Software Requirements Specification
for
Quarto App
Version 1.0 approved
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1. Introduction

1.1 Purpose

The product that this SRS describes is an application that allows the user to play the game Quarto. This application will have many features that will teach players about the game and how to play the game. This application does not currently have a release number and is currently still in development. This application is being made for people who want to enjoy a board game with friends while also maybe learning something about the game they previously did not know. Also a goal of this application is to help teach new players how to play the game.

1.2 Document Conventions

In this document high priority requirements will be bolded.

1.3 Intended Audience and Reading Suggestions

The intended audience for this document is for anyone who is working with this application such as developers, project managers, users, testers, documentation writers, etc. This document contains the reason why this application is being developed and how. It also goes into detail of what the future plans are for this application and what will be added. It will discuss what is needed to use the application and what the application needs in order to function properly for the user. It is recommended that you check the table of contents to find specifically what you are looking for. The best way to read this document is from start to finish. The reason for this is that by reading it all you get a full understanding of the goals and objectives of the application. If you are searching for something specific the table of contents mentioned earlier would be beneficial or just by reading the section names would give you an idea of what is being discussed in that section.

1.4 Product Scope

Our Quarto software has the main goal of emulating all aspects of the board game Quarto, including being able to rotate a board, choose pieces for your opponent, place pieces on the board, and recognize victory conditions. Other important features will include tutorials for new players and beginner ai to allow new players to learn the rules of the game. To keep our

business able to produce high quality games, we will be offering microtransactions to allow players to support our game if they enjoy it, including reskins and recolors of pieces, the board, and backgrounds.

1.5 References

N/A

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2. Overall Description

2.1 Product Perspective

This software will be a self contained game, intended to compete with other board game apps on the market.

2.2 Product Functions

- Allow the board to rotate to 4 viewpoints
- Allow players to choose pieces for their opponent
- Allow players to place the piece chosen by their opponent
- Recognize "4-in-a-row" victory conditions
- Allow players to purchase recolors and reskins for their pieces, board, and backgrounds
- Allow players to select a tutorial, which explains the game rules to the player
- Allow players to compete against beginner ai

2.3 User Classes and Characteristics

There will be several user classes for this application that will be split based on expected desired functionality. An example would be a beginner vs a competitive user. One difference between function of these user classes would be beginner users being hinted to use the tutorial vs experienced players not recieving this indicator. There will also be classes to distinguish between casual and competitive non-beginner users, as well as a class for users who utilize our microtransactions. An example of functionality specific to a paying user would be providing bundled deals on reskins and recolors. While there will be additional prompts and indicators based on user class, there will be no limited functions between users.

To sum, possible user subclasses:
- Beginner user - Prompted to use tutorial, matched with other beginners or beginner ai until they improve.
- Casual user - Prompted to play against beginner ai, matched with beginner ai or other casual players.

- Competitive user - Prompted to play the ranked game mode, matched with casual players or ranked players based on mode.
- Paying user - Offered a bundled deal once per month, matched with casual players or ranked players based on mode.

2.4 Operating Environment

The application will run on the Android 11 platform. The application does not need any other applications to run and has no applications needed to fully function.

2.5 Design and Implementation Constraints

The software will be running in a mobile environment, so low hardware requirements and fitting onto a small screen are important. Language translation options will expand the userbase but also requires minimal text so as to lower translation difficulty. As the software is being developed for android systems, the software must be developed inside an android IDE.

2.6 User Documentation

The application will include a rule page where it covers the rules of the game. Every user will also have the option to complete a tutorial on how to play quarto. This will delivered to the user inside of the application. There will be a button to click, much like a settings button that will bring you to a different screen that explain the rules and how to play.

2.7 Assumptions and Dependencies

The development will be done in an android IDE, however there will be no other dependencies on any external systems.

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3. External Interface Requirements

3.1 User Interfaces

The main goals of the GUI will be clarity and simplicity. Clear, large fonts with few buttons and clickable areas will enable our users to easily identify what they should be doing. As the software will be developed for android smartphones, the screen must be able to be clearly viewed and interacted with on a smaller display.

Main screen:
  - Play button
  - Tutorial button
  - Settings button
  - Shop button

Settings screen:
  - SFX volume slider
  - Music volume slider
  - Language selection

Game screen:
  - Centrally positioned isometric board
  - Change board view arrows - rotate board 90 degrees east or west. Clickable
  - 16 pieces in side trays, 8 on either side of the board

3.2 Hardware Interfaces

Supported types:
  - Desktop/PC with an emulator
  - Android OS
  We will be developing in an Android IDE
The application will use the GPU heavily to process the isometric graphics. The system will also heavily rely on the touchscreen for all inputs.

3.3 Software Interfaces

The only software communication needed for the system would be the installation/download phase at the beginning. The download for the app will be available on the Google Play Store. The system itself would only need a connection to our private servers, however it will be designed to be playable regardless of connection to internet. In the case of an update, a communication between the system and the Google Play Store will be required to receive the update.

3.4 Communications Interfaces

This system will use the built in Google Play Store multiplayer API to communicate all information between players.

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4. System Features

4.1 Quarto board

4.1.1 Description and priority

This feature will fully emulate the quarto board game. This feature will allow for board rotation to 4 viewpoints, allow players

to choose pieces for their opponent, allow players to place the pieces chosen by their opponent, and recognize victory conditions.

Highest priority

4.1.2 Stimulus/Response Sequences

Tapping on a piece will select it

Tapping on a button will give the piece to your opponent

Tapping on a board square will place your given piece

Tapping the ghost button will reduce opacity of the pieces

Tapping board rotate buttons will rotate the board 90 degrees east or west

Placing a winning piece will announce victory

4.1.3 Functional requirements

REQ-1: The system shall allow the user to rotate the board 90 degrees left

REQ-2: The system shall allow the user to rotate the board 90 degrees right

REQ-3: The system shall allow selection of a piece in the side trays

REQ-4: The system shall allow a player to offer their selected piece to their opponent on their turn

REQ-5: The system shall allow a player to place their selected piece on a game square

REQ-6: The system shall reduce piece opacity when ghost mode is selected

REQ-7: The system shall announce victory when 4 matching pieces are placed in a row

4.2 Main menu

4.2.1 Description and priority

Provides player with a menu that allows navigation to all features

High priority

4.2.2 Stimulus/Response Sequences

Tapping a button brings the user to the defined menu

4.2.3 Functional requirements

REQ-1: The system shall include a Play button on the main menu screen that will bring the user to the mode selection screen

REQ-2: The system shall include a Tutorial button on the main menu screen that will bring the user to the tutorial mode

REQ-3: The system shall include a Settings button that will bring the user to the settings screen

REQ-4: The system shall include a Shop button that will bring the user to the shop screen

REQ-5:The system shall include a profile button that will bring you to their profile page

4.3 Mode selection menu

4.3.1 Description and priority

Provides player with a menu that allows selection of 3 different game modes: VS AI, Casual, and Competitive

High priority

4.3.2 Stimulus/Response Sequences

Tapping a button brings the user to the defined mode

4.3.3 Functional requirements

REQ-1: The system shall include a VS AI button that will bring the user to the VS AI game mode

REQ-2: The system shall include a Casual button that will bring the user to the Casual game mode

REQ-3: The system shall include a Competitive button that will bring the user to the Competitive game mode

4.4 Tutorial mode

4.4.1 Description and priority

Teache new players the rules of the game. Each move will be prompted, and users will be locked out of use of

features not currently being showcased.

High priority

4.4.2 Stimulus/Response Sequences

Tapping pieces and buttons as indicated will progress the player through the tutorial

4.4.3 Functional Requirements

REQ-1: The system shall only allow the prompted actions during tutorial mode

REQ-2: The system shall guide the player through all steps of play

REQ-2.1: The system shall indicate how to select a piece for your opponent

REQ-2.2: The system shall indicate how to offer a selected piece to your opponent

REQ-2.3: The system shall indicate how to place a piece offered by your opponent

REQ-2.4: The system shall indicate how to rotate the board to see hidden pieces

REQ-2.5: The system shall indicate how to turn on ghost mode and reduce piece opacity

REQ-2.6: The system shall indicate what a victory condition is and how to obtain it

4.5 Settings menu

4.5.1 Description and priority

Allows the user to select volume and other settings

Medium priority

4.5.2 Stimulus/Response Sequences

Moving the volume slider will adjust volume accordingly

Tapping the language button shall rotate through available languages

4.5.3 Functional Requirements

REQ-1: The system shall allow for volume to be raised

REQ-2: The system shall allow for volume to be lowered

REQ-3: The system shall allow for volume to be muted

REQ-4: The system shall allow for cycling between available languages

4.6 Shop menu
    4.6.1 Description and priority
        Allows the player to purchase recolors and reskins for their pieces, board, and
backgrounds.
        Low priority
    4.6.2 Stimulus/Response Sequences
        Tapping a store item brings the user to a purchase screen
    4.6.3 Functional Requirements
        REQ-1: <TBD>

4.7 VS AI mode
    4.7.1 Description and priority
        Allows the player to play against AI opponents in an offline matchmaking mode. Utilizes
the quarto board
        once matchmaking is complete
        High priority
    4.7.2 Stimulus/Response Sequences
        This feature will automatically load the game's native AI opponent without user input.
Then the feature will
        redirect the player to the quarto board.
    4.7.3 Functional Requirements
        REQ-1: The system AI shall recognize 3 pieces in a row with matching features
        REQ-2: The system AI shall offer random pieces that do not give their opponent a win
condition if available
        REQ-3: The system AI shall offer a winning piece if no other pieces are available

4.8 Casual mode
    4.8.1 Description and priority
        Play the game versus other casual players in an online matchmaking mode. Utilizes the
quarto board once
        matchmaking is complete.
        Medium priority
    4.8.2 Stimulus/Response Sequences
        This feature will automatically match the player with an opponent without user input. Then
the feature will redirect both
        players to the quarto board.
    4.8.3 Functional Requirements
        REQ-1: The system shall put the player into a group of other casual players
        REQ-2: The system shall find an appropriate pair of players
            REQ-2.1: The system shall first look for players with a low ping
            REQ-2.2: The system shall second look for players with similar winrates

4.9 Competitive mode

4.9.1 Description and priority

Play the game versus other competitive players in a ranked online matchmaking mode. Utilizes the quarto board

once matchmaking is complete. Adjusts a hidden rank after each match.

4.9.2 Stimulus/Response Sequences

This feature will automatically match the player with an opponent without user input. Then the feature will redirect

both players to the quarto board.

4.9.3 Functional Requirements

REQ-2: The system shall find an appropriate pair of players

REQ-2.1: The system shall first look for players with similar competitive ratings

REQ-2.2: The system shall second look for players with a low ping

REQ-2: The system shall adjust a competitive rating based on the performance in the previous match

4.95 Profile Page

4.95.1. Description and priority

Check stats on profile page aswell as ranked leaderboards.

4.95.2 Stimulus/Response Sequences

This feature allows players to check on their stats and where they stand compared to other players.

4.95.3 Functional requirements

REQ-1 System will allow user to see stats from all games played on app.

REQ-2 System will allow user to see competitve leaderboards.

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5. Other Nonfunctional Requirements

5.1 Performance Requirements

The system shall not utilize more than 4GB of ram during normal runtime

5.2 Safety Requirements

The system shall abide by COPPA and will only allow account creation by users 13 years of age or older.

5.3 Security Requirements

The system shall hide the user's IP address from malicious users

The system shall hide the user's payment information from malicious users

5.4 Software Quality Attributes

The system shall not crash for the first hour of gametime, 90% of the time

The system shall relay a players move to their opponent within 30 seconds, 99% of the time.

The system shall reach the game screen from launch within 1 minute, 99% of the time.

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6. Other Requirements

N/A

Appendix A: Glossary

Isometric: A 2.5d art style that creates an illusion of 3d by looking at the scene from a diagonal view.

Matchmaking: A system to find opponents of similar skill

Quarto: A board game with 16 unique pieces that are either large or small, dark or light, hollow or solid, and round or square. Players
        take turns selecting pieces for their opponent to place on a 4x4 grid. The goal of the game is to connect 4 of a kind in a row
        by forcing your opponent to give you a winning piece.

Appendix B: Analysis Models

N/A

Appendix C: To Be Determined List

Line 278: Shop menu functional requirements.