

DESIGNING 2D SHOOTER GAME RICOCHET ON WINDOWS PLATFORM

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ABSTRACT

Ricochet is a singleplayer 2D shooter game made for Windows operating system and designed to be played for people of all background and ages. The game utilizes Unity as its game engine, Unity is a very powerful tool used by many beginners or expert game developers, especially indie developers. The development of this game is an attempt to create a simple but entertaining game, The designing process of this game will be utilizing the methods presented in "Game Design Second Edition 2004" by Bob Bates as a foundation of the design of the game "Ricochet" and providing a solid structure for the game development. "Ricochet" is a game designed for casual gamers that likes shooter game. The game has a 2D graphics as its appearance. It consists of 24 levels, with the players requiring to solve the puzzles within each level in order to progress into the next level. In every each of 8 levels the player will encounter a boss that the player requires to fight in order to progress. The game is intended for individuals aged 10 and above. The game follows the story of a spaceship got lost in a rift and got teleported into an abandoned military training space station where it is full of puzzles to be solved in order to leave.

Keywords: Ricochet, Singleplayer, Windows, Unity, 2D.

1. PREFACE

Introduction

Game is something that is highly sought after time-to-time and has been played by people from all ages, primarily adults and teens. The gaming industry has witnessed an unprecedented Surge in popularity and innovation, with various game genres captivating diverse audience worldwide, among these genres, 2D shooter games have retained a strong reputation, blending action, strategy, and reflexes into a unique gaming experience.

Game in definition is a type of play activity, in a space of a pretended reality, where the participant or player try to achieve certain goal by playing with the rules. Games are so diverse that it's difficult to create a definition of a word, this due to the fact that there are diverse types of games and genres. The essential elements of a game are play, pretending, goal, and rules. Games are defined by each set of elements and genres including some additional conditions [1].

“Ricochet” is a 2D singleplayer game with shooter genre that can be played on Windows platform. The game is designed to be played for all ages and played in singleplayer mode. The game has several puzzles and stages for the player to complete in order to progress and finish the game.

Problem Formulation

Design and develop an engaging and challenging 2D singleplayer shooter game, "Ricochet," by utilizing unity for its game engine and made for the Windows platform that incorporates puzzles and stages to provide a unique gaming experience for players of all ages.

Game References

The game “Ricochet” was conceptualized by knitting together several ideas, mechanics, and styles that draw inspiration from several existing games.



Figure 1. Bullet Ricochet

Source: [Bullet ricochet - Apps on Google Play](#)



Figure 2. Stupid Zombies

Source: Stupid Zombies for iPhone and iPad | Macworld

2. RESEARCH METHOD

Before developing the game, a design method is needed in the process of designing the game “Ricochet”. Designing a game requires a template as a foundation, and therefore this research utilizes the methods presented in [2], providing a solid structure for game development.

Design Methodology

“Ricochet” adopts game design principles from Bob Bates “Game Design Second Edition 2004”[2]. The design methodology encompasses:

High Concept

The game is made as a shooter genre, players are challenged in various levels with puzzles and enemies. The following are key details about the game’s design:

1. Name of the Game : Ricochet
2. Game Category : Shooter
3. Language of the Game : English
4. Intended Players : Those aged 13 and above
5. Player Count : Singleplayer and Multiplayer
6. Visuals : 2D
7. Game Development Tool : Unity Engine
8. Coding Language : C#
9. Game Controls : Keyboard and Mouse

10. Supported Platform : Windows 10 and above

Gameplay

The game “Ricochet” belongs to the shooter genre because it is designed to be played to shoot at obstacles and enemies. The gameplay mechanics are centered around the player, the game requires logical thinking, positioning, strategy, and precision. Players will encounter different levels with increasing difficulty. The player can fire projectile that can bounce or ricochet if it hit the wall, this adds complexity and flexibility to the core gameplay of the game, this element allows the player to think about angles, trajectories, and timing to eliminate their opponents.

Storyline

The story of the video game "Ricochet" is about a drone starship that gets lost while on a normal expedition outside of the known galaxy and runs into a mysterious and unstable rift in space. The spaceship attempted evasive maneuvers to dodge the anomaly in a last-ditch effort to avert disaster. Their efforts are in vain, as the ship got dragged through the gap and disappears from the known universe.

When the spaceship awakens, it discovers that it is in a mysterious dimension that is outside of its database. The technology on board the ship is broken, and the ship has sustained damage but the spaceship able to quickly repairs it. The spaceship learned that it had been transported into a ruined space station that seem to be made for military training for military pilots from the lost times. The space station seems to be made to test reflex, critical thinking, and problem-solving abilities.

Audience

The target audience for this game is anyone above the age 10 who has a basic understanding of computers. Children who are 10 years old can play the game with supervision by parents or guardians. However, the game is designed to have no violence, making it suitable for all players of all background and ages.

Software

In the process of developing the game, there are several software is being used during the development of the game “Ricochet”. Tools that are being used are for utilizing several usages, such as, designing, scripting, 2D modelling, and sound design. The following tools are being used during the game development:

1. Unity is the main platform in use for developing the game.
2. Visual Studio Code is a powerful tool used by various developers around the globe, this tool is primarily being used for coding the game scripts.
3. Aseprite is a tool that is used to make sprites and 2D animations of the game.

Display Design

“Ricochet” game features several display designs, including:

1. Main Menu: The main menu presents the title and four selectable menus: Start Game, About, Help, and exit.

2. Gameplay: The gameplay is the User Interface of the game, can be seen when the player enters the first level of the game.
3. Start Game: Starts the game.
4. About: This display provides information such as its background of development and development team
5. Help: This display provides information for controls
6. Exit: This display is to quitting or exiting the game

Shooter

Shooter is a sub-genre of an action game. Shooter is one of the most popular sub-genres in the gaming industry. Many AAA title games are based on this sub-genre such as, Call of Duty and Battlefield.

Shooter is a sub-genre of an action game. Shooter is one of the most popular genres in the gaming industry. In a shooter game, players are required to defeat certain obstacles or enemies with a weapon typically a ranged weapon

3. RESULT AND DISCUSSION

The game requires the player to play on reflex, critical thinking, and logic, combining puzzle and shooter combat. The game “Ricochet” features 24 levels, with every 8 levels are boss level. The graphics used for this game is 2D. The game is designed to be played on Windows platform. The controls for the game “Ricochet” are operated using a mouse and keyboard.

Control Design

The game uses mouse as primary control for shooting and aiming the in-game ship. The game also uses keyboard for shortcuts for various modules such as pause. Each control can be found in Table 1.

Table 1. Control Layout for the game “Ricochet”.

Key	<i>Function</i>
Esc	Pause
Mouse1	Fire
Spacebar	Action/Activate

Character Design

1. Main Character

The main character in the game “Ricochet” is a space ship. The space ship will be played by the player and can shoot out bullets. The player can shoot bullet to destroy objects, obstacles, or enemies. The bullet can also ricochet if the bullet hit the wall. The player also has a health bar if

there are enemies present in a level. The player has the ability to move horizontally up and down fixated in the left side of each map. The design of the main character is depicted in figure 3.

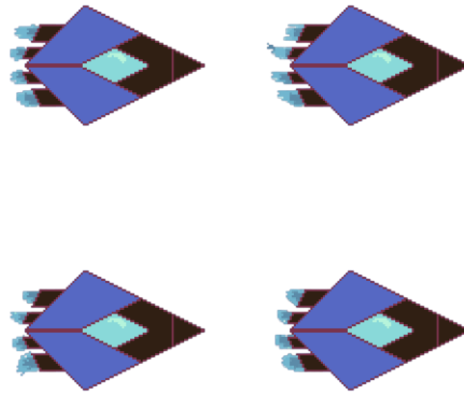


Figure 3. Main Player

Object Design

The objects in the game “Ricochet” are objects can be interacted or destroyed. Each object has its own purposes. The design of the object is depicted in Figure 4. Specification detail can be found in Table 2.



Figure 4. Design Object

Table 2. Object Specification

Object Name	Description	Appearance Presentation
Explosive Barrel	The explosive barrel can be shot to destroy obstacles or enemies	40%
Ammo	Player will receive an additional 7 ammo if they shoot the ammo	20%

Score Design

The game “Ricochet” will not be utilizing scoring system, instead the game will have collectibles that can be obtained on each level, excluding the boss level. Every collectible added will be added to collection, where the collection will be converted into upgrades. The design of the score is depicted in Figure 5.

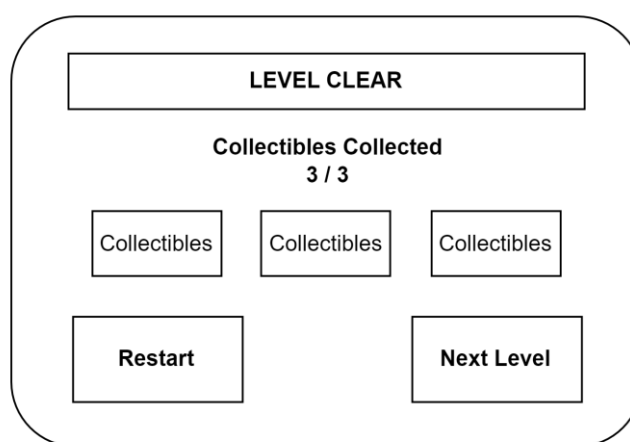


Figure 5. Display of Collectibles Design

Level Design

Level is core element in a game, because level is a place where players can interact with objects in a level. Players can experience core gameplay of the game “Ricochet” within the levels. In the game, there are twenty-four stages, with every eight levels featuring a boss stage. Players can use the objects within the levels to defeat the boss. Each boss has different speed, firing speed, and firing accuracy. The design of level is depicted in Figure 6.

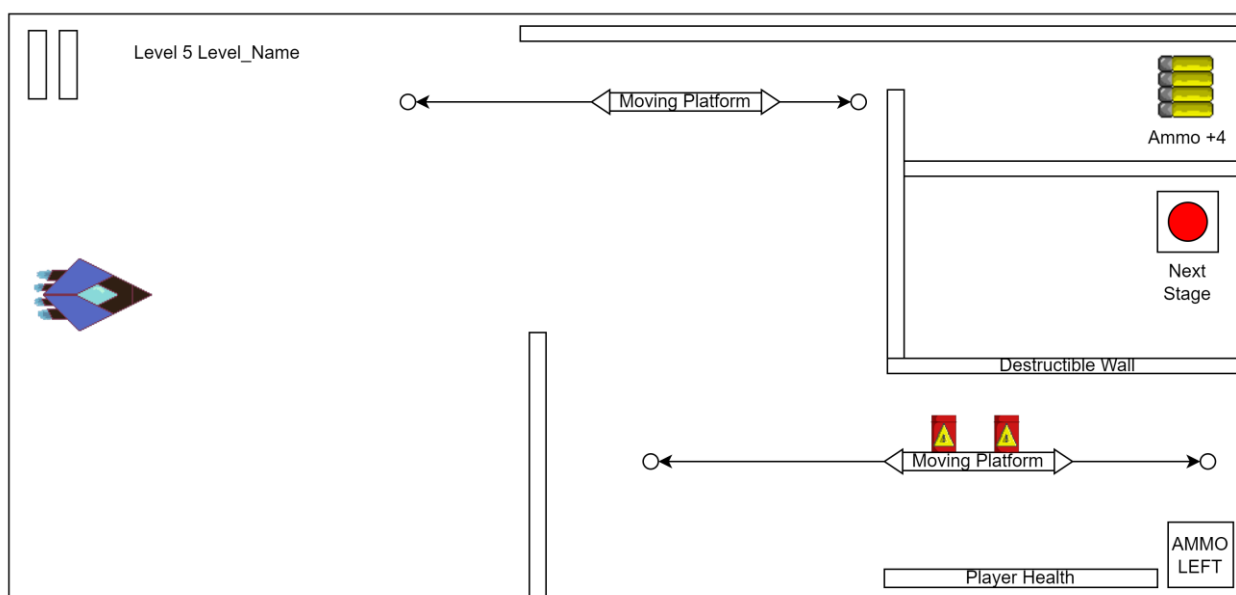


Figure 6. Level Design Level 5

Sound Design

In the game “Ricochet”. There will be three background music tracks that will be used in the game. The first track is the main menu music, which will be played when the player navigates through the main menu. Second track will be played while player is in the regular stage, the background music is added to add ambience to the game.

Display Design

The game “Ricochet” utilizes a 2D display design. The display design specification of the game “Ricochet” can be seen below:

1. Main Menu

The main menu presents the title and four selectable menus. The main menu display is depicted in Figure 7.

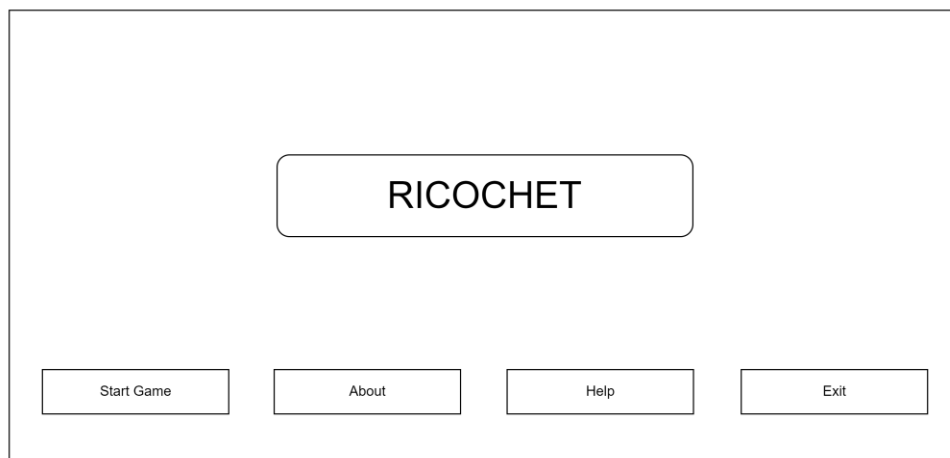


Figure 7. Main Menu Display

2. Gameplay

In Gameplay design layers can see the game User Interface after entering the first level. They will be able to view player health, ammo left, pause button, level name, and level indicator. The display of gameplay is depicted in Figure 8.



Figure 8. Gameplay UI Design

3. Pause

This display will stop the game until the player resumes. The display a menu consisting of: Resume, Restart, Help, Main Menu. The display design of pause is depicted in Figure 9.

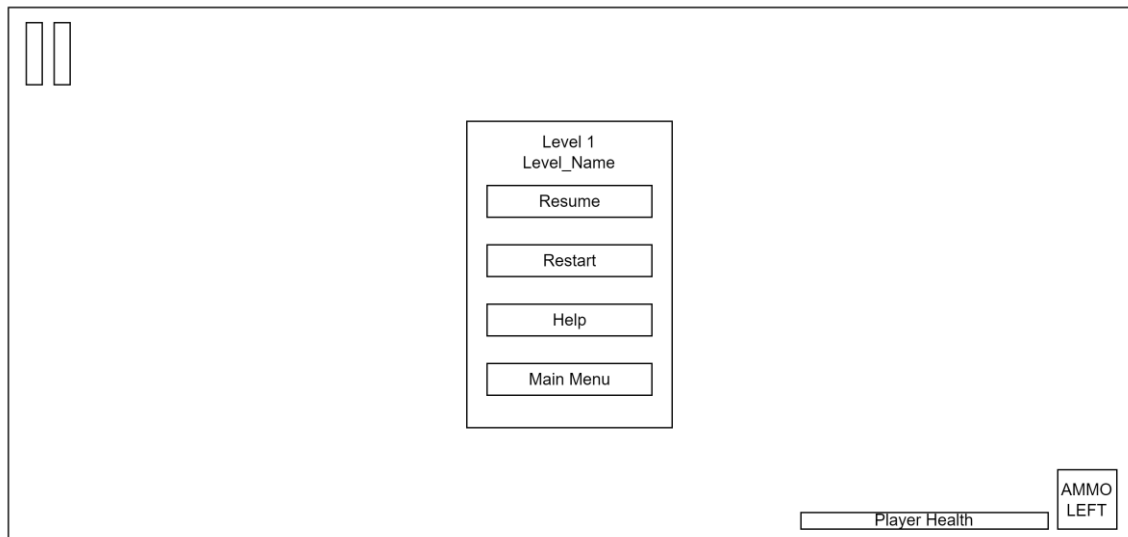


Figure 9. Main Menu Display Design

4. CONCLUSIONS AND RECOMMENDATIONS

“Ricochet” is a game designed for casual gamers that likes shooter game. The game has a 2D graphics as its appearance. It will consist of 24 levels, with the players requiring to solve the puzzles within each level in order to progress into the next level. In every each of 8 levels the player will encounter a boss that the player requires to fight in order to progress.

The game is intended for individuals aged 10 and above. The game follows the story of a spaceship got lost in a rift and got teleported into an abandoned military training space station where it is full of puzzles to be solved in order to leave.

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