Game Proposal

I.　Game Title

Rhythm Duel

II.　Game Design

1. Section I - Game Overview

1.1 Game Concept

Rhythm Duel is a music card battle game that supports single player and multiplayer. Both players need to play against and defeat their opponents on a 3*3 platform using pre-formed decks of cards. Players can also practice their skill by challenging a series of monsters in the single player mode.

1.2 Feature Set

- Various card designs

  With a more complex field system and a unique rhythm mechanism, this game has a more diverse card system than other card games.

- Interesting rhythmic mechanics

  The game has relatively rare rules based on music actions, which will provide players with a strong sense of freshness in the game experience.

- Classic grid battle mechanism

  Refer to the grid battle mode of the classic game Mega Man Battle Network, with a unique and interesting game style.

1.3 Genre

The game is a 2D, strategy, rhythm, card fantasy game.

1.4 Target Audience

The target audience for this game is college students around our age.

1.5 Game Flow Summary

Rhythm Duel features grid-based movement and combat mechanics similar to Mega Man Battle Network series, alongside deck-building gameplay and rhythm game element. The combat in Rhythm Duel takes place on a 3x3 grid. And at the beginning of the game there will also be a rhythm bar which indicates players when to act.   The player's actions can only be made when at the beats of the rhythm bar and gets penalty when they miss a beat, so it is necessary to learn the rhythmic patterns at each game. For each action, players can move the character one square at a time, and, provided they have enough mana, attack using spells in their deck; these take on the form of various close and long range attacks, and some apply status effects or restore health. The enemy moves on a separate 3x3 grid, and their spells follow patterns the player needs to dodge in time. Outside of battle, players can use preset card decks of different styles to cast

different spells, and they can also form their own personalized card decks.

1.6 Look and Feel

The overall appearance of the game is concise and clear, and players can easily capture every detail element in the game interface without causing visual fatigue due to the complicated interface. The game is dynamic, rhythmic and fast-paced. Players will feel relaxed and slightly stimulated when playing.

2. Section II - Gameplay and Mechanics

Card games are usually slow-paced games that require a lot of thought and thus decision making, and while we are avid card game fans, we often lose enthusiasm because the games take too long and lack excitement. And card games require very little action, making it difficult to attract players who prefer more difficult actions. Therefore, we tried to design a fast-paced card game that requires more reactions and actions.

Based on this idea, in order to increase the action and pace of the game, we refer to other games with these two characteristics. We refer to the game "Megaman battle network", which has a card-like design and requires players to perform a lot of operations to release

the cards. However, as a stand-alone game that was released very early, we think that the game's battle system is not mature enough. The player's high level of operation often weakens the role of cards and decision-making too much, and resource management - the most critical feature of card games - is not well designed in this game either.

Another major feature of card games is that most of the game rules are clearly divided and fair, such as the player's turn, resources, actions, etc. We cannot allow players to use cards regardless of resources, or in a particularly disorderly way action. The lack of clear rules will make the game lose the fun of card game games.

Therefore, clear rules are very necessary. For the division of rounds, we borrowed from another game: Crypt of the NecroDancer. In this game, players can only take actions on a specified beat. We think this design is similar to the turn mechanism of a card game. Therefore, we initially set the rules: both players can only act within this specified time interval, and resource allocation allows both players to obtain resources at the same time within each time interval.

As for the card design, we will refer to Slay the Spire, design card sets with different gameplay and ideas. Because the game has a lot to do with the game field, we will also learn from Magic's design of the venue card and use this to expand new ideas. Not only that, because the game has elements different from traditional card games such as venues and rhythms, we also Cards will be designed that involve these different elements, such as speeding up the pace of the game or destroying, changing the field, etc.

Control

 Player uses W/A/S/D to move around the grids, and Q for basic attack(no cost but low damage), four number keys 1 2 3 4 for four different card to use, and uses mouse to select the target of the card (if needed).

3. Section III - Background Story

In the land of Eldoria, there existed a powerful kingdom ruled by the wise and just King Arin. For centuries, the kingdom prospered and its people lived in peace. However, one day, a dark force descended upon the kingdom, led by a mysterious figure known only as the Shadow Lord.

The Shadow Lord and his army of evil creatures, known as the Dark Legion, quickly overpowered the kingdom's defenses and took control of the land. King Arin and his loyal knights fought valiantly against the Dark Legion, but their efforts were in vain. The kingdom was plunged into darkness and despair, and the people of Eldoria were forced to flee their homes in search of safety.

Years passed, and hope seemed lost. But one day, a group of brave adventurers discovered a powerful ancient artifact that could turn the tide of the war against the Dark Legion. However, the artifact was guarded by powerful guardians who had to be defeated in order to claim it.

Thus, the adventurers set out on a perilous journey to collect the pieces of the artifact and take down the guardians guarding them. Each piece of the artifact was held by a different guardian, each more powerful than the last. To defeat them, the adventurers would have to use their wits and skill, as well as their collection of powerful cards representing different weapons, spells, and creatures.
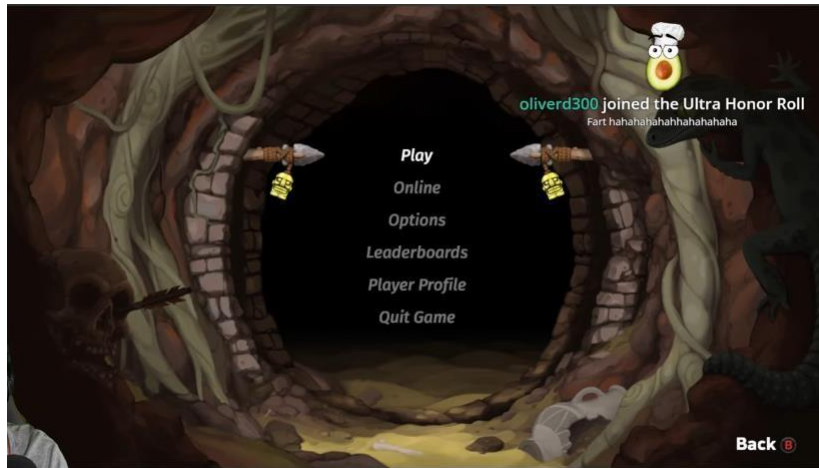
4. Section IV - Levels

There are many levels in this game. In different levels, different bosses are set up, and their ways of attacking players are also

different; in addition, the music, background and cards that players can use in each level are also different.

5. Section V & VIII – Interface & Game Art

Main menu

Reference game: Spelunky 2

The game menu of this game should be simple and clear like this game. The options in main menu should be: play in single player mode, play in multiplayer mode, build your own deck, card collection, options and quit game.

After clicking "Playing in single player mode", players should select which level to challenge and the deck he/she wants to use. If you are a new player, a tutorial level should automatically start to teach the player how to play the game.

Reference game: Exception

This should be the level selecting page, and when player select a level, the decks should be appeared like below.
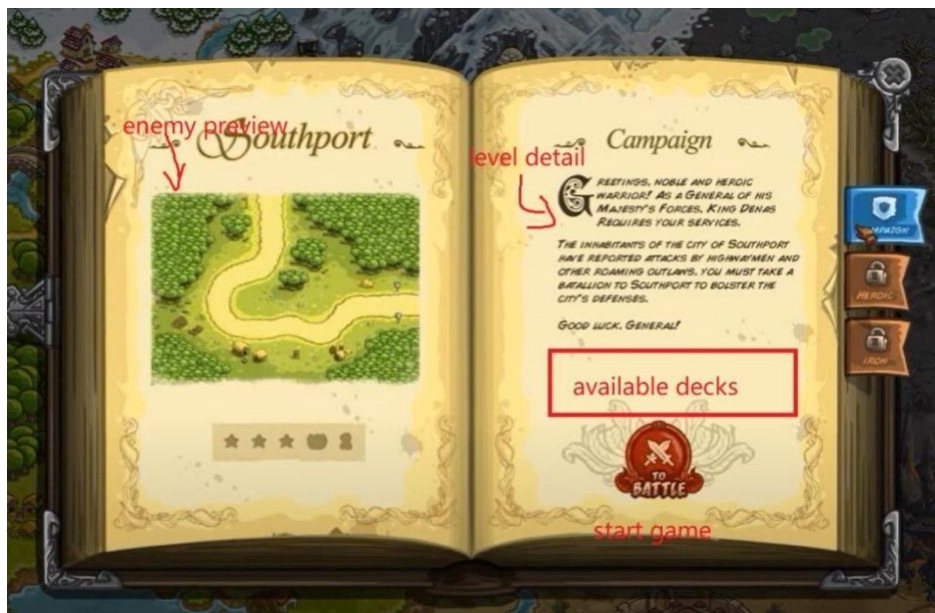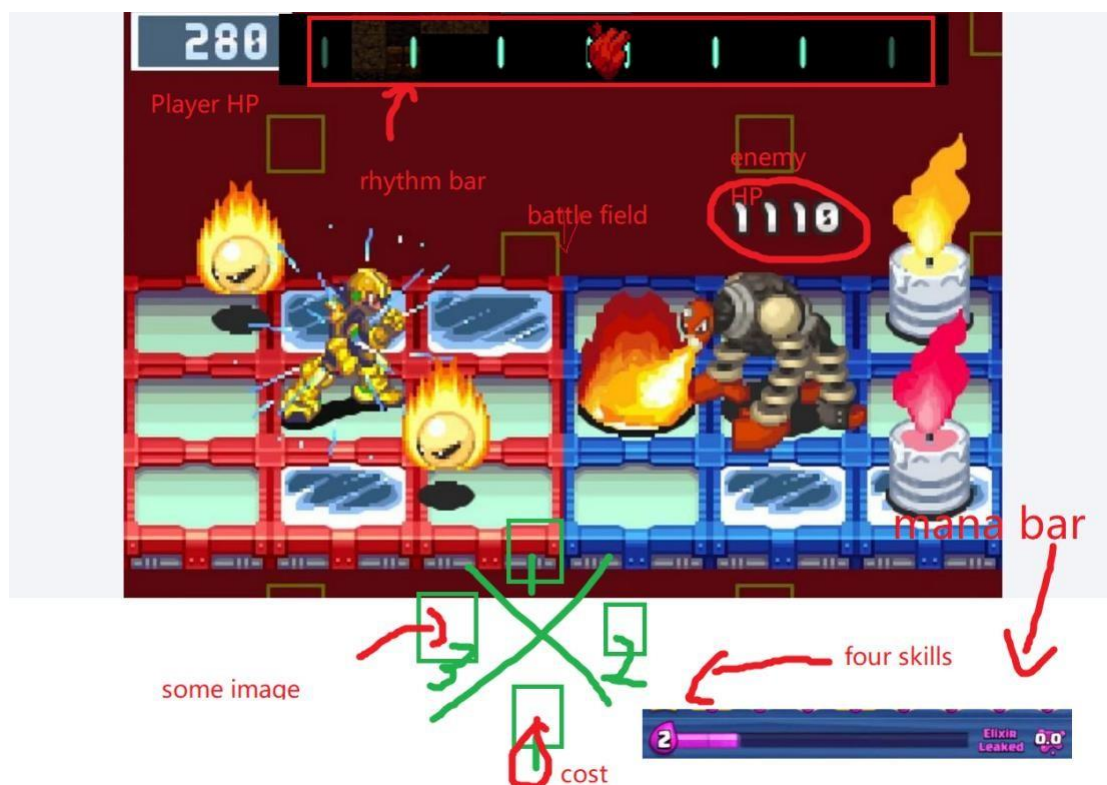

Reference game: Kingdom Rush

And if players want to play multiplayer mode, each player can choose from some pre-built decks. The interface of the game is similar to the picture below.

Reference game: Mario Kart 8 Deluxe

Most importantly, when player starting a battle, the UI should be like this:

In the tutorial, some hints will show at the edge of the screen to teach player how to play.

Reference game: Pathfinder: Wrath of the Righteous

Section VI - Artificial Intelligence

Since our game is a card game, so the ai part is mainly reflected in the single-player mode of the enemy ai. Our group choose a heuristic algorithm to finish our enemy ai. We will design a heuristic function which can evaluate how good a situation is for the player, based on the player's hp, the status of battlefield, enemy's hp, etc. Then the enemy will try all possible options and use the function to calculate the heuristic value of the movement. And the enemy will select the minimum-heuristic-value action to do. (More detail please see Technical Explorations part).

III. Technical Explorations

We have divided the technical exploration of the game into three main directions：

Card part:

Regarding the technical exploration of the cards, we mainly focus on the design of card settlement order. We plan to draw from the method used in the game "Hearthstone". Each turn (rhythm point) will be divided into the following phases:

1. Player operation phase: In this phase, the actions taken by the player will be settled, such as using cards, moving, etc. The effects of cards and the player's position will be settled in this phase.

2. Turret settlement phase: Some summoned creatures that can attack automatically will be settled in this phase.

3. Damage settlement phase: Damage includes the following three types: damage to characters, damage to the floor, and continuous damage (dot), which will be executed in this phase.

4. Scene and death settlement phase: The floor will automatically repair in this phase, and the game will also check if there are any dead characters and remove them from the game.

5. Energy settlement phase: The player's energy will automatically increase in this phase.

Enemy AI part:

We want to explore the artificial intelligence design of game enemies. As a standalone card game, the enemy's decision-making is crucial to determining the game's difficulty and fun. But the enemy ai development is not an easy task, we spent a lot of time on developing ai this thing. We have explored various AI design options and at last we decided to use a heuristic algorithm to finish our enemy ai(The specific process is described in great detail in the Technical Explorations report and will not be repeated here).We will design a heuristic function which can evaluate how good a situation is for the player, based on the player's hp, the status of battlefield, enemy's hp, etc. Then the enemy will try all possible options and use the function to calculate the heuristic value of the movement. And the enemy will select the minimum-heuristic-value action to do (Because this is not an ai class, the specific principle of this ai is not described here too much, please see this article if needed:

https://www.cnblogs.com/devilmaycry812839668/p/15755489.html).

We have conducted extensive background research and found that this algorithm has been widely used in game design. Therefore, we believe

that this algorithm is feasible. And we take reference from Togelius J. et al.'s "Game AI: Challenges and Opportunities."

Other part:

1.For the settlement of conflict events, we have decided to assign priority orders to all possible events and execute them separately based on their different priorities (for example: if the player uses the card "Immune to damage this turn" while the enemy attacks, we will increase the priority of the former during card design). For events of the same type and priority (for example, when the player and the enemy attack at the same time), they will be executed in the order determined by the system. This is the mainstream way of handling card games, and we think it is feasible.

2.Rhythm bar design. One of the features of our game is the combination of rhythm and cards together, so the design for rhythm bar is very necessary. We explored how to design the rhythm bar to ensure the pacing of the game. This part is the core mechanism in our game. We took inspiration from the game "Taiko no Tatsujin" and designed a rhythm bar where notes move towards the judgment area in sync with the music. Players need to perform their action when the notes are near the judgment area. We have already implemented this feature and uploaded a demo video to the group space.

IV.   Implementation Plan

In the remaining project period, according to our backlog arrangement, we have a total of five more planned projects to complete, which I will show here one by one, and these five pending parts divided into design part and the development part.

design part:

    a. Detailed card design and enemy ability design should be done. The design of the cards themselves is one of the most important parts of the card game. When our group decided to make the card game, we were very careful about the design of the cards, because the strength of the cards themselves has been an inescapable topic, both from the suggestions of our classmates and from the discussions within our group. So, we stretched out

the timeline of the card design to ensure that there would be no

major mistakes in the design of the cards themselves. The enemy

design and the card design are more related, so we dealt with

both together.

b. Should get more art assets to complete the game.

The art effects are one of the keys to a successful game, but

unfortunately, because our group itself does not have strong

drawing skills, we seem to struggle with the design and

production of the art, so we will dedicate some time to perfect

the artistic aspects of the game.

development part:

a. Moving system for player, and the rhythm bar has been

implemented, too. Basic framework and flow of the game is

implemented.

Complete the development of the basic framework of the game,

such as rhythm, etc. (described in detail in the game design

section) After completing this step, you will be able to see the

basic flow of the game. *Excitingly, this section was completed by*

the deadline of this article

b. mana manager, card system, health system.

   After the basic framework is completed, this part is to complete

   other more detailed parts of the game.

c. Enemy AI should be implemented.

   Because our game has a single player mode, it is a very

   necessary thing to develop the enemy ai. This part is described

   in detail in the "Technical Explorations" part.

the schedule of play test in wk13 to wk16:

week13-14	card test	Balance is critical to a successful card game. Since every card has its own cost and strengths, game designers need to make sure that every card is weighted about equally - no one card should be invincible or far stronger than the others, or it will ruin the fun for everyone. Therefore, the values of a single card are tested to ensure that there are no cards that exceed the strength limit. In addition to focusing on the card skills themselves, they should also jump out from the local. Card games still focus on some strategy, so the cooperation of different card skills must be considered, as well as the cross-testing between cards. Pay attention to the case where some cards have weak skills on their own (meaning less time and money spent) but work together to produce unbelievable results. Of course, cross-testing is probably more about preventing skill combinations between cards from leading to some strange bugs.
week14-15	enemy test	Testing of enemies is very necessary, if the enemy is too strong may give the player serious frustration and lead to abandoning the game. If the enemies are too weak, the game will become boring. To test the enemies, first, you need the help of a test drive or program, a tool for AI simulation of automatic battles and statistics of battle results and battle data. Design the card combinations and perform the AI battle simulation. Replace the same type of cards, check the battle win rate results, for abnormal data and then carefully look at the battle information to see what causes it. Of course, for the stacked use of skills caused by the numerical problems or more need to be found manually. Another way is that if there is a fixed collective testing time within the game development group, then perfect the good statistics log function, such as the damage caused by a single skill, the win/loss rate of the cards carried, etc.
week15-16	others test	Test all other parts of the game to ensure that there are no bugs that affect the operation of the game or have a significant impact on the player experience