

Requirements Documentation - CodePlay

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1. Introduction

We are a team of four developers working collaboratively to create an educational game using the Godot engine and GDScript programming language. Our project, titled "**Kids Color Book**," aims to provide an engaging and interactive platform for children aged 5 to 10 to learn fundamental color theory concepts through gameplay.

This document represents our **Requirements Documentation – CodePlay** Report, which systematically captures the functional and non-functional requirements, user needs, and design considerations necessary for the successful development of the game. The report will serve as a reference throughout the development lifecycle, ensuring alignment with the project goals and user expectations. The game's user interface UI is designed in **German/ English** so children can easily play and learn color names in different languages through fun and interactive gameplay. The game also supports **touch input**, allowing children to play easily on tablets with tap and haptic feedback for an engaging experience

1.1. Purpose

This document was created by our development team of four members as part of the planning and design phase for the "**Kids Color Book**" game project. It was compiled through collaborative research, requirement gathering, and analysis sessions, using best practices in software requirement specification.

The purpose of this document is to clearly define the functional and non-functional requirements, user needs, use cases, and design parameters for the game. It serves as a comprehensive guide to align the development team and stakeholders on the project scope, objectives, and constraints.

1.2. Intended Audience

- **Development Team:** To understand, implement, and verify the game features and requirements.
- **Project Managers:** To track progress and ensure alignment with goals.
- **Stakeholders and Sponsors:** To review the project scope and confirm requirements.
- **Testers and QA:** To design tests based on the defined requirements.
- **Target Users:**
- **Children (Ages 5–10):** Primary users who will learn color theory through gameplay.
- **Parents:** Secondary users interested in safe and educational content for their children.
- **Teachers:** Users who may incorporate the game as a learning tool in classroom settings.

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1.3. Scope of Use

This document governs the development and implementation of the "**Kids Color Book**" game. It applies to all project phases including design, coding, testing, and deployment. All team members and stakeholders involved in this project are expected to adhere to the guidelines and requirements specified herein to ensure consistency and quality throughout the development lifecycle.

2. Requirements Documentation:

2.1. Product Vision:

"Kids Color Book" is an educational Godot game designed for young children (ages 5–10) to learn basic color theory through playful interaction. The game presents fun challenges where kids mix primary colors to discover secondary or tertiary colors, with friendly visuals and voice feedback.

2.2. Product Goals:

- Teach children the results of color mixing (e.g., red + yellow = orange).
- Provide an engaging, kid-friendly experience with simple controls.
- Use cheerful animations and audio feedback to support learning.
- Increase difficulty progressively by introducing more complex color combinations.

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3. Personas

- **Lily (5, Preschooler):** Needs image-based interaction and voice prompts due to limited reading ability.
- **Mr. Kumar (34, Parent):** Wants safe, add-free educational games for his child.
- **Ms. Ana (28, Teacher):** Seeks curriculum-aligned tools for classroom use that run on common devices.

Persona	Age & Role	Goals	Frustrations	Needs
Lily	5, Preschooler	Have fun, learn through play	Can't read; relies on recognizing images and colors	Simple interaction, bright visuals, and voice prompts
Mr. Kumar	34, Parent	Find safe, educational, and screen-time-appropriate games	Distrusts overly complex or commercial games	Easy-to-use, ad-free educational content
Ms. Ana	28, Primary School Teacher	Use games to reinforce color concepts in class	Lack of suitable learning tools aligned with curriculum	Quick, accessible game that runs on most computers

4. User Stories

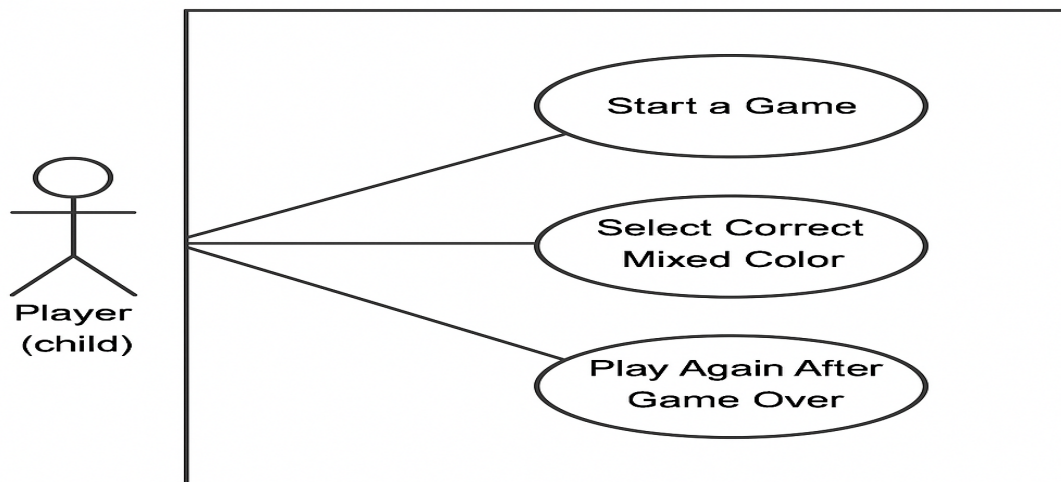
- As a child, I want to mix colors by clicking on them, so that I can learn what new colors they create.
- As a child, I want positive sounds and animations when I succeed, so I feel encouraged to keep playing.
- As a child, I want the game to become more challenging, so I don't get bored as I improve.
- As a parent, I want my child to play an educational game with soothing background voice, so they can learn independently.
- As a teacher, I want to use the game during class, so that students can visually understand color combinations.

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5. Use Cases:

Use Case #	Use Case Name	Actor	Preconditions	Steps	Postconditions
1	Start a Game	Player (child)	Game is launched	1. User clicks 'Start'. 2. Game displays first level with two base colors. 3. Game provides two answer options.	Game begins.
2	Select Correct Mixed Color	Player (child)	A color mixing question is displayed	1. User selects one of the answer options. 2. Game checks answer. 3. If correct, play win sound and animate. 4. If incorrect, trigger 'Game Over'.	Feedback is provided.
3	Play Again After Game Over	Player (child)	Game Over screen is displayed	1. User clicks 'Play Again' button. 2. Game restarts from the first level.	New game begins.

5.1. Use Case Diagram Model:



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UML Element	Symbol / Shape	Used In Diagram?	Description
Actor	Stick figure 	 Yes	Represents the player (child) who interacts with the game.
Use Case	Oval 	 Yes	Represents actions like "Start a Game", "Select Correct Mixed Color", etc.
System Boundary	Rectangle 	 Yes	Surrounds the use cases, labeled as "Color Mixing Game".
Association	Solid line 	 Yes	Shows interactions between the player and each use case.
<> / <>	Text + arrow (optional)	 No	Not required in this simple diagram. Used for advanced use case links.

5.2. Alternative Processes and Special Cases:

Use Case #	Use Case Name	Main Process	Alternative / Special Case	Description
1	Start a Game	Player starts the game; system loads the first level and shows color choices.	N/A	No alternative path defined.
2	Select Correct Mixed Color	Player selects one of two or three options; system checks if the answer is correct.	If incorrect → Game Over	Includes both success and failure paths.
3	Play Again After Game Over	After failure, player can click "Play Again" to restart from Level 1.	Only available if player previously failed or win.	This is a conditional restart flow following an incorrect answer.

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6. Quantity Structure

- Functional Requirements:
 - Display 2-base colors for mixing
 - Provide 3-answer choices
 - Detect correct or incorrect answers
 - Provide visual and audio feedback
 - Track score or level progression
- Non-Functional Requirements:
 - Game should run on desktop systems with minimal requirements
 - Simple, child-friendly UI
 - Responsive audio/visual feedback

Parameter	Description	Quantified Value / Range
Number of base colors	Colors displayed for mixing	2 base colors per level
Number of answer choices	Options given for player to select	3 choices per question
Levels	Number of levels in the game	5 to 10 progressive levels
Score tracking	Points earned for correct answers	(10 + time left) points per correct answer
Feedback time	Duration of audio/visual feedback	2–3 seconds after each answer
UI responsiveness	Time between user input and feedback	15 seconds
Supported platforms	Devices the game can run on	Laptop/Desktop (mouse + keyboard) Tablet/ Laptop (with touch)

7. Summary:

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"Kids Color Book" is an interactive educational game designed in Godot for children aged 5–10 to learn color theory through play. The game encourages players to mix base colors and discover new ones while receiving positive visual and audio feedback. With simple controls, cheerful animations, and progressive difficulty, it supports both independent learning and classroom use. The design focuses on child-friendly usability, low hardware requirements, and meaningful educational outcomes, making it suitable for young learners, parents, and teachers alike.

7.1. Scope and Stakeholders:

Scope:

- Educational game for ages 5–10
- Runs on low-end PCs
- Interactive color mixing gameplay
- Designed for use by children, parents, and teachers

Stakeholders:

- Student Developers (team of 4)
- Young Players (ages 5–10)
- Parents
- Teachers
- Academic Evaluators (course/project mentors)

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8. Dictionary/Glossary of Terms

- **Base Color:**
A primary color provided as input for mixing in the game (e.g., red, yellow). These colors serve as the starting point for creating new colors.
- **Mixed Color:**
The resulting color formed by combining two or more base colors (e.g., red + yellow = orange). The player must identify the correct mixed color from answer choices.
- **Level:**
A stage or round of the game that presents a specific color mixing challenge. Levels typically increase in difficulty or complexity.
- **Feedback:**
Audio or visual responses given immediately after a player makes a choice. Feedback indicates whether the choice was correct or incorrect and includes animations or sounds.
- **Voice Prompt:**
Fun and engaging background audio or spoken cues played during gameplay to enhance the player's experience.
- **Game Over:**
The state reached when a player selects an incorrect answer, ending the current game or level.
- **Restart Game:**
The action of starting the game again from the beginning, usually triggered by player input after a game over or completion.
- **Restart Timer:**
A countdown timer that runs after a game over or level completion, giving the player a limited amount of time to decide whether to restart or exit.
- **Score:**
A numerical value representing the player's progress and success, typically increased by earning points for correct answers.

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9. Appendix:

9.1. Tools & Technologies Used

- Game Engine: Godot
- Language: GDScript
- Platform: Desktop (Windows/Linux/Mac)
- Documentation: Microsoft Word or Google Docs

9.2. Project Timeline (Sample)

- Week 1–2: Requirements & Design
- Week 2–6 Game Development
- Week 7: Testing & Feedback
- Week 8: Final Polishing & Submission

9.3. References

- Godot Documentation: <https://docs.godotengine.org>
- Color Mixing Theory: Basic art education resources from internet.

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(Refer to Table of Contents at beginning for section navigation.)