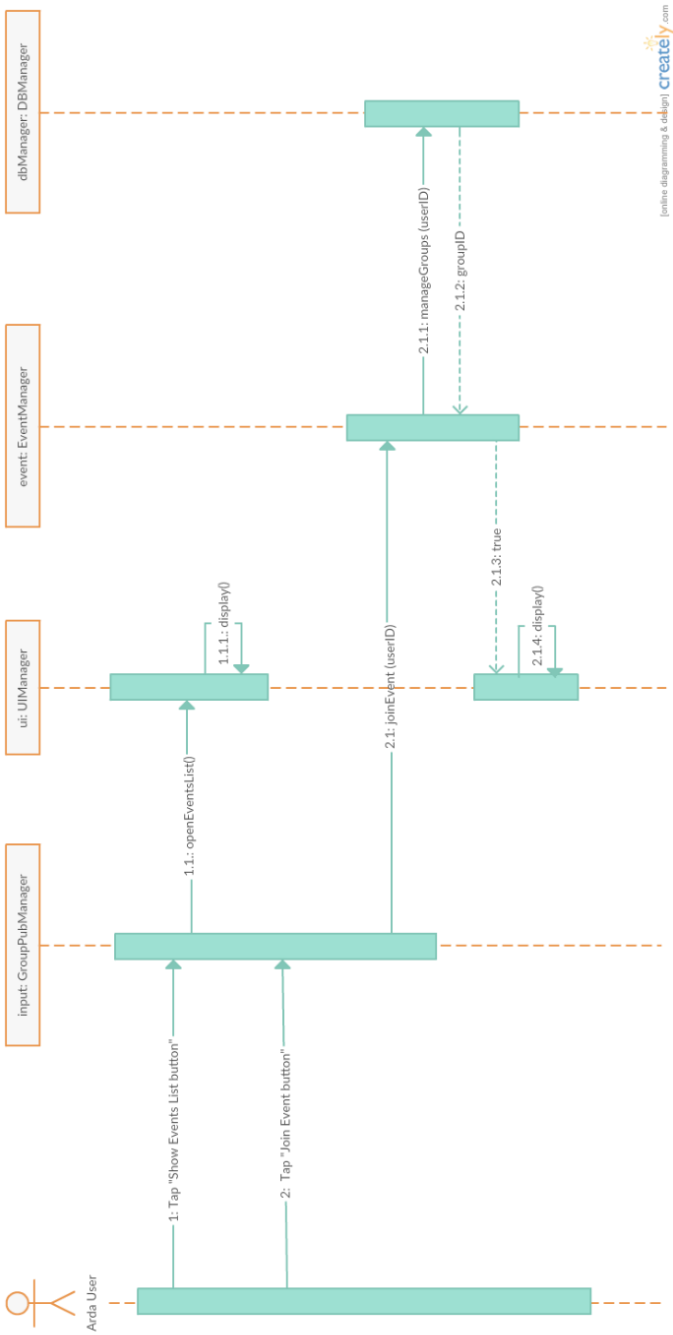

Figure 3: Sequence diagram of "Join an event"

Scenario: Arda has joined an event and went to the pub where the event is held. The event has just started and questions started to appear on his smartphone. He answers the question and gets the result.

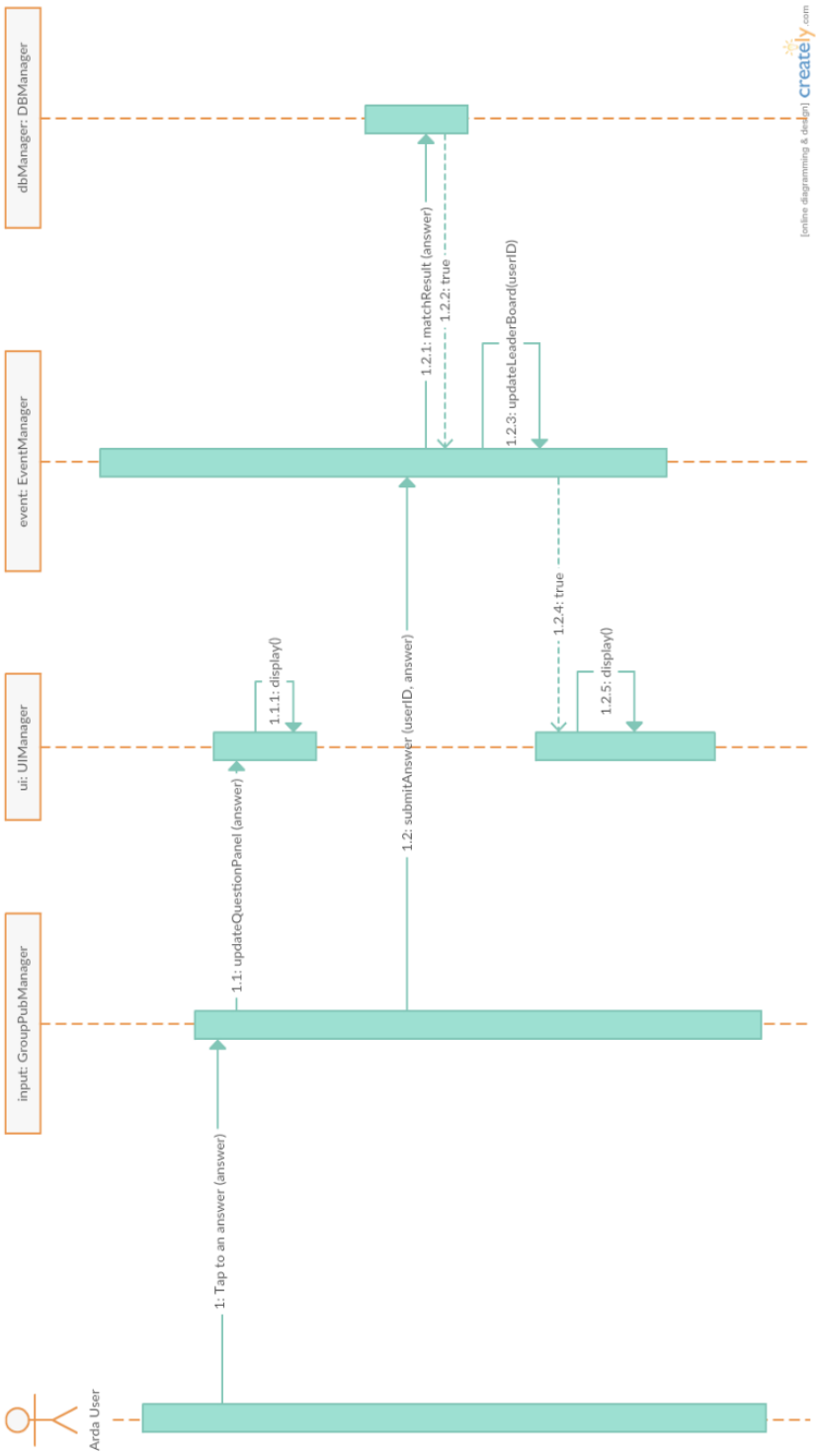

Figure 4: Sequence diagram of "Answer to a question"

Scenario: Arda liked the application and mentioned about it to his friends. He wants to create a group and participate in the next event with his friends.

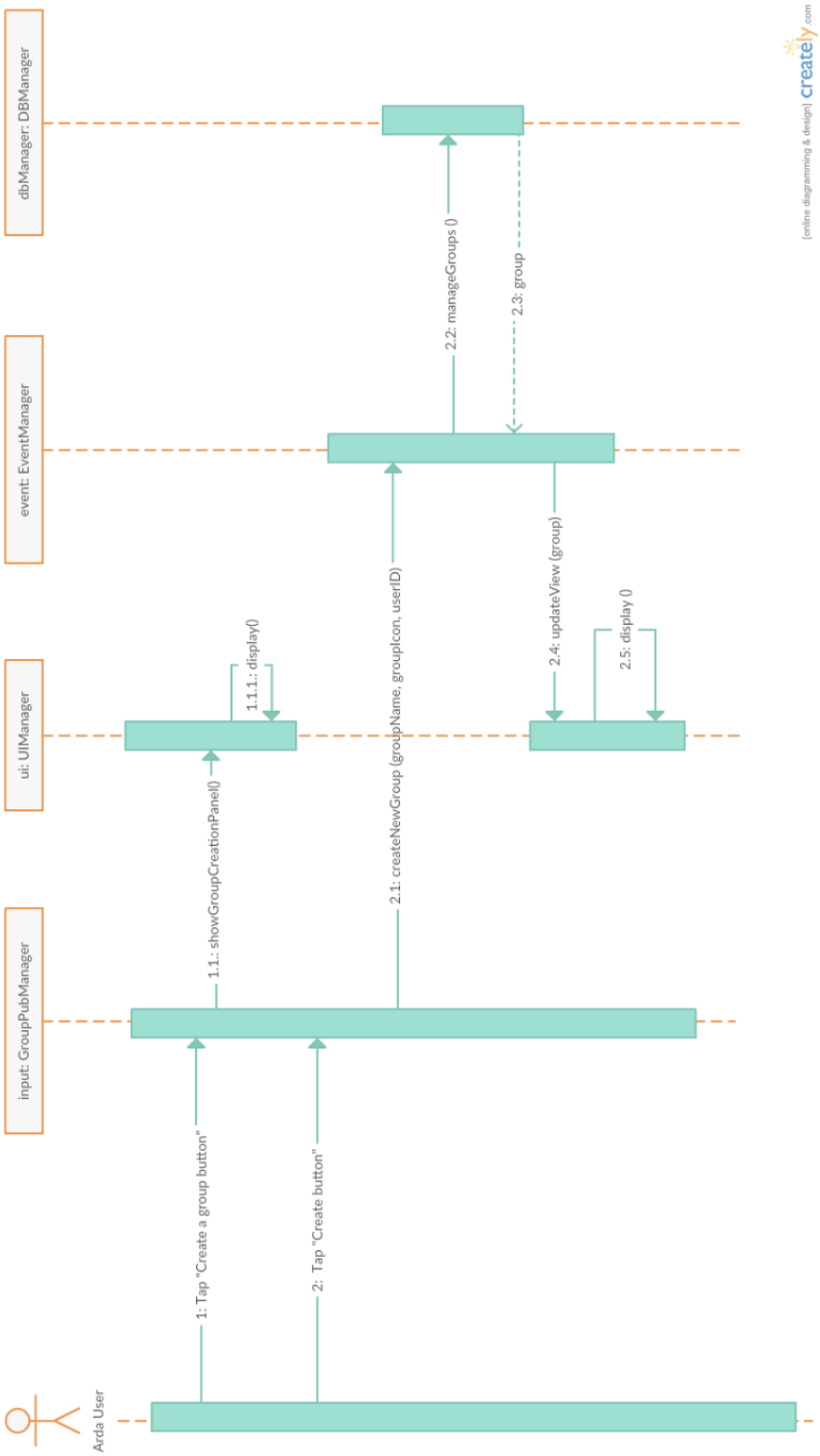

Figure 5: Sequence diagram of "Create a group"

2.5.4.2. Activity Diagram

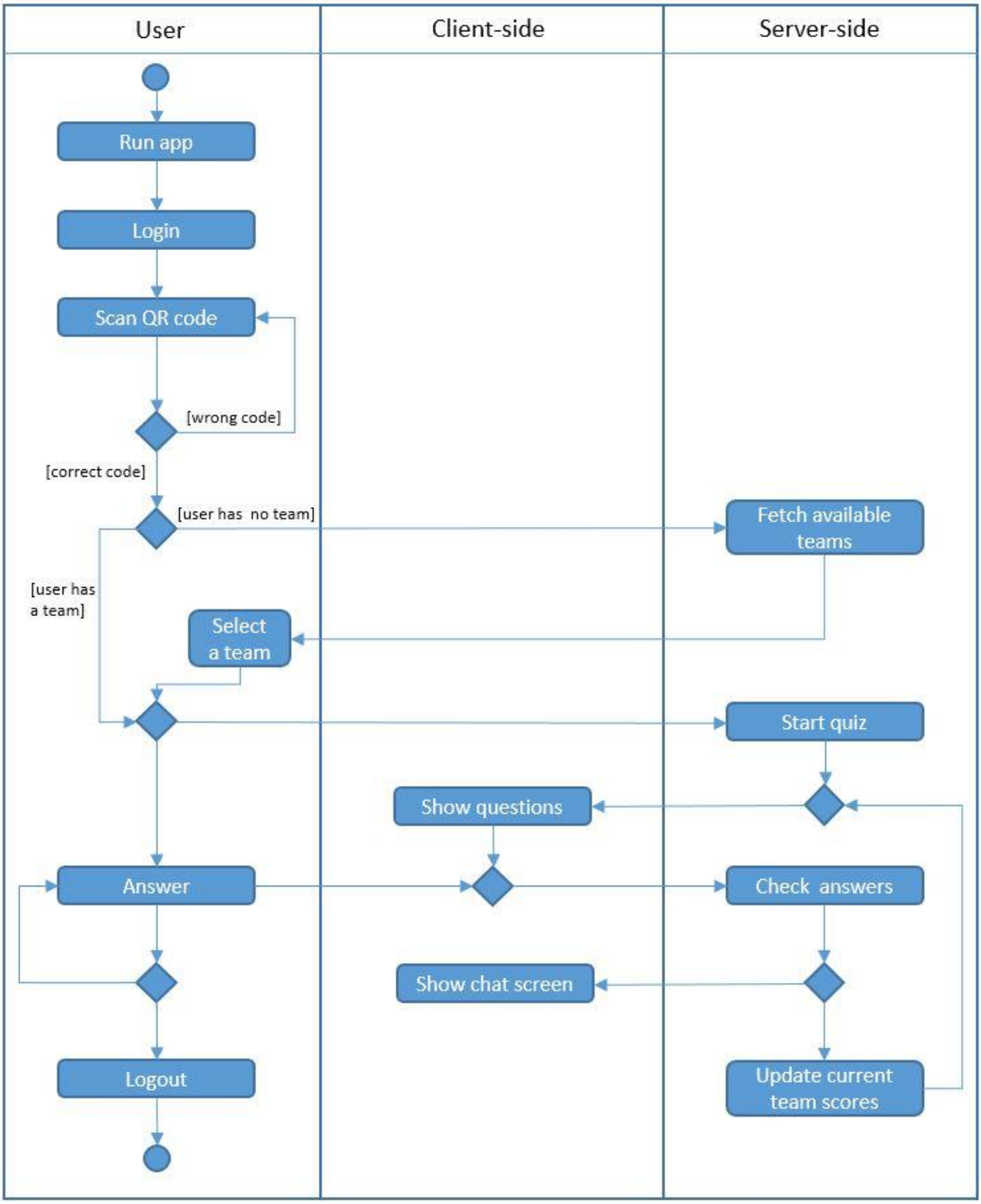

Figure 6: Activity Diagram of a simple quiz routine for a GrouPub user

2.5.5. User Interface

2.5.5.1. Loading Screens

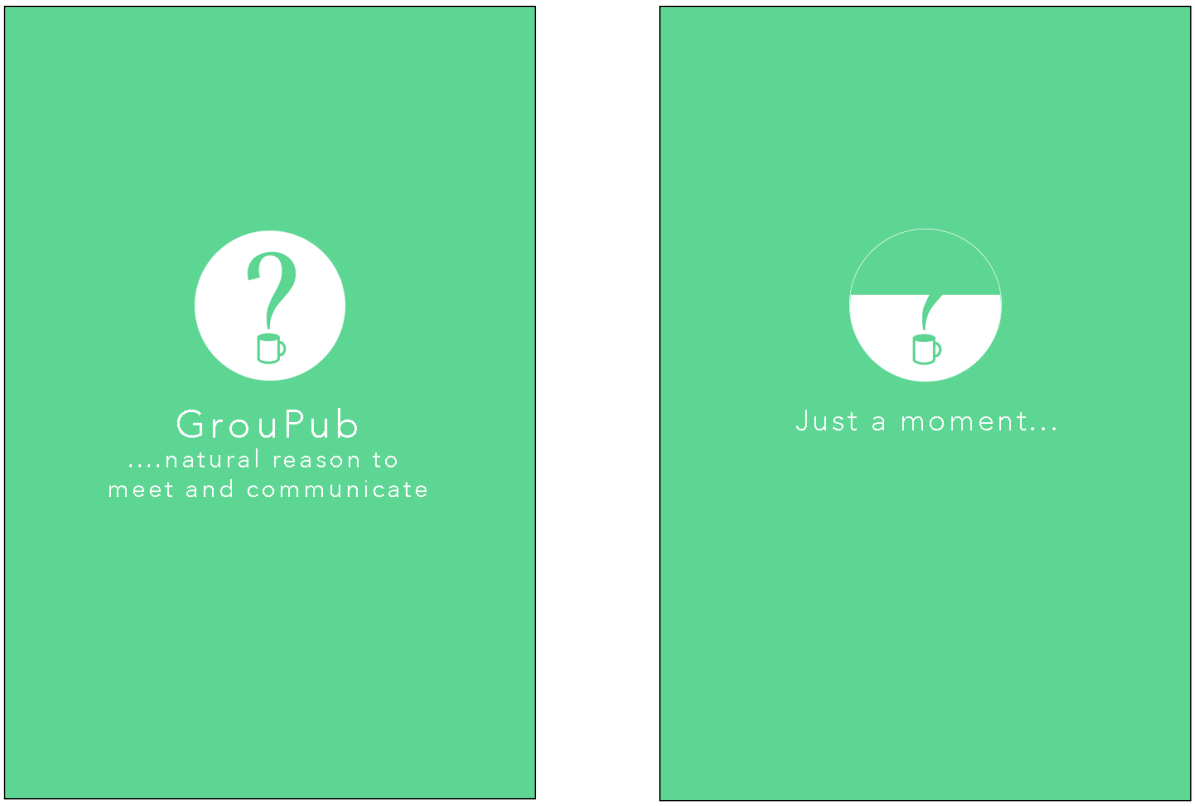

Figure 7: Loading screen of the system

In loading screen, firstly the user will see the logo of our application and then a loading image will be shown which will inform user about the amount of time he/she needs to wait.

2.5.5.2. Login and Signup Pages

Figure 8: Login page

Users can enter to the application by their usernames and passwords. If they do not have an account, they can easily sign-in with their e-mail addresses and a password which they will choose. They can also get information about the application and us from “Hakkımızda” section.

2.5.5.3. About Us

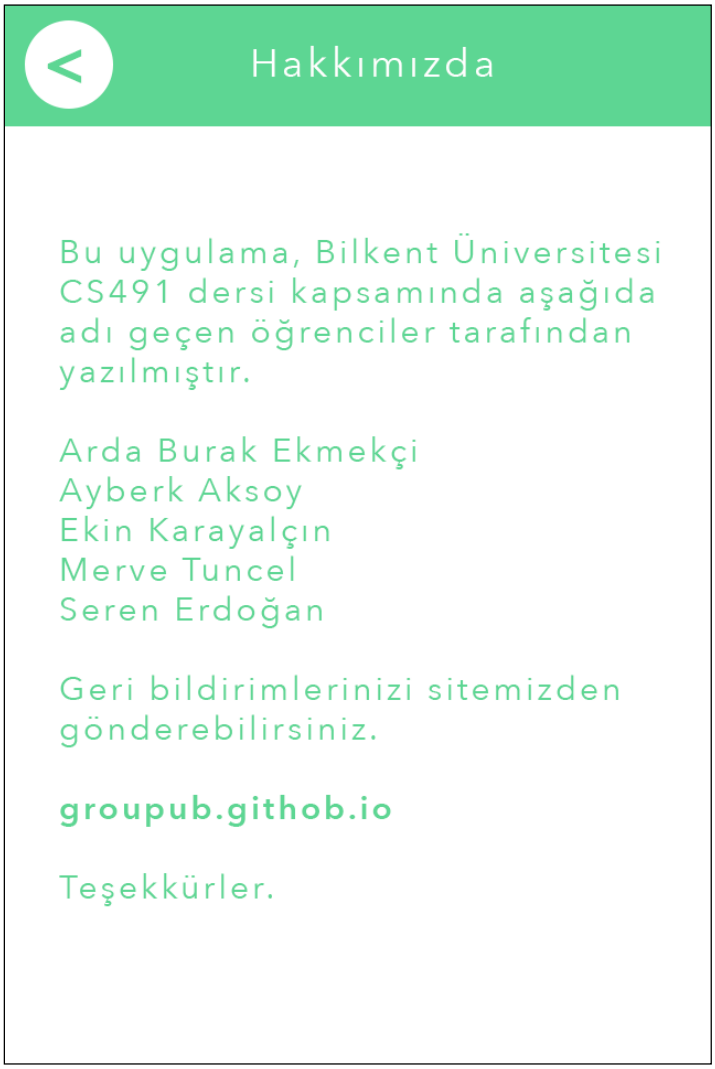

Figure 9: Project information page

This page will give information about the project and provide the contact information.

2.5.5.4. Index Page after Login

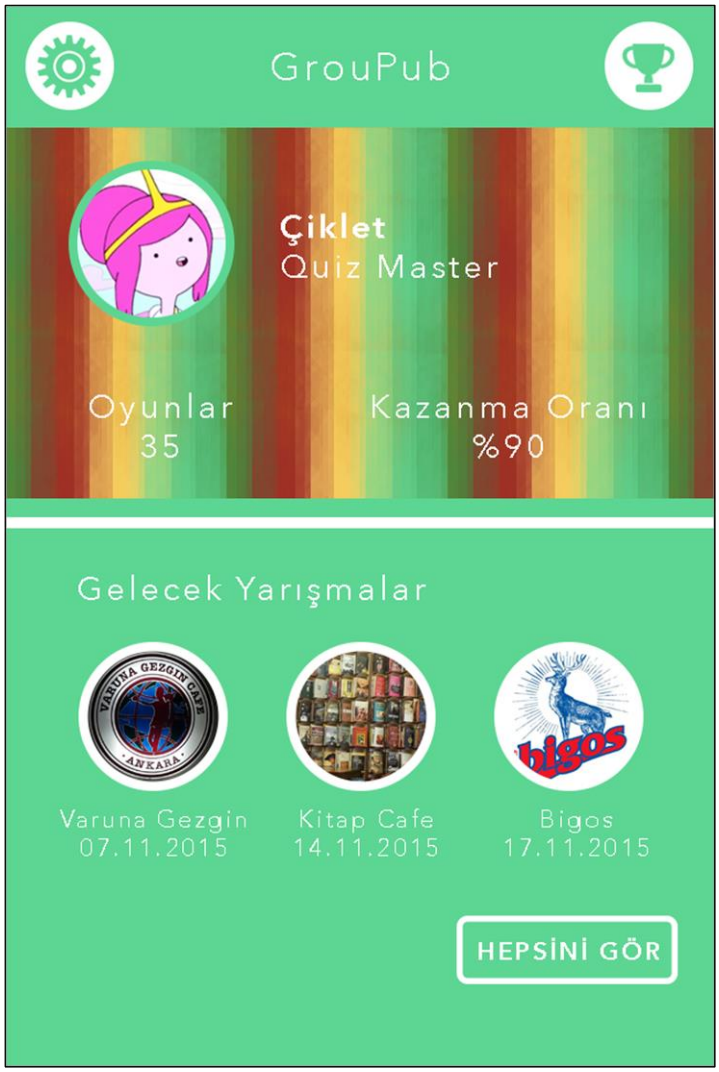

Figure 10: Events main page

After logging in, the profile information and upcoming events will be shown. The user can select among these events or to see more, can click to the “Hepsini gör” button.

2.5.5.5. Leaderboard

Figure 11: Leaderboard for past events

When the user clicks the top-right button (with the trophy symbol) at previous page, the leaderboard of all time will be shown. If he/she is not in Top-10, he/she will be shown at the bottom with his/her placement.

2.5.5.6. Settings

Figure 12: Application settings page

If the user click the top-left button (the button with gears), he/she will be able to change the settings. If the user wants, the logout is also possible.

2.5.5.7. Event Page

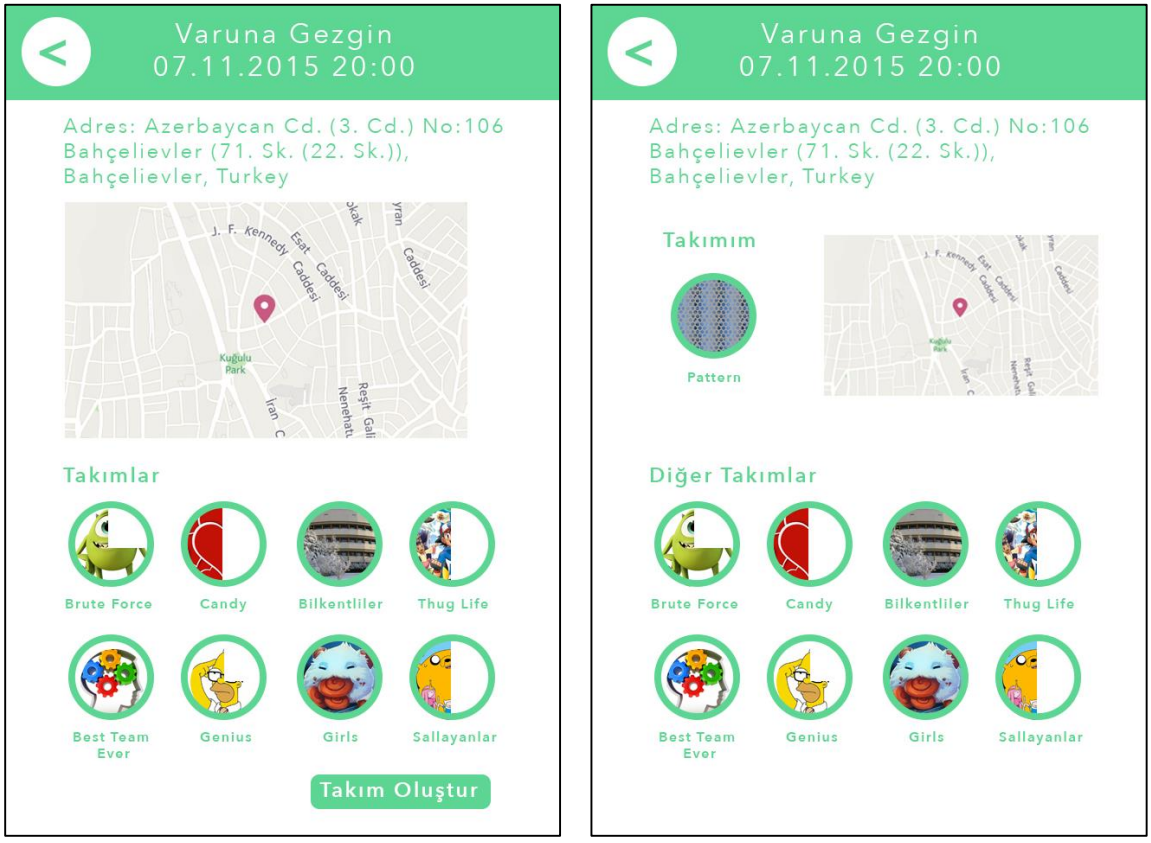

Figure 13: Joining an event (an event's information page)

If the user already has a team, the right interface will be shown. Otherwise, creating a team and applying to join a team options are possible. The icons of teams will give information about empty spots at that team. If the whole icon is visible, it means that team is full.

2.5.5.8. My Team

Figure 14: Team main page for the team admin

When the user has a team, by clicking the icon of team, he/she will be able to see information about team members and empty spots. Inviting friends is also possible in this section. There is a private chat feature with the team members before the event.

2.5.5.9. Create a New Team

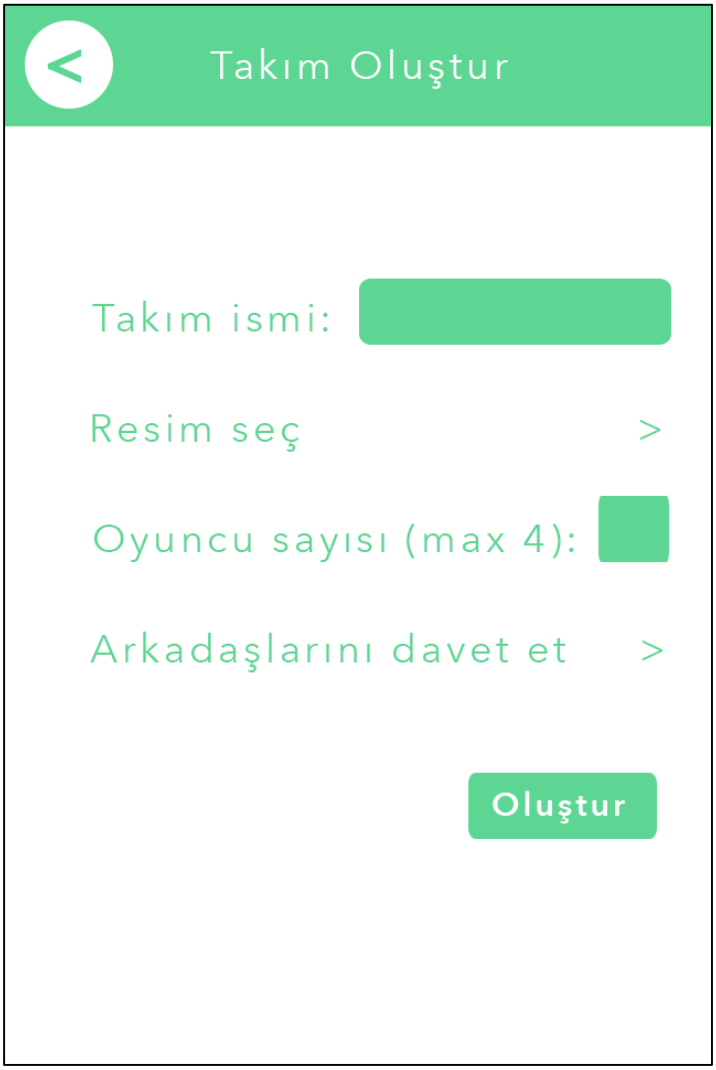

Figure 15: Team creation page

If the user does not want to join existing teams, creating a new team is an option. With a name, an icon and a size; a new team can be created. The user can directly invite friends while creating the team.

2.5.5.10. Apply to Join a Team

Figure 16: Some user's team page

When the user wants to join a team, he/she needs to click “Gruba Katıl” button. He/she can also chat with the team members to convince them.

2.5.5.11. Authentication before Event

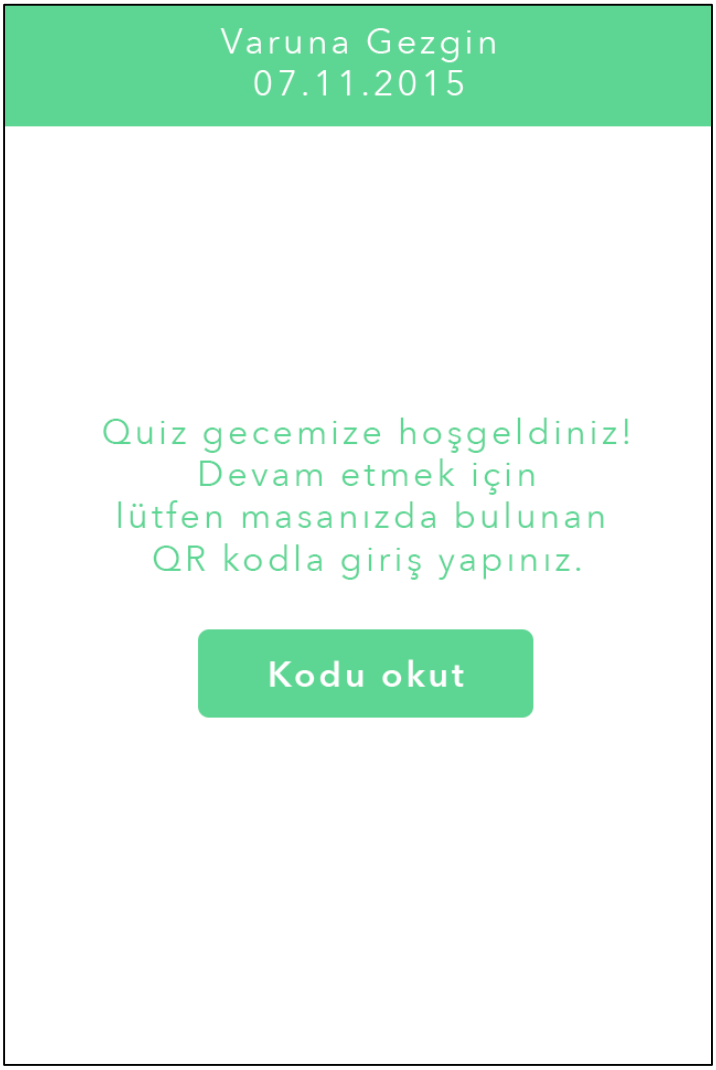

Figure 17: QR code scan page in order to join the quiz event in a specific location

To be sure that the user does not attend the quiz from another place, there will be QR codes at the event place for users to authenticate.

2.5.5.12. Event Page during Quiz

Figure 18: Event page during the quiz

After authentication, the user can start to play (if the event is started). At this page, the amount of correct and false answers, the number of remaining question are shown. The leaderboard for the event is also listed. There is a countdown to show the amount of time for the next question. The attendees of event can chat among them about questions.

2.5.5.13. Answer Question

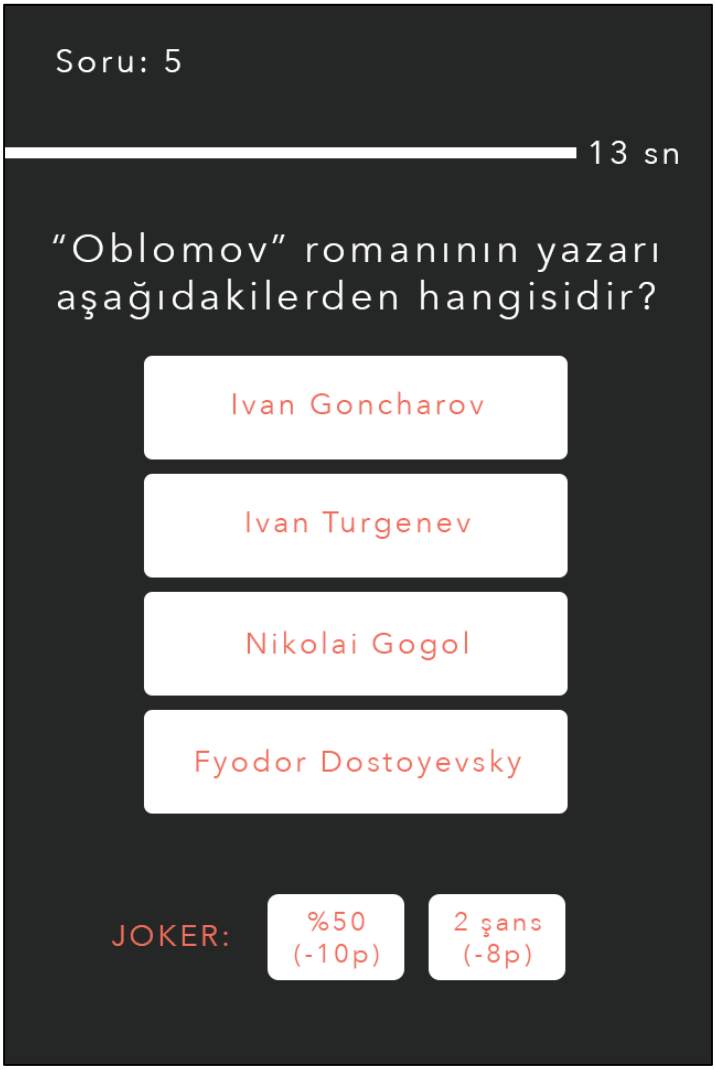

Figure 19: A simple, quiz question example

Every member of the team will answer the questions. They can give the same answer or different. The point of group for that question will be calculated according to all answers given. The point also depends on the amount of time the answer is given. If the user wants to use lifelines, the point will be subtracted.

2.5.5.14. Leaderboard among Groups

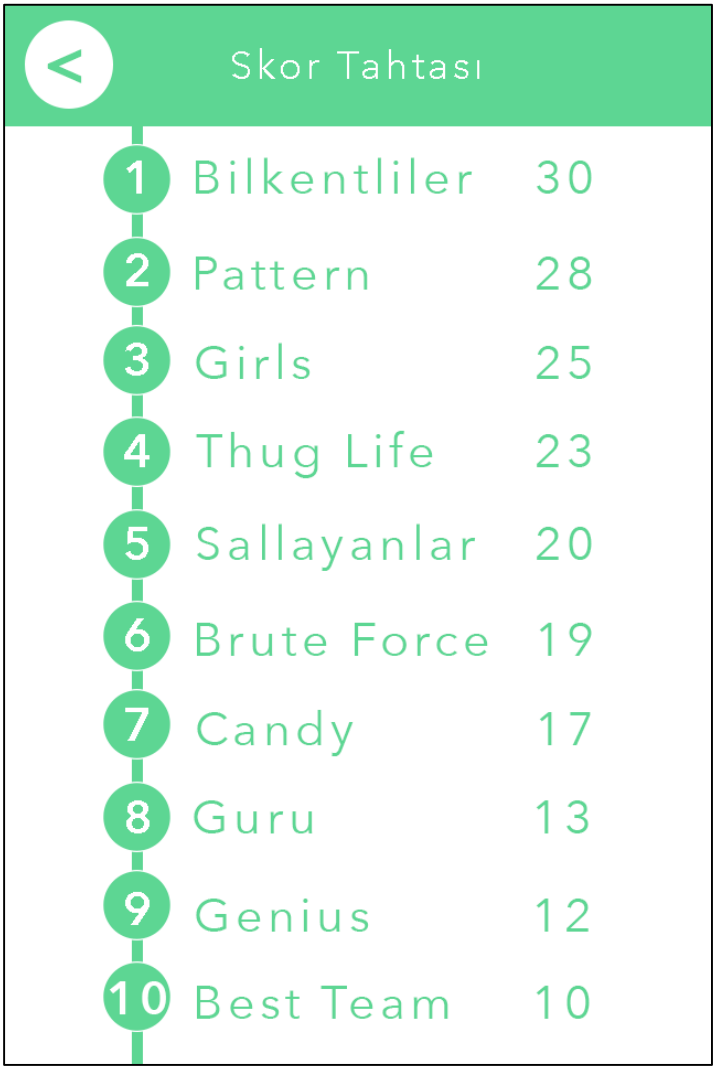

Figure 20: Leaderboard of a specific event

After every question, the scoreboard will be updated according to the answers.

2.5.5.15. Requests to Join the Group

Figure 21: Join requests to a user's team

Team members can accept or decline a request after looking at the profile of that user.

3. GLOSSARY

Event: An event represents a quiz event that is taking place in a specific location (pub, café etc.). It includes information about the quiz event including the start time and the location.

Group: A group (that is formed by a user) represents a group of maximum five users that belongs to a specific event.

Host: Host is the location where an event will take place. A host can be a pub, a café or anywhere public with tables and chairs where people can sit together and solve quiz questions.

Word Blocker: A class (will be written by us) that scans a conversation and censors each word that is registered in its database. The database of the word blocker will be created and maintained by us. The purpose of this class is to censor out insulting and inappropriate words and to help calculate the heat level of a user.

Heat Level: Heat level of a user indicates how often that user uses words that are registered in the word blocker's database. Every time a restricted word is used, the heat level will increase by some amount. After reaching a certain threshold, that user will not be able to chat with anyone for a limited amount of time. Note that the heat level of a user will start to cool down if that user does not use a restricted word.

Rating: User A can rate user B based on how polite user B was to user A. The average rating of each user will be publicly displayed, giving a rough description of how polite each user is.

4. CONCLUSION

GrouPub is a location-based quiz and chat application where users can participate in quiz events hosted at different locations, join various groups formed by other users, socialize, make friends and win different kinds of rewards.

As use case models indicates, after logging in, users have the option to create or join groups once they select an event. Users will also have the opportunity to chat with members of the group they joined or chat with user from other groups to get invited. Group leaders can also see other users that are searching for a group and start a conversation with them. Once the event time comes, users can meet up with their group mates at the specified location and wait for the event to start. Group leaders can also recruit other users that are present at the specified location before the event starts. Once the event starts, users will receive questions at a certain time interval. At the end of the event, the group with the most points wins the event and gets rewarded by the host. In addition, all groups and group members will be recorded in the GrouPub leaderboards. Users can see their or their group's ranking by viewing the leaderboards after the event.

To sum up, GrouPub aims to bring people together, make them form groups and socialize by giving them a reason to do so, which is the quiz event. Even the shiest users will found themselves in a group, trying to win the quiz event.

REFERENCES

[1] PhoneGap Framework Website. Available: http://phonegap.com/

[2] The Java EE: What Are RESTful Web Services? [Online]. Available: https://docs.oracle.com/javaee/6/tutorial/doc/gijqy.html

APPENDIX A

Important Deadlines:

- Project Specifications

  Monday, Oct. 5, 2015

- Analysis Report

  Monday, Nov. 2, 2015

- High-Level Design Report

  Thursday, Dec. 24, 2015

- Low-Level Design Report

  Monday, Feb. 15, 2016

- Final Report

  Thursday, Apr. 21, 2016

- Presentations & Demonstrations:

  Apr. 25 - 29, 2016 *To be announced*