

1.0 Introduction

The **Hangman game** is a captivating word-guessing challenge that sharpens players' deductive reasoning and vocabulary skills. Players must reveal a hidden word by guessing letters, with a limited number of attempts. The game features three distinct difficulty levels: Easy, Medium, and Hard. In Easy mode, players enjoy 5 minutes, 3 hints, and more attempts, making it accessible for beginners. Medium mode offers a balanced challenge with 3 minutes, 2 hints, and a moderate number of attempts. Hard mode, designed for seasoned players, presents a tough challenge with just 1 minute, 1 hint, and fewer attempts. Hints come in two forms: descriptive hints that offer context about the word, and letter hints that reveal one of the letters. If users input no or multiple letters in one go, an error message box will display. Besides this, if a player wins or loses a winning/losing dialogue will pop up displaying the word and high scores for that particular difficulty level.

The game features a dynamic scoring system that tracks and displays high scores for each game, ranking the top three best timings for each difficulty level. These high scores, which actually refer to the fastest completion times, motivate players to improve and foster a sense of competition. Additionally, the game includes a tutorial to guide new players and offers the option to mute background music for more focused gameplay. The game progresses as players either successfully guess the word or complete the hangman drawing, providing an engaging and rewarding experience. Developed using ScalaFX 8 and Scala 2.12, this game blends interactive elements with cognitive challenges to create an entertaining and stimulating experience.

1.1 Hangman Game Rules

Objective: Guess the hidden word by proposing letters before time runs out or the hangman figure is fully drawn.

Gameplay:

- Start with underscores representing the hidden word.
- Guess one letter at a time. Correct guesses fill in the blanks; incorrect guesses contribute to drawing the hangman.

Difficulty Levels: With each difficulty level, the words get more complex and intricate.

1. **Easy:** 5 minutes, 8 lives, 3 hints.
2. **Medium:** 3 minutes, 8 lives, 2 hints.
3. **Hard:** 1 minute, 8 lives, 1 hint.

Hints: Provide clues about the word. Number varies by difficulty and hints are limited.

Lives: Lose a life for each incorrect guess. Game ends when lives are exhausted, or the hangman is fully drawn.

Time Limit: Complete the word before time expires.

Winning/Losing:

- Win by revealing the word within the time limit and lives.
- Lose if the hangman is completed or time runs out.

Scoring: Points are earned for correct guesses and remaining time. Top 3 high scores for each difficulty are tracked and able to be cleared.

Game Controls:

1. **Guess Button:** Submits guesses.
2. **Hint Button:** Provides clues.
3. **Mute Button:** Toggles sound.
4. **Restart Button:** Restarts game with same difficulty.
5. **Exit Button:** Ends the game and prompts for action.

2.0 Hangman Game Functionality

Main Features:

1. **Difficulty Selection:** Choose from three levels: Easy, Medium, and Hard.
2. **Gameplay:** Guess letters to uncover a hidden word.
3. **Live Game Messages:** Real-time updates on game progress and status.
4. **Score System:** Live score display and high scores (shortest times) are recorded for each difficulty level.

Others:

5. **Tutorial screen:** players are able to view a tutorial before playing the game.
6. **Restart Game:** Option to restart the game, resetting the current word and score.
7. **Check for Game End:** Checks if the game has ended from a set of conditions.
8. **Hint System:** Provides 2 types of hints to user (descriptive and letter hints)
9. **Timer:** A countdown timer that adjusts based on the selected difficulty level.
10. **Pop up messages:** when players lose/win.
11. **Delete Scores:** option to delete all high scores in the database.

2.1 Feature Explanation

2.1.1 Difficulty Selection

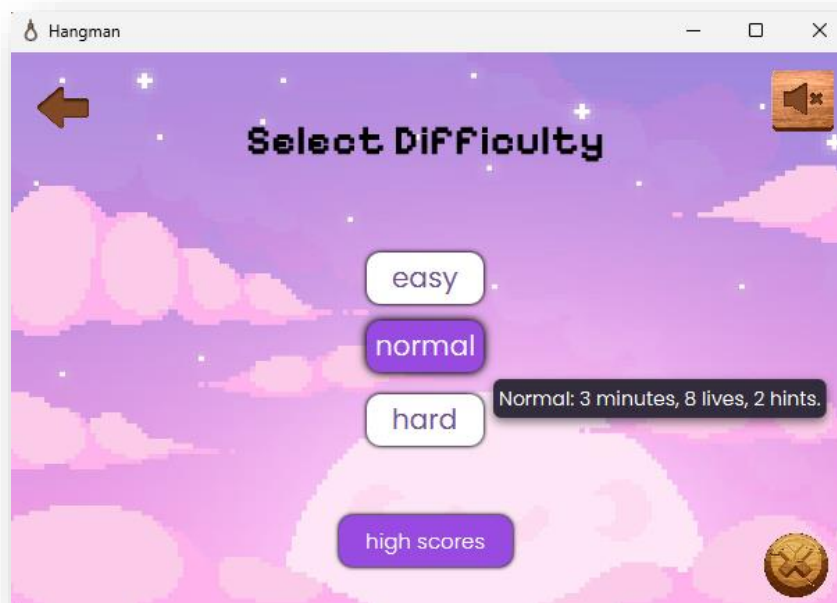


Fig 2.1.1

The difficulty selection feature is integral to tailoring the Hangman game experience to different skill levels. Players can choose between three difficulty levels: Easy, Medium, and Hard. As you hover around each difficulty, a tool tip appears reiterating the difficulty's minutes, lives and hints. Each level adjusts the gameplay parameters to provide an appropriate challenge. Along with hint and timer adjustments, the vocabulary with each difficulty also become more complex and less common in everyday language

- **Easy Mode** offers 5 minutes, 3 hints.

- **Medium Mode** provides 3 minutes, 2 hints.
- **Hard Mode** is designed for seasoned players, with only 1 minute, 1 hint.

2.1.2 Gameplay

The core gameplay mechanics revolve around guessing letters to uncover a hidden word that is generated based on difficulty level selected.

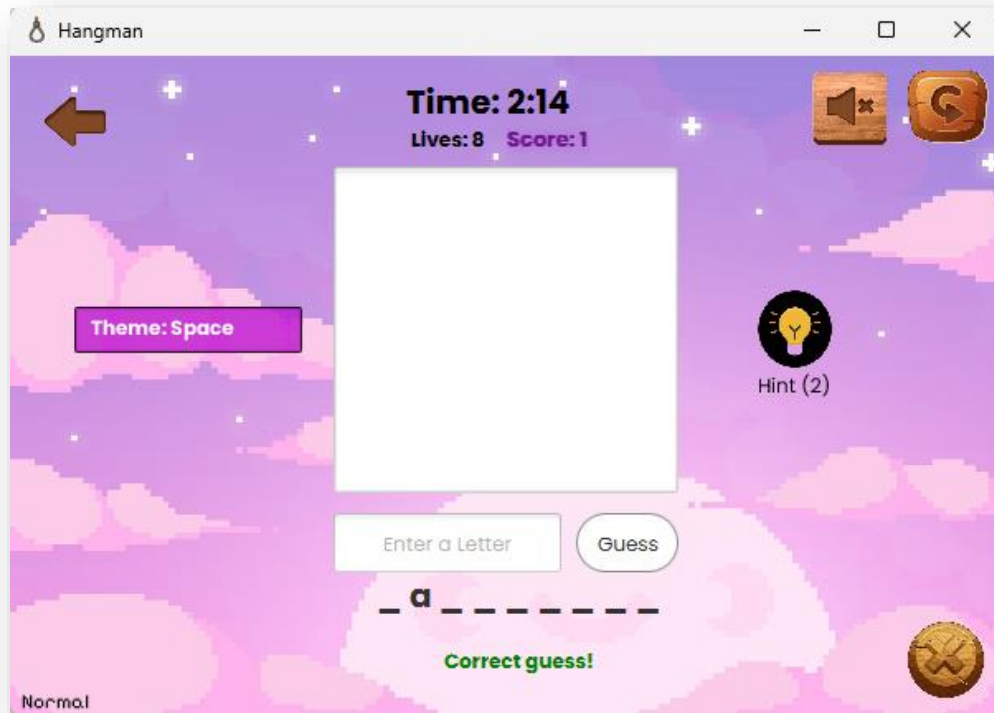


Fig 2.1.2.1

Players input a letter, and the game checks whether the guessed letter is part of the word. If correct, the letter is revealed in its respective positions within the word. If incorrect, the hangman drawing progresses, bringing the player closer to a loss, decrementing the score tracker. The gameplay mechanics include:

- **Word Display:** The word is displayed with underscores representing each letter, which are replaced by the correctly guessed letters as the game progresses.
- **Guessing Letters:** Players can guess letters, and the game tracks these guesses. Correct guesses reveal letters in the word, while incorrect guesses decrease the remaining attempts and advance the hangman drawing.

- **Hints:** Players can use hints to get either descriptive clue about the word or to reveal a letter within the word. The number of hints available depends on the selected difficulty level.
- **Theme:** a theme associated with each word will be displayed every game.
- **Timer:** A countdown timer limits the time to guess the word. The game ends when the timer runs out.
- **Game messages:** further elaborated in *section 2.1.3*.

Hangman drawings: The game includes a series of drawings that represent the hangman being progressively drawn with each incorrect guess, as shown in *Fig 2.1.2.2*.

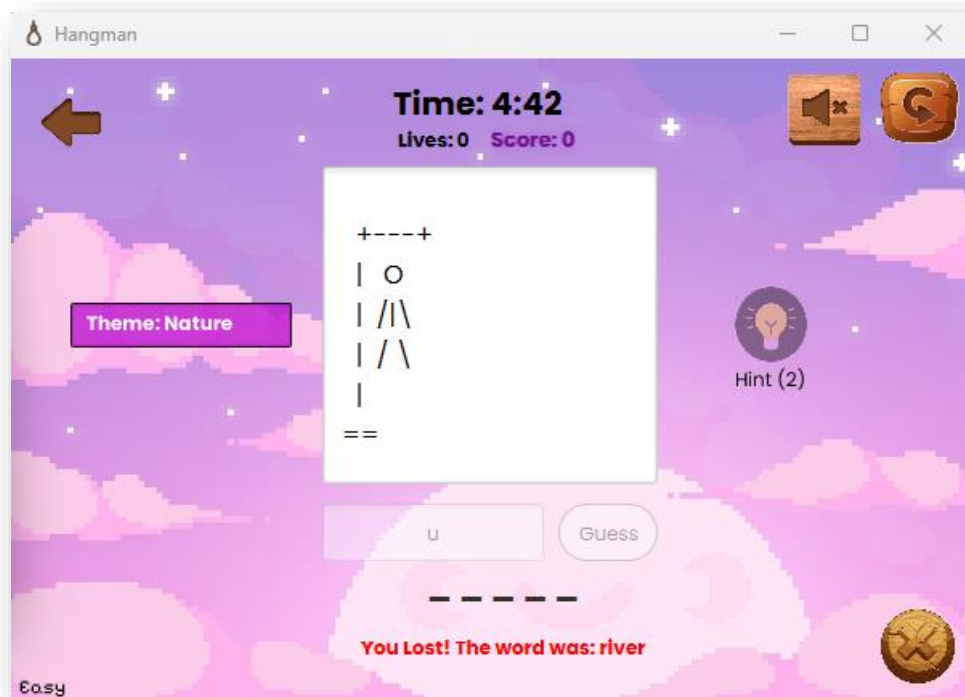


Fig 2.1.2.2

- **Restart Option:** Players can restart the game to try again after a win or loss.

- **Win/Loss Pop-Up Messages:** Upon game completion, pop-up messages display the result, providing options to restart the game or return to the difficulty selection screen. Win pop up alerts are displayed in *Fig 2.1.2.4* and loss pop up in *Fig 2.1.2.3*.

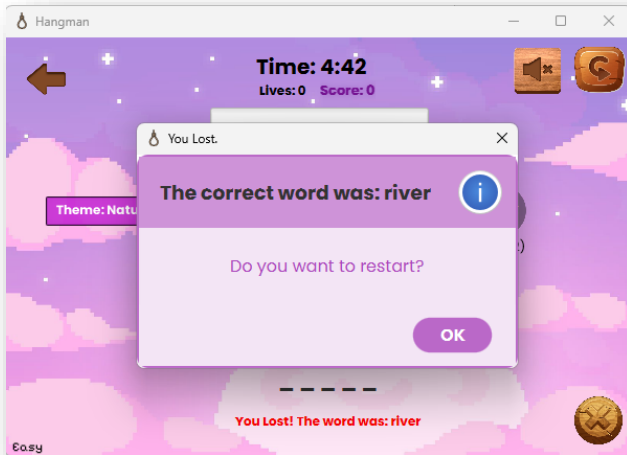


Fig 2.1.2.3: Loss

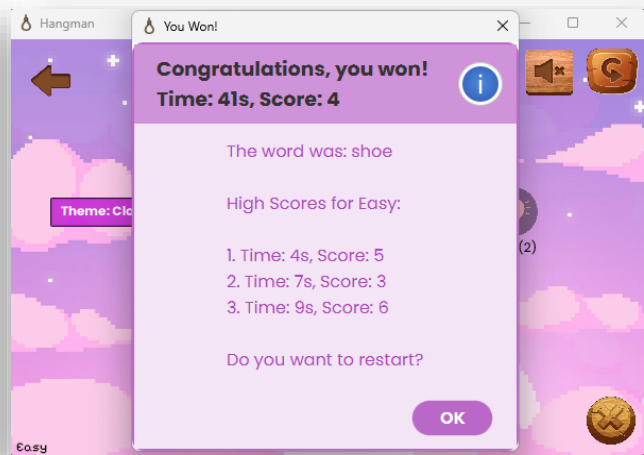


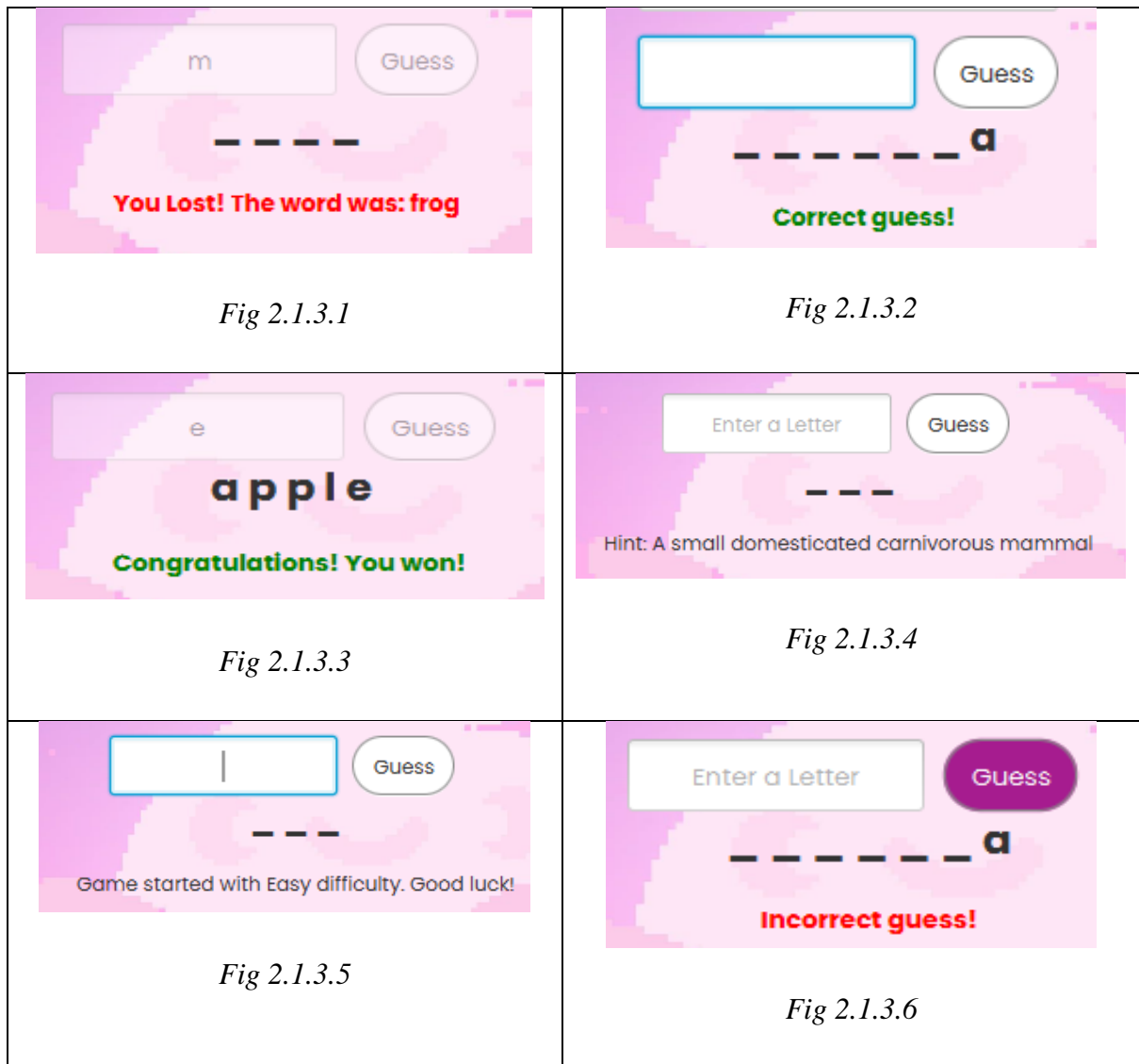
Fig 2.1.2.4: Win

2.1.3 Live Game Messages

Live game messages are crucial for keeping the player informed and engaged throughout the game. These real-time messages on the bottom of the screen provide immediate feedback on the player's actions and the game's current state. The types of live messages include:

- **Correct Guess:** Notifies the player when they have guessed a correct letter, showing the updated word with the new letter revealed.
- **Incorrect Guess:** Alerts the player when they have guessed incorrectly, indicating the reduction in remaining attempts and showing the progress in the hangman drawing.
- **Hints Used:** displays the hint upon clicking the hint button.
- **Game Message:** Communicates whether the player is winning, losing, and displays the status of the guessed letter.

Example of Messages in Game:



In *Fig 2.1.3.1* this message pops, up when the time has run out or when all 8 lives have been used up. *Fig 2.1.3.2* occurs with every correct guess when a letter is guessed. *Fig 2.1.3.3* occurs when the game has been won and the word is completely guessed. *Fig 2.1.3.4* when a hint is clicked, and the hint is displayed as the message. *Fig 2.1.3.5* occurs when the game just started and restates the difficulty level. *Fig 2.1.3.6* occurs when a letter guessed isn't part of the word.

2.1.4 Score Tracking

The score tracking feature adds a competitive and motivational element to the game. As players guess letters correctly, their score increases, reflecting their success in uncovering

the word. The high scores element refers to the timing of each game result - the shorter the timing recorded for game result under the specified difficulty, the higher its rank. The game tracks scores based on the difficulty level and displays them in real-time during gameplay. High scores are stored and sorted based on the time taken to guess the word- shorter the time the higher it is ranked in the Score Board. Key aspects of score tracking include:

- **Incremental Scoring:** Each correct guess contributes to the player's score, which is displayed live during the game.
- **High Scores (Timings):** The game records the best times for each difficulty level, encouraging players to beat their previous records and improve their performance. Essentially, highest scores refers to the shortest timings that a game has completed for each difficulty.
- **Leaderboard Display:** After completing a game, players can view their high scores, categorized under each difficulty. Only the top 3 from each difficulty is chosen to be displayed. They also have the choice to clear all scores from the database.

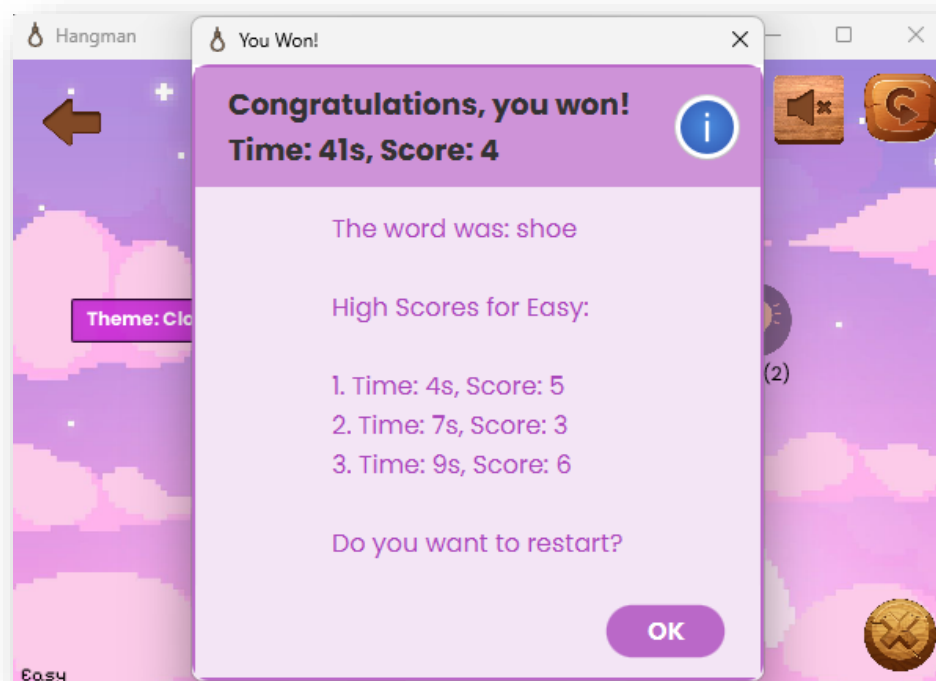
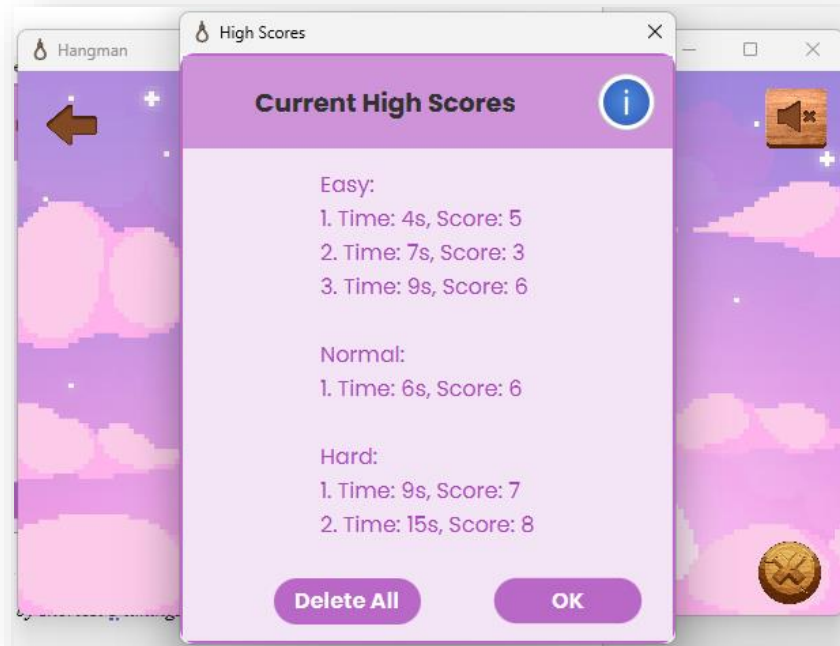


Fig 2.1.4.1: Immediately after winning a game, top 3 high scores associated to difficulty is displayed.



*Fig 2.1.4.2: Clicking into the high scores button in **difficulty page**, current high scores are displayed sorted by **shortest 3 timings** in each difficulty.*

As illustrated in Figures 2.1.4.1 and 2.1.4.2, after completing a game in Hard mode, the player achieved a score of 7 with a time of 9 seconds. This result is prominently displayed in Figure 2.1.4.2, under the difficulty section where it is listed as the #1 high score under the Hard difficulty category, reflecting its status as a new high score. The results are ranked based on the time taken, NOT the scores.

3.0 UML Class Diagram

The UML class diagram below provides a detailed overview of the architecture for a Hangman game application. For clearer view, an attached vpp has been attached.

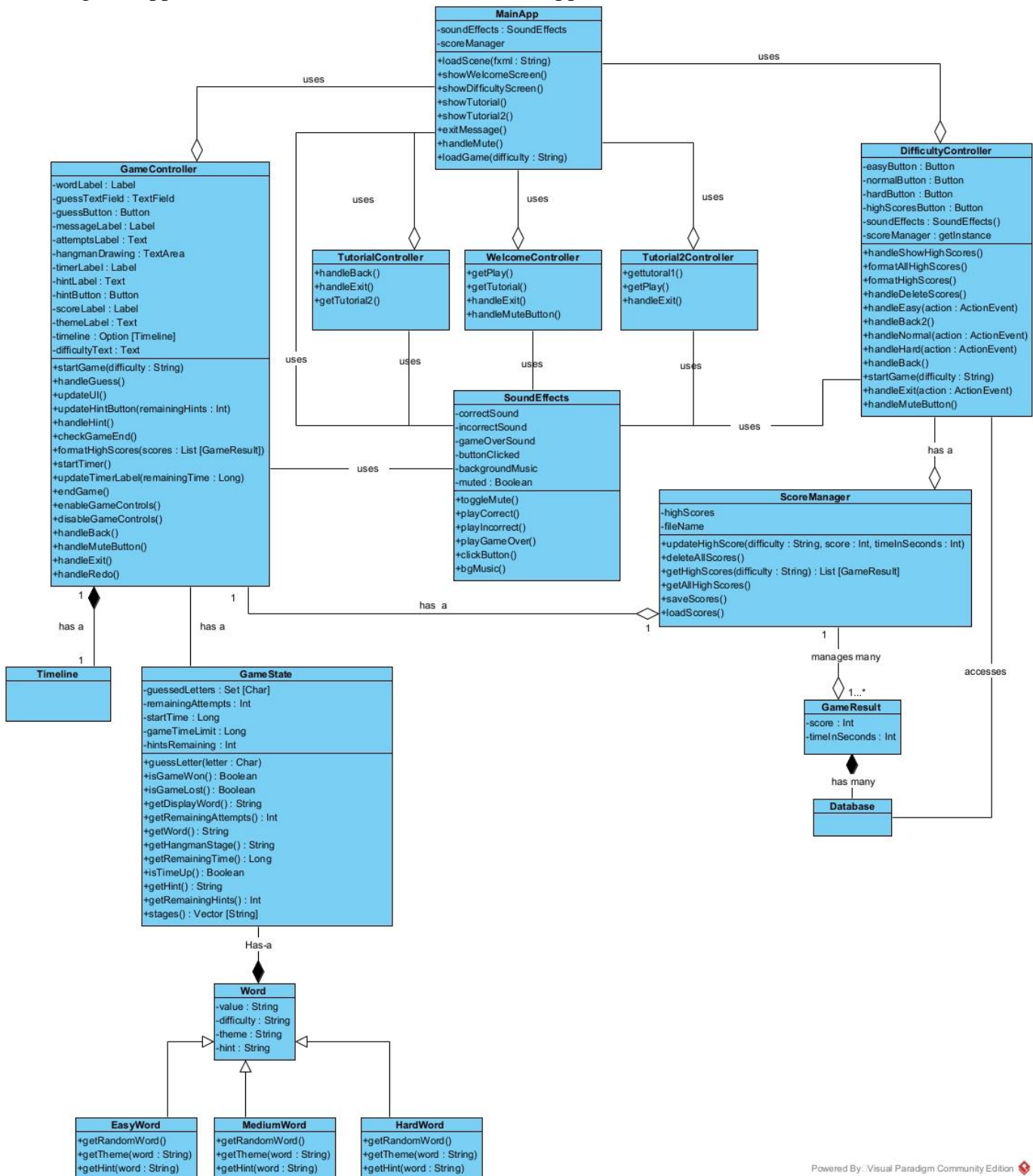


Fig 3.1: UML class diagram

Resources:

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