Contents

1.Introduction

1a.Overview

The product is a Android application which allows users to play the code breaker game mastermind against each other over a network and offline. Players will sign in using their google play accounts and they will be able to find matches with random people over the network or play against their friends. The product will make use of the existing google play framework and database to enable the networking aspect of the game.

Players will play for 3 rounds in each game. There will be a default of 10 tries to figure out the code and a 4 minute time limit per round. Settings such as time limit and number of tries will be customizable.

Players will have the option for a rematch or quit to main menu after the game is complete. There will be a chat box on screen during the game for both players to communicate while playing.

Players will also be able to play single player against the computer and locally against a friend. In the local game a player will set the code and then allow the other player to crack it on the same phone, like the original board game.

The Android application is being developed because there is a need in the marketplace for a head-to-head game which requires logical thinking and problem-solving. Mastermind is an excellent game to encourage the development of a person's problem solving skills, a set of skills that are crucial not just in the world of computing, but in any walk of life.

1b.Glossary

Mastermind:

A classic board game where 2 players compete against each other. One player sets a coloured code sequence and their opponent must try to guess the code in the allotted amount of guesses. The code breaker is given feedback on their attempts and from this they must use deduction to break the code.

Android:

Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets.

Google Play Services:

Google Play Services is a proprietary background service and API package for Android devices.

2.SystemArchitecture

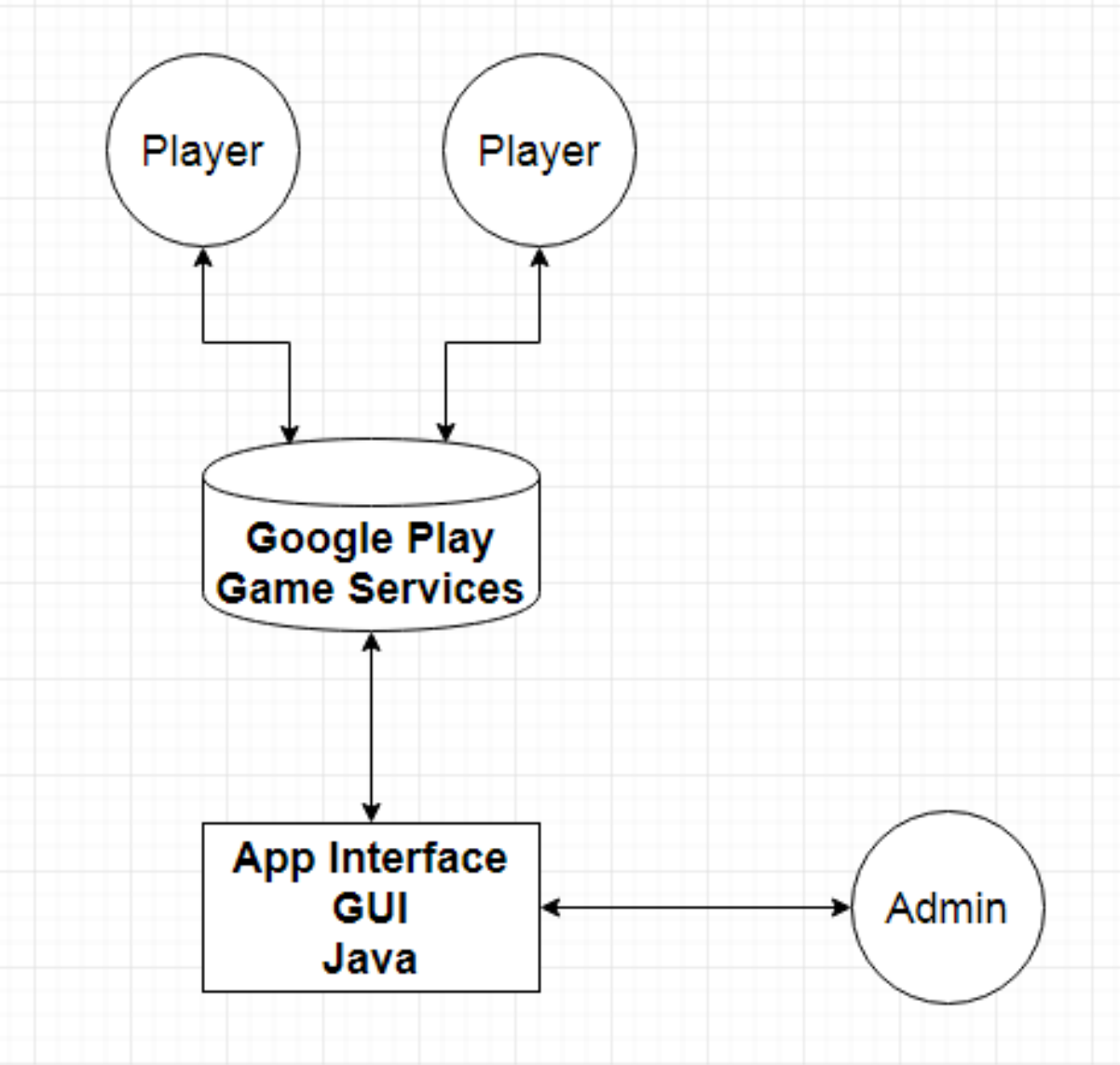

Figure A

3.High Level Design

3a.High Level Design Diagrams

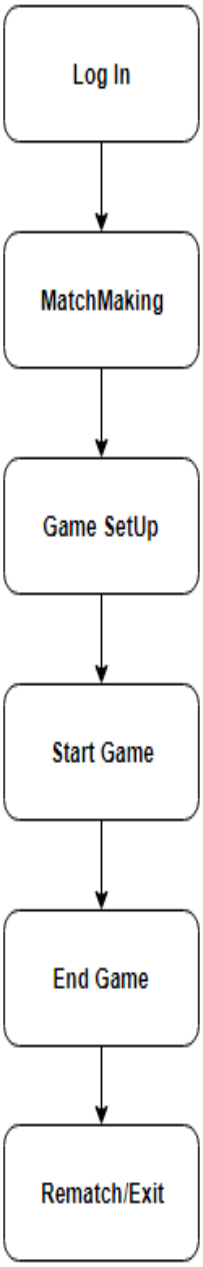

Figure B

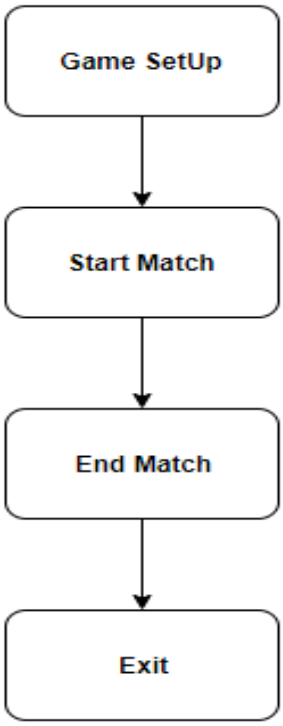

Figure C

3b. High Level Design Descriptions

Descriptions for figure B:

- **1 - Log In**

  Log into your account using username and password.

- **2 - MatchMaking**

  Search for a game and connect both users into a lobby.

- **3 - Game SetUp**

  Create the game based upon settings selected by both players e.g time limit.

- **4 - Start Game**

  Initialise the game and bring both players to the game screen.

- **5 - End Game**

  As the game is completed, bring both players to the end game screen.

- **6 - Rematch/Exit**

  Give both players the choice to have a rematch or exit to the main menu.

Descriptions for figure C:

- **1 – Game SetUp**

  Allow user to set the game settings such as time limit.
- **2- Start Game**

  Initialise the game and bring the player to the game screen.
- **3- End Game**

  As the game is completed, bring the player to the end game screen.
- **4- Exit**

  Exit to the main menu.

4.Problems and Resolutions

Problem: Applying User settings to game board.

Description: Passing the users choices from the game settings page into the gameplay section of the game initilialising the board, proved quite troublesome to at the beginning. We had not coded for Android applications prior to this, which meant it was a steep learning curve.

Resolution: By utilising data holders, we were able to effectively pass user settings into different activities throughout the application, allowing us to create a game session in which the user settings had been applied.

Problem: Incorporating the Google Play Games Services into the application.

Description: We encountered a lot of problems trying to implement Google's API's into our application. It was something we were not familiar with using and it was much more complicated than we had anticipated.

Resolution: As we were making little progress trying to use the API's in our own application we decided to make a very basic sample application that would allow us to grasp the concept and use of this framework. By doing this, we were able to understand how to correctly implement these services and create the networking element of our game.

Problem: Location of the Google Sign In button.

Description: Initially we wanted the user to sign in on the home screen but during our implementation this was proving tricky. We needed to use this user information during our online gameplay but this required us to keep track of user information through activities even if the user played offline.

Resolution: By placing the google sign in button in the online section of the application it allowed us to effectively use the data. It made more sense to have the button located here as it was only required if the user wanted to play online.

Problem: The online game.

Description: The main part of our game was proving to be quite a difficult feature to implement. It was stressful process as there were a lot of errors and times were our code wasn't having the desired outcome, and due to our lack of experience with online android games, the errors were time consuming to solve.

Resolution: By putting the majority of our combined time and effort into the online game we were able to produce and semi functional version of the online game we wanted. Then after a slow but worthwhile process of fixing and streamlining our online game mode we produced an online game mode that we were satisfied with.

5.Installation Guide

To install the "Mastermind" application the following steps must be followed:

1. Go onto the Google Play Store and ensure you are logged in with a valid google play account.
2. Using the search bar, search for "Mastermind".
3. Select the Mastermind application with the following thumbnail.

4. You will be directed to a page displaying our application and all of the relevant information about it. Click the "Install" option.
5. The application will begin downloading in the background. Please wait for the game to completely install.
6. A notification will appear informing you when the application is downloaded and ready to open.
7. The application will be found in the app menu on your device or alternatively a shortcut will be made and it can be found on one of your home screens.
8. Select the Mastermind game on your device and the application will start, ready for you to play.

Software Requirements:

- Android Operating System
- Minimum API level 21

Hardware Requirements:

- An Android Device