Software Requirements Specification

For Mobile Treasure (Scavenger) hunt application developed by:

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Introduction

The requirements for this project can easily be broken up into two groups; the requirements for the phone and the requirements for the server. Listed below are some commonly used definitions along with the requirement separated by which device they will be run on. The first table contains the requirements for the software that will run on the phone. In the second table are the requirements for the software that will run on the server.

Definitions:

* Mobile device – A mobile phone running Android OS 2.1 or greater.
* Hints – Instructions that will assist the players in finding a QR Code.
* Atypical game ending – This occurs when the game master prematurely ends the game.
* Game stats – The data corresponding to a specific user that contains how long they have been playing the game and how many QR Codes they have found during this current game.
* End game stats – The data corresponding to all users that contains how long it took each player to complete the game and ranking in accordance with who finished first.

Phone Requirements:

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| **Functional Requirement** | **Demonstration Scenario(s)** | **Success Measure(s)** |
| The mobile device **shall** be capable of capturing an image using the integrated camera. | Take a picture using the integrated camera and view the picture after. | If the picture is able to be found and viewed. |
| A mobile device **shall** obtain a 90% accuracy rate while attempting to OCR images containing a version 2 QR Code that has a 0 degree rotation, no tilt for the QR Code, and exhibits good contrast, and the QR Code occupies 50 – 90% of the image. | Process several different images that match the requirements to achieve a sufficient sample size. | If 90% or more of the QR Codes in the pictures are found and able to be read. |
| A mobile device **shall** obtain an 80% accuracy rate while attempting to OCR images containing a version 2 QR Code that has any degree of rotation, no tilt for the QR Code, and exhibits good contrast, and the QR Code occupies 50 – 90% of the image. | Process several different images that match the requirements to achieve a sufficient sample size. | If 80% or more of the QR Codes in the pictures are found and able to be read. |
| A mobile device **shall** obtain a 70% accuracy rate while attempting to OCR images containing a version 2 QR Code that has any degree of rotation, with 45 to 90 degrees of tilt for the QR Code, exhibits good contrast, and the QR Code occupies 50 – 90% of the image. | Process several different images that match the requirements to achieve a sufficient sample size. | If 70% or more of the QR Codes in the pictures are found and able to be read. |
| The mobile device will be able to recognize other versions of QR Codes. | Process an image containing a QR Code that is not version 2. | If the mobile device is able to find a QR Code that is not version 2. |
| The mobile device **shall** not retain an image after the image has been processed. | Fully process an image and make sure that it is no longer referenced in memory or on disk. | If the image which has been processed is no longer on the device. |
| The mobile device **shall** provide a live preview to the user prior to an image capture. | Prepare to take a picture and check to see if the live preview is visible. | If the live preview is visible. |
| The mobile device will display the game stats of the current user. | Navigate to where the game stats can be viewed and view them. | If the game stats are present and viewable. |
| The mobile device may display the game stats of the other players in the game. | Navigate to where the game stats of other players can be viewed and view them. | If the game stats of other players are present and viewable. |
| The mobile device will display the rankings for all players to all players after the game has ended. | End the game and look to see if the rankings for all players are viewable. | If the rankings for all players are viewable after the game has ended. |
| Once the end game has been reached The mobile device will display the end game stats until the app is closed. | End the game and make sure the end game stats are there. Close the app and reopen it to make sure they are gone. | If the end game stats are viewable from the time the game ends to when the app is closed. |
| The mobile device will display the end game stats to all users once the game has ended. | End the game and make sure that each user is capable of viewing the end game stats. | If each user is able to view the end game stats. |
| The mobile device will display the user’s stats while waiting for the end game once a player has found all QR Codes. | Have one user find all QR Codes and make sure only their stats are viewable until the end game. | If only the users stats can be viewed until the end game. |
| The mobile device shall be able to decode version 2 QR Codes. | Provide several examples of the version 2 QR Code and see if the application can decode them. | If the correct data is extracted from the examples. |
| The mobile device will be able to decode other versions of QR Codes. | Provide several different versions for the application to decode. | If the application successfully decodes all versions provided. |
| The mobile device will be able to upload the content of a QR Code to the server to determine if it is the correct QR Code. | Attempt to upload test data to the server. | If the server receives the test data sent by the mobile device. The test data will most likely be found in the server log. |
| The mobile device will be able to download the results of a QR Code test from the server. | Have the server upload both a positive response and a negative response to the mobile device. | If the device receives the test responses in the correct order. |
| The mobile device will display to the user if the QR Code submitted to the server was the correct QR Code. | Have the server upload both a positive response and a negative response to the mobile device. | If the device displays the correct results for the responses. |
| The mobile device will be able to download the hints needed to find the appropriate QR Code from the server. | Have the mobile device download the hints for a QR Code. | Verify that the hints had been successfully downloaded. |
| The mobile device will display the hints for the current QR Code. | Download the hints for the current QR Code. | Verify that the hints shown are associated with the current QR Code. |
| The mobile device will allow the user to register his mobile device with the server. | Register a mobile device with the server. | If the server completes the registration once it has been initiated. |
| The mobile device will display to the user a notification when the game is complete. | Complete the game. | Verify that the notification was displayed. |
| The mobile device will display a notification if the game has ended atypically. | End the game atypically on the server. | Verify that the correct notification was displayed. |

Server Requirements:

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| **Functional Requirement** | **Demonstration Scenario(s)** | **Success Measure(s)** |
| The server will be able to generate QR Codes. | Generate a QR Code. | Use tested software to verify the QR Code was generated properly. |
| The server will generate all QR Codes for a game such that every code is unique to that game. | Create all the QR Codes needed for a game. | Very that the contents of every QR Code is unique. |
| The server will store the QR Code data required for a game. | Create a game including the QR Codes. | Verify that the game data and QR Codes are in the database. |
| The server will store the hints associated with a QR Code. | Create QR Codes and the hints that correspond to them. | Verify that the QR Codes and hints are stored in the database. |
| The server will keep a hint/QR code association. | Create the QR Codes and hints for a game. | Verify that a hint can be associated with the appropriate QR Code. |
| The server will store which QR Codes each user of the game has found. | Have some users find different amounts of QR Codes. | Verify that the server is accurately reporting the proper amount of found QR Codes. |
| The server will notify the mobile devices of how many QR Codes it needs to find. | Process zero or more QR Codes and subtract them from the total. | Verify that the number reported by the server matches the calculated total and that it is successfully uploaded. |
| The server will keep track of how long a player has been playing for. | Start a game to start the time tracking. | Make sure that the server logged when a user started the game. |
| The server will store a unique identifier for each player. | Have several players register for a game. | Verify that each user has a unique Id in the database. |
| The server will allow users to register their mobile device with the server. | Register a mobile device with the server. | If the server successfully registers a mobile user. |
| The server will create a unique path for each user to find the QR Codes. | Start and complete a game while keeping track of the order the QR Codes are found by each player. | If every players path is unique from the other players paths. |
| The server will verify if the user has found the correct QR Code. | Process and upload the wrong QR Code and the right QR Code. | If the provides the correct results for each test. |
| The server will upload the results of QR Code verification to the appropriate user. | Have one user verify a QR Code and make sure the other users don’t get the notification. | If only the user who submitted the test received the results. |
| The server will upload the hints for a QR Code to the user’s mobile device. | Start a game and ensure that the hints are present once the game has been started. | If the hints have been successfully uploaded. |
| The server will allow the game master to create new games. | Create a new game on the server. | If a new game was indeed created. |
| The server will provide an interface for the game master to insert data into the database. | Start a game and begin inserting data into the database. | If the game master has an interface to insert data to the database. |
| The server will allow the game master to log the hints for the QR Codes after the QR Codes have been created. | Start a game and create the QR Codes then enter the hints for a QR Code. | If the game master is able to enter the hints after they have created the QR Codes. |
| The server will not start the game until after all players have registered. | Create a game and register all mobile devices one at a time. | The game doesn’t begin until all mobile devices have registered. |
| The server will allow a game master to end the game atypically. | Create a game and end the game atypically | The game ends atypically and the proper notifications are sent to the users. |
| The server will notify all registered mobile devices when the game has ended. | Cause the game to end. | Verify all mobile users have received the notification. |
| The server will be available to verify QR Codes until the end game phase. | Play a complete game. | The users were able to play a complete game. |
| The server will send a notification to a user of where they placed once the game has ended. | Play a complete game. | Verify that the server sent the end game stats including the rankings. |
| The server will send the end game stats for all users to all registered mobile devices. | Play a complete game. | Verify that each mobile device received the stats for all users. |
| The server will state the finishing time for each user as either the time once they have found all devices or the time at which the game has ended. | Play a game that ended normally and also a game that ended atypically. | Verify that the stop times are the correct times. |
| The game master will be able to reset the server for a new game once a game has ended. | End a game and reset the server. | The server will have reset itself in preparation for the next game. |
| The server will retain all QR Codes and associated hints when the server has been reset. | End a game and reset the server | The server still has all the QR Codes, hints, and hint/QR Code associations in the database. |