FIND & SEARCH WORD GAME FOR LEARNING ENGLISH

By

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A REPORT

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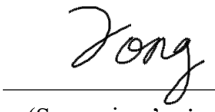

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ABSTRACT

This project is to develop a gamified learning platform based on Android. This Android game is designed to promote responsible gaming and learning behavior. In this month of increasingly advanced technology, smartphones have become a tool used by almost every household. Online gaming has also become a pastime for most young people, especially with the COVID-19 pandemic. When they can't go out, many people choose to pass the time through online games. Games can not only be used to pass time, but can also be used to learn knowledge or stimulate students' interests. Butmany teenagers also recharge money in online games in exchange for what they want. In addition, thetraditional review method uses rote memorization to make students negative and have a negative attitude towards learning. Therefore, we will achieve responsible gaming behavior and enhance students' enthusiasm for learning by adding interesting gameplay, rankings, notification functions for minors not to recharge, different levels of difficulty, different specific themes, etc.

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LIST OF ABBREVIATIONS

RAM	Random-Access
SSD	Solid states drives
GB	Gigabyte
WIFI	Wireless Fidelity
UI	User Interface
API	Application Programming Interface
UX	User Experience

CHAPTER 1 INTRODUCTION

Gamification for learning android games is an online puzzle game. This android game is good for engagement for player interest. The main purpose of Puzzle Game is to help players improve their thinking logic, exercise their brain power, improve their vocabulary and so on through games. In this era full of electronic devices, more and more teenagers are using electronic devices to play online games. As can be seen from Figure 1.1.1, from 2016 to 2021, the number of users using smartphones has increased. Therefore, the increase of smart phone users means that the number of people playing online games will continue to increase [1].

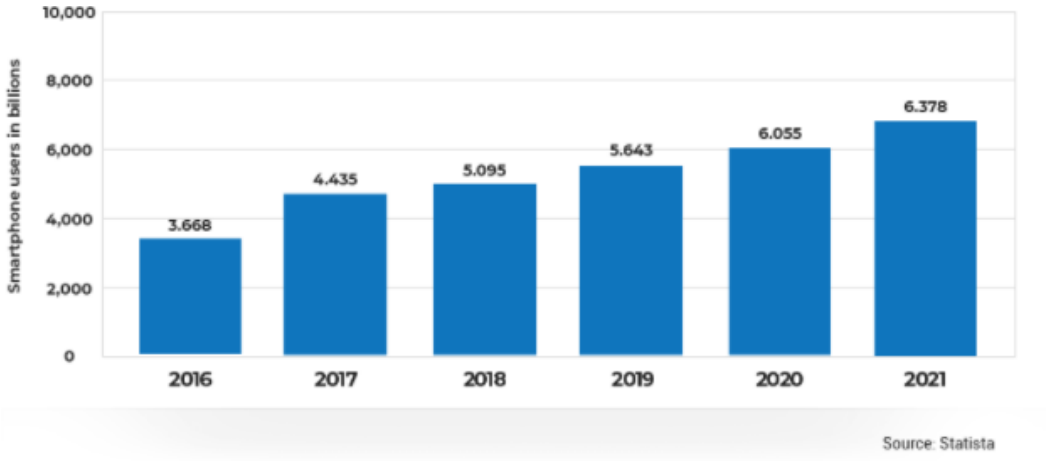


Figure 1.1.1 *The Number of Smartphone Users*

Source: (How Many People Have Smartphones Worldwide (Oct 2021), 2021)

Online games attract players to play games with many fictitious, interesting rules or characters. Players can gain happiness, decompress and relax, and learn all kinds of knowledge by playing online games. Online games can also help players meet many new online friends to increase social skills. But some players will slowly become addicted because they are fascinated by the game.

Currently, there are many online games that focus on gamification of learning. For example, Words Of Wonders, Crossword With Friend and Sudoku. All of these online games provide different ways to improve the user's ability. Help users increase their thinking logic and exercise their brain power. But many producers of online games

are not only for helping users, but also for earning income. Therefore, in many online games, there will be behaviors such as recharging money and spending in the game to obtain characters in the game, customs clearance hint, and so on.

1.1 Problem Statement and Motivation

1.1.1 Problem Statement

Online puzzle game is a good android game for students learning with engagement their interest in learning. As time goes by, online puzzle games not only bring benefits to students, but also bring many negative effects to students. Therefore, we will discuss what online games will bring about negative effects on teenagers.

• Engagement and Motivation in Language Learning

Workbooks, which are common in traditional language learning resources like textbooks, frequently lack any stimulating or compelling content to encourage students to study for a week. Uninteresting learning resources discourage a lot of students from continuing their education, which raises dropout rates and lowers student engagement. Many young people employ digital interactions in today's classrooms. When comparing conventional methods with current technology, it is evident that the former is less effective in igniting pupils' excitement for learning. Gamification-based learning has been shown to dramatically increase students' motivation, which in turn improves learning results [2]. This type of gamified learning not only makes dull and challenging material enjoyable, but it also helps pupils retain the information. Thus, creating learning resources based on games might assist students in offering a more efficient learning experience and increase their learning motivation, which ultimately can effectively improve learning success. Leaderboards can also increase player competition, not only increasing player competition in the game, but also increasing student engagement.

• Effectiveness of Vocabulary Acquisition Tools

The effectiveness of vocabulary acquisition tools is a matter of opinion. The majority of vocabulary learning resources available today are based on memorization. However, rote memorizing frequently requires a lot of time and is devoid of rich contextual frameworks and effective learning strategies. While using this conventional approach can help students retain the material more quickly, over time it will get diluted and forgotten. Furthermore, learners find it challenging to correctly use rote memory in real-world situations due to its traditional manner. Contextual cues and terminology particular to a given category can enhance learning and long-term memory more quickly and efficiently, according to cutting-edge research [3]. For instance, when the contextual signal "the largest land animal" and the animal phrase "elephant" are encountered, they will be reminded of

slowly recall the word. This not only makes it easier for the learner to remember the vocabulary, but also makes the learner understand the vocabulary better. By incorporating leaderboards, you may boost player competitiveness in the game as well as student engagement.

• Recharge games for minors

Game consumption is a very common thing in online games. From figure 1, we can know that in 2020, the total revenue of PUPG, an online game, is more than 2.6 billion US dollars, and it is also the number one game in the world in terms of total revenue that year. Why can the revenue of PUPG be so high? In the (Xuan Cao, 2022) article, the research shows that game designers use multiple psychological effects such as foot in the door effect, ratchet effect, scarcity effect, etc. to make players willing to consume for the game [4]. Especially teenagers are

more likely to be induced to overconsume because they are addicted to games. And overconsumption can lead to households being unable to afford their consumption. For example, some underage children whose families are not well-off will secretly use their hard-earned money to rechargewithout telling their parents because they are addicted to online games, which makes their families unable to afford the consumption.

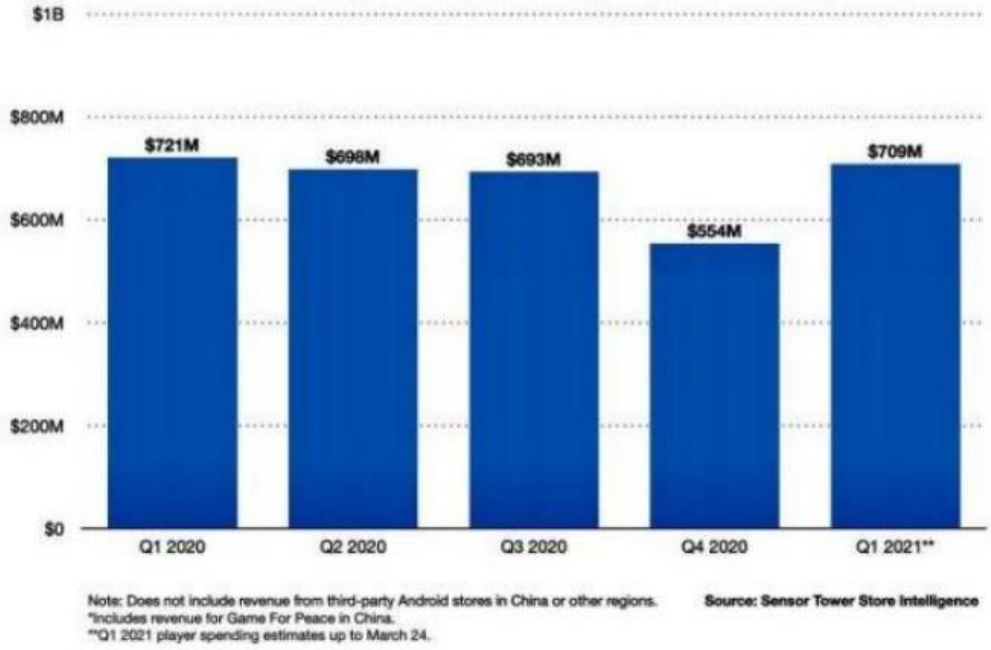


Figure 1.2.1 PUPG Player Spending

Source: (The Applications of Psychological Effects in Game Design and Suggestions for Parents and Teenagers, 2022)

1.1.2 Motivation

At present, gamification learning is conducive to improving students' learning interest and making learning easier. However, learning gamification also faces many problems. In this process, we need to solve three problems.

One of the problems may be addiction to games. Turning learning into a game is helpful for students to promote learning, but the disadvantage is also obvious. The disadvantage is that students are easy to become addicted to games. For those who are addicted to games, they cannot concentrate on their studies, and even waste their studies just to play games. Therefore, many users hope that when learning gamification, games can help students improve their enthusiasm for learning instead ofbeing addicted to games.

In addition, the impact on health is also one of the problems, because long-term exposure to electronic devices can easily cause vision loss, glaucoma, etc. Not only that, but students also who are addicted to games may even be unable to sleep, eat, or take a bath because of playing games, resulting in unbalanced nutrition and lack of sleep. This is a serious issue when it comes to responsible gaming practices. Therefore, parents hope that when students play games, they can play games in a healthy state. A good game not only considers whether the game is good, but also considers users from the perspective of users.

Finally, the game consumption of minors is also a problem that needs to be solved. Because many young students are immature and unable to resist the pleasure brought by the game, and merchants use multiple sales effects to induce students to recharge and consume games. Some even go so far as to defraud their parents' hard-earned money to recharge the game in order to complete the tasks in the game. From a businessman's point of view, profits can be obtained, but for teenagers who are not temperate, it will cause trouble for family and friends. Therefore, parents hope that merchants can restrict the behavior of underage users to recharge games and reduce the behavior of underage consumption indiscriminately.

1.2 Project Objectives

- **Increase Engagement and Motivation**

To boost player motivation and engagement during vocabulary learning, the project employs multiple gamification tactics. For instance, distinct levels are employed via a score system to entice students' passion and accomplishment in language learning. Ratings, for instance, might boost a player's sense of achievement and acknowledgement of their work [5]. Differentiating across difficulty levels can boost learning motivation because they create a sense of progression, enabling players to accomplish a number of goals and learn more along the way. likewise. Furthermore, players' excitement for words can be enhanced via real-time feedback. This is so that in addition to pointing out your errors, real-time feedback may also provide gradual emotional value by congratulating you on finishing the right answer.

- **Develop Enhance Vocabulary Retention**

- This objective improves vocabulary learning by being context- and category-based. Develop vocabulary for specific categories such as animals, fruits, occupations, etc. to guess words, and provide descriptive hints for each word to help use the word as a bridge to long-term memory. For instance, learning is made much easier when the prompt "Tallest animal with a long neck" is added to the term "Giraffe" since it provides contextual cues and aids in categorizing the vocabulary. By continually leveraging players' lexical curiosity, this approach improves learning by encouraging players to logically commit phrases to memory. Current educational research supports the project's goal of improving players' accurate application of learnedlanguage and vocabulary retention [6].

- **Develop an android game that prohibits minors from recharging money and game consumption**

Because the self-control ability of teenagers is weaker than that of adults, it leads to the unrestrained game consumption behavior of underage teenagers. Therefore, this function hopes to reduce minors' addiction to games and indiscriminate consumption by prohibiting minors from recharging money and game consumption. In the (Jordi

Franciscus Gosselt, 2011) article, many countries have introduced age restrictions to keep young people safe from dangerous products [7]. Dangerous products among them include drinking, smoking, potentially negative effects of games, and more. Age restrictions are a bigger step than preventing teens from spending less on games.

1.3 Project Scope and Direction

The project aims to invent an Android game for learning gamification to promote responsible gaming behavior. This Android game allows users to learn in a gamified way while increasing their motivation for the game. This Android game is suitable for middle school students. We will use the following features to enable responsible gaming behavior to play games and increase student engagement in learning.

The first is a specific topic. Specific themes plus contextual cues help players memorize words in an associative way. The second is for users to use it well. Provide friendly UI design to allow players to get started with the game better. Different levels of difficulty are then provided to increase player achievement and learn more vocabulary. In addition, different games such as hangman game and word search game are provided so that players have a variety of choices to learn words more actively. Finally, game consumption by minors is prohibited. This function prohibits underage middleschool students from recharging and spending in games. This function is to reduce the random consumption behavior of underage users. For example, the system will use the date of birth to determine whether the user is an adult. If the user is underage, they will not be able to recharge money and consume games. Through this function, we will be able to play a certain role in protecting minors.

Functionalities in Hangman Game Module:

- Enable players to play games and learn English vocabulary with funning.
- Enable to guess is represented by a row of dashes representing each letter or number of the word.
- Will show the result and give the score to the player to know their English level.

Functionalities in Word Search Game Module:

- Enable players to play games and learn English vocabulary and Grammarly with funning.
- Enable the player to find the word given or hints given in the grid with 8 possible directions horizontally, vertically, or diagonally.
- Enable the player choose different level of difficult.
- Will show the result and give the score to the player to know their English level.

Functionalities in Reminder Module:

- Enable the system to send player a notification under 18 years old not rechargeable

1.4 Contributions

Through this learning game based on responsible gaming behavior, I believe users will have a game that can help them engage their interest in learning. Compared with ordinary puzzle games, this android game is embedded in the system. Some codes are added to make the game better achieve the purpose of responsible gaming behavior. As a result, the ability to perform functions is improved.

1.5 Report Organization

The details of this report's organization are shown in 5 chapters. Chapter 1 is for introduction. Chapter 1 covers the problem statement and motivation, project objectives, project scope and direction, project contributions, and report organizational. Second, Chapter 2 is a Literature review. A literature review is conducted on various existing blockchain land registration systems to evaluate their respective strengths and weaknesses. Third, Chapter 3 describes about system requirements, system design diagram, system architecture diagram, and timeline. Chapter 4 describes thepreliminary work. Finally, chapter 5 is the conclusion of all projects.

CHAPTER 2 LITERATURE REVIEW

2.1 Previous works on Deep Learning

2.1.1 Words of Wonders

Figure 2.1.1.1 Words of Wonders Android Game

Source: (Words of Wonders, 2018)

Words of Wonders is a challenging crossword puzzle where several letters are formed and connected [8]. Words of Wonders was released on April 10, 2018. The name of the game maker is Wordz. Since Words of Wonder was released, the game downloads have exceeded one hundred million. Great World Wonders can also improve users' vocabulary and spelling skills. The gameplay of this game starts with a few letters as unique clues, then the player needs to write and create new words from the few letters by thinking about it. Finally, connect all the words together to complete all the crossword tasks. A game like this game is word collect.

The difference between Words of Wonders and word collet is that words of wonder is to improve the vocabulary and skills of users based on the knowledge of various countries and the wonders of the world, while Word Collect is a game that mainly enjoys word games to let Users can gain more knowledge while playing games. Although the gameplay of these two games is roughly the same, Words of wonder is a game that allows users to learn a variety of vocabulary, while Word Collect is a game

specially created for word game fans. Fun word game. Word Collect is more about enjoying games than learning.

In addition, Words of Wonders and Word Collect have daily challenges to allow users to experience different vocabulary every day. The difference is that Words of Wonders provides a level that players need to reach level 30 to start the daily challenge to improve the success rate of users who can complete the daily challenge level. In Word Collect, you can challenge the daily challenge levels without any restrictions. Then, on the user side, Word Collect game downloads also exceeded one hundred million. This shows that the number of users of the two games is quite large. Finally, both Words of Wonders and Word Collect have the behaviour of recharging money and spending in the game to get hints in the level. The price of in-app purchases or reminders in Words of Wonders ranges from US$0.99 to US$74.99 per item, while Word Collect ranges from RM4.49 to RM909.99 per item.

Strengths:

- Education: Words of Wonders is a program that helps improve users' English vocabulary and language skills. It can effectively improve the player's thinking ability and increase their knowledge of English. Therefore, the game can play a strong educational role.
- Engaging Gameplay: The game offers fun and engaging gameplay that makes it fun and addictive for players to play. But after the player successfully clears each level, especially when successfully overcoming difficult questions, the player will feel a sense of accomplishment and can increase self-confidence.
- Accessibility: Words of Wonders is a game that can be downloaded and played on mobile devices or web browsers, making it very useful to many groups.
- Regular Updates: The game will frequently update new levels and add different challenges so that many players can keep the game fresh for a long time.
- Relaxing: The pressure of this game is less than other games, it is very suitable for casual players to play to relax and relieve stress.

Weaknesses:

- In-App Purchases: The game contains in-app purchases of virtual items and items like many games, which can be a drawback for players who want to avoid spending money on the game.
- Repetitive Gameplay: Although the levels will be updated, the core mechanics of the game's gameplay have not changed significantly. Repeated gameplay for a long time may cause players to feel bored.
- Difficulty Spikes: The difficulty of the game increases as more levels are passed. The increase in difficulty may make players feel frustrated that they cannot pass the level for a long time and reduce interest in the game.
- Limited Social Interaction: Although the game provides social interaction, it is not powerful, which may weaken the experience for gamers who like to compete with other players.
- Advertising: Although the game is free, it has many advertisements to interrupt players from playing the game, which can lead to some players having a diminished experience of the game or even not wanting to continue playing the game.

2.1.2 Crosswords With Friends

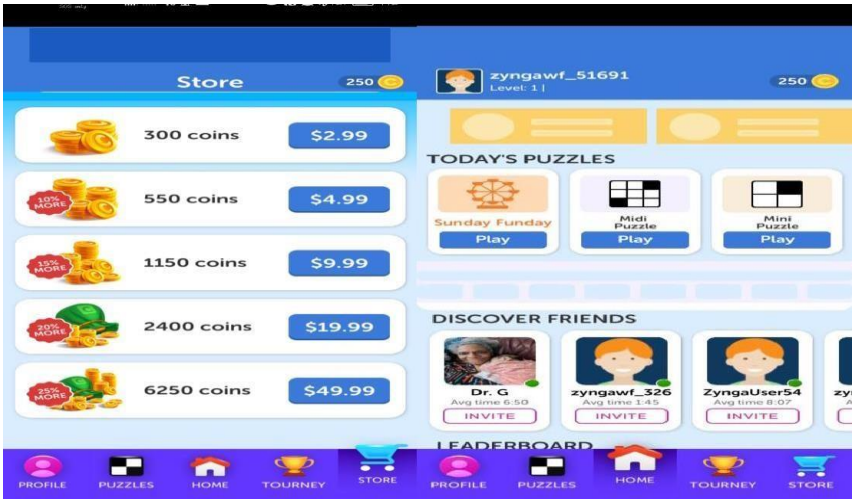


Figure 2.1.2.1 Crossword With Friends Android Game

Source: (Crossword With Friends, 2017)

Crosswords With Friends is a crossword puzzle game that tests your brain. The game was released on March 3, 2017, and the game downloads exceeded one million [9]. Crosswords With Friends is mainly tested on topics related to entertainment, pop culture and sports news. The gameplay of the game is to use a short sentence as a prompt to let the player guess what vocabulary it is. The game hopes that players can help players exercise their brains and increase their vocabulary through continuous thinking and exercise. A similar game to Crossword With Friends is English Crossword Puzzle.

The gameplay of English Crossword Puzzle is similar to that of Crossword With Friend, but the difference between the two is that the difficulty of English Crossword Puzzle is biased towards the easy level of English learners. The levels of English Crossword Puzzle are divided into simple, normal, hard, etc. and there is no special theme. English Crossword Puzzle will pale in comparison to Crossword With Friend's entertainment, pop culture, and sports news-related themes. That's because Crossword With Friend has different themes for players to enjoy, and the game introduces a new unique and fun theme every day. In this way, players will not lose their desire to play the same theme of their game for a long time.

In addition, one of the most obvious differences between Crossword With Friend and English Crossword Puzzle is interactivity. Crossword With Friend provides rankings to allow users to compete with friends to stimulate users' mentality to play

games. The English Crossword Puzzle does not provide user rankings for users to compete with friends.

However, these two games are more time-consuming than ordinary puzzle games. In terms of users, the game downloads of English Crossword Puzzle also exceeded one million. Finally, in terms of consumption, Crosswords With Friends is from RM4.49 to RM269.99 per piece and English Crossword Puzzle is from RM3.99-RM42.99 per piece. English Crossword Puzzle will be cheaper by comparison.

Strengths:

- Social Interaction: Crossword With Friends is a multiplayer game that offers interactivity. Multiplayer games not only allow players to interact but also compete to improve their puzzle-solving abilities.
- Daily Puzzles: The game offers daily challenges to increase interest in the game and keep players engaged.
- Varied Difficulty Levels: The game caters to beginners and enthusiasts by offering puzzles of varying difficulty. This ensures that a wide range of players of varying skill levels can be dealt with. So the setting offers great appeal.
- In-App Purchase: While the game's in-app purchases may be a bad experience for some players, some players can use purchase tips to help them better solve some of the challenging puzzles. This allows them to enhance the gaming experience.

Weaknesses:

- Limited Gameplay Variety: Compared with other games, this game mainly offers crossword puzzles, so the variety in terms of gameplay will be relatively weak.
- Connectivity issues: The game offers real-life multiplayer play with friends or opponents over the Internet, but may be unfriendly to players in poor network areas.
- Limited learning Curve: Compared to other games, the crossword game is more traditional, so players looking for novelty and variety will find this game less challenging.

- Advertisements: This game is like many free mobile games. Although it is free to download, it cannot avoid having many advertisements to interrupt players from playing the game. This will cause some players to have a weakened experience of the game or even not want to continue playing the game.

2.1.3 Sudoku Puzzle Game

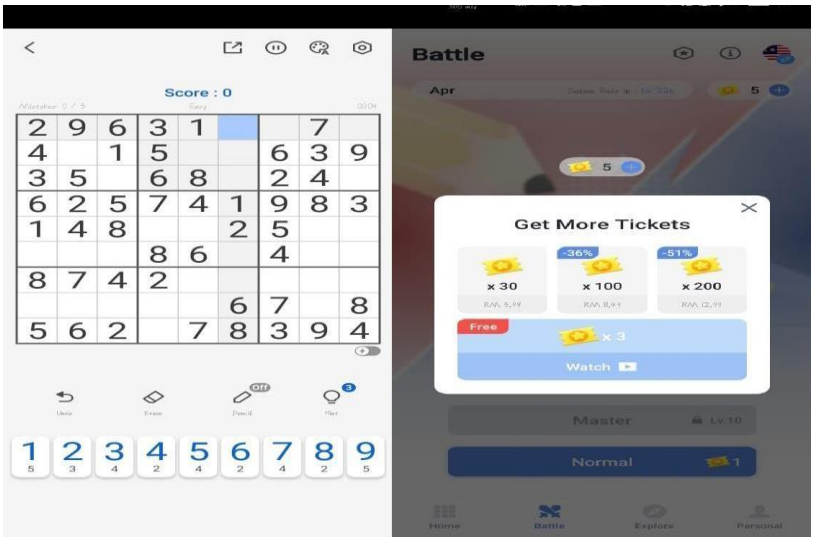


Figure 2.1.3.1 Sudoku Puzzle Game Android Game

Source: (Sudoku Puzzle Game, 2018)

Sudoku Puzzle Game is a very popular and addictive brain puzzle game. Sudoku is a game suitable for helping users exercise their brain power, improve logical thinking and memory, and kill time. The game was released on July 27, 2018, and the game's downloads exceeded five hundred million, making it very popular [10]. The gameplay of the game puts the numbers 1-9 into each grid cell, but in each row, column, and mini grid, the numbers 1-9 cannot be repeated and can only appear once. It is considered successful when the above conditions are met. Because its games are very interesting, it is also very popular all over the world, and many people even become addicted to playing it. And the similar game to Sudoku Puzzle Game is Number Puzzle Game. Number Puzzle Game is also a classic and addictive sliding puzzle game. Number Puzzle Game is played by arranging a sequence of randomly numbered blocks.

Both Sudoku Puzzle Game and Number Puzzle Game need more time to solve the puzzles, so once the player starts the game, it takes a certain amount of time to solve the puzzles. Staring at electronic products for a long time will cause damage to the player's eyes. To protect players' eyes, Sudoku Puzzle Game provides a dark mode to reduce the damage of electronic products to players' eyes. But Number Puzzle Game does not have this function. Finally, in terms of consumption, Sudoku Puzzle Game is priced at RM3.99 per piece and RM83.99.

Strengths:

- Mental Exercise: Suduko is a great mental exercise game because it requires players to use logical reasoning and critical thinking to help them solve puzzles. So it can play a very good role in exercising the brain.
- Accessibility: Suduko games are suitable for a wide range of players due to the easy gameplay of the game.
- No Time Pressure: Suduko games rarely have a time limit compared to many time-limited games. The lack of a time limit will greatly reduce the stress on the player and allow players to play the game easily and stress-free.
- Minimal Ads: To increase the user experience and the interference of advertisements to players, the game only provides a small amount of advertisements to keep players enthusiastic about the game.

Weaknesses:

- Lack of Innovation: Suduko is a simple game with limited rules, so it lacks variety and innovation in gameplay compared to complex puzzle games.
- Solo Experience: Compared to other multiplayer games, Suduko is a single-player game due to the lack of being able to interact and compete with other players. This may cause players to reduce interest in the game.

- Limited Replayability: Due to the limited rules of this game, there are relatively few changes in the gameplay. For players who like innovation and constant change, repetitive gameplay can be boring for players.
- Learning Curve: Although the gameplay of this game is simple, it is challenging, so it may be difficult for many novice players.

2.2 Limitation of Previous Studies

Type of systems / Feature and Characteristic	**Words Of Wonders**	**Crossword With Friend**	**Sudoku Puzzle Game**
Degree of difficulty	Normal	Hard	Hard
Time Spending for flaying one round game	Low	High	High
Number of game downloads	More than 100 million	More than 1 million	More than 50 million
Interaction with other player	High	High	High
Provide game consumption function	✓	✓	✓
Provide different type game	✗	✗	✗
Able to help users improve their knowledge or personal abilities	✓	✓	✓
Provide dark mode	✗	✗	✓

Table 2.2.1 Limitation of Previous Studies

2.3 Proposed Solutions

The first solution to solve game addiction is to provide a notification message function to notify the user and the user's parents when the user has played for a certain amount of time. In this way, users will reduce the number of users who do not know how long they have played because they are too addicted to the game. Notifying the user's parents can help some users with poor self-control. This is because when a user with poor control ability is addicted to the game and cannot extricate himself, the parents can promptly prohibit the addictive behavior of the game through the notification. In this way, the chances of users becoming addicted to the game can be reduced.

In addition, provide the function of limiting the duration of playing games or prohibiting players from playing games for a long time. Since excessive game play will cause damage to the player's personal health and physical and mental health, this function hopes to create a game that prohibits the player from continuing to play the game when the player has played the game for a certain period of time to reduce the damage to the player. It will help the user to play the game for a long time or excessively.

Finally, developers can add age-restricted features on top of game consumption. The behavior of adding age restrictions is for underage users who cannot recharge or consume in the game. This is because many underage users will easily recharge the unbreakable levels of the game to get hints to pass the level due to addiction. This function also hopes to reduce the burden of minors spending their parents' money.

CHAPTER 3 PROPOSED METHOD/APPROACH

Methods

The process of the project is divided into different development phases, namely strategy, analysis, and planning, UI/UX design, android game development, testing and deployment. Start defining use cases and functional requirements for the application. Also, UI/UX design started designing functionality for mobile apps. Furthermore, application development is about defining the technical architecture. This means starting to integrate backend, frontend, and API. Apart from that, the testing step is to test the stability, usability, and security of the application. Finally comes deployment, which is the step of publishing the mobile application to the Play Store.

This find & search word game for learning English mobile application, as a model, will use the methodology prototype model. By collecting the feedback survey from the user after the phase has been done, it helps us can analyze and know the problem of our application. Then make improvements or enhancements based on the feedback survey. Since the game has a large number of user interactions and complex user interface systems, the prototype model is a suitable design for the game. It allows for more flexibility at the beginning of the layout to identify problems and missing features more quickly. This model can therefore meet new requirements relatively easily, making customers more comfortable and satisfied.

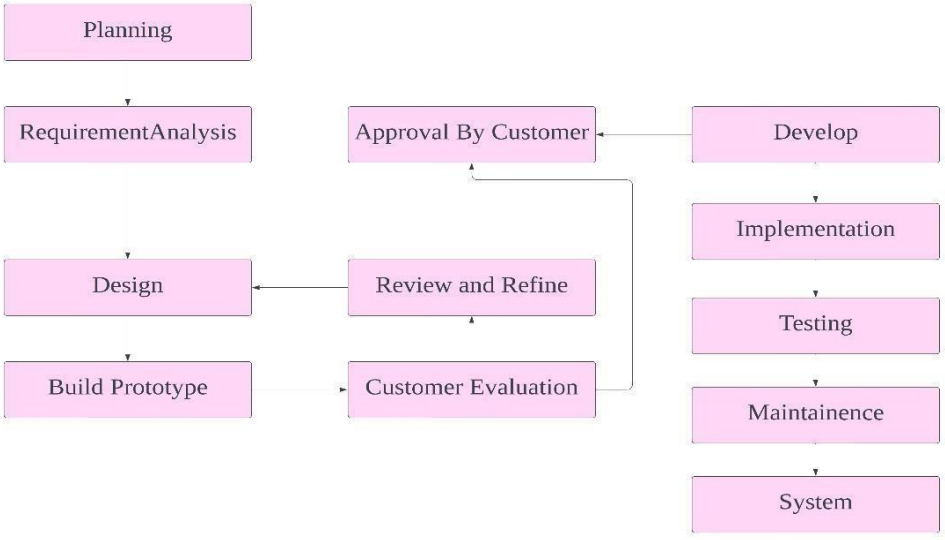


Figure 3.1 Prototype Methodology Model

First phase: Requirement Gathering (Planning)

In this phase, we need to analyze the needs and define the requirements. In this method, we will conduct a questionnaire to the players to determine their requirements and expectations for the program.

Second phase: Quick Design

The second phase begins with the preliminary design. A basic design is provided at this stage, not a complete design. But it will help us to have a quick overview while developing the prototype.

Third phase: Build a Prototype

Phase 3 begins, where we start prototyping and quickly complete a small low-level working model.

Four phases: Initial player evaluation

The fourth phase begins with the initial testing of the initial prototype. Then collect user feedback and suggestions through questionnaires.

Five phases: Refining prototype

At this stage, we will analyze improve, and increase based on player feedback and suggestions. After the changes are made, the final application is created.

Six phases: Implement Application, Testing, and Maintain

After the final application development, start comprehensive testing and maintenance. Finally, complete the real complete application.

3.1 System Design Diagram

3.1.1 System Architecture Diagram

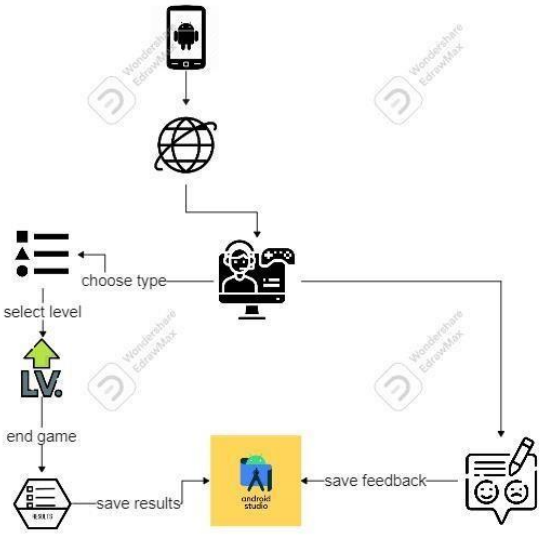


Figure 3.1.1.1 *System Architecture Diagram*

3.2.1 Overall Use Case Diagram of Find & Search Word Game For Learning English

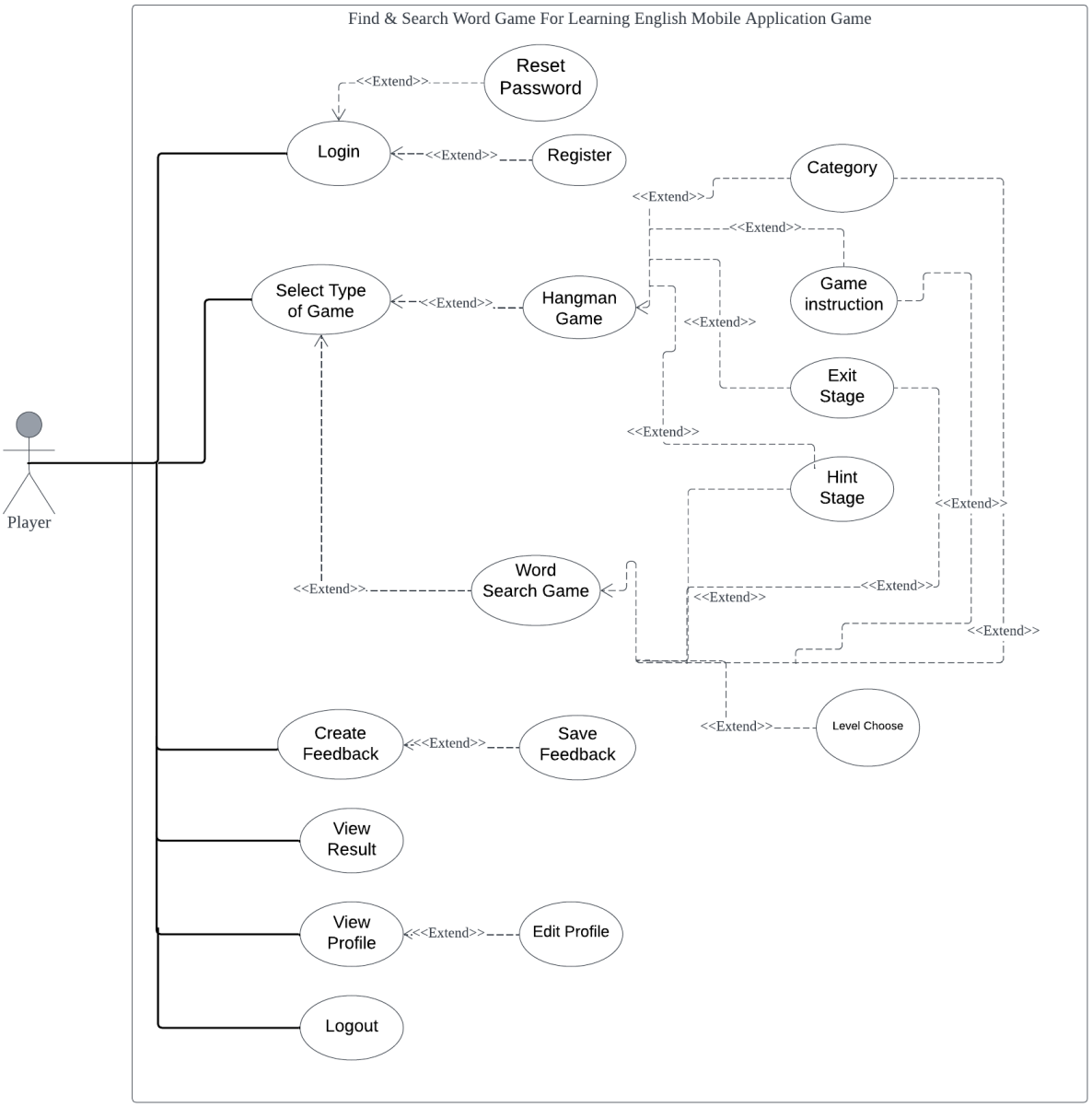


Figure 3.2.1 *Overall Use Case Diagram*

3.2.2 Login Module

3.2.2.1 Use Case Description- Login Module

Use Case Name: Player Login	**ID:3**	**Importance Level:** High
Primary Actor: Player	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Player – intends to access his or her game account.		
Brief Description: This use case provides guidance on controlling user account login procedures.		
Trigger: User wants to login to the game main page **Type:** External		
Relationships: Association: Player Include: Enter email and password, parent name, phone number Extend: Reset password Generalization:		
Normal Flow of Events: 1. Player enter the email and password. 2. The system will validate the email and password. 3. The system will login success and access to the home page		
Sub Flows: -		
Alternative/Exceptional Flows: 1a. If player forgot password, click forgot password. 2a. Failed to log in to home page. (Incorrect information entered) 2b. If verify fail, system will display “Please enter valid password and email” message.		

Table 3.2.2.1.1 *Use Case Description for Login Module*

3.2.2.2 Activity Diagram- Login Module

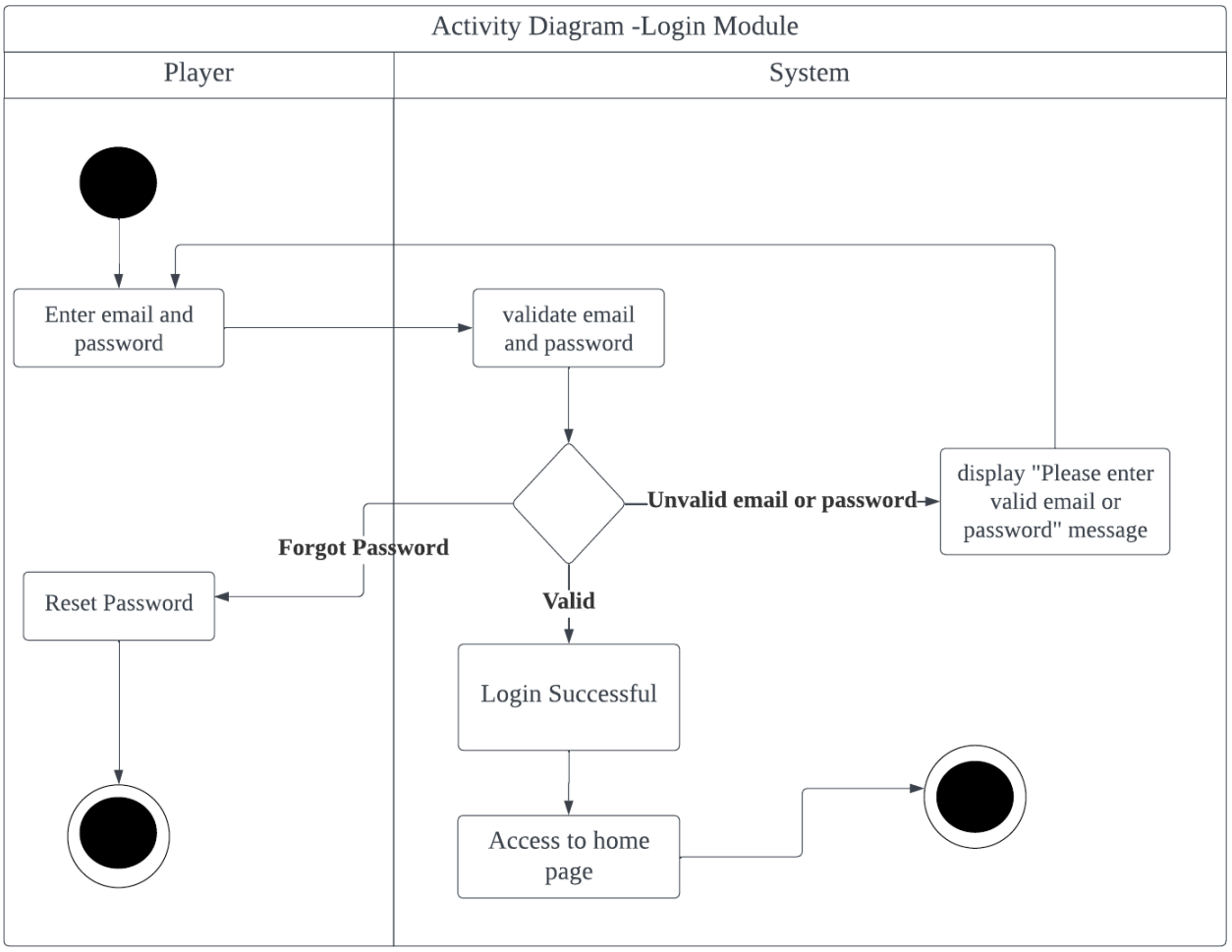


Figure 3.2.2.2.1 *Activity Diagram for Login Module*

3.2.3 Register Module

3.2.3.1 Use Case Description – Register Module

Use Case Name: Sign up for new account	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Player – intends to sign up for new account.		
Brief Description: This use case explains how to manage the registration process for new account.		
Trigger: Player want to using a mobile application. **Type:** External		
Relationships: Association: Player Include: Complete the gmail, password, user name and date of birth Extend: Generalization:		
Normal Flow of Events: 1. Player register a new account. 2. Player must fill in all personal form email and password. 3. Player also need to fill in the user name and date of birth. 4. Player will receive the verify email. 5. Player need click the verify message. 6. The system will verify the email. 7. If verify success, the system will display success message and save the data into firebase.		
Sub Flows: -		
Alternative/Exceptional Flows: 7a. If verify fail, system will display “verify unsucessfully” message.		

Table 3.2.3.1.1 *Use Case Description for Register Module*

3.2.3.2 Activity diagram- Register Module

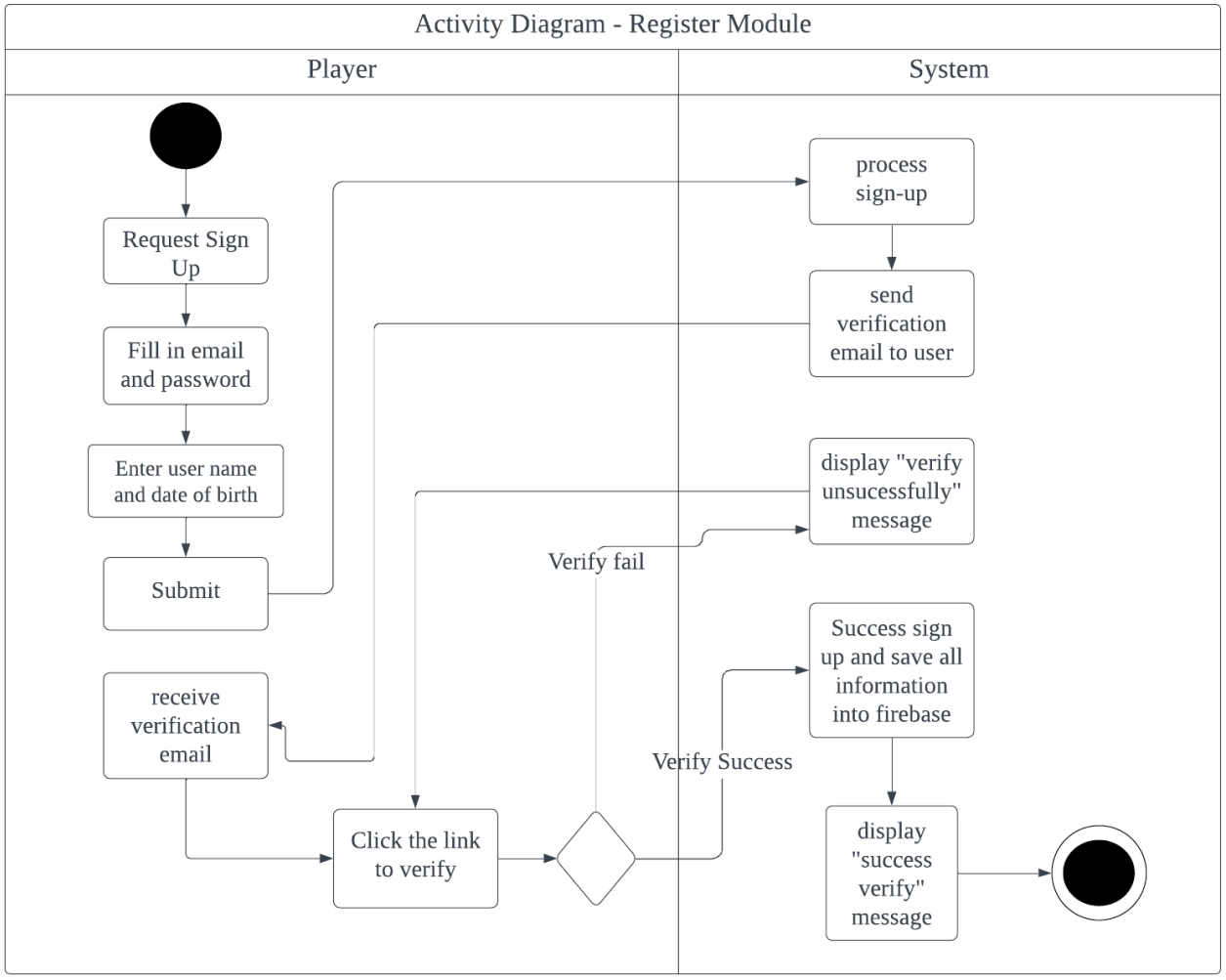


Figure 3.2.3.2.1 *Activity Diagram for Register Module*

3.2.4 Forgot Password Module

3.2.4.1 Use Case Description - Forgot Password Module

Use Case Name: Reset Password	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – reset or change the account's password		
Brief Description: This use case explains how to manage reset password process for player's account.		
Trigger: Player want to reset or change the password of his account. **Type:** External		
Relationships: Association: Player Include: Enter email Extend: Generalization:		
Normal Flow of Events: 1. Player need enter the email. 2. System will send the link to player email. 3. Player can click the link to reset the password. 4. The system will save and update new password in firebase. 5. The system will display "reset successfully" message.		
Sub Flows: -		
Alternative/Exceptional Flows:		

Table 3.2.4.1.1 *Use Case Description for Forgot Password Module*

3.2.4.2 Activity Diagram – Forgot Password Module

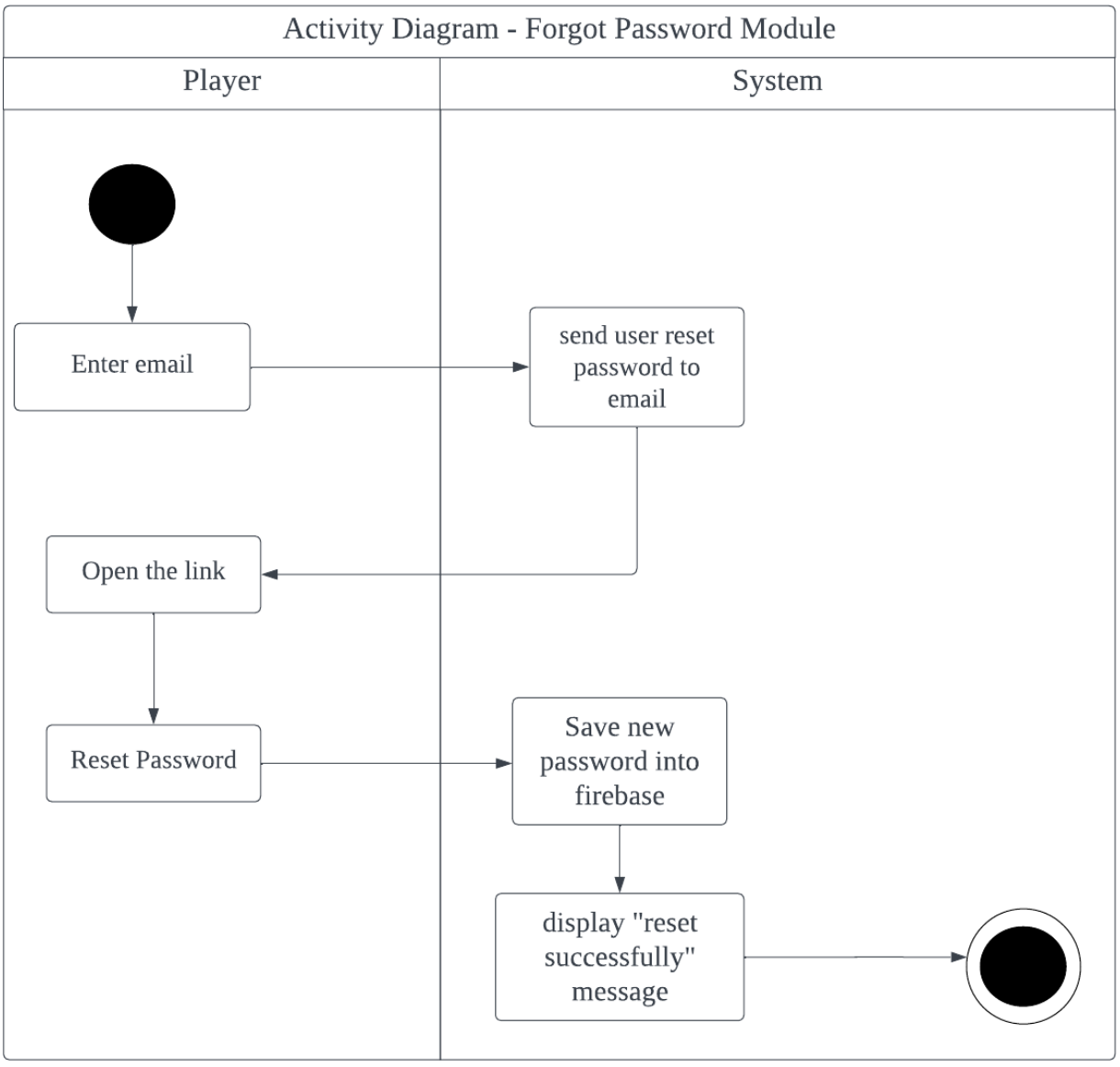


Figure 3.2.4.2.1 *Activity Diagram Forgot Password Module*

3.2.5 Game Page

3.2.5.1 Use Case Description – Game Module

Use Case Name: Game Started	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – choose and start the game		
Brief Description: This use case explains how to choose and start the hangman game.		
Trigger: Player want to select type of game and start the game **Type:** External		
Relationships: Association: Player Include: Extend: Choose the type of game Generalization:		
Normal Flow of Events: 1. Player can choose the type of game. 2. Player can choose the categories or level of game. 3. The system will display the game player choose.		
Sub Flows: -		
Alternative/Exceptional Flows:		

Table 3.2.5.1.1 *Use Case Description for Game Page Module*

3.2.5.2 Activity diagram – Game Page Module

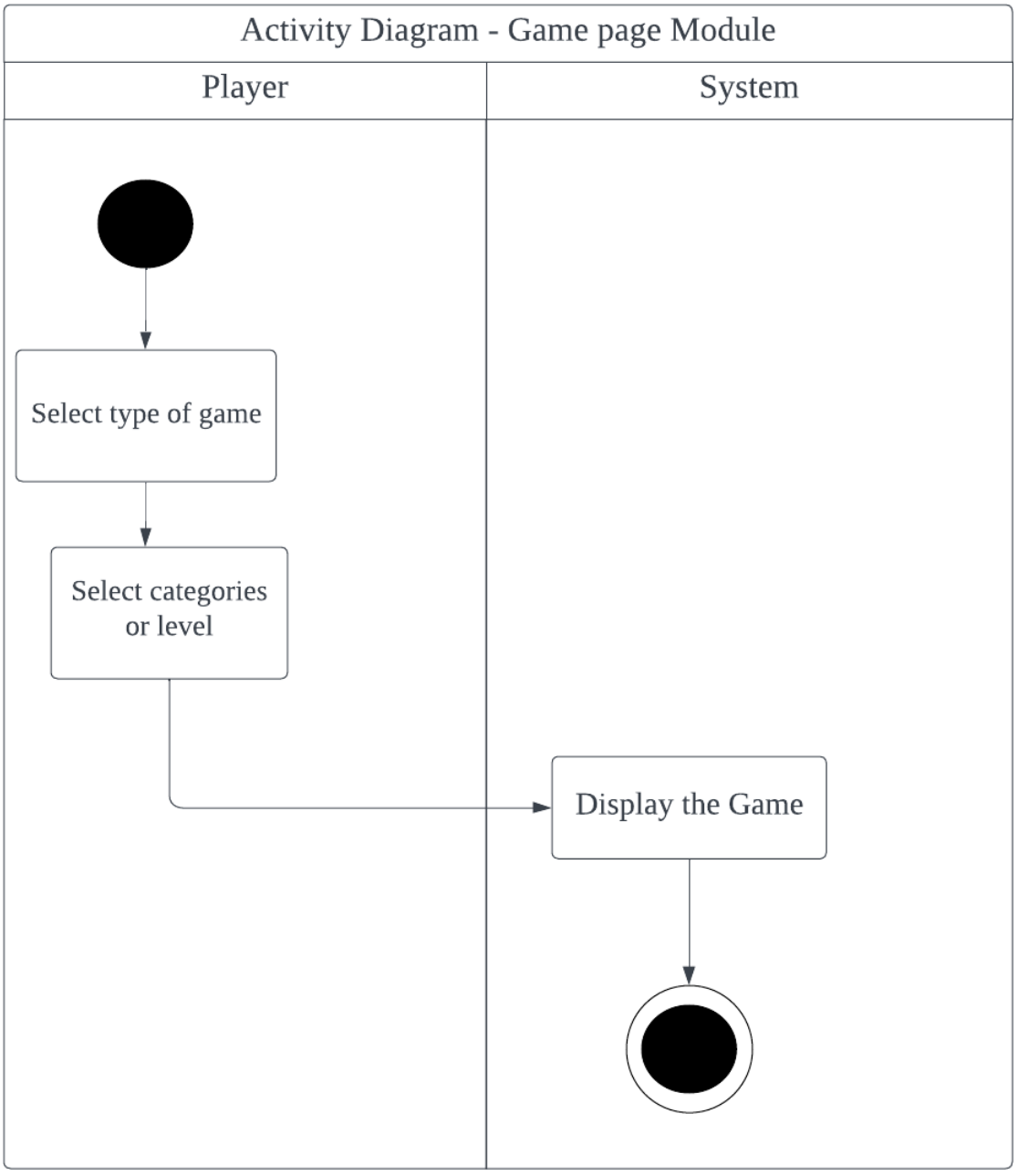


Figure 3.2.5.2.1 *Activity Diagram for Game Page Module*

3.2.6 Result Page Module

3.2.6.1 Use case description – Result Page Module

Use Case Name: Result Show	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – see the result		
Brief Description: This use case explains how to see the result when end of the game.		
Trigger: Player want to see the result **Type:** External		
Relationships: Association: Player Include: Extend: Generalization:		
Normal Flow of Events: 1. System will display the result when end of the game. 2. System will save the result automatic. 3. Player can press back button to home page.		
Sub Flows: -		
Alternative/Exceptional Flows:		

Table 3.2.6.1.1 *Use Case Description for Result Page Module*

3.2.6.2 Activity Diagram – Result Page Module

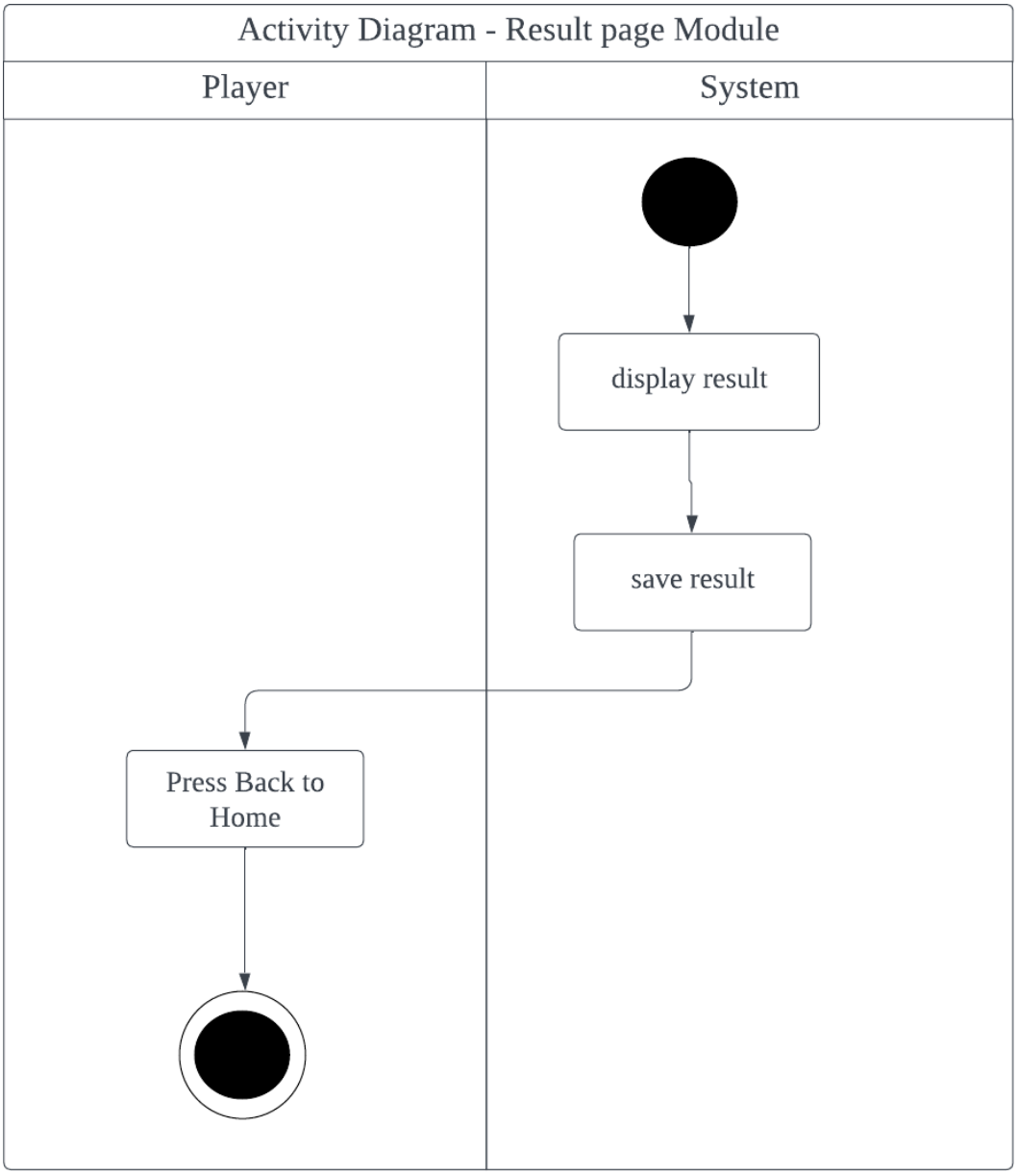


Figure 3.2.6.2.1 *Activity Diagram for Result Page Module*

3.2.7 Hangman Module

3.2.7.1 Use Case Description - Hangman Module

Use Case Name: Hangman Game	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – start playing the hangman game.		
Brief Description: This use case explains how to the process of playing hangman game.		
Trigger: When user start playing hangman game **Type:** External		
Relationships: Association: Player Include: Extend: Generalization:		
Normal Flow of Events: 1. Player select the categories of hangman game. 2. System will display the game. 3. Player guess the word. 4. If guess correct, the system will display next question and user need to guess again with keeping the error mistake from previous question. 5. If done guess all question, system will display done all word success message to user. 6. Show and save the result into firebase.		
Sub Flows: -		
Alternative/Exceptional Flows: 4.1 If guess wrong, the system will save the result into firebase. 5.1 If guess wrong, the system will save the result into firebase.		

Table 3.2.7.1.1 *Use Case Description for Hangman Game Module*

3.2.7.2 Activity Diagram – Hangman Game Module

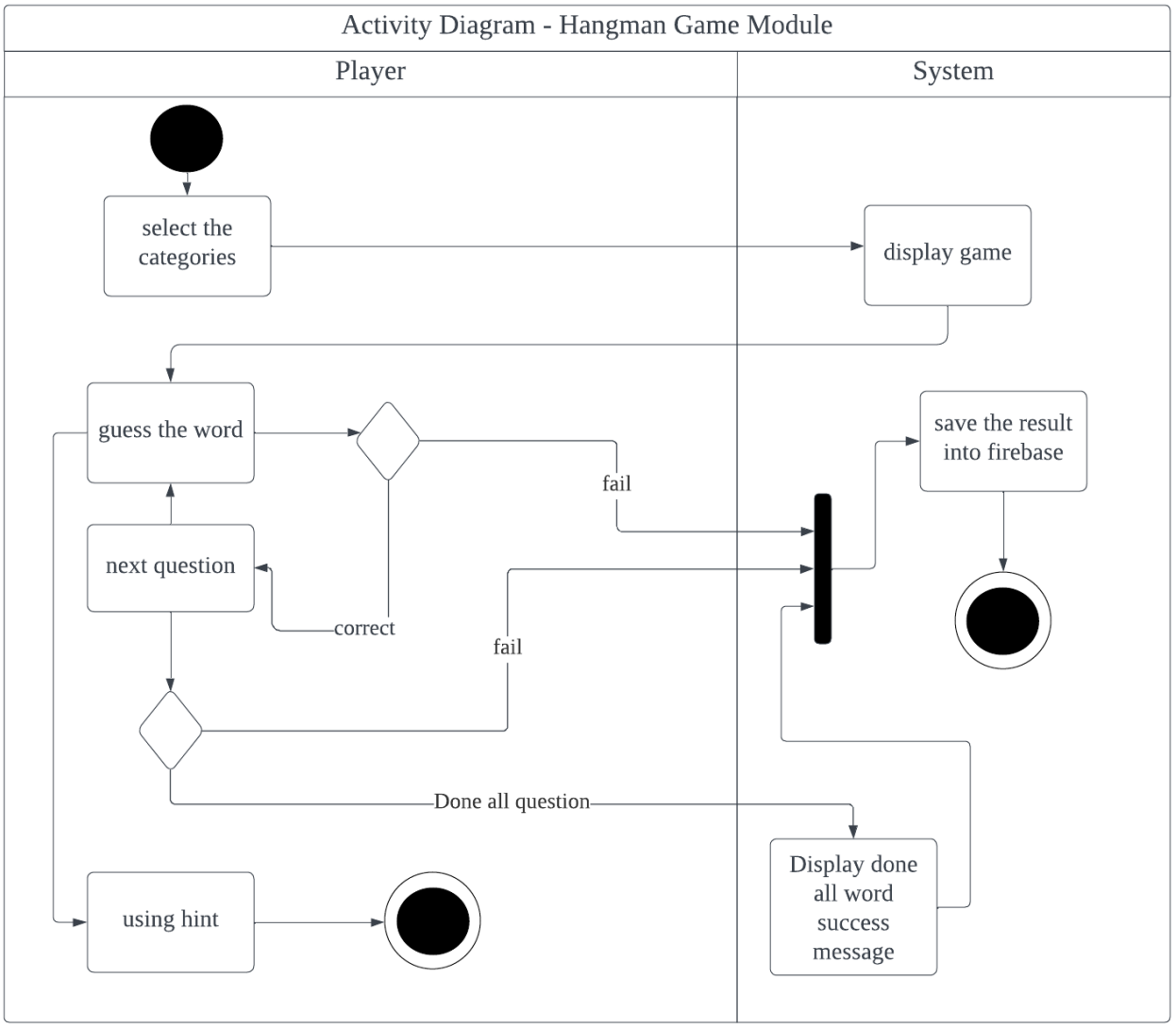


Figure 3.2.7.2.1 *Activity Diagram – Hangman Game Module*

3.2.8 Word Search Game Module

3.2.8.1 Use Case Description – Word Search Game Module

Use Case Name: Word Search Game	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – start playing the word search game.		
Brief Description: This use case explains how to the process of playing word search game.		
Trigger: When user start playing word search game **Type:** External		
Relationships: Association: Player Include: Extend: Generalization:		
Normal Flow of Events: 1. Player select the level of word game. 2. Player select the categories of word search game. 3. System will display the game. 4. Player find the hidden word. 5. If success find all the hidden word, the system will display done finding all word success message. 6. Save the result into firebase.		
Sub Flows: -		
Alternative/Exceptional Flows: 5.1 If fail finding all the hidden, the system will display the unsuccess message to player.		

Table 3.2.8.1.1 *Use Case Description for Word Search Game Module*

3.2.8.2 Activity Diagram – Word Search Game Module

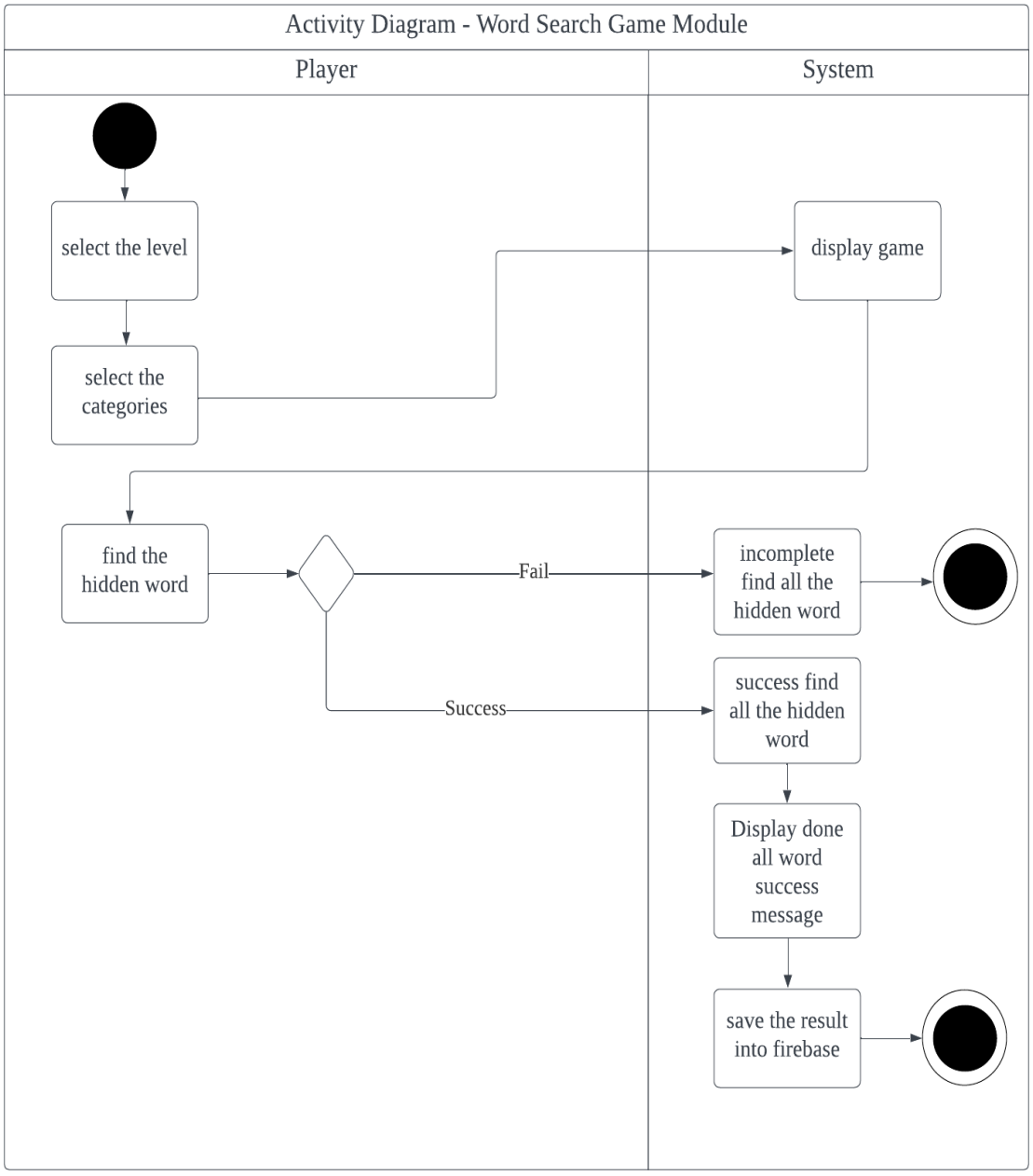


Figure 3.2.8.2.1 *Activity Diagram – Word Search Game Module*

3.2.9 Hint module

3.2.9.1 Use Case Description – Hint Module

Use Case Name: Hint	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – get hint for the hangman or word search game.		
Brief Description: This use case explains how player using the hint function.		
Trigger: When player click the hint button **Type:** External		
Relationships: Association: Player Include: Extend: Click hint Generalization:		
Normal Flow of Events: 1. Player can click the hint button. 2. System will display one random answer for hangman or word search game.		
Sub Flows: -		
Alternative/Exceptional Flows:		

Table 3.2.9.1.1 *Use Case Description for Hint Module*

3.2.9.2 Activity Diagram – Hint Module

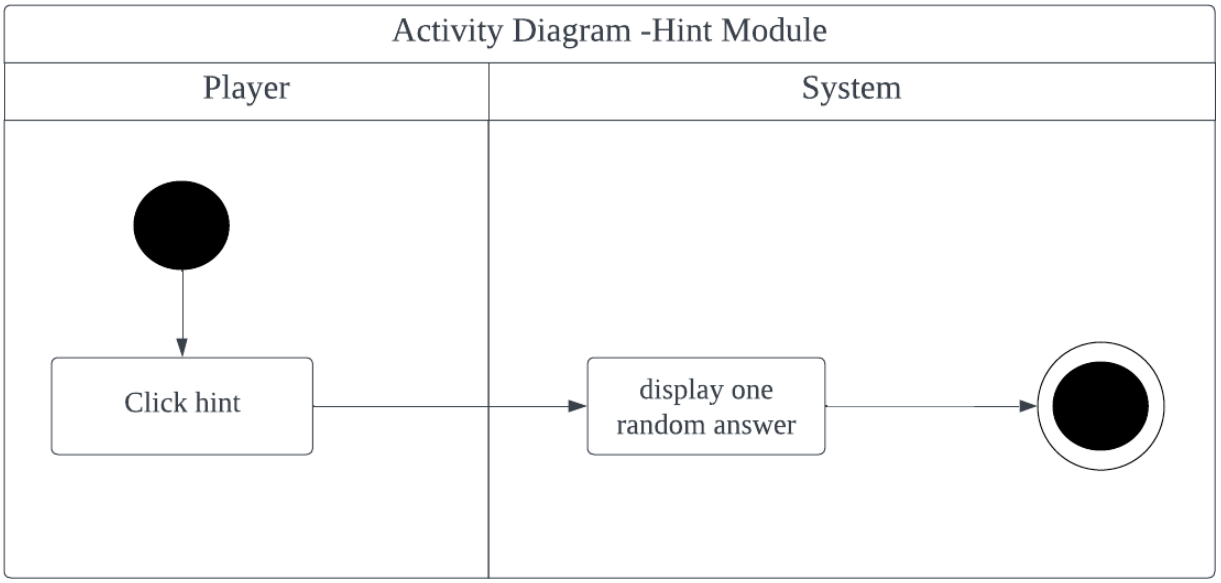


Figure 3.2.9.2.1 *Activity Diagram - Hint Module*

3.2.10 Profile Module

3.2.10.1 Use Case Description – Profile Module

Use Case Name: Profile	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – view profile information.		
Brief Description: This use case explains how to edit and save the change of information for profile.		
Trigger: Player want to view or edit Profile I **Type:** External		
Relationships: Association: Player Include: Extend: Edit profile, save profile Generalization:		
Normal Flow of Events: 1. Player can view the profile information. 2. Player can edit the user name and date of birth. 3. Player submit the edit of profile information change. 4. If success edit, system display “Edit Success” message. 5. System save the change data of profile information to firebase.		
Sub Flows: -		
Alternative/Exceptional Flows: 4.1 If edit fail, system display “Fail Edit” message to player.		

Table 3.2.10.1.1 *Use Case Description for Profile Module*

3.2.10.2 Activity Diagram – Profile Module

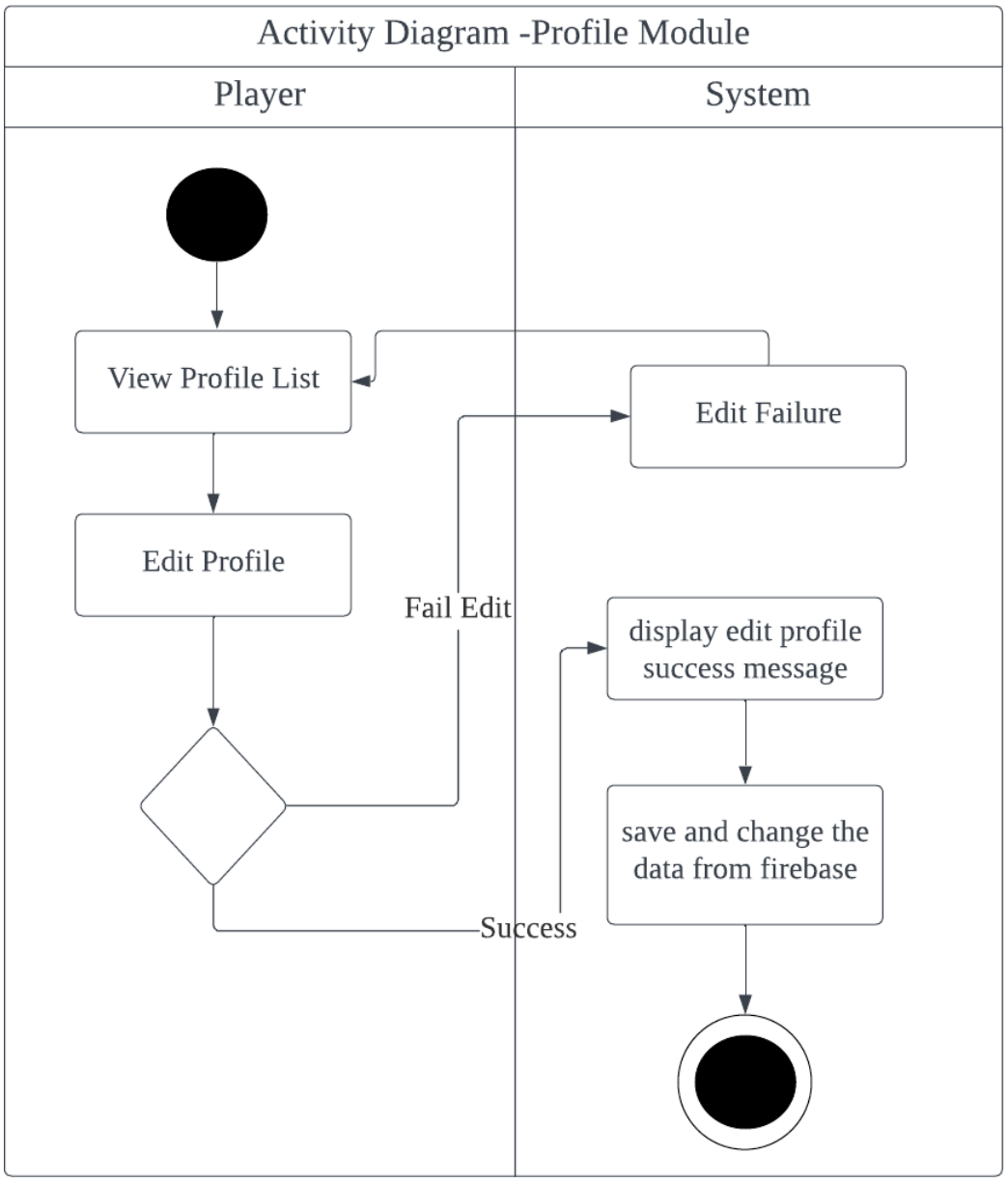


Figure 3.2.10.2.1 *Activity Diagram - Profile Module*

3.2.11 Feedback Module

3.2.11.1 Use Case Description – Feedback Module

Use Case Name: Feedback	**ID:3**	**Importance Level:** High
Primary Actor: Player, System	**Use Case Type:** Detail, Essential	
Stakeholders and Interests: Players – send feedback for the hangman game.		
Brief Description: This use case explains how to create and submit the feedback process for the hangman game.		
Trigger: User want to give feedback of the game experience **Type:** External		
Relationships: Association: Player Include: fill in feedback Extend: Generalization:		
Normal Flow of Events: 6. Player can select the feedback. 7. Player need to fill in the feedback form. 8. Player submit the feedback. 9. If success submit, system save the feedback data into firebase. 10. The system display "Submit Success" message to player.		
Sub Flows: -		
Alternative/Exceptional Flows: 3a. If submit fail, system display "Fail Submit" message to player.		

Table 3.2.11.1.1 *Use Case Description for Feedback Module*

3.2.11.2 Activity Diagram – Feedback Module

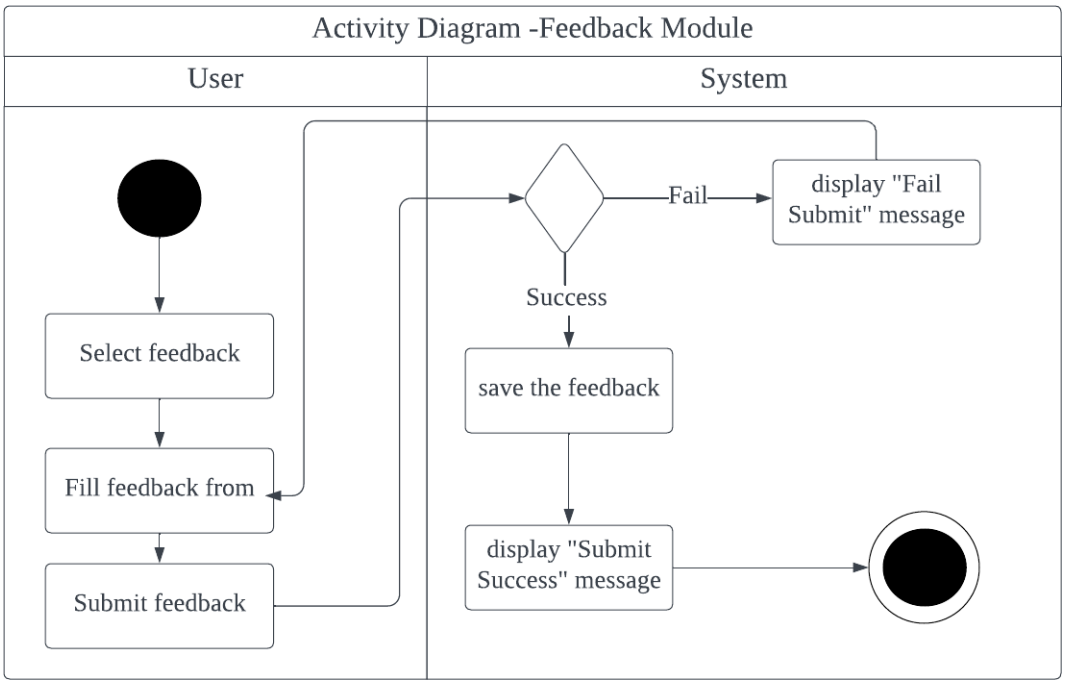


Figure 3.2.11.2.1 *Activity Diagram - Feedback Module*

3.2 Timeline

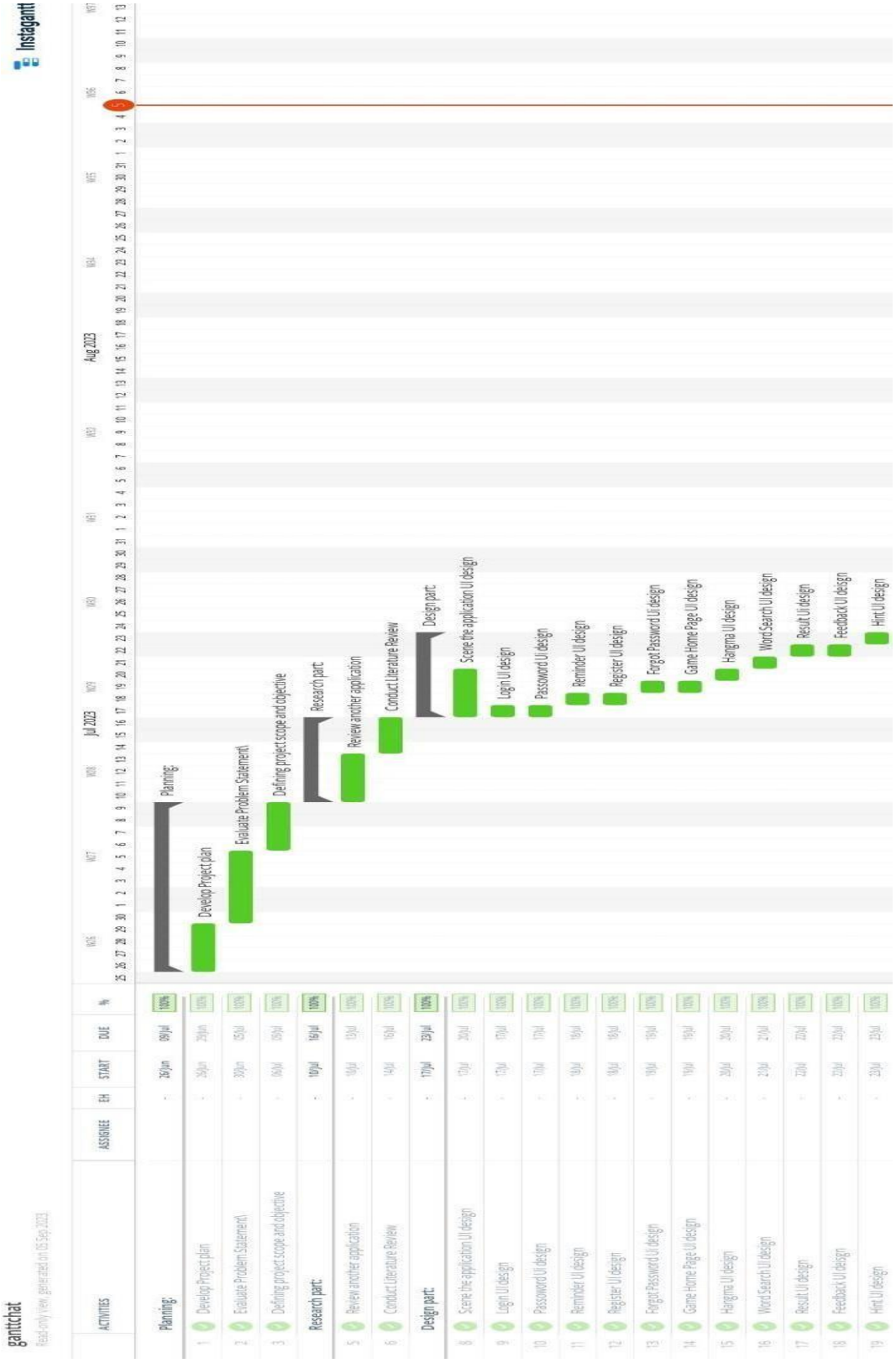


Figure 3.2.1 *Project Timeline FYP1*

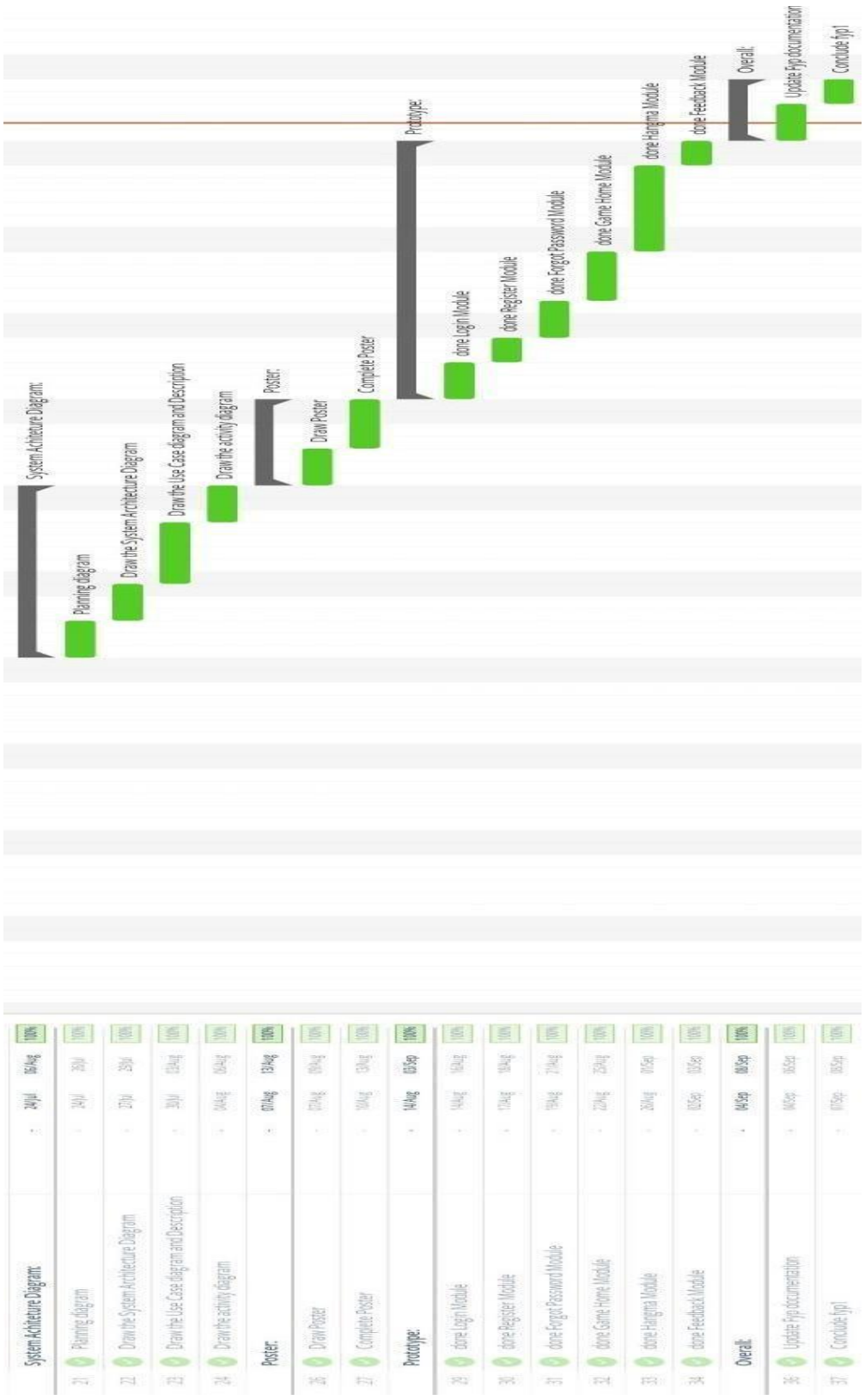


Figure 3.2.2 *Project Timeline FYP1*

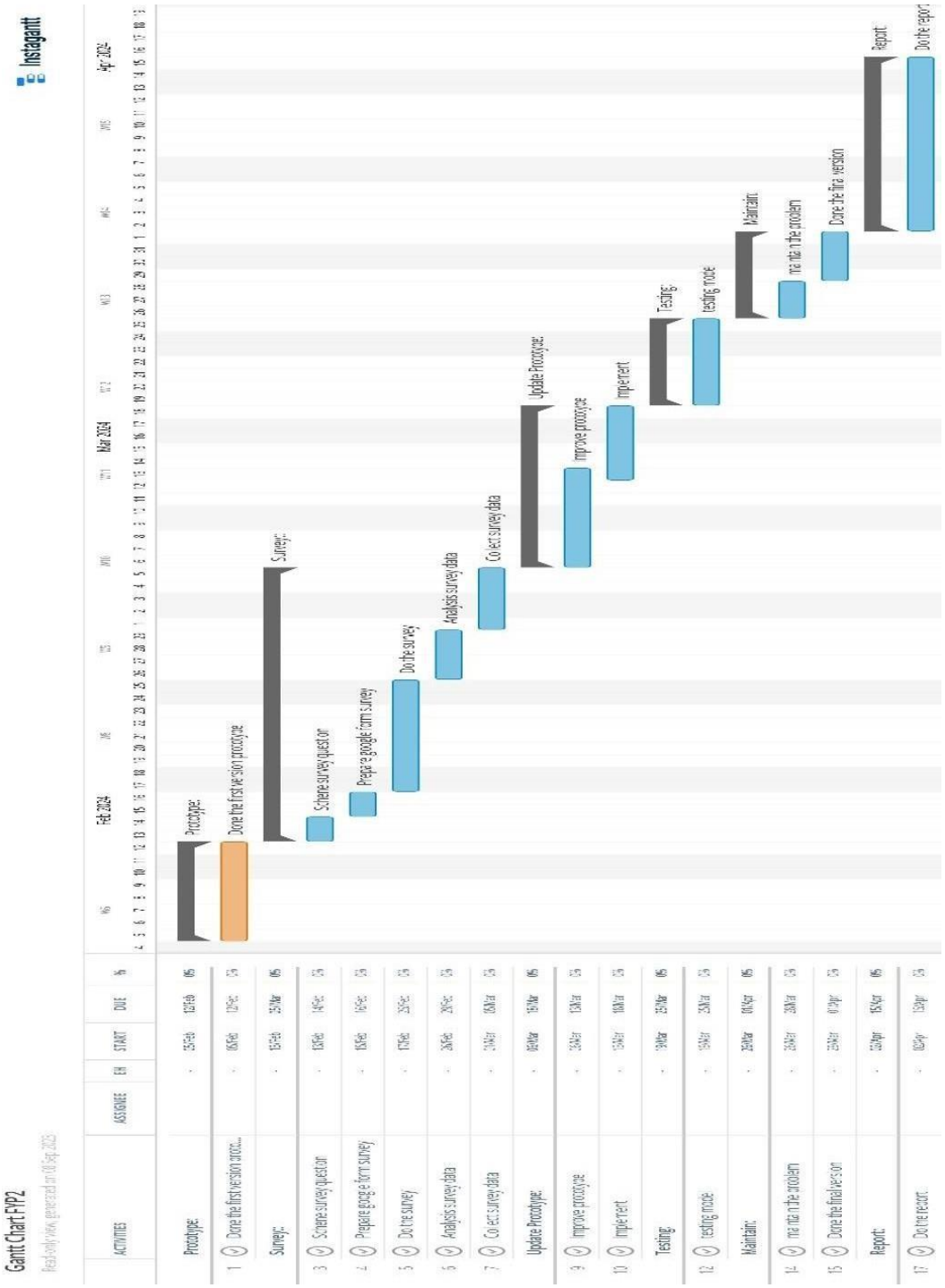


Figure 3.2.3 *Project Timeline FYP2*

CHAPTER 4
System Design

4.1 System Block Diagram

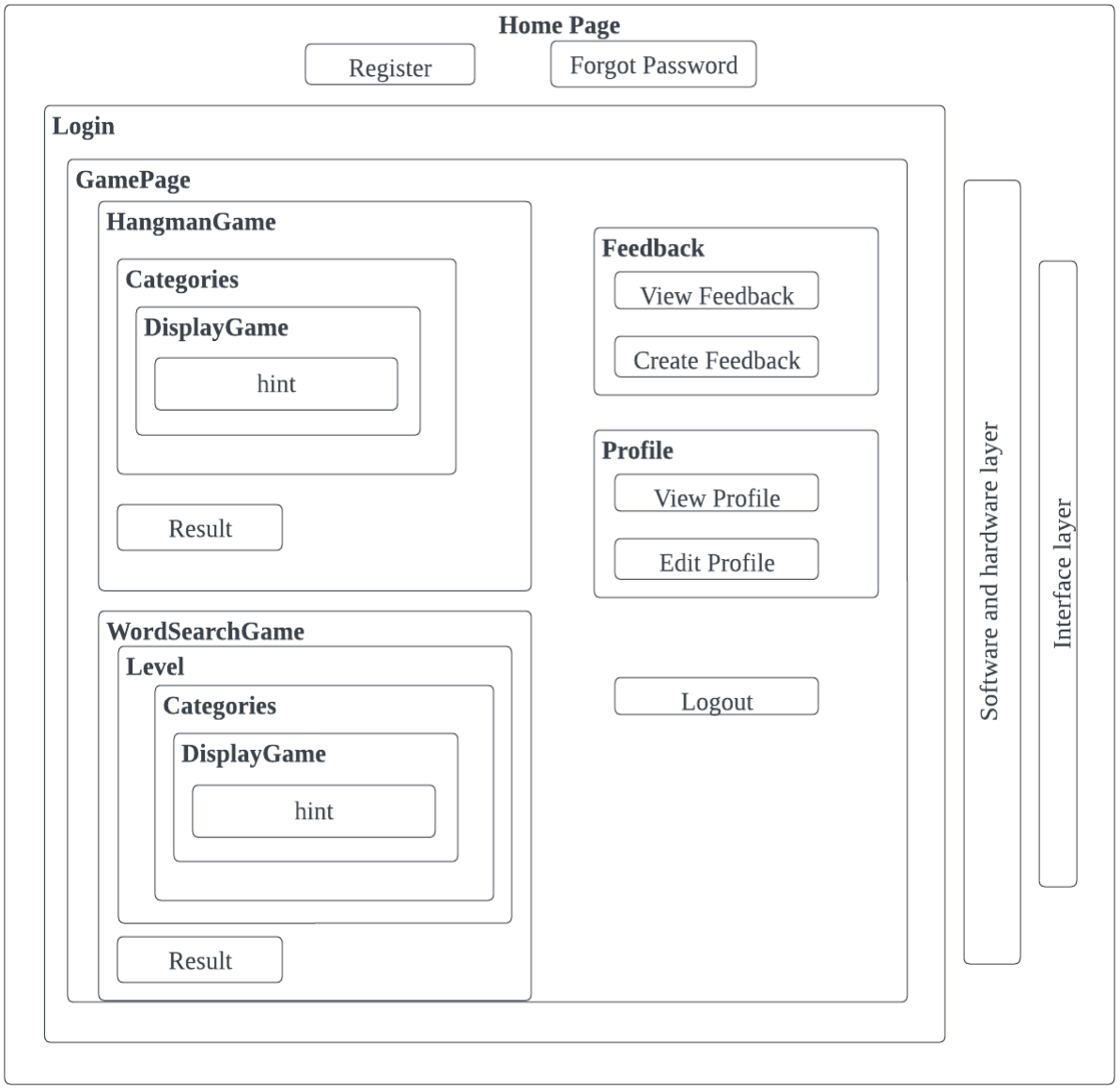


Figure 4.1.1 System Block Diagram

4.2 System Flow Descriptions

Initially, the player needs to connect their Android device to the Internet in order to log in the Find & Word Search Game mobile application. It is mandatory for the player must has email in Firebase Authentication.

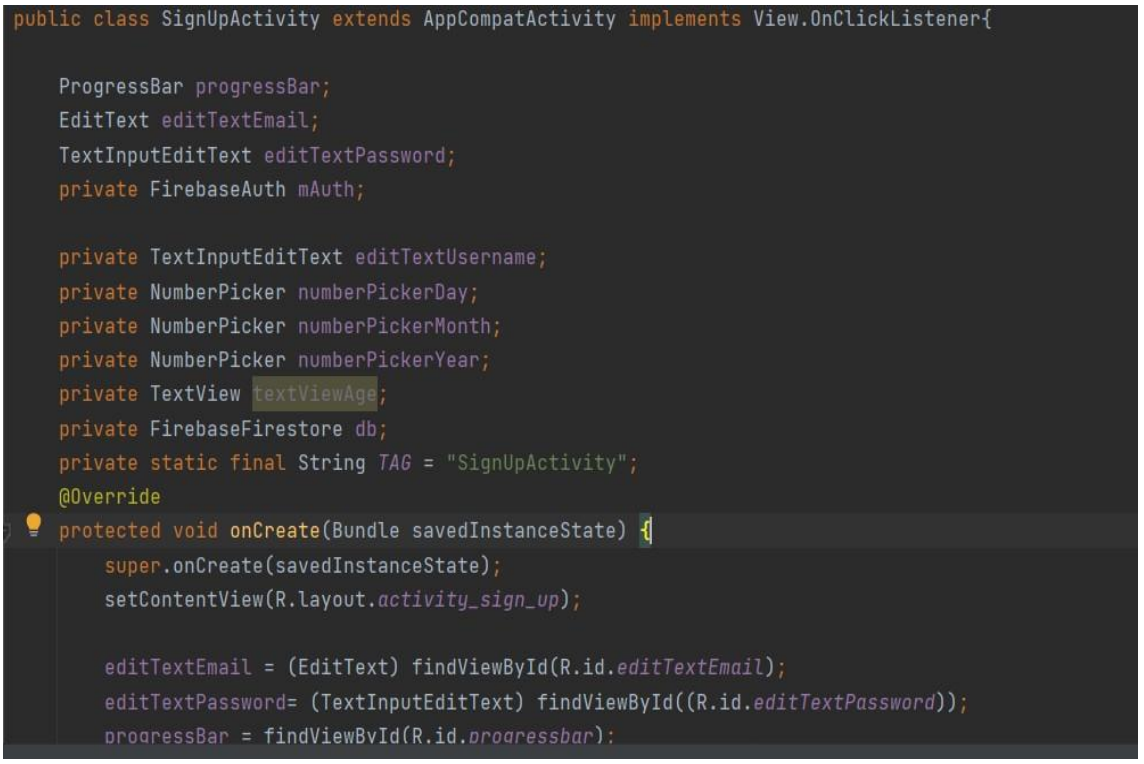
4.2.1 LoginActivity.java

```java
package testing6java.myapplication;

import ...


public class LoginActivity extends AppCompatActivity implements View.OnClickListener{


    private FirebaseAuth mAuth;
    EditText editTextEmail;
    TextInputEditText editTextPassword;
    ProgressBar progressBar;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_login);

        editTextEmail = (EditText) findViewById(R.id.editTextEmail);
        editTextPassword = (TextInputEditText) findViewById(R.id.editTextPassword);
        progressBar=findViewById(R.id.progressbar);

        mAuth=FirebaseAuth.getInstance();
```

Figure 4.2.1.1 LoginActivity.java

This activity class is to implements the login page. The player is need request enter the email address and password to login to login home page screen. The class using the Firebase Authentication to verify the email and password. If the email address exist, then check for the password. If both verify success, take player to the login main page. Then, it also has the “reset password” feature call passReset() to let player change their password with player click in the email and send.

4.2.2 SignUpActivity.java



```
public class SignUpActivity extends AppCompatActivity implements View.OnClickListener{

    ProgressBar progressBar;
    EditText editTextEmail;
    TextInputEditText editTextPassword;
    private FirebaseAuth mAuth;

    private TextInputEditText editTextUsername;
    private NumberPicker numberPickerDay;
    private NumberPicker numberPickerMonth;
    private NumberPicker numberPickerYear;
    private TextView textViewAge;
    private FirebaseFirestore db;
    private static final String TAG = "SignUpActivity";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_sign_up);

        editTextEmail = (EditText) findViewById(R.id.editTextEmail);
        editTextPassword= (TextInputEditText) findViewById((R.id.editTextPassword));
        progressBar = findViewById(R.id.progressbar);
```

Figure 4.2.2.1 SignUpActivity.java

The sign up activity is provides the functionality for player to sign up a new account. It using the registerUser() method to do the check fill in all data and validate of input of email and password format correct or not and calculateAge method to calculate the age of player. If that correct, it will be send email to player to verify. After verify, the data will save in the firebase.

4.2.3 LoginHomePage.java

```java
public class LoginHomePage extends AppCompatActivity {

    private Button hangmanButton;
    private Button wordSearchButton;
    private Button logOutButton;

    private Button profileButton;
    private Button feedbackButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_login_home_page);

        hangmanButton = findViewById(R.id.hangmanButton);
        wordSearchButton = findViewById(R.id.wordSearchButton);
        logOutButton = findViewById(R.id.logOutButton);
        profileButton = findViewById(R.id.profileButton);
        feedbackButton = findViewById(R.id.feedbackButton);

        hangmanButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) { startHangmanGame(); }
```

Figure 4.2.3.1 LoginHomePage.java

This is login home page is about the main menu of player to choose the thing that player want. It have 5 buttons call, hangmanButton, wordSearch button, log out button, profile button, feedback button. The system will using setOnClickListener to detect the click of player then intent to correspond button.

4.2.4 HomeActivity.java

```java
public class HomeActivity extends AppCompatActivity implements View.OnClickListener {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_home);

        Button animalButton = findViewById(R.id.animalButton);
        Button fruitsButton = findViewById(R.id.fruitButton);
        Button sportsButton = findViewById(R.id.sportButton);
        Button colorButton = findViewById(R.id.colorButton);
        Button shapeButton = findViewById(R.id.shapeButton);
        Button clothingButton = findViewById(R.id.clothingButton);
        Button supplieButton = findViewById(R.id.supplieButton);
        Button bodyPartButton = findViewById(R.id.bodyPartButton);
        Button weatherButton = findViewById(R.id.weatherButton);
        Button transportButton = findViewById(R.id.transportButton);
        Button resultButton = findViewById(R.id.resultButton); // 新增的按钮
```

Figure 4.2.4.1 HomeActivity.java

This figure is can let user to choose the categories button. After the player chooses the button, it will intent to HangmanActivity and keep the name of corresponding button into Categories.

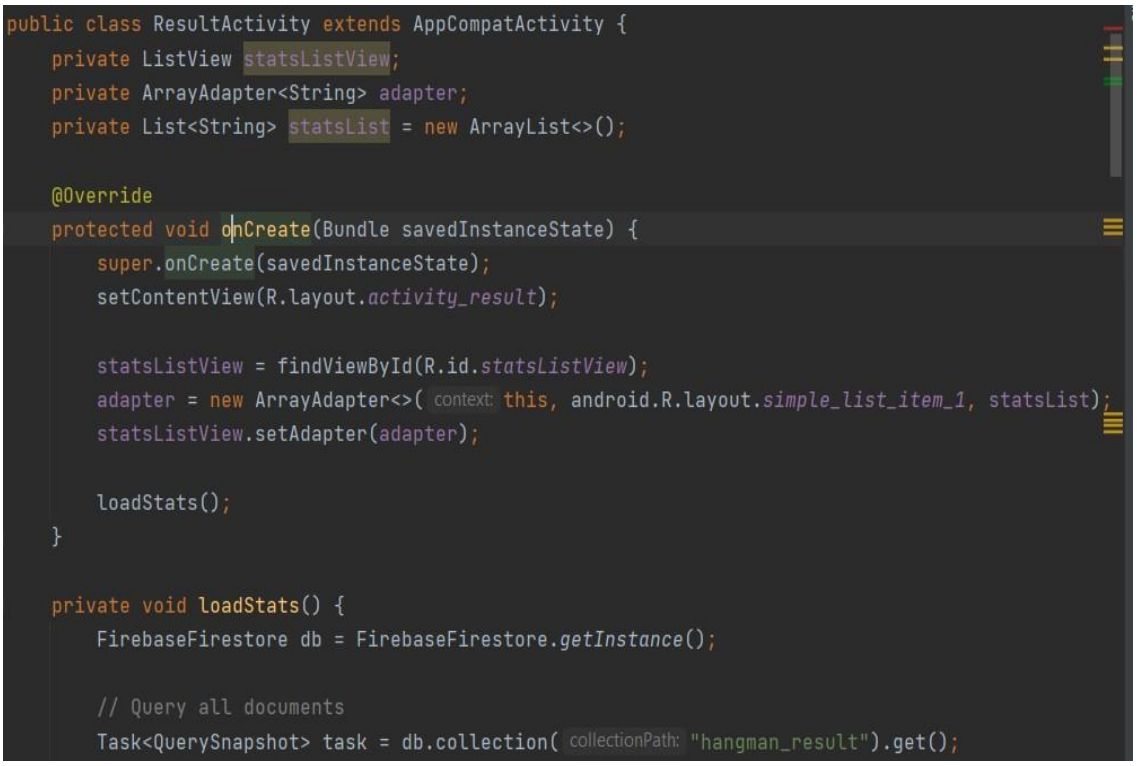
4.2.5 HangmanActivity.java

```
public class HangmanActivity extends AppCompatActivity implements View.OnClickListener {
    private String category;
    private List<String[]> wordList;
    private String currentWord;
    private boolean[] guessedLetters;
    private TextView wordTextView;
    private ImageView hangmanImageView;
    private int wrongGuessCount = 0;

    private Chronometer timer;
    private Button hintButton, newGameButton;
    private TextView tipsTextView;
    private int hintCount = 0;
    private TextView lettersUsedTextView;
    private StringBuilder usedLetters = new StringBuilder();

    private int correctWordCount = 0;
    private long totalTimeInMillis = 0;
    private List<String> guessedWords = new ArrayList<>();
    private TextView titlesTextView;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
```

Figure 4.2.5.1 HangmanActivity.java

This figure shows about the Hangman game show with using newGame() method. Then, the word is retrieve from class Categories. Then showhint() method is for show random answer to player. After fail or done all word, do the save firebase feature for save the hint usage, title name, time using, and word done.

4.2.6 ResultActivity.java

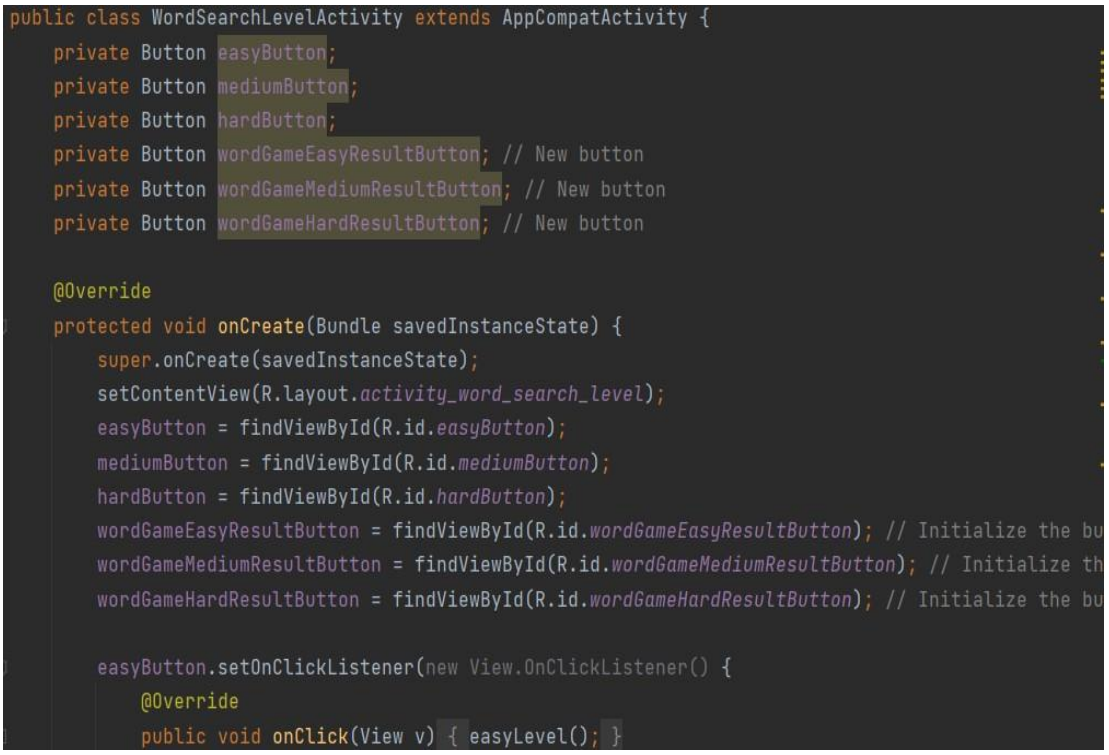


```
public class ResultActivity extends AppCompatActivity {
    private ListView statsListView;
    private ArrayAdapter<String> adapter;
    private List<String> statsList = new ArrayList<>();

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_result);

        statsListView = findViewById(R.id.statsListView);
        adapter = new ArrayAdapter<>( context: this, android.R.layout.simple_list_item_1, statsList);
        statsListView.setAdapter(adapter);

        loadStats();
    }

    private void loadStats() {
        FirebaseFirestore db = FirebaseFirestore.getInstance();

        // Query all documents
        Task<QuerySnapshot> task = db.collection( collectionPath: "hangman_result").get();
```

Figure 4.2.6.1 ResultActivity.java

This figure is do the feature of show the answer save with Hangman Activity. loadStats() method to retrieve the data from firebase and save in array, then show in word descending, time ascending, hint ascending, title name alphabat ascending.

4.2.7 WordSearhLevelActivity.java



```
public class WordSearchLevelActivity extends AppCompatActivity {
    private Button easyButton;
    private Button mediumButton;
    private Button hardButton;
    private Button wordGameEasyResultButton; // New button
    private Button wordGameMediumResultButton; // New button
    private Button wordGameHardResultButton; // New button

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_word_search_level);
        easyButton = findViewById(R.id.easyButton);
        mediumButton = findViewById(R.id.mediumButton);
        hardButton = findViewById(R.id.hardButton);
        wordGameEasyResultButton = findViewById(R.id.wordGameEasyResultButton); // Initialize the bu
        wordGameMediumResultButton = findViewById(R.id.wordGameMediumResultButton); // Initialize th
        wordGameHardResultButton = findViewById(R.id.wordGameHardResultButton); // Initialize the bu

        easyButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) { easyLevel(); }
```

Figure 4.2.7.1 WordSearchLevelActivity.java

This figure is can let user to choose the level of word search game button. After the player chooses the button, it will intent to corresponding button.

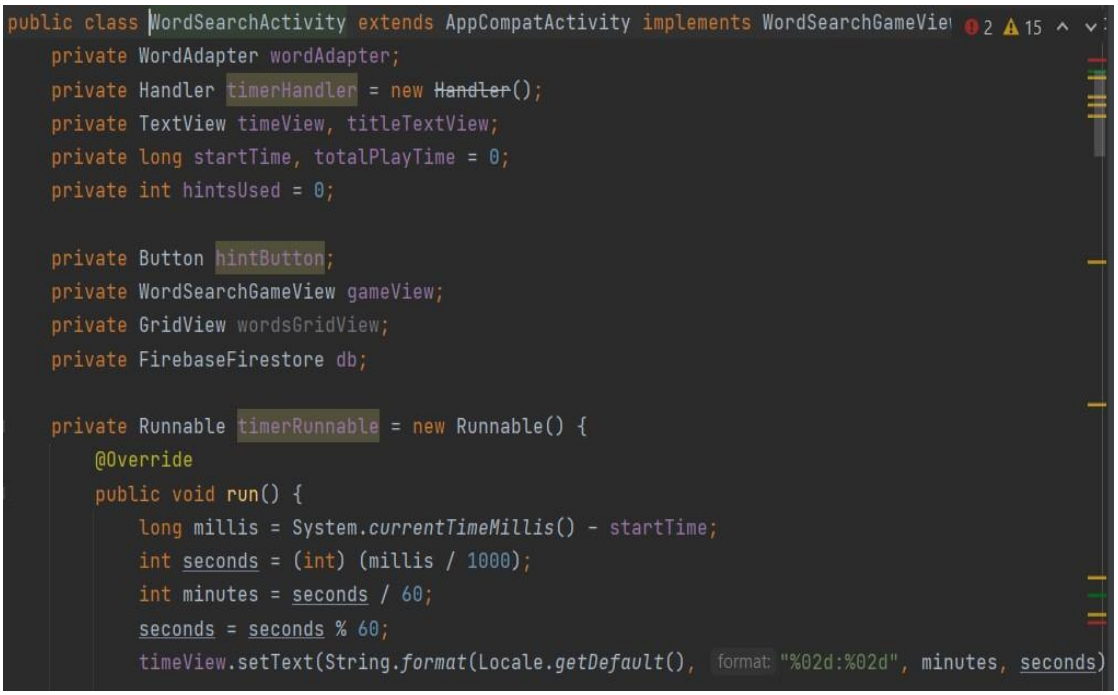
4.2.8 MainActivity.java

```java
public class MainActivity extends AppCompatActivity implements View.OnClickListener {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        Button animalsButton = findViewById(R.id.animalsButton);
        Button fruitsButton = findViewById(R.id.fruitsButton);
        Button sportsButton = findViewById(R.id.sportsButton);
        Button colorButton = findViewById(R.id.colorButton);
        Button bodyPartButton = findViewById(R.id.bodyPartButton);
        Button weatherButton = findViewById(R.id.weatherButton);
        Button transportButton = findViewById(R.id.transportButton);
        Button occupationsButton = findViewById(R.id.occupationsButton);
        Button foodButton = findViewById(R.id.foodButton);
        Button countriesButton = findViewById(R.id.countriesButton);

        animalsButton.setText("ANIMALS");
        fruitsButton.setText("FRUITS");
        sportsButton.setText("SPORTS");
        colorButton.setText("COLORS");
```

Figure 4.2.8.1 MainActivity.java

This figure is can let user to choose the categories button. After the player chooses the button, it will run the WordSearchActivity and keep the name of corresponding button into Categories..

4.2.9 WordSearchActivity.java



```
public class WordSearchActivity extends AppCompatActivity implements WordSearchGameVie  2  15
    private WordAdapter wordAdapter;
    private Handler timerHandler = new Handler();
    private TextView timeView, titleTextView;
    private long startTime, totalPlayTime = 0;
    private int hintsUsed = 0;

    private Button hintButton;
    private WordSearchGameView gameView;
    private GridView wordsGridView;
    private FirebaseFirestore db;

    private Runnable timerRunnable = new Runnable() {
        @Override
        public void run() {
            long millis = System.currentTimeMillis() - startTime;
            int seconds = (int) (millis / 1000);
            int minutes = seconds / 60;
            seconds = seconds % 60;
            timeView.setText(String.format(Locale.getDefault(),  format: "%02d:%02d", minutes, seconds)
```

Figure 4.2.9.1 WordSearchActivity.java

This figure is run the with retrieve the name of categories then run the WordSearchGameView class to display the game. Then showhint() method is for show random answer to player. After fail or done all word, do the save firebase feature for save the hint usage, title name, time using.

4.2.10 MediumMainPage.java

```java
public class MediumMainPageActivity extends AppCompatActivity implements View.OnClickListener {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_medium_main_page);

        Button animalsButton = findViewById(R.id.animalsButton);
        Button fruitsButton = findViewById(R.id.fruitsButton);
        Button sportsButton = findViewById(R.id.sportsButton);
        Button colorButton = findViewById(R.id.colorButton);
        Button bodyPartButton = findViewById(R.id.bodyPartButton);
        Button weatherButton = findViewById(R.id.weatherButton);
        Button transportButton = findViewById(R.id.transportButton);
        Button occupationsButton = findViewById(R.id.occupationsButton);
        Button foodButton = findViewById(R.id.foodButton);
        Button countriesButton = findViewById(R.id.countriesButton);

        animalsButton.setText("ANIMALS");
        fruitsButton.setText("FRUITS");
        sportsButton.setText("SPORTS");
        colorButton.setText("COLORS");
        bodyPartButton.setText("BODY PARTS");
        weatherButton.setText("WEATHER");
```

Figure 4.2.10.1 MediumMainPage.java

This figure is can let user to choose the categories button. After the player chooses the button, it will run the WordSearchMediumActivityand keep the name of corresponding button into Categories..

4.2.11 WordSearchMediumActivity.java

```java
public class WordSearchMediumActivity extends AppCompatActivity implements WordSearchGameView.OnWordFoundListener{

    private WordAdapterMedium wordAdapterMedium;

    private Handler timerHandler = new Handler();
    private TextView timeView, titleTextView;
    private long startTime, totalPlayTime = 0;
    private int hintsUsed = 0;

    private Button hintButton;
    private WordSearchGameView gameView;
    private GridView wordsGridView;
    private FirebaseFirestore db;
    private Runnable timerRunnable = new Runnable() {

        @Override
        public void run() {
            long millis = System.currentTimeMillis() - startTime;
            int seconds = (int) (millis / 1000);
            int minutes = seconds / 60;
            seconds = seconds % 60;
```

Figure 4.2.11.1 WordSearchMediumActivity.java

This figure is run the with retrieve the name of categories then run the WordSearchGameView class to display the game. Then showhint() method is for show random answer to player. After fail or done all word, do the save firebase feature for save the hint usage, title name, time using.

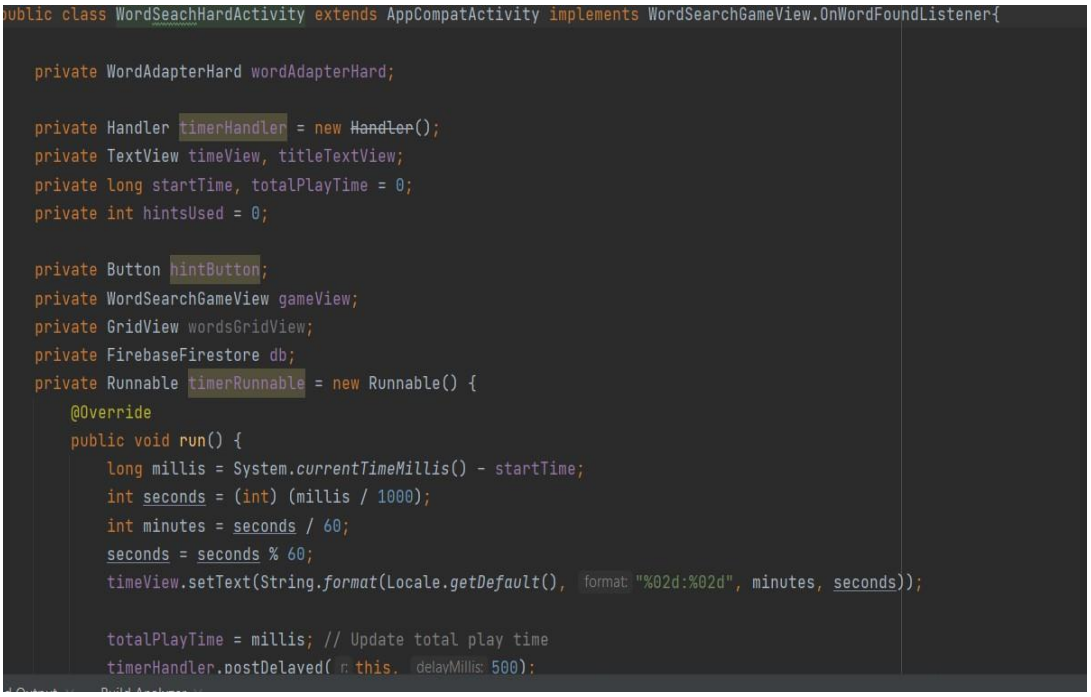
4.2.12 HardMainPage.java

```
public class HardMainPageActivity extends AppCompatActivity implements View.OnClickListener {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_hard_main_page);

        Button animalsButton = findViewById(R.id.animalsButton);
        Button fruitsButton = findViewById(R.id.fruitsButton);
        Button sportsButton = findViewById(R.id.sportsButton);
        Button colorButton = findViewById(R.id.colorButton);
        Button bodyPartButton = findViewById(R.id.bodyPartButton);
        Button weatherButton = findViewById(R.id.weatherButton);
        Button transportButton = findViewById(R.id.transportButton);
        Button occupationsButton = findViewById(R.id.occupationsButton);
        Button foodButton = findViewById(R.id.foodButton);
        Button countriesButton = findViewById(R.id.countriesButton);

        animalsButton.setText("ANIMALS");
        fruitsButton.setText("FRUITS");
        sportsButton.setText("SPORTS");
        colorButton.setText("COLORS");
        bodyPartButton.setText("BODY PARTS");
        weatherButton.setText("WEATHER");
```

Figure 4.2.12.1 HardMainPage.java

This figure is can let user to choose the categories button. After the player chooses the button, it will run the WordSearchHardActivity and keep the name of corresponding button into Categories..

4.2.13 WordSearchHardActivity.java

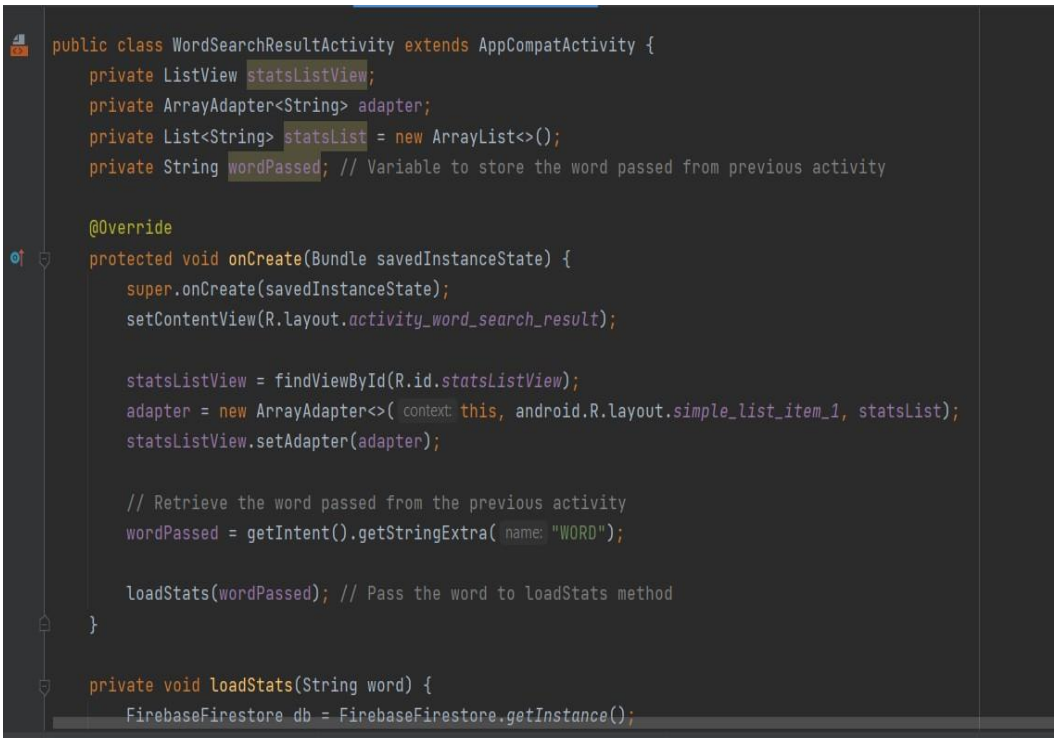


```
ublic class WordSeachHardActivity extends AppCompatActivity implements WordSearchGameView.OnWordFoundListener{

    private WordAdapterHard wordAdapterHard;

    private Handler timerHandler = new Handler();
    private TextView timeView, titleTextView;
    private long startTime, totalPlayTime = 0;
    private int hintsUsed = 0;

    private Button hintButton;
    private WordSearchGameView gameView;
    private GridView wordsGridView;
    private FirebaseFirestore db;
    private Runnable timerRunnable = new Runnable() {
        @Override
        public void run() {
            long millis = System.currentTimeMillis() - startTime;
            int seconds = (int) (millis / 1000);
            int minutes = seconds / 60;
            seconds = seconds % 60;
            timeView.setText(String.format(Locale.getDefault(),  format: "%02d:%02d", minutes, seconds));

            totalPlayTime = millis; // Update total play time
            timerHandler.postDelayed( r: this,  delayMillis: 500);
```

Figure 4.2.13.1 WordSearchHardActivity.java

This figure is run the with retrieve the name of categories then run the WordSearchGameView class to display the game. Then showhint() method is for show random answer to player. After fail or done all word, do the save firebase feature for save the hint usage, title name, time using.

4.2.14 WordSearchResultActiviy.java

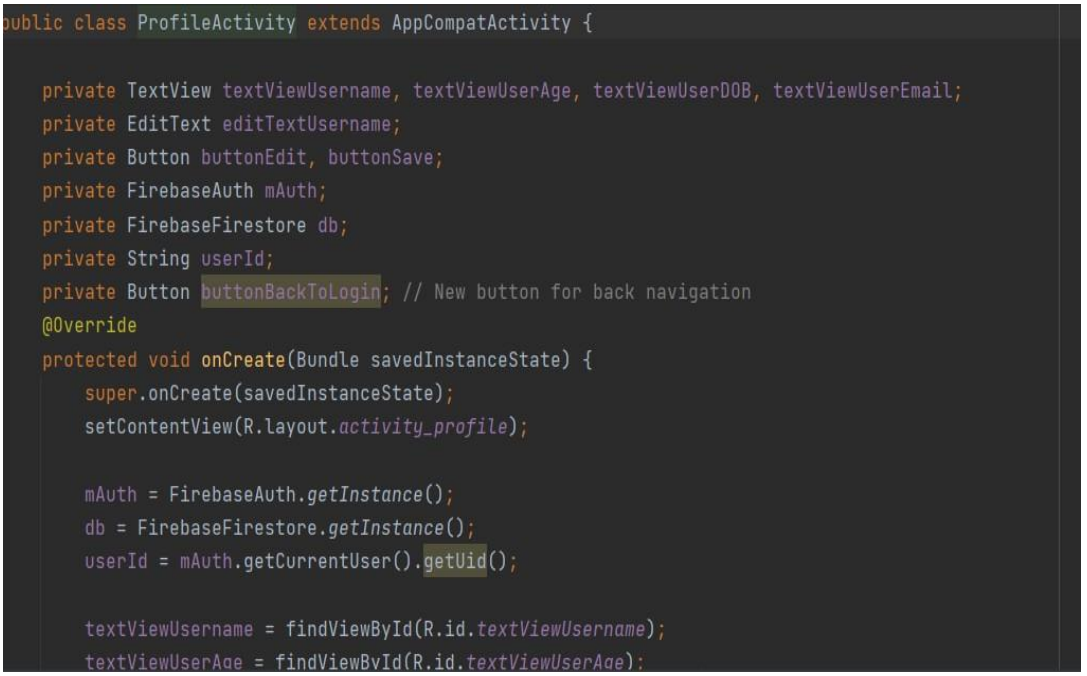


```
public class WordSearchResultActivity extends AppCompatActivity {
    private ListView statsListView;
    private ArrayAdapter<String> adapter;
    private List<String> statsList = new ArrayList<>();
    private String wordPassed; // Variable to store the word passed from previous activity

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_word_search_result);

        statsListView = findViewById(R.id.statsListView);
        adapter = new ArrayAdapter<>( context: this, android.R.layout.simple_list_item_1, statsList);
        statsListView.setAdapter(adapter);

        // Retrieve the word passed from the previous activity
        wordPassed = getIntent().getStringExtra( name: "WORD");

        loadStats(wordPassed); // Pass the word to loadStats method
    }

    private void loadStats(String word) {
        FirebaseFirestore db = FirebaseFirestore.getInstance();
```

Figure 4.2.14.1 WordSearchResultActivity.java

This figure is do the feature of show the answer save with corresponding name from different level button. loadStats() method to retrieve the data from firebase and save in array, then show in time ascending, hint ascending, title name alphabat ascending.

4.2.15 ProfileActivity.java



```
public class ProfileActivity extends AppCompatActivity {

    private TextView textViewUsername, textViewUserAge, textViewUserDOB, textViewUserEmail;
    private EditText editTextUsername;
    private Button buttonEdit, buttonSave;
    private FirebaseAuth mAuth;
    private FirebaseFirestore db;
    private String userId;
    private Button buttonBackToLogin; // New button for back navigation
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_profile);

        mAuth = FirebaseAuth.getInstance();
        db = FirebaseFirestore.getInstance();
        userId = mAuth.getCurrentUser().getUid();

        textViewUsername = findViewById(R.id.textViewUsername);
        textViewUserAge = findViewById(R.id.textViewUserAge);
```

Figure 4.2.15.1 ProfileActivity.java

This figure is retrieve the data from firebase and show to user using loadUserData() method. Then, upadateusername() method and updatedataofBirth() method for edit the information of profile.

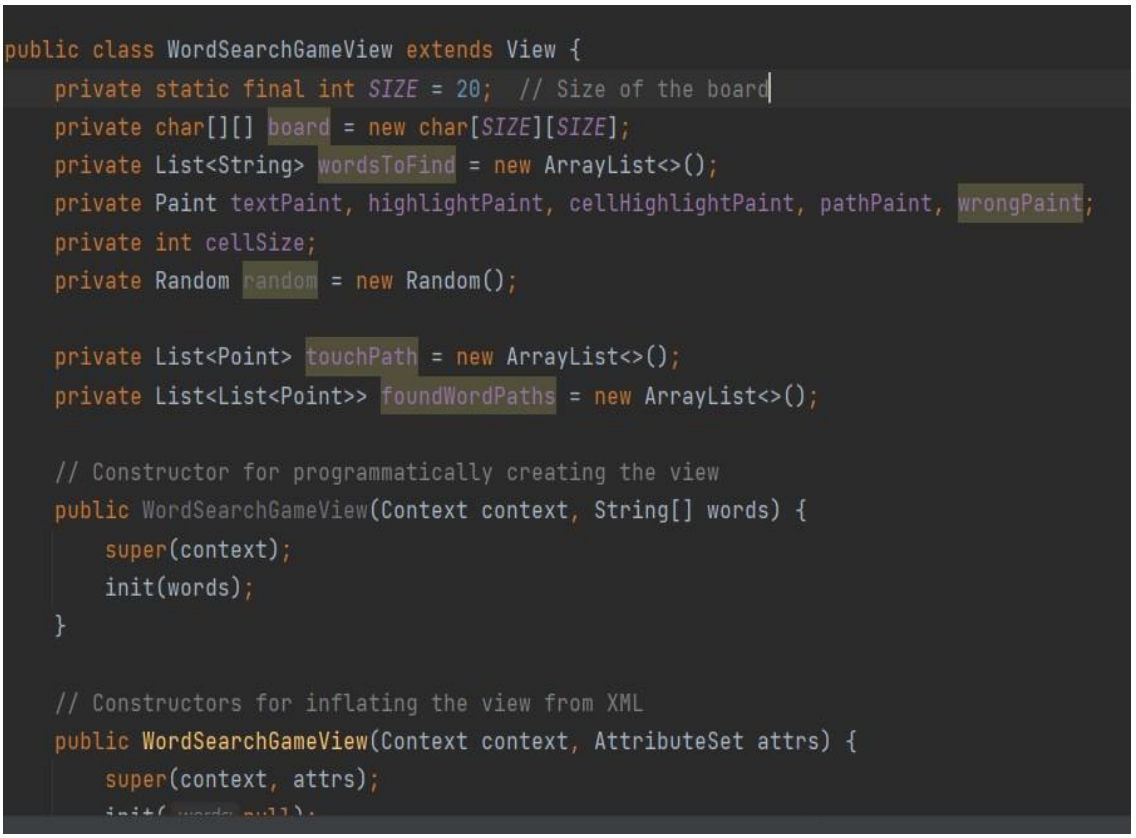
4.2.16 SupportActivity.java

```
public class SupportActivity extends AppCompatActivity {

    private EditText editTextFeedback;
    private RatingBar ratingBarSatisfaction;
    private Button buttonSubmitFeedback;
    private Button buttonBackToLogin; // New button for back navigation

    private FirebaseFirestore db;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_support);

        db = FirebaseFirestore.getInstance();

        editTextFeedback = findViewById(R.id.editTextFeedback);
        ratingBarSatisfaction = findViewById(R.id.ratingBarSatisfaction);
        buttonSubmitFeedback = findViewById(R.id.buttonSubmitFeedback);
        buttonBackToLogin = findViewById(R.id.buttonBackToLogin);

        buttonSubmitFeedback.setOnClickListener(new View.OnClickListener() {
```

Figure 4.2.16.1 SupportActivity.java

This figure has two element let player input, after input, click the submitfeedback() method to save the data in firebase.

4.2.17 WordSearchGameView.java



```
public class WordSearchGameView extends View {
    private static final int SIZE = 20;  // Size of the board
    private char[][] board = new char[SIZE][SIZE];
    private List<String> wordsToFind = new ArrayList<>();
    private Paint textPaint, highlightPaint, cellHighlightPaint, pathPaint, wrongPaint;
    private int cellSize;
    private Random random = new Random();

    private List<Point> touchPath = new ArrayList<>();
    private List<List<Point>> foundWordPaths = new ArrayList<>();

    // Constructor for programmatically creating the view
    public WordSearchGameView(Context context, String[] words) {
        super(context);
        init(words);
    }

    // Constructors for inflating the view from XML
    public WordSearchGameView(Context context, AttributeSet attrs) {
        super(context, attrs);
        init( words: null);
```

Figure 4.2.17.1 WordSearchGameView.java

This figure is the code that display. Its display include the size of 20, 8 direction for move, generateBoardAndWords() method to display the grid view.

4.2.18 Categories.java

```
public class Categories {
    // Define constants for category names
    public static final String ANIMALS = "Animals";
    public static final String FRUITS = "Fruits";
    public static final String SPORTS = "Sports";
    public static final String COLORS = "Colors";
    public static final String SHAPES = "Shapes";
    public static final String CLOTHING = "Clothing";
    public static final String SCHOOL_SUPPLIES = "School Supplies";
    public static final String BODY_PARTS = "Body Parts";
    public static final String WEATHER = "Weather";
    public static final String TRANSPORTATION = "Transportation";
    // Method to get the word list for a specific category
    public static List<String[]> getWordList(String category) {
        List<String[]> wordList = new ArrayList<>();

        // Populate word list based on the category
        switch (category) {
            case ANIMALS:
                wordList.add(new String[]{"ELEPHANT", "Hint: Largest land animal"});
                wordList.add(new String[]{"GIRAFFE", "Hint: Tallest animal with a long neck"});
                wordList.add(new String[]{"MONKEY", "Hint: Primate known for its agility"});
                wordList.add(new String[]{"RABBIT", "Hint: Small mammal with long ears"});
```

Figure 4.2.18.1 Categories.java

This is the list of vocabulary and hints of 10 different categories for Hangman Game**.**

4.2.19 WordSearchCategories.java

```
public enum WordSearchCategories {
    ANIMALS(new String[]{"ELEPHANT", "GIRAFFE", "ALLIGATOR", "KANGAROO", "CROCODILE",
            "CHIMPANZEE", "PORCUPINE", "RHINOCEROS", "OCTOPUS", "OSTRICH",
            "PLATYPUS", "HEDGEHOG", "SEAHORSE", "STARFISH", "CHAMELEON", "ARMADILLO"}),
    FRUITS(new String[]{"PINEAPPLE", "WATERMELON", "RASPBERRY", "BLACKBERRY", "KIWIFRUIT",
            "STRAWBERRY", "CANTALOUPE", "GRAPEFRUIT", "CRANBERRY", "POMEGRANATE",
            "BLUEBERRY", "PERSIMMON", "TANGERINE", "PAPAYA", "MANGO", "GUAVA",
            "FIG", "PASSIONFRUIT", "LYCHEE", "DRAGONFRUIT"}),
    SPORTS(new String[]{"BASKETBALL", "VOLLEYBALL", "BADMINTON", "GYMNASTICS", "TABLE TENNIS",
            "SWIMMING", "SOCCER", "TENNIS", "CYCLING", "SKATEBOARDING", "WRESTLING",
            "ARCHERY", "BOXING", "FENCING", "KARATE", "JUDO", "ROWING", "DIVING",
            "GOLF", "CRICKET"}),
    COLORS(new String[]{"TURQUOISE", "LAVENDER", "CRIMSON", "MAROON", "INDIGO",
            "CORAL", "MAGENTA", "CYAN", "AMBER", "VERMILION",
            "SAPPHIRE", "TEAL", "OLIVE", "MAUVE", "FUCHSIA",
            "AQUAMARINE", "CHARTREUSE", "BEIGE", "IVORY", "TAUPE"}),
    BODY_PARTS(new String[]{"FOREHEAD", "SHOULDER", "KNUCKLE", "SHINBONE", "ELBOW",
            "THIGH", "WRIST", "ANKLE", "RIBCAGE", "PELVIS",
            "TRACHEA", "VERTEBRA", "ESOPHAGUS", "CLAVICLE", "COCCYX",
            "PATELLA", "TONSIL", "ACHILLES", "MANDIBLE", "PHALANGES"}),
    WEATHER(new String[]{"BLIZZARD", "TORNADO", "HURRICANE", "MONSOON", "HAILSTORM",
```

Figure 4.2.19.1 WordSearchCategories.java

This is the list of vocabulary of 10 different categories for Word Search Game**.**

Chapter 5

System Implementation

5.1 Hardware Setup

Computer and an Android smartphone are the two pieces of hardware used in this project. A computer was used to create 3D model objects from MRI and CT datasets through the processes of visualisation and segmentation. It was also utilised toapply AR technology to the 3D model objects. This augmented reality application for studying human anatomy is tested and implemented on a mobile device.

Description	Specifications
Model	Huawei MateBook D 14
Processor	AMD Ryzen 7 3700U with Radeon Vega Mobile Gfx 2.30 GHz
Operating System	Windows 10
Graphic	Nvidia GeForce MX250
Memory	8GB RAM
Storage	SATA 512GB

Table 5.1.1 Hardware

5.2 Software

Specification	Description
Android Studio 4.0	Use to type the coding to build mobile application.
Firebase	Use to store the user data.
Window 10	Use to run all the software and application.

Table 5.2.1 Software Requirement

Coding, a database, and an operating system are the software requirements for this suggested system. The code for creating the mobile application can be written using Android Studio 4.0. Additionally, firebase is the programme utilised to store the

data. Huawei Window 10 is the final operating system utilised to execute all software and hardware applications.

5.3 Setting and Configuration

After finishing each development task, developers can choose to Run or Debug the emulator by clicking on the respective icon. However, the developer needs to construct and configure a virtual device before running or debugging a program for the first time. A Google Pixel 3a model, which has a resolution of 1080 x 2220: 440 dpi and comes pre-installed as a virtual device in Android Studio, was used to test this suggested way. The emulator is compatible with Android 8.0.0. A cloud-based database called Firebase Realtime Database houses loan applications, payments, budget history, and profile data. Firebase Storage is used to store all of the photos. In Firebase Authentication, passwords and email addresses are kept and used for user login credential verification. Furthermore, by integrating Google Analytics into the suggested system, Firebase can gather analytical data over time,such as average engagement time per activity, activity views per screen or page, and event count by name.

Preliminary Work

5.4 Preliminary Work Result

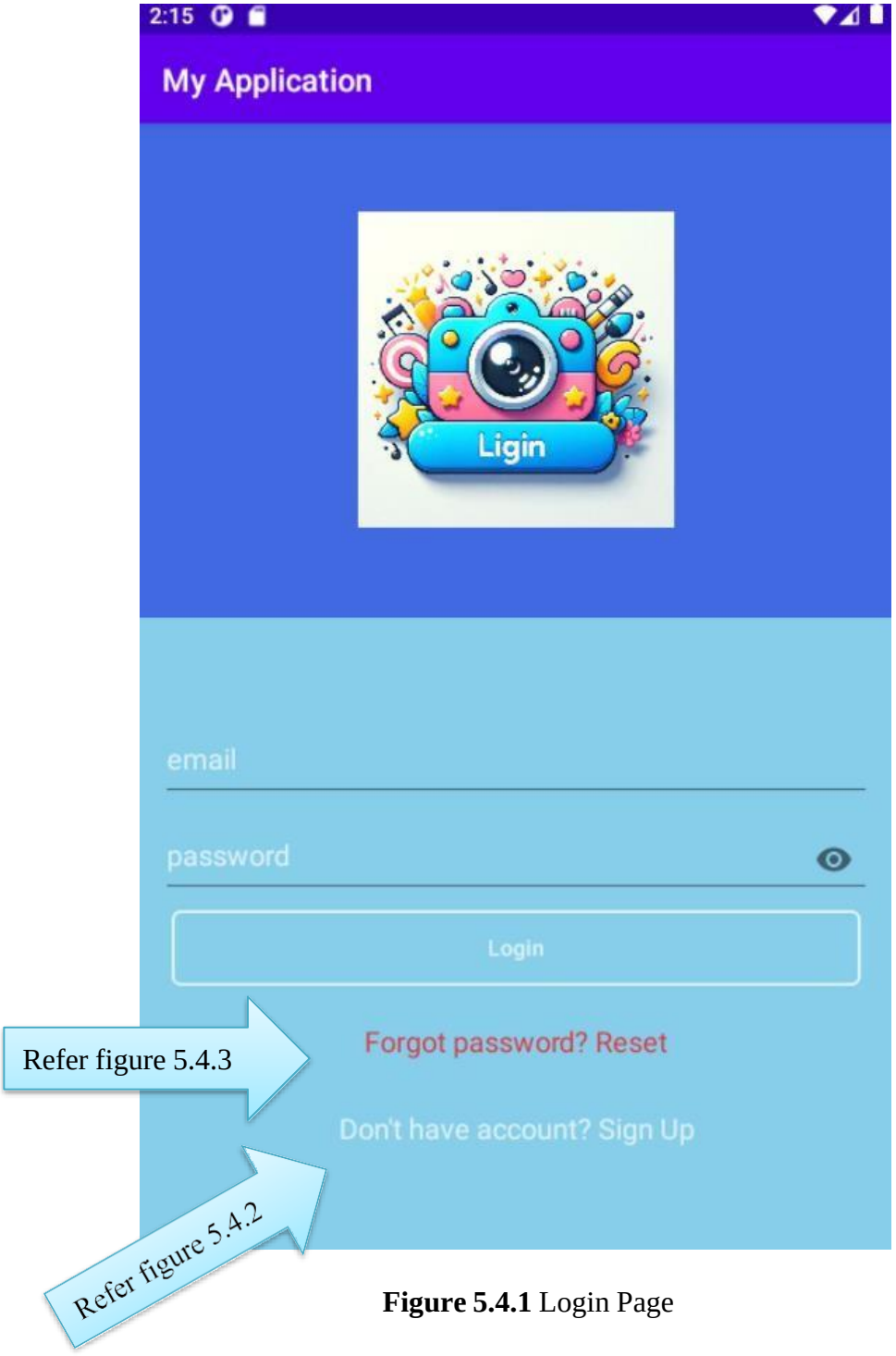


Figure 5.4.1 Login Page

Figure 5.4.2 Register Page

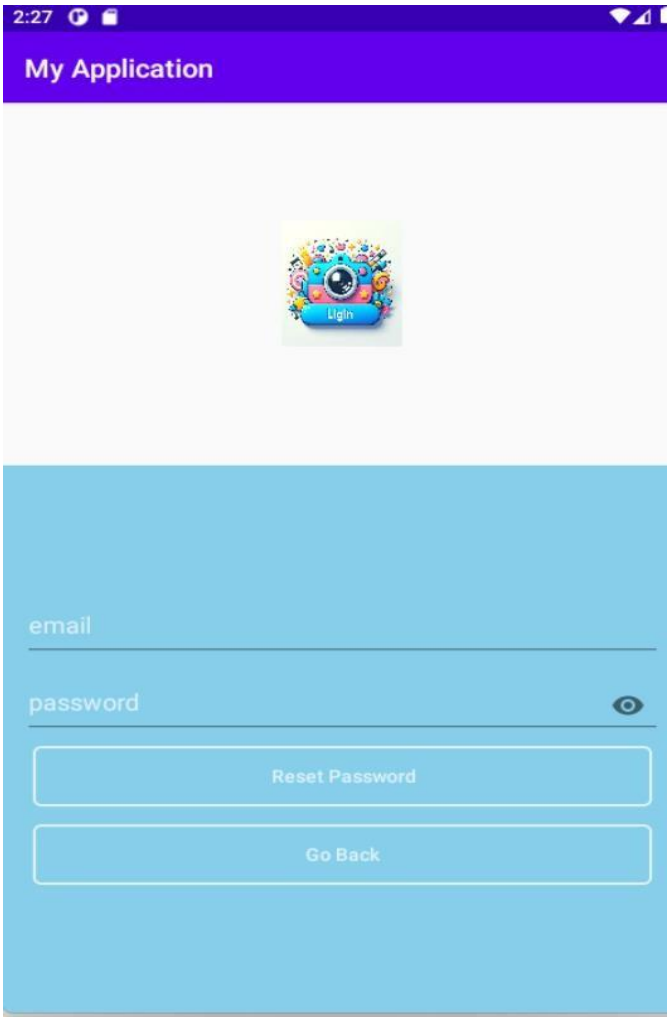


Figure 5.4.3 Reset Password Page

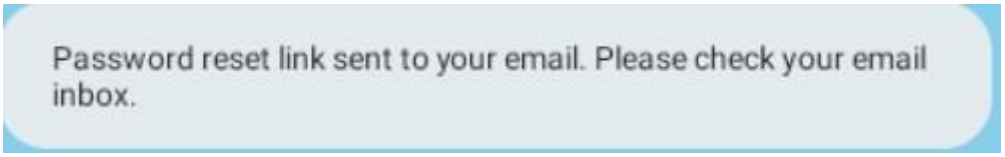


Figure 5.4.4 Reset Password Alert Message

Hello,

Follow this link to reset your project-854552705593 password for your raymondleong.0710@gmail.com account.

https://myfypproject-5a2ae.firebaseapp.com/__/auth/action?mode=resetPassword&oobCode=avUv7yy0Yd_QooaYOg-2OOJYiOSJ_SCHoZUkbLS64M4AAAGPFbAO2g&apiKey=AIzaSyA17IE7IZ8-s_8qF0OpbbhQ6qIqH8wCA2A&lang=en

***Figure 5.4.5** Reset Password*

In order to login to FIND AND SEARCH WORD GAME App, player must enter the email address and password that save on the Firebase Authentication system, as show in Figure 5.4.1. Second, this system allow user to register account and reset password. For Register page as shown at Figure 5.4.2, user need to enter the email, password, user name, data of birth. Then, click the sign up button to be send verify email to player. After verify, user success sign up account and can log in to game home page.

For reset password page as shown in Figure 5.4.3, player is access to change their password with click “Forgot Password? reset” button from the login page. Enter the email address of player, and click reset password. System will send a email like Figure 5.4.5 to let user reset password and displayalert message for reset password like Figure 5.4.4.

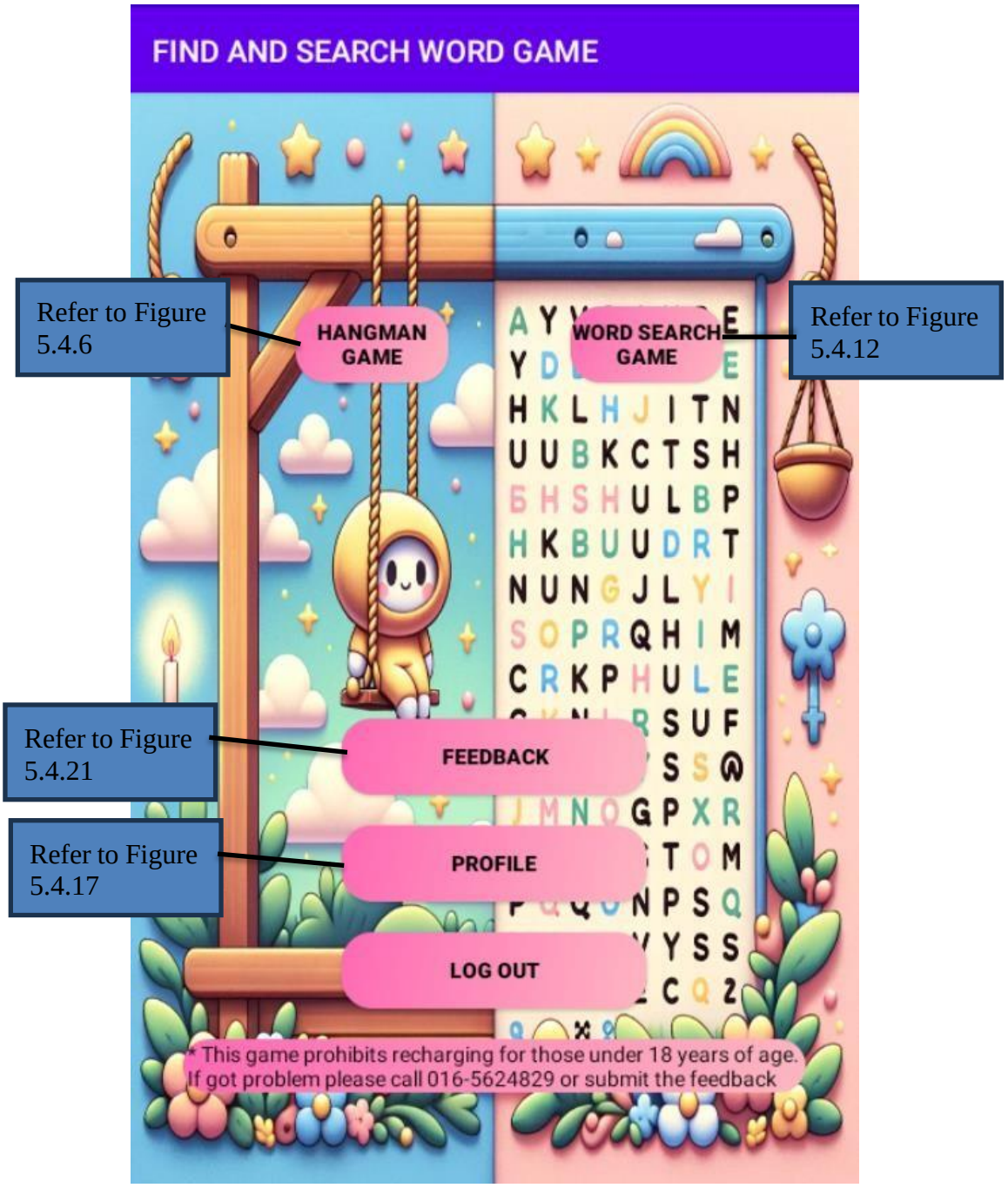


Figure 5.4.6 Game Home Page

Then main page game of after log in as show in Figure 5.4.5. This page display the hangman game button, word search game button, feedback button, profile button, and log out button. When click the log out button, it will turn back to the login page refer to Figure 5.4.1

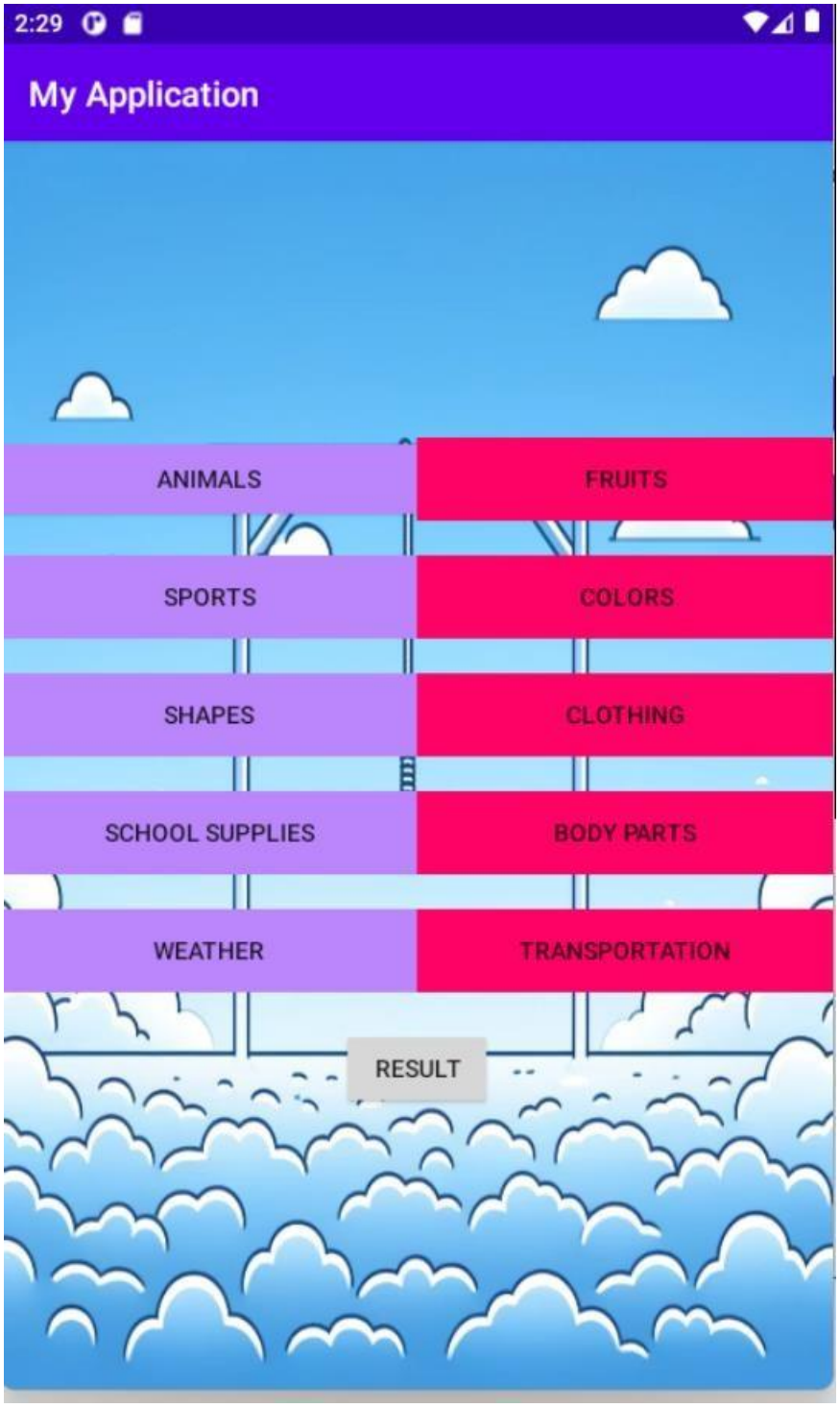


Figure 5.4.7 Hangman Category Choose Page

This Page is to present the categories choose of the hangman game.

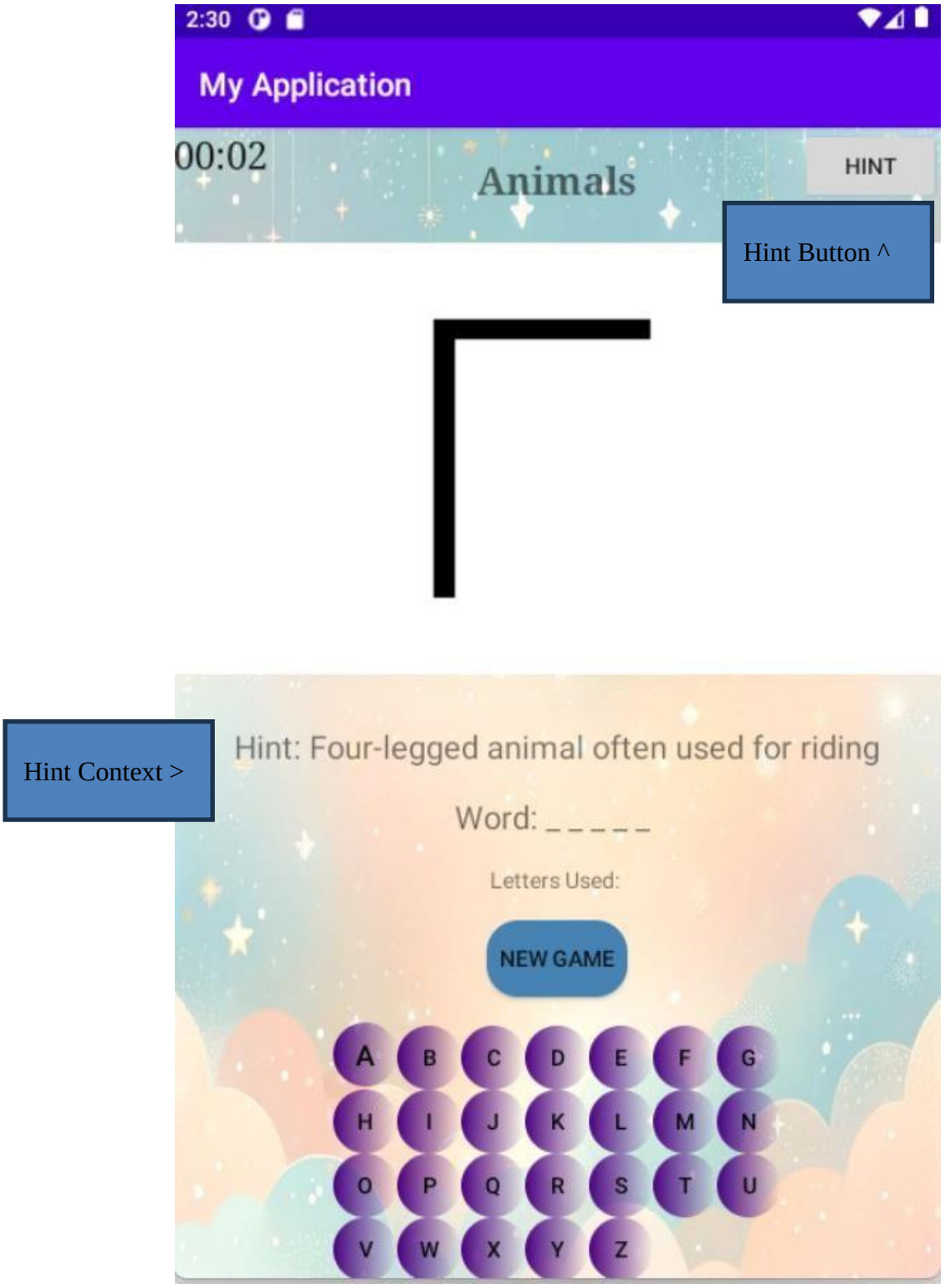


Figure 5.4.8 Hangman Display Game Page

This Page is about the Hangman game display the word need to guest and the hint context of the guessing word. Then, it also has time view and show the title of the categories.

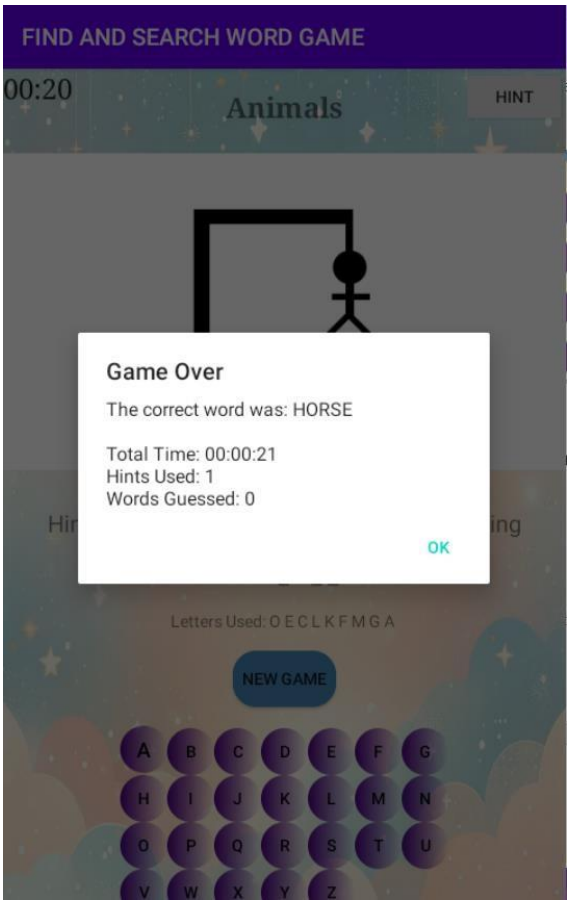


Figure 5.4.9 Game Over Display

This page show that when answer wrong for mistake seven time, and the result show message, save the result into firebase.

Figure 5.4.10 Alert Success Message

Alert Success Message if success guest the word, and click continues to be next question with keeping the previous mistakeerrors.

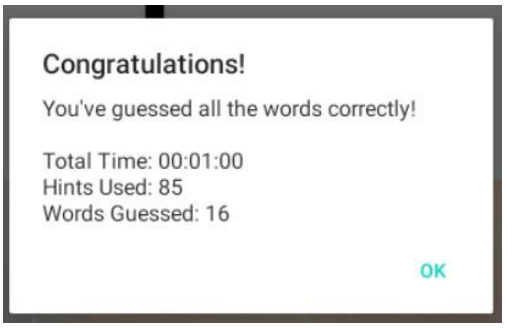


Figure 5.4.11 Success Message

Alert Message if success guest all the word and savethe result into firebase.

Figure 5.4.12 Result

The hangman result retrieve from firebase.

The result show 10 rank with words descending, time ascending, hints ascending, title alphabet ascending only.

Figure 5.4.13 Level Choosing

This figure is to display the level choose easy, medium, and hard. Then also have the result of different level.

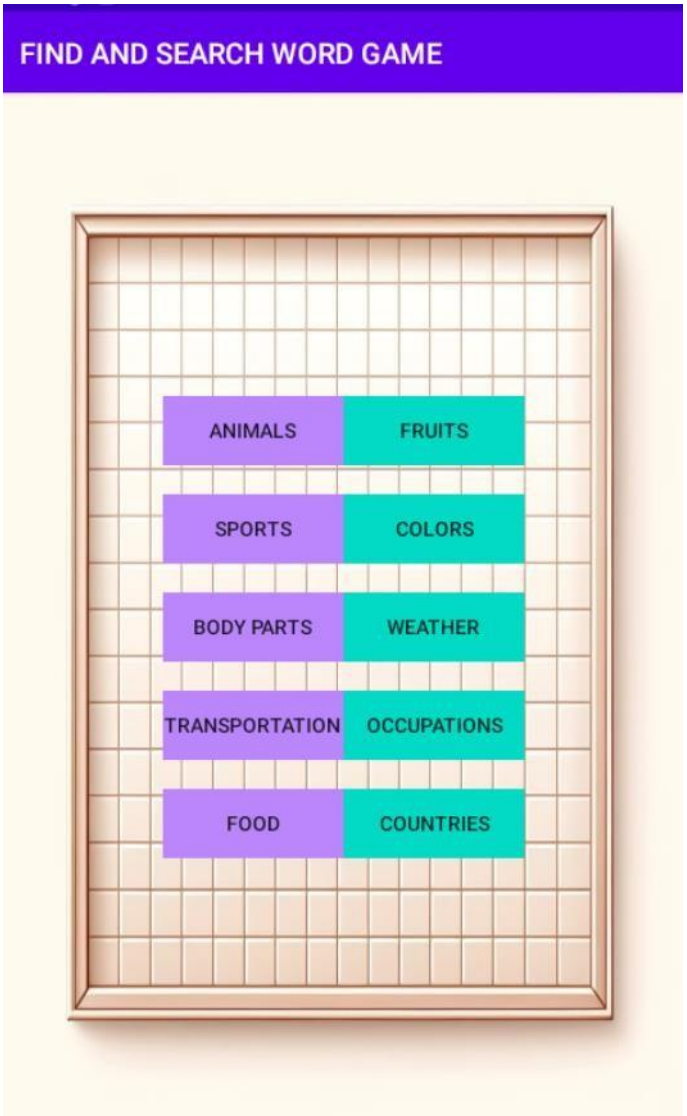


Figure 5.4.14 Categories Choose

This figure shows the categories of the word search game after choose the level.

Figure 5.4.15 Display Game

This figure shows the display game of word searh game, it have the time view, category title of player choose, hint button to let user click to show one random answer. The below is the list word view of the hidden word we want to find.

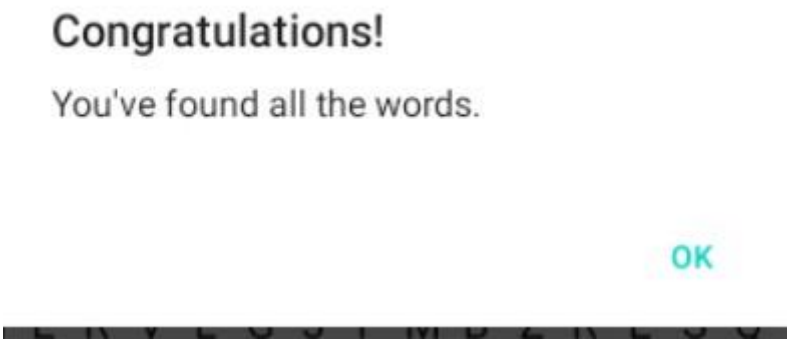


Figure 5.4.16 Succes Alert Message

This figure shows the success message of find all the hidden words and it will save the result automatically in firebase.

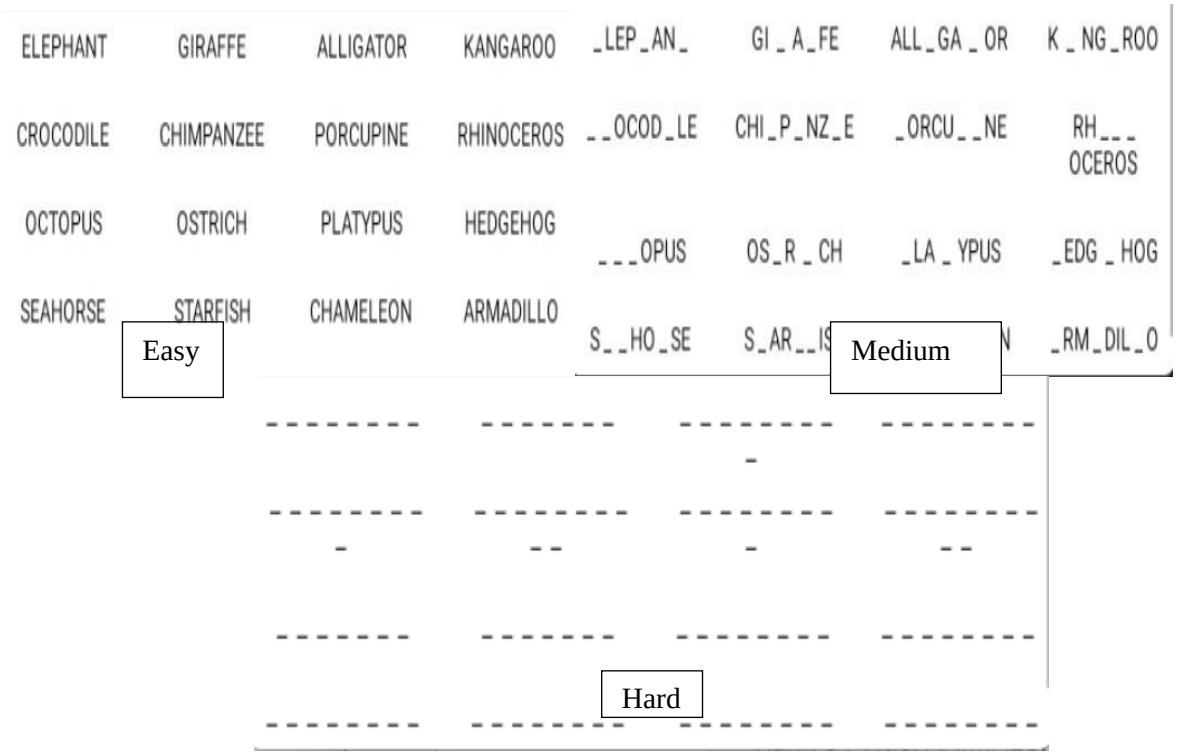


Figure 5.4.17 Different levels Page

This figure shows the 3 different levels of the hidden word need to find by player. Easy show fully word, medium show unfully word, hard show the long of the word only.

Figure 5.4.18 Word Search Result

The result show 10 rank with time ascending, hints ascending, title alphabet ascending only

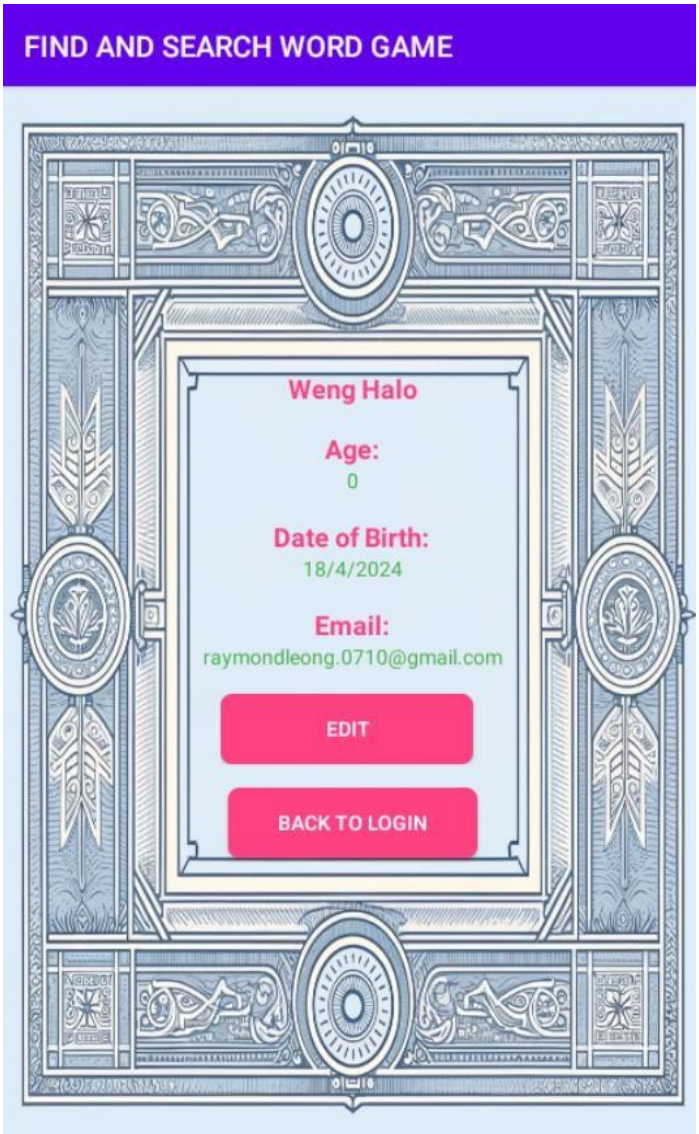


Figure 5.4.19 Profile page

This figure shows the profile information. Player can click edit change the user name and the date of birth.

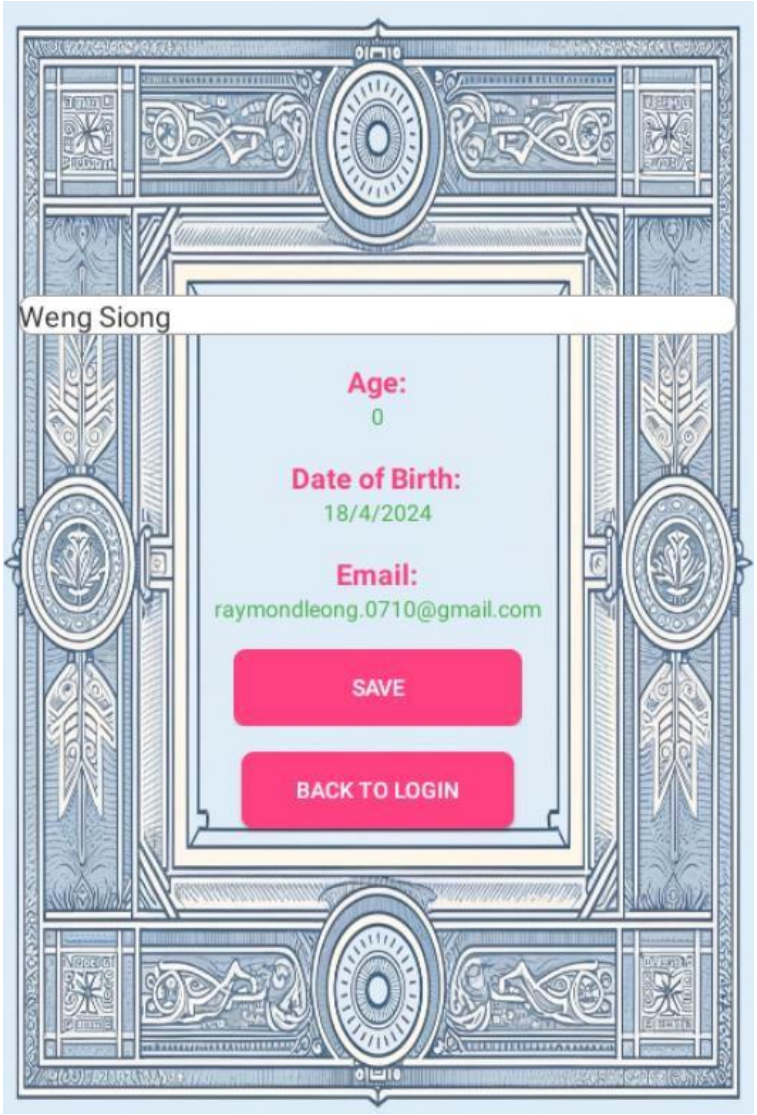


Figure 5.4.20 Edit Profile Page
This figure shows the edit of user name.

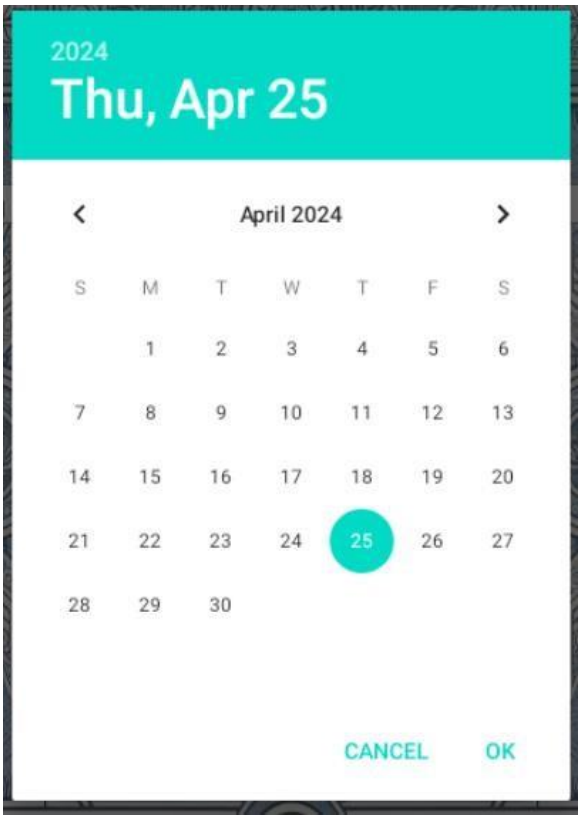


Figure 5.4.21 Date of Birth Edit

This figure shows the edit of date of birth..

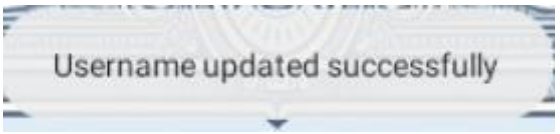


Figure 5.4.22 Success Message

This figure shows the edit success message and change the data to firebase.

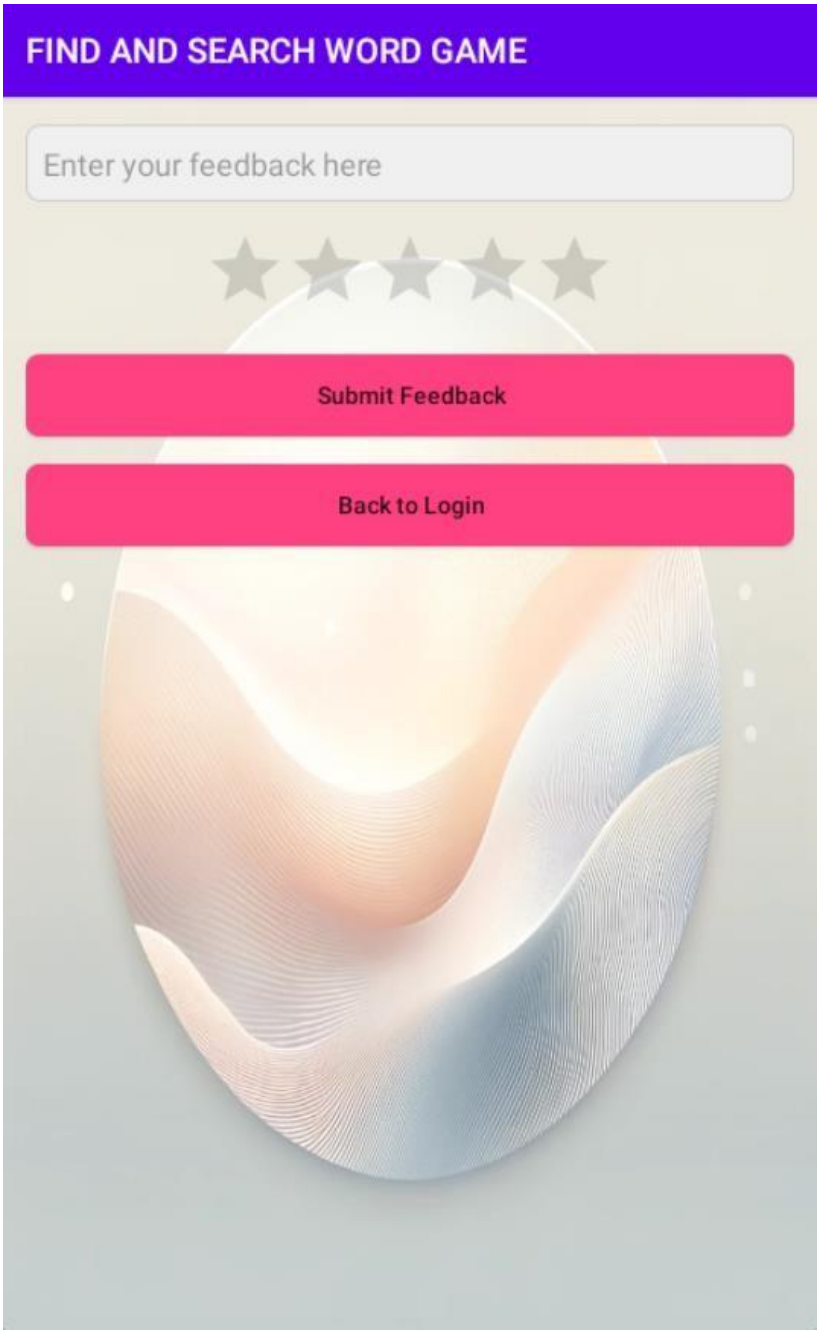


Figure 5.4.23 Feedback Page

This figure shows the adding of feedback with need adding the feedback and ranking. Click submit feedback button to submit form.

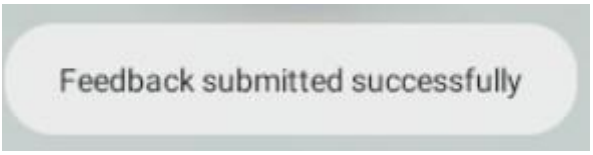


Figure 5.4.24 Feedback Submit success alert message and save in firebase

System Evaluation and Discussion

6.1 System Evaluation Survey Results

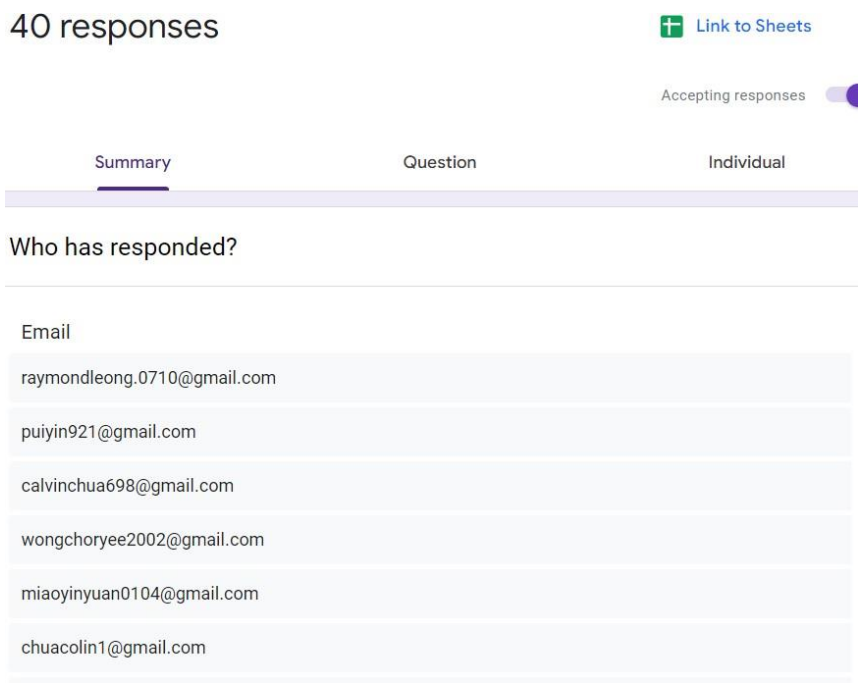


Figure 6.1.1 All Respondents

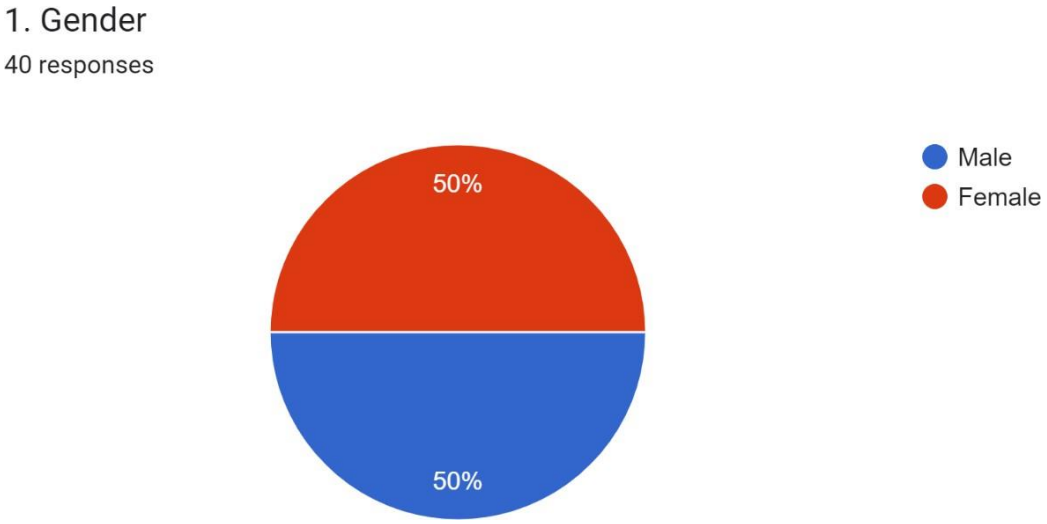


Figure 6.1.2 Demography Gender

Based on the survey result, 50% of the respondents is female and 50% of the respondents is male.

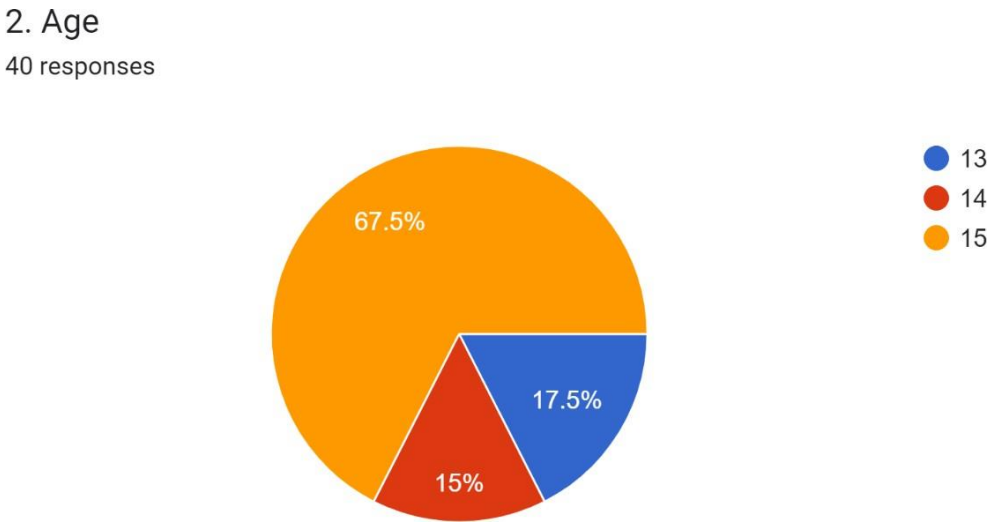


Figure 6.1.3 Demography Age

Based on the survey result, the highest of the respondents is 15 years with 67.5% and the lowest of the respondents is 14 years old with 15%.

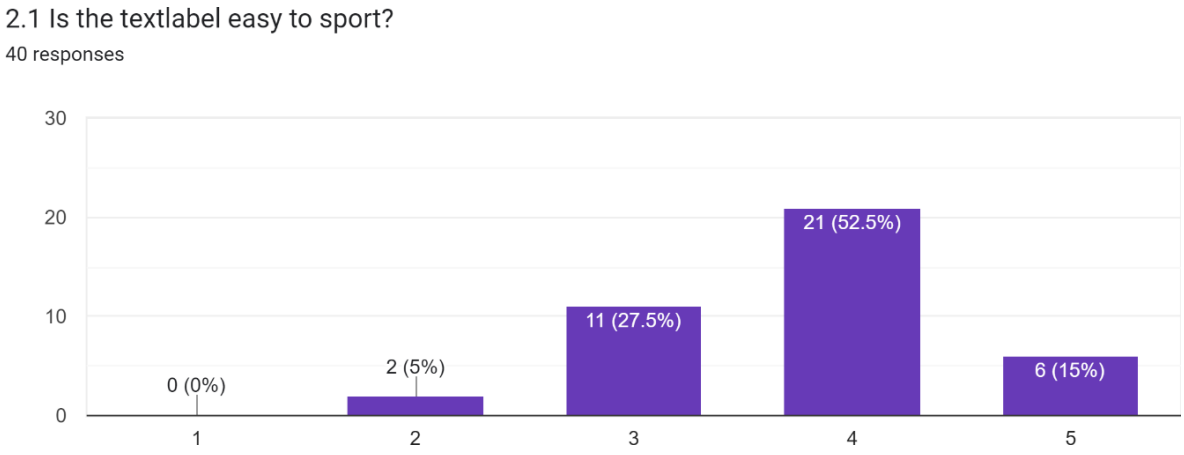


Figure 6.1.4 Interface design Hangman Game (1)

Based on the survey result, the highest is 52.5% of the respondents were satisfied with the textlabel easy to sport with 21 respondents, while the 5% of the respondents were not satisfied with the textlabel easy to sport with 2 respondents. Overall, this survey result of Find & Search Word Game application is easy to sport with many player satisfied and very satisfied, but still improve the textlabel in future because of a lot of player are not satisfied for the textlabel.

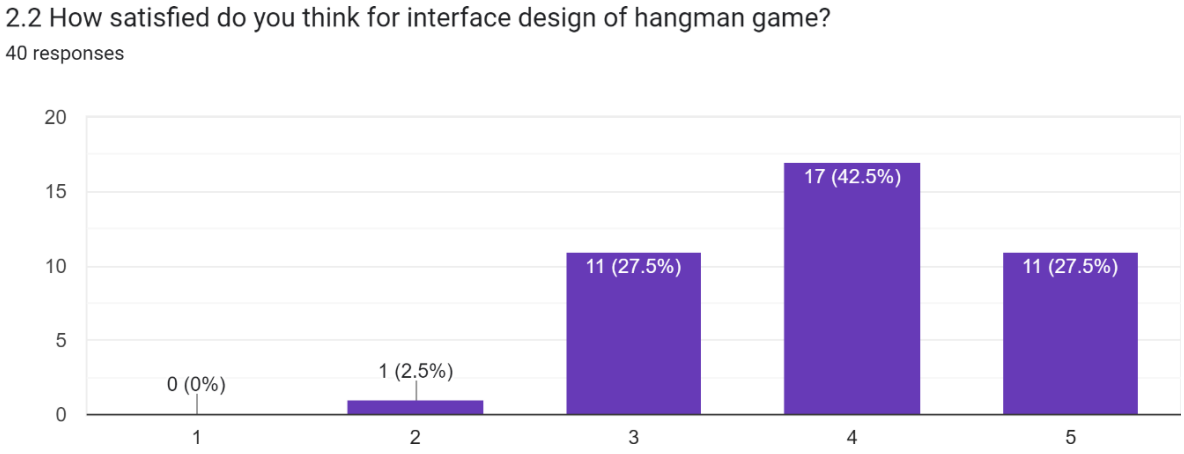
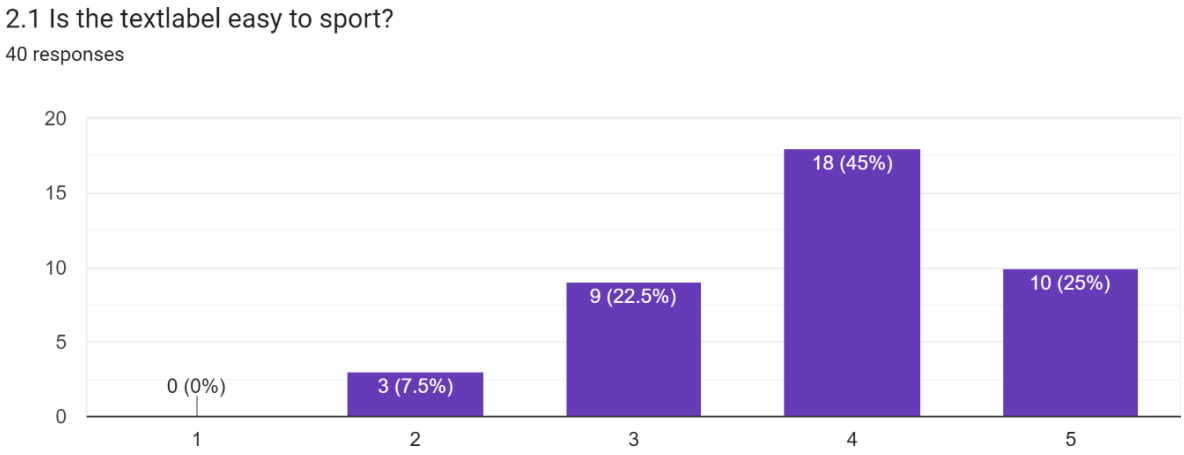


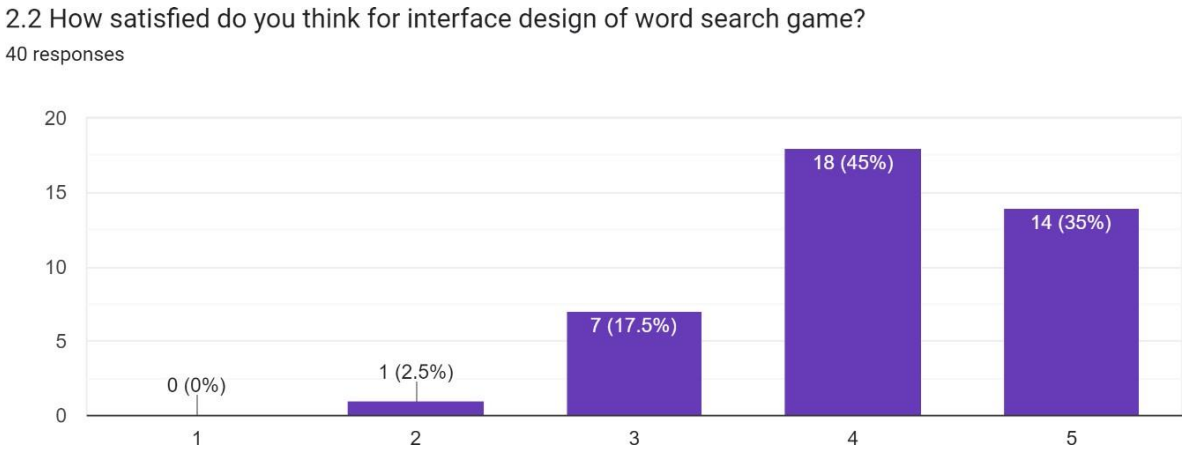
Figure 6.1.5 Interface design Hangman Game (2)

Judging from the survey results, the highest is 42.5% of the respondents are satisfied with the interface design of the Hangman game, with 17 respondents, while 0% of the respondents are dissatisfied with the interface design of the Hangman game, with 0 Respondents. Overall, most of the interviewees are satisfied with the interface design of Hangman game, and only a small number of interviewees feel that it needs improvement.



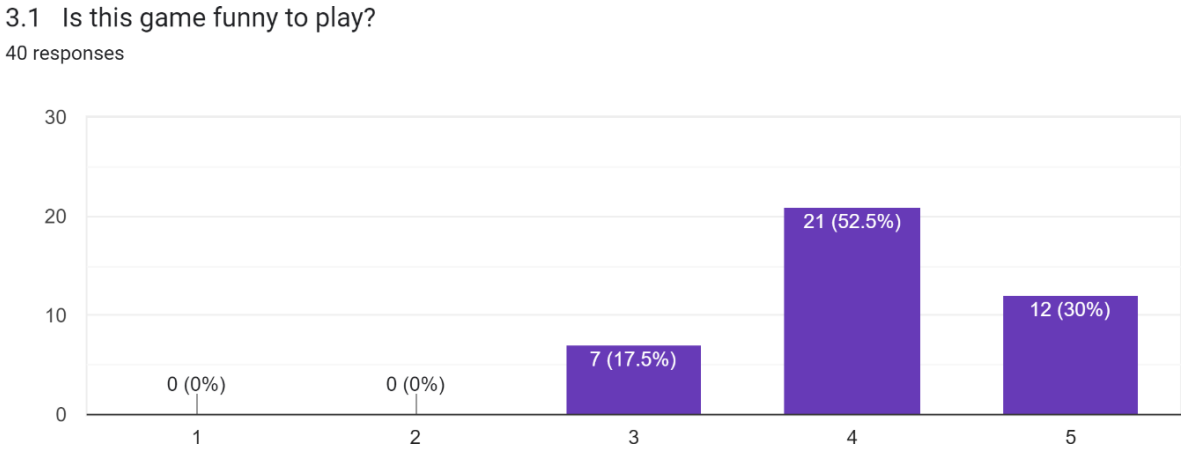
Based on the survey result, the highest is 45% of the respondents were satisfied with the textlabel easy to sport with 18 respondents, while the 0% of the respondents were not satisfied with the textlabel easy to sport with 0 respondents. Overall, this survey result of Find & Search Word Game application is easy to sport with many player satisfied and very satisfied, but still improve the textlabel in future because of a lot of player are not satisfied for the textlabel.

Figure 6.1.6 Interface design Word Search Game (1)



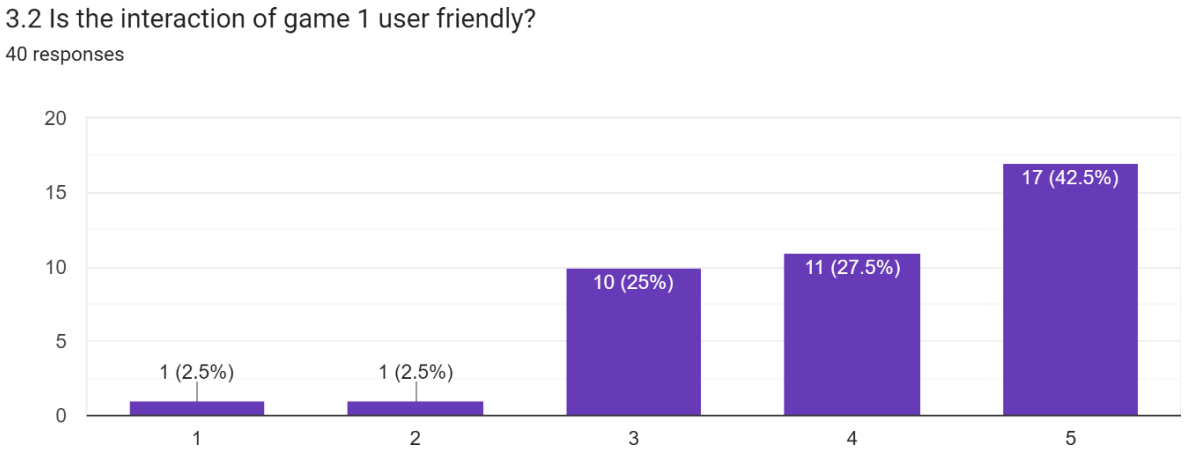
Judging from the survey results, the highest is 45% of the respondents are satisfied with the interface design of the Find & Search Word Game, with 18 respondents, while 0% of the respondents are dissatisfied with the interface design of theFind & Search Word Game, with 0 Respondents. Overall, most of the interviewees are satisfied with the interface design of Find & Search Word Game, and only a small number of interviewees feel that it needs improvement.

Figure 6.1.7 Interface design Word Search Game (2)



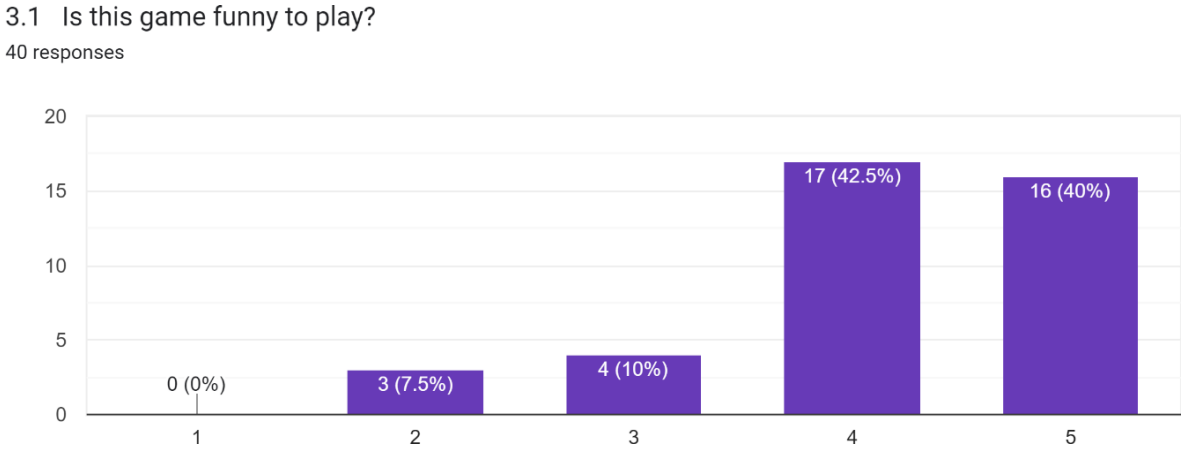
Judging from the survey results, the highest is 52.5% of the respondents are satisfied with the game is funny to play, with 21 respondents, while 0% of the respondents are dissatisfied with the game is funny to play, with 0 Respondents. Overall, most of the player are satisfied with the game is funny to play and love it.

Figure 6.1.8 User Experience Hangman Game (1)



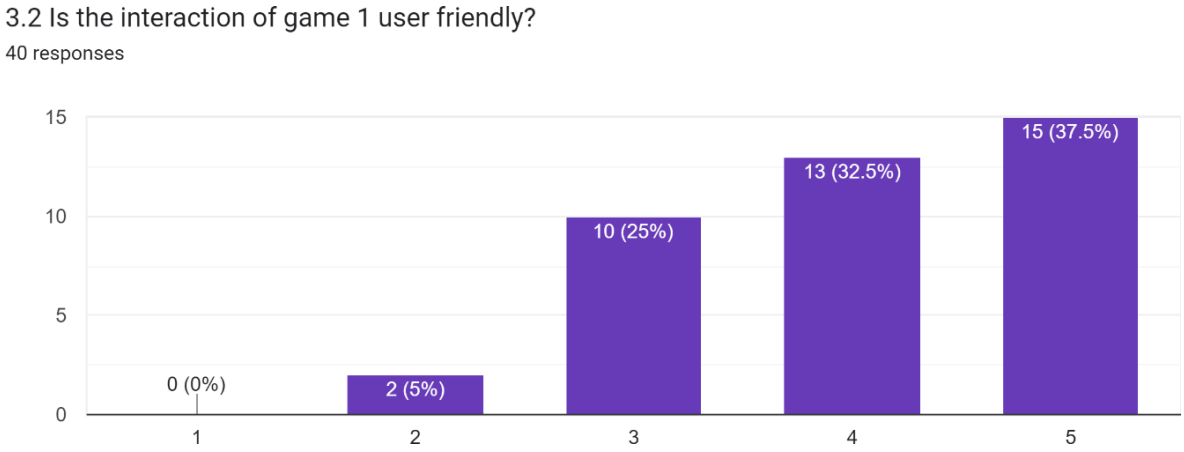
Judging from the survey results, the highest is 42.5% of the respondents are satisfied with the interaction of game 1 user friendly, with 17 respondents, while 2.5% of the respondents are dissatisfied with the interaction of game 1 user friendly, with 1 respondents. Overall, most of the interviewees feel that the interaction of game 1 user friendly is good,just a little bit interviewees feel bad.

Figure 6.1.9 User Experience Hangman Game (2)



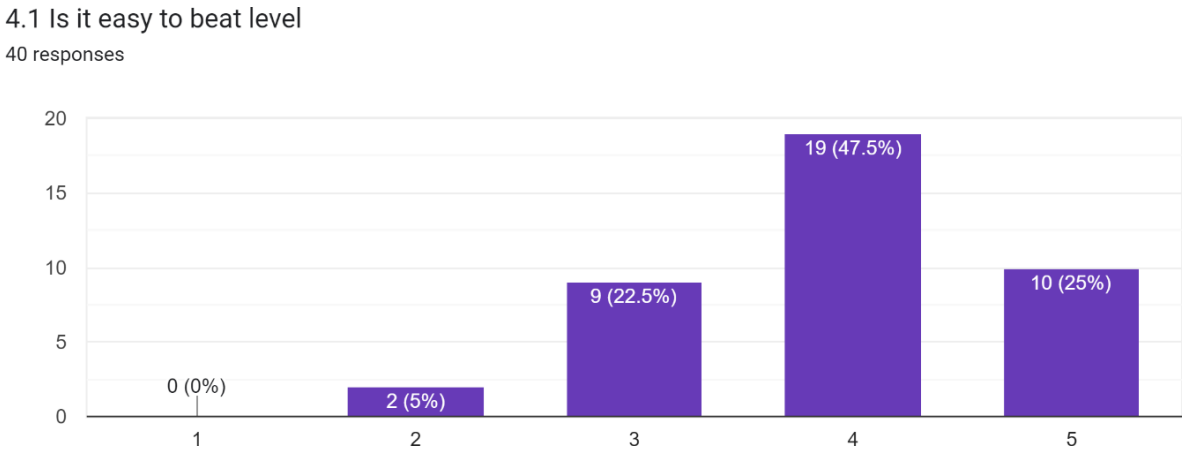
Judging from the survey results, the highest is 42.5% of the respondents are satisfied with the game is funny to play, with 17 respondents, while 0% of the respondents are dissatisfied with the game is funny to play, with 0 Respondents. Overall, most of the interviewees are satisfied with the game is funny to play and love it.

Figure 6.1.10 User Experience Word Search Game (1)



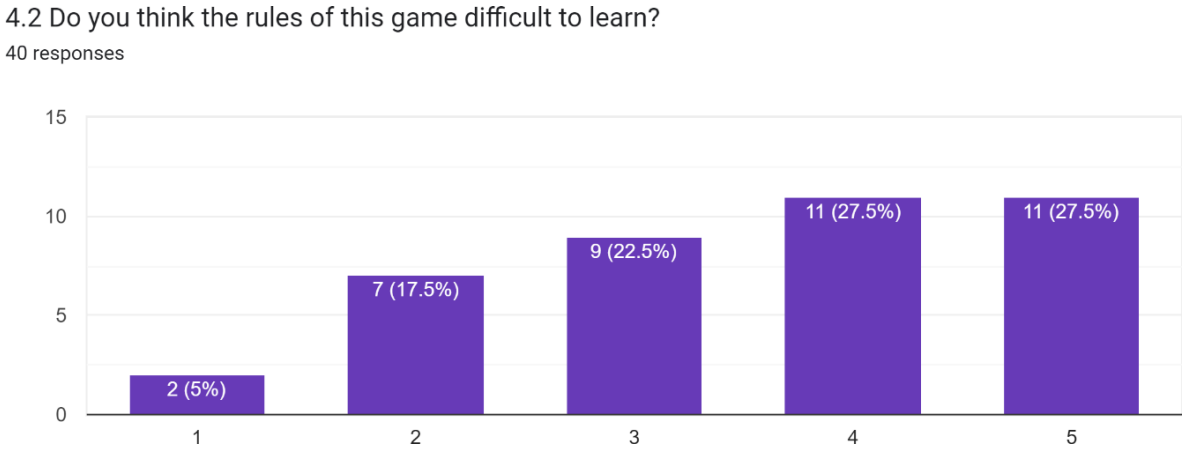
Judging from the survey results, the highest is 32.5% of the respondents are satisfied with the interaction of game 1 user friendly, with 13 respondents, while 0% of the respondents are dissatisfied with the interaction of game 1 user friendly, with o respondents. Overall, most of the interviewees feel that the interaction of game 1 user friendly is good,just a little bit interviewees feel bad.

Figure 6.1.11 User Experience Word Search Game (2)



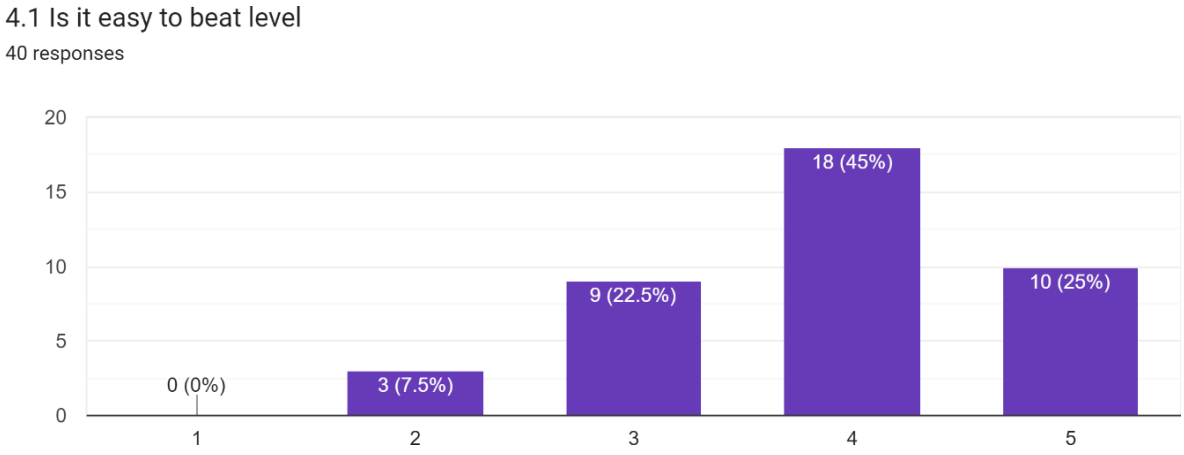
Judging from the survey results, the highest number of 47.5% of the respondents felt that the game was easy to clear, with 19 respondents, while 0% of the respondents felt that the game was difficult to clear, with 0 respondents. Overall, most interviewees feel that the game is easy to complete, so need to increase the difficulty of the game later.

Figure 6.1.12 Game Complexity Hangman Game (1)



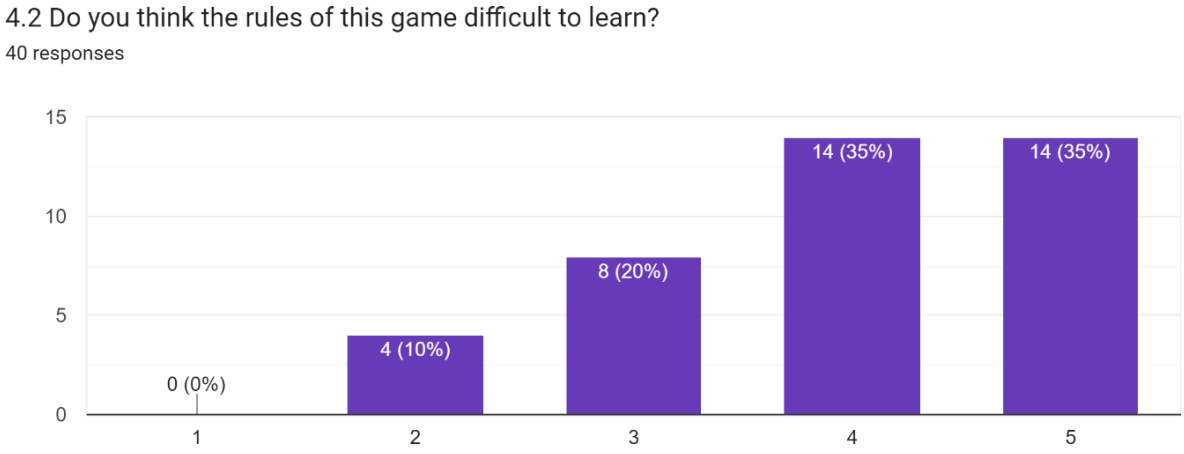
Judging from the survey results, the highest number of 27.5% of the respondents felt that the game rules is difficult to learn, with 11 respondents, while 5% of the respondents felt that the game rules is difficult to easy, with 2 respondents. Overall, most interviewees feel the this game rules is difficult to learn, so need to change to rules to moreeasy to lear later.

Figure 6.1.13 Game Complexity Hangman Game (1)



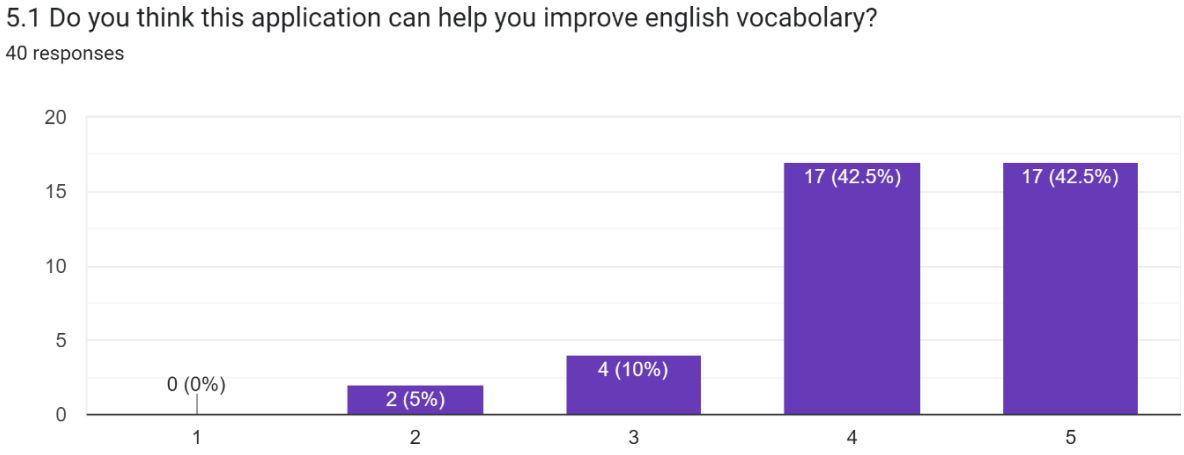
Judging from the survey results, the highest number of 45% of the respondents felt that the game was easy to clear, with 18 respondents, while 0% of the respondents felt that the game was difficult to clear, with 0 respondents. Overall, most interviewees feel that the game is easy to complete, so need to increase the difficulty of the game later.

Figure 6.1.14 Game Complexity Word Search Game (1)



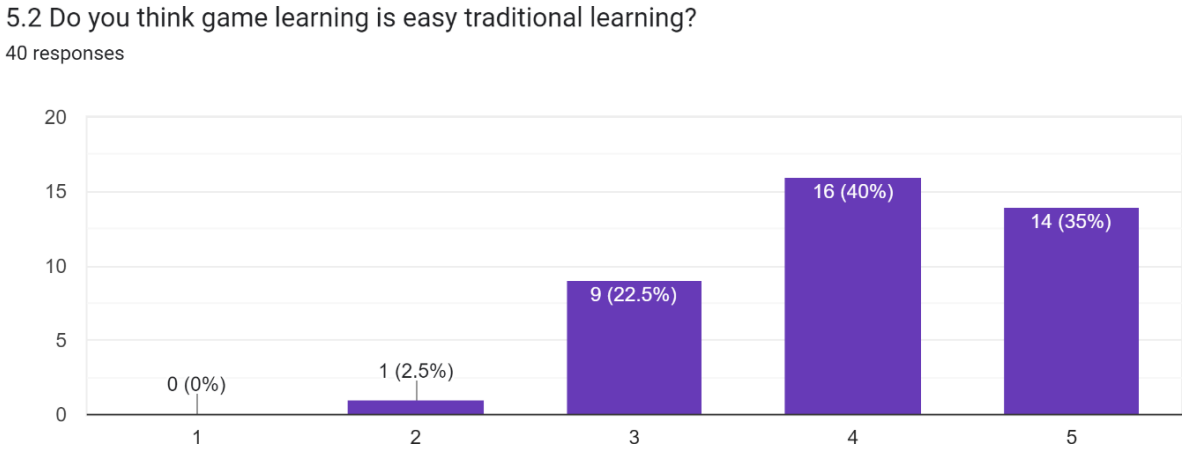
Judging from the survey results, the highest number of 35% of the respondents felt that the game rules is difficult to learn, with 14 respondents, while 0% of the respondents felt that the game rules is difficult to easy, with 0 respondents. Overall, most interviewees feel the this game rules is difficult to learn, so need to change to rules to moreeasy to lear later.

Figure 6.1.15 Game Complexity Word Search Game (2)



Judging from the survey results, the highest number of 42.5% of the respondents felt that the game can help they improve their english vocabolary, with 17 respondents, while 0% of the respondents felt that the game can't help they improve thier english vocabolary, with 0 respondents. Overall, most interviewees thing this game has help they improve thier english vocabolary.

Figure 6.1.16 Feedback (1)



Judging from the survey results, the highest number of 42.5% of the respondents felt that the game learning is easy than traditional learning , with 17 respondents, while 0% of the respondents felt that tthe game learning is hard than traditional learning , with 0 respondents. Overall, most interviewees feel the game learning is easy than traditional learning .

Figure 6.1.17 Feedback (2)

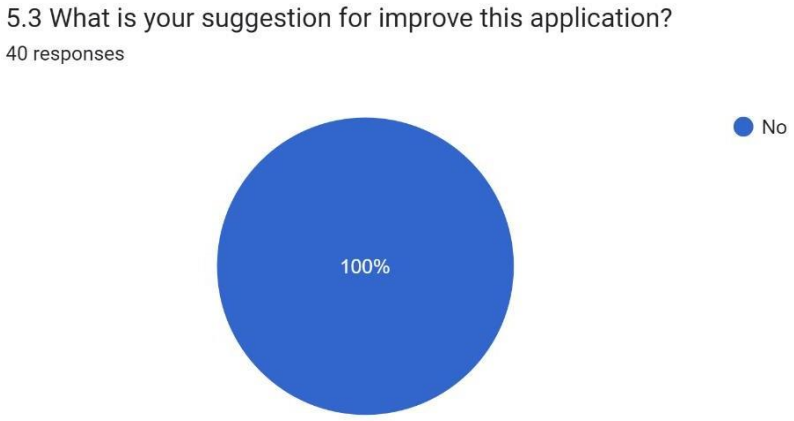


Figure 6.1.18 Feedback (3)

Judging from the survey results,is not has any suggestion for improve this application.

6.2 Testing Setup and Result

6.2.1 Unit Testing 1 - User Login

Input	Expected Output	Actual Output
Enter the correct email address and password to access the login.	The system enables the player to log in.	The player successfully login.
If the player enters the wrongemail address or password, they cannot access the login.	The system denies the player access to login.	The player is unable to login to the system.
If the user attempts to login without entering any values, the system will not allow access.	The system prohibits access for the player who attempts to login without entering any values.	The player is unable to loginto the system.
By clicking "Forgot Password," the system sends an email with instructions to reset the password.	The user can reset their password using the instructions in the email.	The player can create a newpassword by resetting it
Clicking "Not have account? Register" will redirect the player to the registration page	The system will redirect the user to the registration page upon clicking "Not have account? Register."	The player can navigate to theregistration page.

Table 6.2.1.1 *Unit Testing 1 - User Login*

6.2.2 Unit Testing 2 - Register Login

Input	Expected Output	Actual Output
The player completed all required text fields.	The registration procedure went well.	A new user account for the player has been created.
The player typed an email address that was not valid.	The registration effort was unsuccessful.	The player did not successfully create a new user account.

The player typed in a password with more than 6 -15 characters and password should contain at least one number, one lowercase letter, one uppercase letter, and one special character.	The registration attempt was rejected.	The player did not successfully create a new user account.
The player did not fill out any fields before clicking the register button.	The registration attempt was a failure.	The player did not successfully create a new user account.
Clicking the sign up button.	The user will be directed to the admin login page by the system.	The user can go to the admin page after the redirection is accomplished.

Table 6.2.2.1 *Unit Testing 2 - Register*

6.2.3 Unit Testing 3 –Game Main Page

Input	Expected Output	Actual Output
The player able to view and choose the button of game main page.	The player will able to view and click all the button.	All the button has beenshown in this page and can be click.
By clicking on the “Hangman” button, the system immediately redirect theuser to the dedicated “Hangman Main” page.	After clicking on the "Hangman" button, the player will be directed to the dedicated "Hangman Main" page.	The system successfully redirect the user to the dedicated "Hangman Main" page
By clicking on the “WORD SEARCH GAME” button, the system immediately redirect theuser to the dedicated “Word Seacrh Game Main” page.	After clicking on the " WORD SEARCH GAME " button, the player will be directed to the dedicated " Word Seacrh Game Main " page.	The system successfully redirect the user to the dedicated " Word Seacrh Game Main " page
By clicking on the “Feedback” button, the system immediately redirect theuser to the dedicated “Feedback” page.	After clicking on the " Feedback " button, the player will be directed to the dedicated " Feedback " page.	The system successfully redirect the user to the dedicated " Feedback " page
By clicking on the “Profile” button, the system immediately redirect theuser to the dedicated “Profile” page.	After clicking on the " Profile " button, the player will be directed to the dedicated " Profile " page.	The system successfully redirect the user to the dedicated " Profile " page

By clicking on the “Log Out” button, the system immediately redirect the user to the dedicated “Login” page.	After clicking on the "Log Out" button, the player will be directed to the dedicated "Login" page.	The system successfully redirect the user to the dedicated " Login " page

Table 6.2.3.1 *Unit Testing 3 – Game Main Page*

6.2.4 Unit Testing 4 – Hangman Game Main Page

Input	Expected Output	Actual Output
View the categories list button of Hangman game	The player will able to view and click all the button.	All the button has beenshown in this page and can be click.
If the player edit will empty	After clicking on the " Categories " button, the player will be directed to the dedicated " HangmanGame " page.	The system successfully redirect the user to the dedicated " HangmanGame " page
By clicking on the “Result” button, the system immediately redirect theuser to the dedicated “Result” page.	After clicking on the " Result " button, the player will be directed to the dedicated " Result " page.	The system successfully redirect the user to the dedicated " Result" page

Table 6.2.4.1 *Unit Testing 4 – Hangman Game Main Page*

6.2.5 Unit Testing 5 –Profile Page

Input	Expected Output	Actual Output
The player completed change the user name or date of birth	The edit procedure went well.	A new user name or date of birth with be update in firebase.

If the player enters the empty user name.	The system denies the edit of user name.	The player is unsucess to edit the user name.
If the player enters the empty date of birth.	The system denies the edit of date of birth.	The player is unsucess to edit the date of birth.

Table 6.2.5.1 *Unit Testing 5 – Profile Page*

6.2.6 Unit Testing 6 –Feedback Page

Input	Expected Output	Actual Output
The player fill in all fields with correct and no null	The save procedure went well.	A new feedback data with be save in firebase.
If the player enters the no fill in all the fields.	The system denies the save of the feedback data.	The player is unsucess to save the data of feedback.
If the player enters the empty date of birth.	The system denies the edit of date of birth.	The player is unsucess to edit the date of birth.

Table 6.2.6.1 *Unit Testing 6 – Feedback Page*

6.2.7 Unit Testing 7 –Hangman Result Page

Input	Expected Output	Actual Output
View the information of hangman result.	It wills show the result as well.	It will show the result from firebase.
If the any data in the firebase.	The system will now show anything.	The system show blank.

Table 6.2.7.1 *Unit Testing 7 – Hangman Result Page*

6.2.8 Unit Testing 8 –Word Searh Game Result Page

Input	Expected Output	Actual Output
View the information of word search game result.	It wills show the result as well.	It will show the result from firebase.
If the any data in the firebase.	The system will now show anything.	The system show blank.

Table 6.2.8.1 *Unit Testing 8 – Word Search Game Result Page*

6.3 Project Challenges

In the process of developing a system, we usually face different challenges. The first oneis insufficient computer storage space. This is because a large number of files need to be downloaded during development to support the running of the application. Therefore, thisproblem also results in reducing the time spent on projects in exchange for clearing storage space. Therefore, it is necessary to increase or delete computer storage space.

The second problem is network problems. Since the network in my area is good and bad,and I need firebase for storage and retrieval, network delays also lead to frequent codingproblems, so a stable network is needed.

6.4 Objective Evaluations

The first goal is to provide different difficulties and successful gamification methods to help players increase their engagement and enthusiasm for learning. The second one, coupled with contextual hints, was successfully implemented to help players improve theirmemory and allow them to better apply words in the right place. Finally, the ban on underage recharge successfully reduced the abuse of money by teenagers.

Chapter 7

Conclusion and Recommendation

7.1 Conclusion

The proposed gamified learning and responsible gaming and learning behaviors aim to provide a better educational experience while increasing (especially among adolescents) motivation towards learning. Architecturally, we have a user-friendly interface, different levels of game difficulty and logic, reminders for recharge and consumption by those under 18, and use Firebase as data storage to avoid data loss.

The Gantt chart also details the time usage from requirements collection, data reference, design to prototype construction and the completed time usage. In the future, we will also collect feedback through questionnaires in order to continuously improve and improve.

Our game hopes to allow players to develop healthy and good gaming habits by prohibiting consumption by minors, thereby reducing the impact of the game on players' lives or health. We also hope that players can learn more vocabulary and useit in an enjoyable way. Correct application in real life. Ultimately, we want players to be able to experience learning gamified while having fun, especially for students.

7.2 Recommendation

To improve the project, it is recommended to give priority to adding situational drama, such as an animation of drinking tea in a milk tea shop as a prompt, and then let the players guess what is in that scene. If the answer is correct, the character makes the next move and the player continues guessing. This is because compared to traditional methods, the form of animation attracts players' attention and enthusiasm more. Furthermore, presenting it in a plot format will make it easier for players to remember the vocabulary. Next time you encounter the same scene, your mind will automatically connect related words.

REFERENCES

[1] Ash.Turner.“3.12 billion more phones than people in the world!” BankMyCell. https://www.bankmycell.com/blog/how-many-phones-are-in-the-world

[2] R. Smiderle, S. J. Rigo, L. B. Marques, J. A. Peçanha de Miranda Coelho, and P. A. Jaques, “The impact of gamification on students’ learning, engagement and behavior based on their personality traits,” Smart Learning Environments, vol. 7, no. 1, Jan. 2020, Available: https://slejournal.springeropen.com/articles/10.1186/s40561-019-0098-x

[3] Zai Fengyu, “The Impact of Vocabulary Learning Methods on Students’ Vocabulary Application Skills,” *English language teaching and linguistics studies*, vol. 5, no. 4, pp. p206–p206, Oct. 2023, doi: https://doi.org/10.22158/eltls.v5n4p206.

[4] S. R. Yazid, D. F. Heriyawati, and J. Mistar, “UNVEILING STUDENT PERSPECTIVES: EXPLORING THE IMPACT OF GAMIFICATION IN ENGLISH LANGUAGE TEACHING,” *English Review: Journal of English Education*, vol. 12, no. 1, pp. 137–148, 2024, doi: https://doi.org/10.25134/erjee.v12i1.9371.

[5] Q. Wang, “Memorization strategy and foreign language learning: a narrative literature review,” *Frontiers in Psychology*, vol. 14, Sep. 2023, doi: https://doi.org/10.3389/fpsyg.2023.1261220.

[6] C. Hellström, K. W. Nilsson, J. Leppert, and C. Åslund, “Influences of motives to play and time spent gaming on the negative consequences of Adolescent Online Computer Gaming,” Computers in Human Behavior, vol. 28, no. 4, 2012, pp. 1379–

1387, doi:10.1016/j.chb.2012.02.023

[7] J. F. Gosselt, Off limits. the effectiveness of age limits in reducing underage sales. doi:10.3990/1.9789036532617

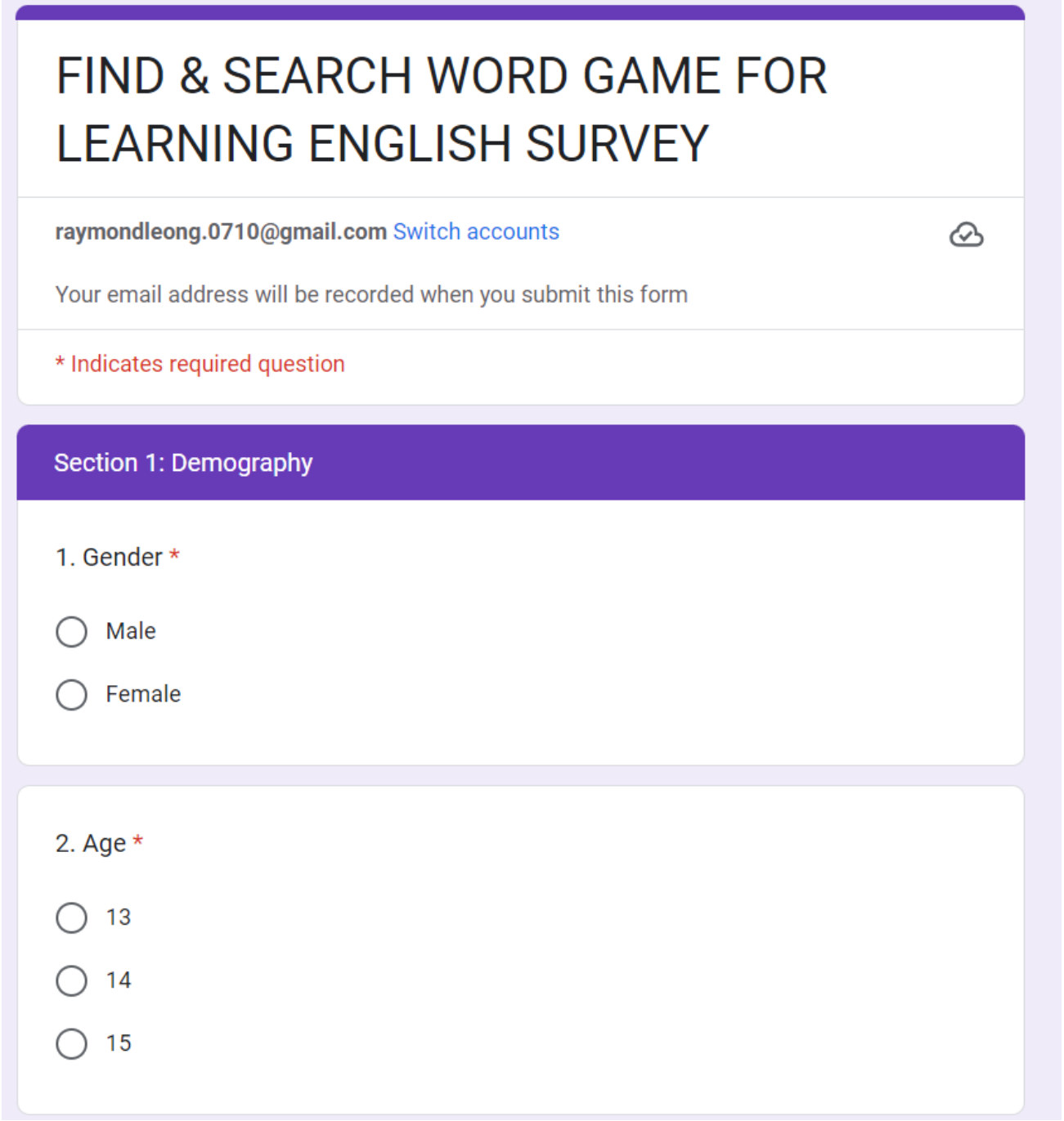
[8] “Words of wonders: Crossword - apps on google play,” Google, https://play.google.com/store/apps/details?id=com.fugo.wow&hl=en&gl=US (accessed Sep. 7, 2023).

[9] “Crosswords with Friends - Apps on Google Play,” Google, https://play.google.com/store/apps/details?id=com.zynga.crosswordswithfriends&hl=en_US (accessed Sep. 7, 2023).

[10] “Sudoku - classic Sudoku Puzzle - apps on Google Play,” Google, https://play.google.com/store/apps/details?id=easy.sudoku.puzzle.solver.free (accessed Sep. 7, 2023).

APPENDIX

System Evaluation Survey Form *(Project II)*



FIND & SEARCH WORD GAME FOR LEARNING ENGLISH SURVEY

raymondleong.0710@gmail.com Switch accounts

Your email address will be recorded when you submit this form

* Indicates required question

Section 1: Demography

1. Gender *

- Male
- Female

2. Age *

- 13
- 14
- 15

Section 2 : Interface Design

Hangman Game

2.1 Is the textlabel easy to sport? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

2.2 How satisfied do you think for interface design of hangman game? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Word Search Game

2.1 Is the textlabel easy to sport? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

2.2 How satisfied do you think for interface design of word search game? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Section 3 : User Experience

Hangman Game

3.1 Is this game funny to play? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

3.2 Is the interaction of game 1 user friendly? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Word Search Game

3.1 Is this game funny to play? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

3.2 Is the interaction of game 1 user friendly? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Section 4: Game Complexity

Hangman Game

4.1 Is it easy to beat level *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

4.2 Do you think the rules of this game difficult to learn? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Word Search Game

4.1 Is it easy to beat level *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

4.2 Do you think the rules of this game difficult to learn? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

Section 5: Feedback

5.1 Do you think this application can help you improve english vocabolary? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

5.2 Do you think game learning is easy traditional learning? *

	1	2	3	4	5	
Not Satisfied	○	○	○	○	○	Satisfied

5.3 What is your suggestion for improve this application? *

- ○ No
- ○ Other: _____

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:2**
Student Name & ID: Leong Weng Siong 21ACB03036	
Supervisor: Miss. Tong Dong Ling	
Project Title: FIND & SEARCH WORD GAME FOR LEARNING ENGLISH	

1. WORK DONE

- No work completed in week 2

2. WORK TO BE DONE

- change the new problem statements and defining project scope and objective

3. PROBLEMS ENCOUNTERED

- No problem in week 2

4. SELF EVALUATION OF THE PROGRESS

- The starting progress is well as easy.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:4**
Student Name & ID: Leong Weng Siong 21ACB03036	
Supervisor: Miss. Tong Dong Ling	
Project Title: FIND & SEARCH WORD GAME FOR LEARNING ENGLISH	

1. WORK DONE

- Done idea of new problem statement and project objective

2. WORK TO BE DONE

- Complete the task of prototype.

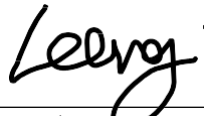
3. PROBLEMS ENCOUNTERED

- Need to change the feature of prototype for new problem statement

4. SELF EVALUATION OF THE PROGRESS

- Project goes according to the timeline.

Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:6**
Student Name & ID: Leong Weng Siong 21ACB03036	
Supervisor: Miss. Tong Dong Ling	
Project Title: FIND & SEARCH WORD GAME FOR LEARNING ENGLISH	

1. WORK DONE

- Done several task of prototype.

2. WORK TO BE DONE

- Do the survey form and complete all task of prototype.

3. PROBLEMS ENCOUNTERED

- prototype too many bug, need spend more time to complete.

4. SELF EVALUATION OF THE PROGRESS

- cannot complete all the task of prototype as well.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:8**
Student Name & ID: Leong Weng Siong 21ACB03036	
Supervisor: Miss. Tong Dong Ling	
Project Title: FIND & SEARCH WORD GAME FOR LEARNING ENGLISH	

1. WORK DONE

- Done survey form.

2. WORK TO BE DONE

- Do the report that need.

3. PROBLEMS ENCOUNTERED

- too many test in this week, the time using for final year project less.

4. SELF EVALUATION OF THE PROGRESS

- Project goes smooth to the timeline.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:10**
Student Name & ID: Leong Weng Siong 21ACB03036	
Supervisor: Miss. Tong Dong Ling	
Project Title: FIND & SEARCH WORD GAME FOR LEARNING ENGLISH	

1. WORK DONE

- Done prototype and some part of report.

2. WORK TO BE DONE

- Do complete report as fast as well.

3. PROBLEMS ENCOUNTERED

- Need to change the UI of prototype and some bug.

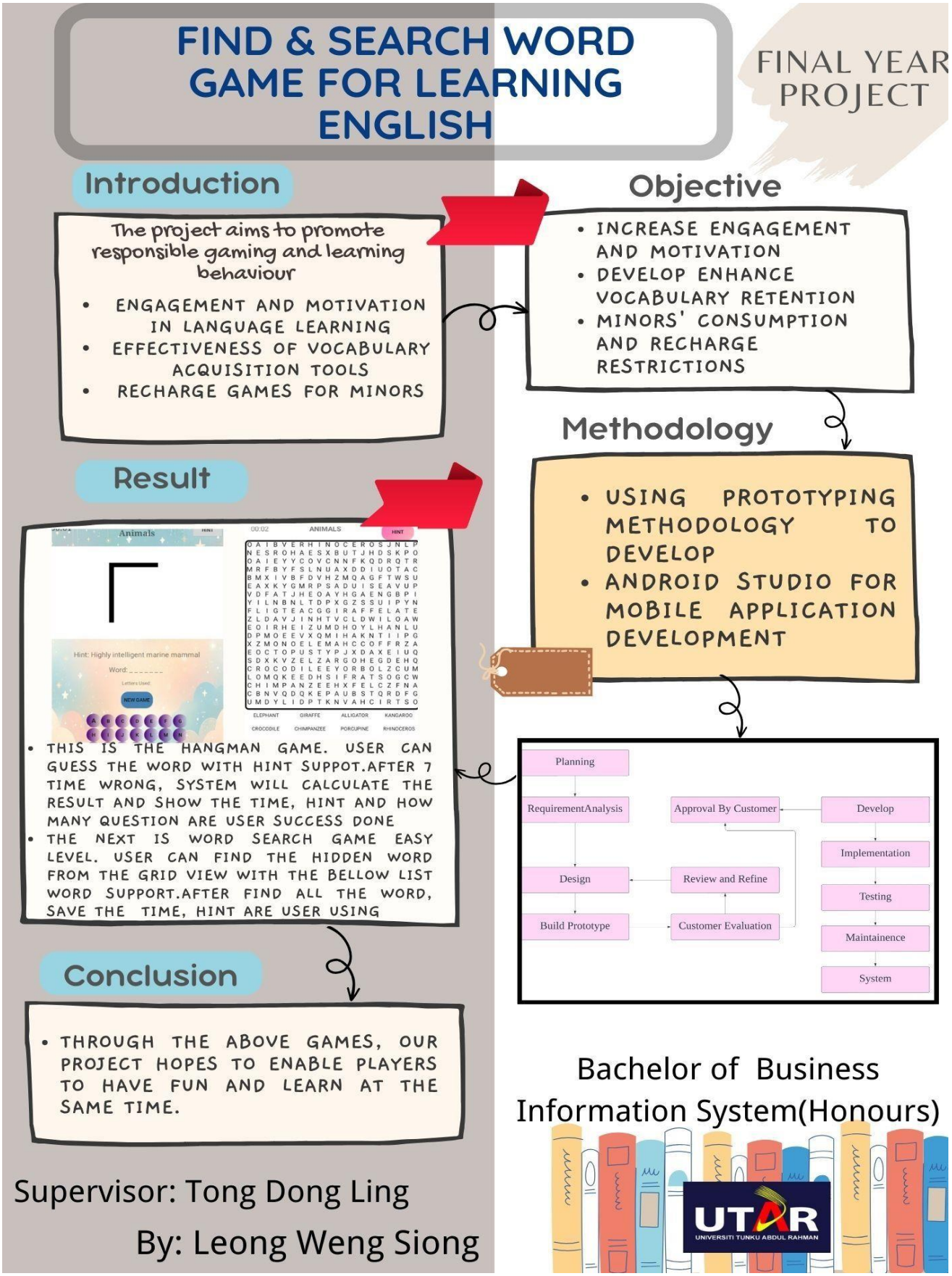
4. SELF EVALUATION OF THE PROGRESS

- Project goes according to the timeline.

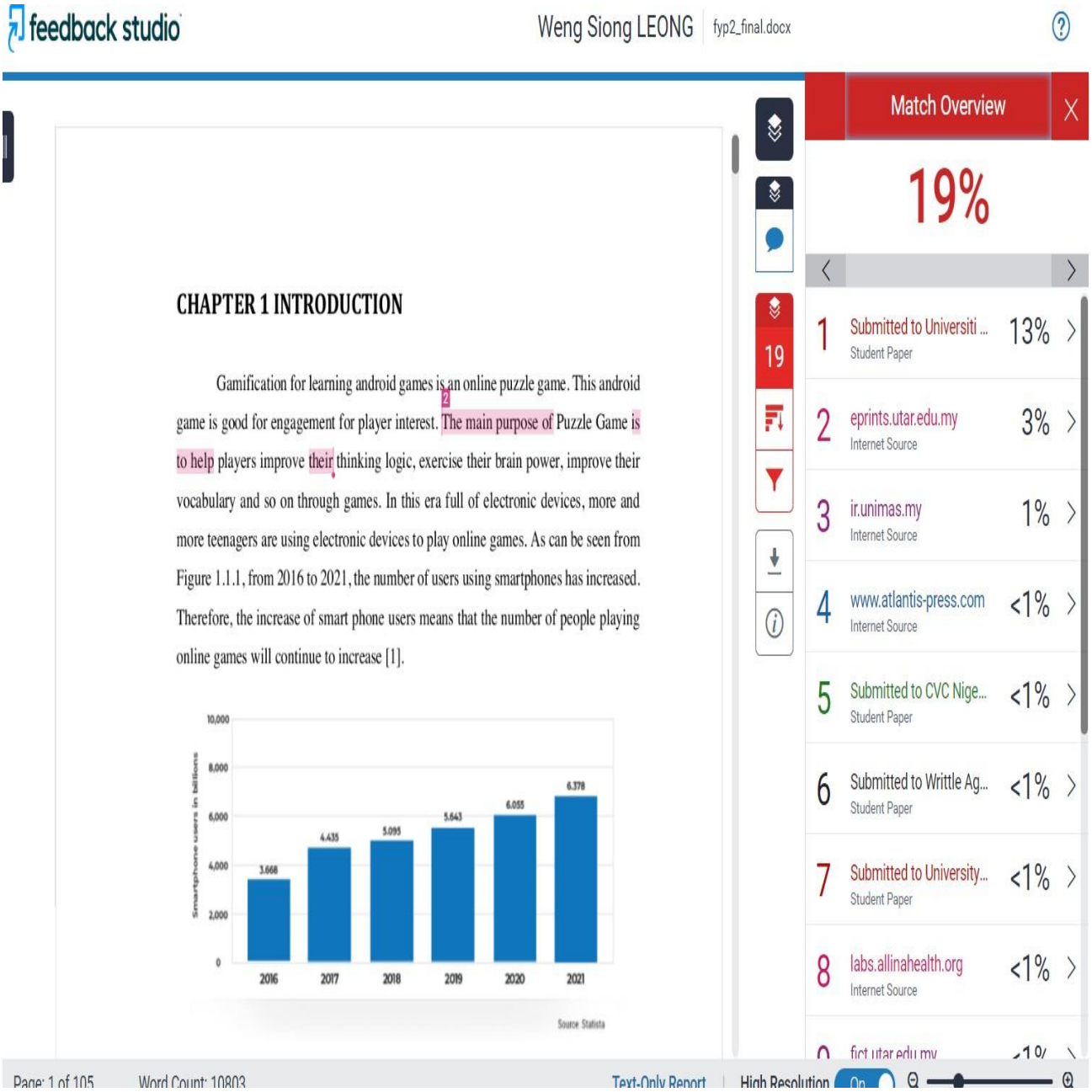
Supervisor's signature

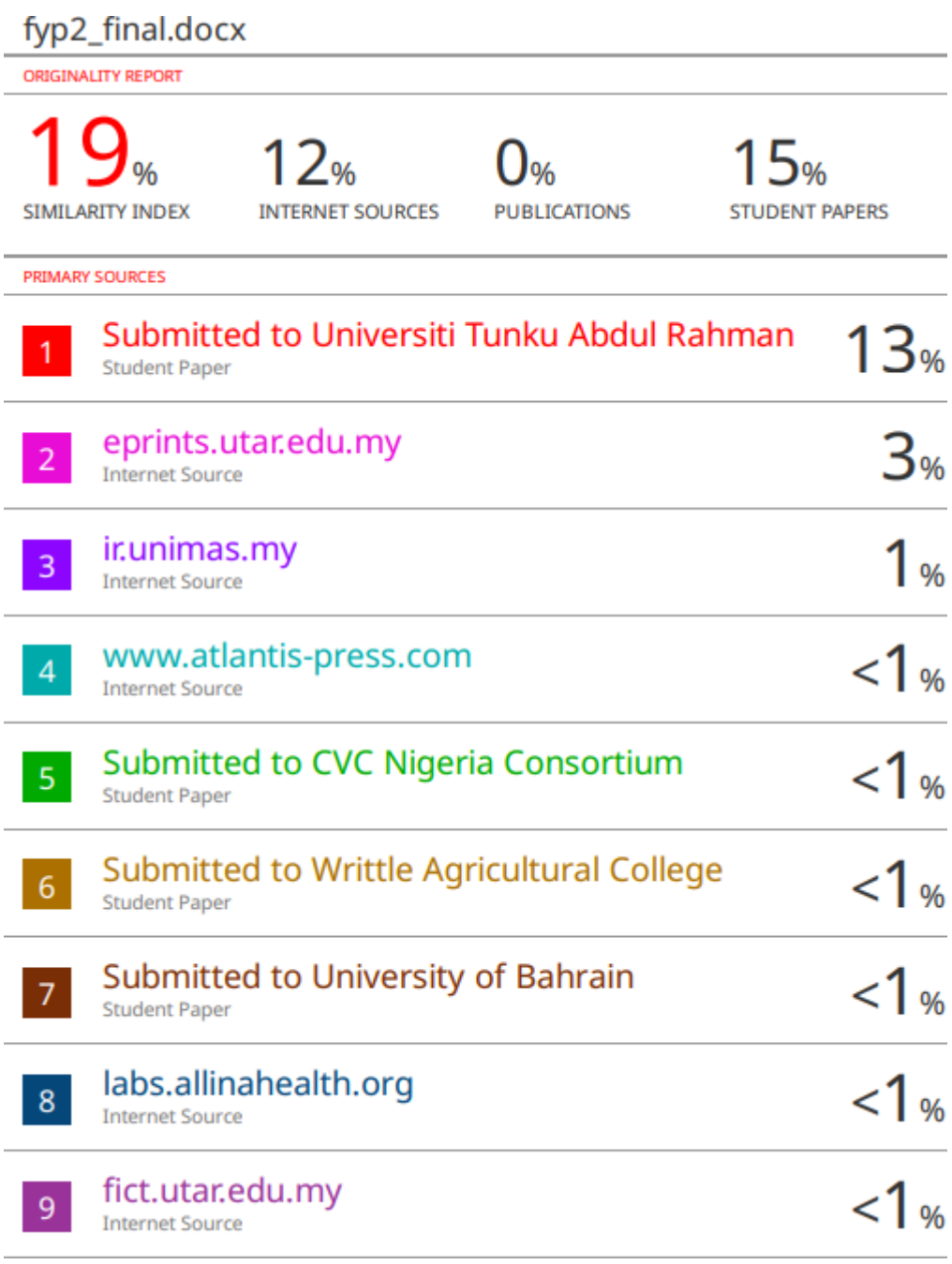
Student's signature

POSTER


FIND & SEARCH WORD GAME FOR LEARNING ENGLISH
FINAL YEAR PROJECT
Introduction
The project aims to promote responsible gaming and learning behaviour
• ENGAGEMENT AND MOTIVATION IN LANGUAGE LEARNING
• EFFECTIVENESS OF VOCABULARY ACQUISITION TOOLS
• RECHARGE GAMES FOR MINORS
Objective
• INCREASE ENGAGEMENT AND MOTIVATION
• DEVELOP ENHANCE VOCABULARY RETENTION
• MINORS' CONSUMPTION AND RECHARGE RESTRICTIONS
Methodology
• USING PROTOTYPING METHODOLOGY TO DEVELOP
• ANDROID STUDIO FOR MOBILE APPLICATION DEVELOPMENT
Result
Animals
Hint: Highly intelligent marine mammal
Word: _ _ _ _ _ _ _
NEW GAME
ANIMALS
ELEPHANT
GIRAFFE
ALLIGATOR
KANGAROO
CROCODILE
CHIMPANZEE
PORCUPINE
RHINOCEROS
• THIS IS THE HANGMAN GAME. USER CAN GUESS THE WORD WITH HINT SUPPOT.AFTER 7 TIME WRONG, SYSTEM WILL CALCULATE THE RESULT AND SHOW THE TIME, HINT AND HOW MANY QUESTION ARE USER SUCCESS DONE
• THE NEXT IS WORD SEARCH GAME EASY LEVEL. USER CAN FIND THE HIDDEN WORD FROM THE GRID VIEW WITH THE BELLOW LIST WORD SUPPORT.AFTER FIND ALL THE WORD, SAVE THE TIME, HINT ARE USER USING
Planning
RequirementAnalysis
Design
Build Prototype
Review and Refine
Customer Evaluation
Approval By Customer
Develop
Implementation
Testing
Maintainence
System
Conclusion
• THROUGH THE ABOVE GAMES, OUR PROJECT HOPES TO ENABLE PLAYERS TO HAVE FUN AND LEARN AT THE SAME TIME.
Supervisor: Tong Dong Ling
By: Leong Weng Siong
Bachelor of Business Information System(Honours)
UTAR
UNIVERSITI TUNKU ABDUL RAHMAN

PLAGIARISM CHECK RESULT





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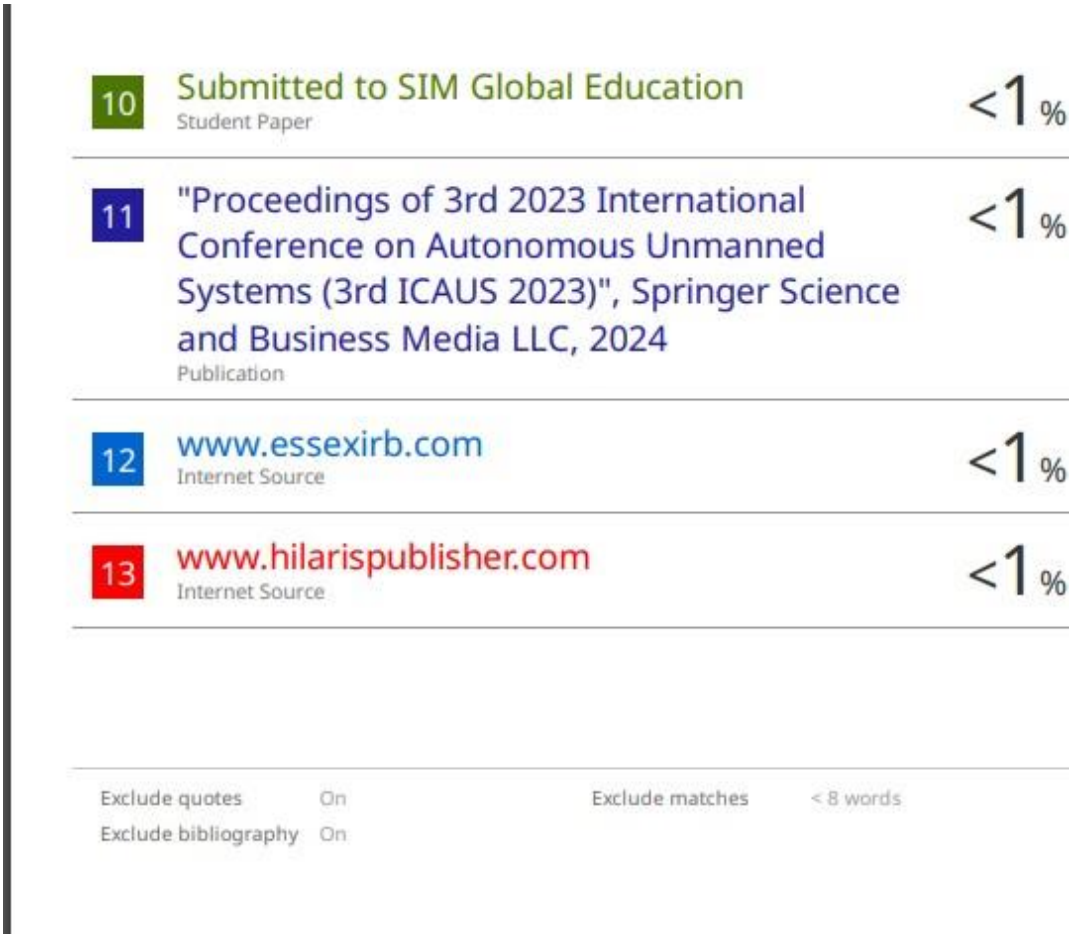
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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s) of Candidate(s)	Leong Weng Siong
ID Number(s)	21ACB03036
Programme / Course	IB
Title of Final Year Project	Find & Search Word Game For Learning English Mobile Application

Similarity	**Supervisor's Comments (Compulsory if parameters of originality exceed the limits approved by UTAR)**
Overall similarity index: 19 % **Similarity by source** Internet Sources: 12 % Publications: 0 % Student Papers: 15 %	
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Parameters of originality required, and limits approved by UTAR are as Follows: **(i) Overall similarity index is 20% and below, and** **(ii) Matching of individual sources listed must be less than 3% each, and** **(iii) Matching texts in continuous block must not exceed 8 words** ***Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than***	

Note: Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Name: Tong Dong Ling

Date: 26 Apr 2024

Signature of Co-Supervisor

Name: _____

Date: _____

FYP 2 CHECKLIST

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY (KAMPAR CAMPUS)

CHECKLIST FOR FYP2 THESIS SUBMISSION

Student ID	2103036
Student Name	Leong Weng Siong
Supervisor Name	Tong Dong Ling

TICK (√)	DOCUMENT ITEMS Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
	Front Plastic Cover (for hardcopy)
√	Title Page
√	Signed Report Status Declaration Form
√	Signed FYP Thesis Submission Form
√	Signed form of the Declaration of Originality
√	Acknowledgment
√	Abstract
√	Table of Contents
√	List of Figures (if applicable)
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	List of Symbols (if applicable)
√	List of Abbreviations (if applicable)
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√	Bibliography (or References)
√	All references in bibliography are cited in the thesis, especially in the chapter of literature review
√	Appendices (if applicable)
√	Weekly Log
√	Poster
√	Signed Turnitin Report (Plagiarism Check Result – Form Number: FM-IAD-005)
√	I agree 5 marks will be deducted due to incorrect format, declare wrongly the ticked of these items, and/or any dispute happening for these items in this report.

*Include this form (checklist) in the thesis (Bind together as the last page)

I, the author, have checked and confirmed all the items listed in the table are included in my report.

Leong

(Signature of Student)
Date: 26/04/2024